

Tribon M2



# 用户手册

平面建模

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User's Guide Planar Modelling



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Operator's Instructions

平面



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## 模型



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## 分开

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目的:	将一组零件分成两组
要求:	必须激活一个板架。没有将提示激活。该板架必须包含多个零件, 选择
说明:	指定要分开的零件组, 然后确认将分出的零件。
选项:	不可用
结果:	产生了新组。在新组零件嵌在scheme的结尾。没有被选择的零件仍求进行更改



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## 分离扶强材

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目的:	将现有的组通过将每根扶强材分成两半生成两个新的组
要求:	激活一个板架。板架中必须有扶强材, 这组扶强材同时必 择, 此功能中, 一个扶强材也适用
说明:	显示将分离的扶强材组, 从显示的子菜单中选择线定义。 强材, 零件类型也可用作分离扶强材卒。如令一根扶强材
选项:	使用`Options' 转换线或零件分离扶强材
结果:	如用线分离, 整组被分成两组, 插在scheme文件的末尾; 不相交的构建仍留在原组中, 分成的两组插在scheme文件



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## 删除

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目的:	删除零件组、板架及scheme
要求:	以板架必须激活。若无, 操作前会提示
说明:	显示并确认移除此组零件
选项:	不可用
结果:	从视图及板架中删除一组零件, 从scheme中删除要求 scheme要



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## 板架



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## 复制/移动

### 复制

目的:	在新的位置生成新的拷贝
要求:	激活一个或多个板架
说明:	<p>显示一个表格, 目前激活的板架名已填入。输入新的板架名及模型, 也可选`AS OLD' 或 `NEW MODULE'减少手工输入。`AS OLD'将拷贝名称及模型至新板架。`NEW MODULE'要求输入模型数量, 它将代替现在板架名中的模块。方向按钮用于指导如激活板架数超过一页, 在输入新板架并检查表格, 出现第二个表格并要求定义新板架的位置, 输入板架的绝对位置, 或规定沿X、Y或Z轴增量移动。增量移动可由“相关位置”钮, 根据一个线性距离或肋骨号或纵骨位置。正数(如10000或+FR10), 沿X轴向前移动, 沿Y朝左, 沿Z轴向上。一个负值(如-50000或-LP10)将移动板架向后, Y轴向右, 或Z轴向下</p> <p>对于板架名重复: AB123-8&lt;12(10)32&gt;P为AB123-812P, AB123-822P and AB123-832P</p> <p>如发生错误, 在新板架零件生成时, 零件依然被拷贝, 到将给出一个警告窗口, 零件可在新scheme中修改或代替</p> <p>If an error occurs in the generation of a component in the new panel, the component will still be copied, but a warning window will be given. The component may be modified or replaced in the new scheme.</p> <p><b>注释</b></p> <p>如用相对位置, 距离不用循环输入, 当名字循环时, 讲使用相同的增量</p>
选项:	不可用
结果:	在新的位置生成新的板架及scheme文件, 坐标及名称将在板架定义数据中更新, 对于船体曲线、肋骨及纵骨位置也对应于新的位置更新。船体视图也作更新, 但视图范围必须修改并包含新的板架。当视图id更新该板架不显示

### 移动

目的:	将现在的板架移至新的位置
要求:	激活一个或多个板架, 如没有, 提示激活
说明:	出现一个表格, 要求定义新的位置, 可输绝对值
选项:	不可用
结果:	激活的板架移至新的位置, Schemes 将按新位置信息和参照肋位及纵向曲线更新



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## 分离

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目的:	按一平面分离一个板架或一个板架组
要求:	在目前视图中激活一个或多个板架, 如没有激活的板架, 将在分离前提示激活板架
说明:	提示一线规定分离板架的平面, 出现一个表格要求提供一个新的名字, 在分离后, 也提供一个设施创建从非对称板架创建跨中或相反
选项:	当提示指出线时可使用。提供一个菜单选择分离的方法。板架可由选取已存在的线或沿X、Y或Z轴定义一个坐标值, 或选择一个相交平面
结果:	两个新的板架被创建, 旧板架从数据库中抛弃, 如相交板架用于分离已激活的板架, 当创建新板架时, 应考虑相交板架的厚度

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## 删除

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目的:	从数据库及工作区中删除激活的板架
要求:	在目前图中将激活一个或多个板架, 如没有激活板架, 在
说明:	确认提示板架删除, 如选“ALL”不作提示确认
选项:	选Option出现一个表格, 这将给出删除具体板架及分段的形式选择及命名的板架组合进行
结果:	从数据库及工作区中去除板架



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## 视图



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## 节点图

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目的:	对具体剖面或已有视图零件加一个详细的视图
要求:	包含要求的零件或在目前图中的船体视图
说明:	从子菜单中选择视图定义的方法
选项:	不可用
结果:	显示一个子菜单

### 1. Two CP's

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目的:	在已存在的视图中加一个指定的剖面详图
要求:	必须有一个船体视图抽取详图
说明:	选两个光标点, 并规定前后平面的距离。如'Insert'。↓ 选择包含/排除在该视图中
选项:	当确认显示的线, 定义视图方向时选'Reject'
结果:	产生详图, 在放下该视图前进行变换用'Way to Transf

### 2. 面板

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目的:	加一个详细的面板详图
要求:	包含板架的视图。目前图中必须有一个面板
说明:	从现有板架中选一个面板, 如面板选择时靠近长度中靠近端部, 仅显示选择的面板端部节点。(从弯曲的
选项:	可选择在详图的包含/排除具体的板架、分段、外板、仅显示板架的构件被显示
结果:	详图被创建, 并可进行变换。视图方向按系统缺省

### 3. 扶强材

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目的:	加一个扶强材的节点
要求:	包含扶强材的板架的船体视图必须存在目前图中
说明:	从现存板架中选一根扶强材, 如靠近中点, 显示整根
选项:	'Options'可允许在向图中包含/排除具体的板架及分段
结果:	'Way to Transform'产生详图并可变换, 试图方向为缺

#### 4. 肘板

---

目的:	加一个肘板详图
要求:	试图包含一个肘板的板架
说明:	在已存在的板架上选肘板
选项:	'Options'可包含具体的板架、分段、外板曲线及外板2
结果:	'Way to Transform'产生详图并可变换, 试图方向为缺

#### 5. 缝

---

目的:	加一个大比例详细剖面通过一个视图中的缝
要求:	包含缝的板架必须存在于目前图中
说明:	选一缝
选项:	不可用
结果:	同上

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#### 更新

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目的:	在视图范围内更新目前视图, 包含任何修改
要求:	在目前视图中有视图
说明:	选一个视图或'All'并确认选择
选项:	不可用
结果:	视图更新再生包含模型更改, 'All'被选, 所有视图再生。出目前界限的修改将不作修改



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#### 修改

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目的:	补充板架至目前视图中
要求:	在目前视图有一船体视图
说明:	从子菜单中选一视图修改的方法
选项:	不可用
结果:	显示子菜单

### 1. 重制板架

---

目的:	用补充的板架补充现存的视图
要求:	在目前视图中船体视图
说明:	在目前视图中要求的板架。提示时确认
选项:	`Options' 可选择切换视图 `Plane view'、`Interse
结果:	在选取视图中再生选择的板架

### 2. 增加镜像

---

目的:	在现存板架中家加一对称的图像
要求:	显示板架船体视图为`SBP'必须存在于目前视图中
说明:	选取要求的SBP板架住目前视图及在提示时视图
选项:	可选择'Plane view'至`Intersection'转换图纸的模式, 或
结果:	所选板架的对称图像。注意, 如对称图像的任一区域

### 3. 添加指定的板架

---

目的:	至显示一额外, 在目前视图中用户定义的板架
要求:	在目前视图生成
说明:	显示新的板架在新的视图中, 输入板架名
选项:	不可用
结果:	在选取的视图中显示新的板架。注意如额外的板架在: 失

### 4. 修改限制

---

目的:	定义目前视图的极限
要求:	船体视图必须存在于目前视图中
说明:	显示及确认修改视图, 选择光标位置, 对角位置显示:
选项:	选 `Options' 来修改视图的深度, 在已存在平面的前
结果:	在图中更改视图的极限, 但视图将不自动再生。选`Vi 视图



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## 选择多视图

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目的:	当创建新板架零件时选择/不选择视图将更生
要求:	超过一个视图必须为目前的视图中
说明:	显示视图, 更改状态为on
选项:	'Options'可在选和不选之间转换
结果:	由矩形标出视图并再生零件, 标NOT的视图将不作更新



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## PosNo



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## 范围

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目的:	定义模型的范围。所有`Part Name`功能将操作
要求:	平面建模必须激活
说明:	从`Object`菜单中选`Part Name`。选`Part Name`子菜单中的`Set Scope`, 输入要求的板架、分段或装配。或如考虑所有零件选`All`, 通配符也可用于提供板架、分段或装配清单来简化选择
选项:	不可用
结果:	一组板架、分段或装配, 将在目前范围内激活, 允许执行`Part Name`功能

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## 更变

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目的:	在目前的范围内对于相同的零件执行`global`统一更
要求:	平面建模必须激活, 所有被更改的必须具备相同的
说明:	在`Part Name`子菜单中选`Modify`。当提示时输入E
选项:	`Options`可用于允许重新执行最近的选择
结果:	与现在的数字相配的所有数字或新数字取代

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## 复制

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目的:	拷贝目前选其范围的位置号至一个新的范围
要求:	平面建模激活。位置号必须在当前范围内设定
说明:	从`Part Name`子菜单中选择`Copy`。输入新的范围到将被拷贝的当前位置号。新范围将与最初范围相同的方法提示。如企图对在新范围已分配位置号的零件拷贝位置号时将出现警告
选项:	不可用
结果:	零件数将拷至所示新的范围。如出现任何警告, 零件将不作更新

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## 选择

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## 激活

目的:	激活板架。允许不打开对板架进行更改。激活的板架将在数据库内锁定以防其他人修改
要求:	一个包含要求板架的试图必须存在当前视图中
说明:	显示激活的板架, 连续显示是否进一步激活板架
选项:	选`Options'出现一表格, 出现包括/排除具体板架或分段, 以通配符给出。板架激活可由图形及命名板架进行
结果:	所选板架以一矩形放于视图周围并亮显。标有`S'或`M'字母, `S'表示已存储并与数据库形同, `M'表示已作修改, 为存储

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## 保存

目的:	保存已激活的板架
要求:	一个或多个板架必须在视图中激活。一个或多个激活板架已作更
说明:	从菜单中选`Save'。如一个板架已被修改, 确认保持板架。如选`
选项:	不可用
结果:	保存在更新数据库, scheme重写, `M'改成`S'



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## 船体工具



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## 注释



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## 位置号

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目的:	在任意零件的命名及描述至船体视图
要求:	目前图中必须有船体视图。型件类型从屏幕菜单选择
说明:	从屏幕菜单中选一零件类型, 在船体视图中显示要求的零件, *
选项:	Options'可选择显示或省略每一个零件描述, 如零件名、材质、
结果:	一个备注将被显示在图中, 识别所选零件的描述



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## 装配

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目的:	加装配名至船体视图中的任一零件
要求:	图中必须有一船体视图, 要求的零件必须在scheme中有一assemb
说明:	选取一零件类型从屏幕菜单中, 显示船体视图中要求的零件, 显
选项:	可选择定义, 定义识别的装配等级
结果:	识别装配位置(为所造零件)的注释显示的视图中

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## 坡口

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目的:	加坡口定义缝
要求:	一个包含板架带缝的船体视图, 显示在目前图中。缝必须在s
说明:	显示要求的缝, 将坡口注释放于图中
选项:	不可用
结果:	一个显示坡口节点及文本, 同时也识别坡口的材料侧



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## 曲线

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## 创建曲线

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目的:	在指定位置创建用户的曲线通过切到船体表面
要求:	激活船体建模部分, 船体表面必须存在
说明:	从'Object'菜单中选'Curve', 从'Curve'菜单中选'Insert'输入要求的曲线定义数据。选'Continue'显示表格下页。规定切取船体表面的位置, 选创建完成该功能
选项:	不可用
结果:	具体定义的数据及一个曲线, 在数据库内创建。如所选择的曲线已经存在, 确认覆盖已存在的曲线或用不同的曲线名

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## 保存曲线

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目的:	在所选数据中储存该曲线作为CAT目标
要求:	打开图形
说明:	选`Curve`, 选`Save`, 输入CAT目标名, 输入CAT目标名, 选`Yes`确认。该名覆盖现在的曲线, 选`No`输入另一个名。选择代表曲线的几何
选项:	可选择具体数据库用于保存该曲线
结果:	所示曲线被储存在所选的数据库中

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## 收缩量信息

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目的:	显示收缩量信息
要求:	船体视图必须存在, 数据库中也有收缩量目标
说明:	显示一视图, 这时收缩量信息必须显示或按ALL选择所有视图, 视图中有收缩量的板架将亮显, 选择收缩量需显示的板架
选项:	不可用
结果:	在图中, 收缩量住处将用于所选板架的显示

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## 相交板架

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目的:	应增加符号至视图, 显示间断和连续的板架
要求:	包含相交板架的船体视图必须在目前图中
说明:	在要求视图中显示相交板架
选项:	不可用
结果:	显示板架连续的符号出现在视图中



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## 重新初始

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目的:	重载缺省文件
要求:	无
说明:	无
选项:	不可用
结果:	读取缺省文件



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## 创建输入

---

目的:	产生一个输入文件用于油漆面积计算, 并随意开始计算
要求:	Tribon模型信息图形视图必须可用, 如表面包含在计算中, 船体表面必须存在
说明:	输入要求的数据至适当的区域, 选'Room'、'Surface'或'Sum', 开始创建输入文件, 计算将用于执行先前创建的输入文件的计算
选项:	不可用
结果:	一个输入文件必须生成, 油漆面积数据库必须与结果区域更新。如计算已经产生

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[操作说明](#)

## 计算

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目的:	开始油漆面积的计算
要求:	船体表面必须存在, 如表面包含在计算中
说明:	从对话框中选择输入文件
选项:	不可用
结果:	油漆面积数据库将与合志区域一起更新

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## 用户手册

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# 1 概要

此文件是Tribon Hull Modelling (TBHM) 向导性描述。

此导则包含大量系统的不同目标, 它的使用及其环境, 例如:

- 它定义系统的目的, 规定TBHM的活动;
- 它描述TBHM以其他TBH的关系;



- 它描述系统要求的环境;
- 它给系统自身的描述。包括输入、功能、结果等。

此导的读者对Tribon系统的一般特征及概念应有粗糙的想法。



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## 2 体系之目的



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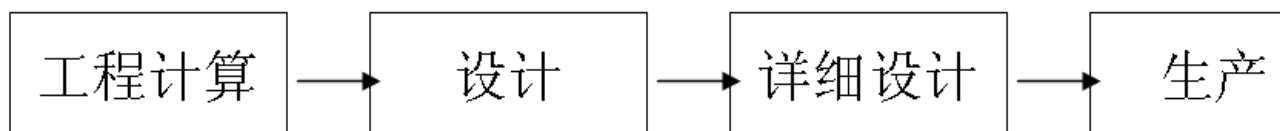
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### 2.1 背景

一个船的设计及生成能分成大量阶段。此可分成几种方法, 一个可能的方法, 有意识在一个粗的水平, 如下图说明:



当在船体信息流中运用, 不同的阶段可列如下

#### 工程计算

这是一个船舶特征定义的早期阶段, 传播尺寸被设定, 静水及稳性计算被进行, 这其中的重要结果是初步形状。

#### 设计

在此阶段, 预先设计 (入级) 图生成, 强度分析用于进行选择板厚, 传统上, 设计阶段的结果在入级图中。

#### 详细设计 (工程)

在详细设计过程中, 初步设计贯穿详细及生产的需要, 生产信息被发展 (图、切割磁带、

草图等)。

生产

此阶段包含零件的加工及船的装配。

TPHM(Tribon Planar Hull Modelling)用于早期设计阶段。当船可手动列出, 粗糙草图。根据这些草图, 在初步表格的信息, 强度计算的结果等等。TPHM创建一个设计模型并生成入级图纸, TPHM也包含详细设计阶段的所有功能。

相应的, TPHM也包含所有的活动, 包含生产准备的设计。



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## 2.2 目的

TPHM总结如下:

A在设计阶段

- 创建早期设计的数字模型
- 开发设计(入级)图, 根据图形生成模型
- 用模型信息根据早期的活动, 如初步的重量计算, 初步的材料订购等

B在详细设计阶段

- 进一步重新定义模型, 将早期模型分成生成单元并加入详细的信息
- 从详细模型进一步生成工作图
- 用模型作为信息不同部分的基础

TPHM建立早期的设计模块, 但也允许再详细设计过程中进行连续精化和细化该信息。

TPHM不包含强度计算模块, 入级规范与系统仅至限制的范围, 浓缩至宏标准。

使用英制。

[See Also](#)



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## 3 TPHM和其它Tribon船体子系统之间的关系

TPHM 是TBH家族子系统系统中的其他成员, 并因此基于共同规定和惯例

TPHM的信息创建按一样或轻微修改的概念保存及处理, 此设施, 包含 TPHM 与其他系统之间的信息交换, 它也表示可产生TPHM 与其他子系统的光滑过渡。

此程序可分成三个不同的分类:

1. 生成基本信息的程序/子系统不同在TPHM中创建
2. 程序可作为一种运用设施, 生成picture 信息在批处理模式
3. 程序使用TPHM生成的信息。



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### 3.1 为TPHM创建的基本信息程序

例, 初始化程序/子程序如:

- 运用设施对于创建集数据库的初始化
- 船形的生成程序, 这能作为TID表面模块
  - TPHM也对外部表面生成系统的界面, 可直接使用如 NAPA 生成的表面, 用于 TPHM
  - Tribon 表面建模-像所有其他 TBH 程序能直接在表面上工作, 仅使用这些表格对用户没有不同
- 外板及型材的缝(纵骨及横骨)必须在正常模块中生成, TBH也可用于生产信息的准备。



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### 3.2 Tribon 平面建模的载体程序

- TPHM的创建功能能在批处理中进行, 一个典型的例子使模型中间形信息的生成。这两个单独的程序, 一个是平面切割模型的图, 另一个是外板展开图。
  - 这个合成图可产生实际TPHM发展成图
- 这有TPHM的特殊子系统, 分成TPHM的topology关系。在更改此系统时, 有助于分析

因果关系记帮助更新模型。

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### 3.3 用于创建TPHM的信息的程序

TPHM的哲学的特征, 在数据库逐步建立。许多以后的活动时根据建立的模型。如, 不同生产信息的生成。

许多程序能在TPHM模型上操作。如板件的生成, 重量及重心的计算, 生产信息及扶强材等的生成等。



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### 3.4 求和

TPHM很大程度依赖一些其他子系统, 如船型及外板板件。

TPHM产生生成准备的信息。

TPHM的一些支持程序提供了批处理执行一定任务



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## 4 TPHM特性



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## 4.1 硬件

当运行交互模式时，正常运行模式（见下面章节），TPHM能从任何tribon支持的工作站启动

系统的独立于操作系统，如工作站图形的处理，也在相关文件中描述  
[See Also](#)

当在背景模式下运行，系统仅要求正常终端窗口

为能从系统获益，使用高质量打印机



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## 4.2 一般的Tribon 功能

TPHM的交互功能，一般分为通过部分及特殊部分，通用部分对所有程序一样，包含交互及图形功能，还有图纸的扩展功能。所有模型物体作为工程体积出现在这里。

一般功能是在上左及下右部分，特殊运用功能在上右部分。

通用功能是沿袭了 TBGD 的运用在绘图手册中描述，所有公共文件及数据文件在这里描述。



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## 4.3 主要活动

TPHM的总目的生成 3D 船模及生成图

TPHM有三种不同的主要活动:

1. 模型生成
2. 生成模型信息图
3. 图的生成



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### 4.3.1 模型的生成

模型最小部分分别储存在panel.

如一个板架作为一个单独信息件, 它也可在此内容中生成。如强肋骨及生成阶段, 参考, 还有交互。一板架的包围曲线及板架的图形, 例如强肋骨。

模型的生成能在背景模式下还有交互模式下生成。

像其他 Tribon 系统用设计语言描述模型, 输入此语言被分成 input schemes, 是正常文本文件

详细见[General about the Design Language](#).



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### 4.3.2 从模型中生成图形

信息的主要部分由 pictures (平面视图和相交) 3D 视图, 这些图可由自动或半自动生成 3D 模型

这能在系统中经一特殊功能交互选取 picture 的信息

也有特殊子图生成功能, 在单独背景下运行

一个图也能逐步生成, 在生成阶段, 板架在图中直接生成

生成一般模型特征从THGD可作为投影体积模型出现而不仅为符号视图。子下述符号TBHM特定的视图见TPHM视图, 而TBGD在视图中提交模型



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### 4.3.3 图的生成

从模型生成子图, 这些图是交互图开发阶段, 补充不同的额外信息, 所有这些操作由TPHM不同的功能支持。

注意两种上述试图, 能自由混合在一个和相同图中。可在所有视图中发展。



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### 4.3.4 背景模式

当在后台运行, 系统能从一正常窗口开始, 在此运行模式。系统仅能由schemes生成搬家, 这能从准备输入数据文件视图中生成。

后台模块用于交互不加任何东西至系统, 或者交互任务需同时进行



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### 4.3.5 交互模式

交互是TPHM的正常模式, 该系统由操作者直接控制的工作站进行

如其他交互系统, TPHM有一套下拉菜单, 用于满足系统的具体要求



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## 4.4 系统的构成

实际的TPHM包含三个程序。Tribon 数据库及不同类型的常规数据文件。在此节最后部分中描述, 此图包含TPHM具体的功能使用的数据库。绘图如Input模型。访问大量模型数据库。

此箱表示程序及盘符索引数据文件。Tribon 数据库有一特殊指示, 次序数据库表示一带子符号。

此图仅描述实际TPHM, 包括所有三个程序, TBHMGEN 和 TBHMDWG。大量其他程序必须与TPHM一起用。此图中他们不包含, 但在TPHM特殊中列出, 初始化应执行在用TBPHEM时。



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### 4.4.1 文件

SYMBOL	符号字体55及8由系统使用。除了用于绘图功能中的字体, 然而显示包含符号
FONT	的图, 当创建图出现时, 符号字体被使用
DEFAULT	此文件包含有控制程序活动的参数。
MESS	标准信息文件, 包含用于交互通用在系统及操作者和大标题的信息的引用
SCHEME	文件包含 input scheme.
LOG	文件用于系统错误信息等, 不会影响正常系统的用户。一般用于系统维护及错误跟踪
LIST	正常行打印文件包含input scheme列表, 生成板架, 错误信息等。一个输入 scheme 相应于一个 LIST 文件
CAT TRACE	在某一错误状态下, 此系统将倾卸一些目前内容, 在文件中为以后的列表及标准运用程序的帮助。



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## 4.4.2 数据库

### FORM BANK (SB\_CGDB)

This bank stores different kinds of information in CAT objects.

- Hull surface.
- Hull reference.
- Seams and butts.
- Frames, waterlines and buttocks.

### STRUCTURE BANK (SB\_OGDB)

- Structure reference.
- Blocks.
- Plane and curved panels.
- Longitudinal and transversal frames.
- Bracket objects.
- Planes in the hull.
- End cut table.

### PICTURE BANK (SBD\_PICT)

数据库包含由不同状态下模型生成的子图:

- Panel pictures and bracket pictures from separate generation of panels.
- Views derived from the model, either in Tribon Planar Hull Modelling itself or in the picture generating programs (TBHMDWG and SHELLX). These views may also include added information from an interactive run of Tribon Planar Hull Modelling.

### DRAWING BANK (SB\_PDB)

The drawings developed in Tribon Planar Hull Modelling are stored in this data bank.

### STANDARDS BANK (SBD\_STD)

用于标准信息的数据库, i.e. drawing forms and standard details created in Tribon Planar Hull Modelling.



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## 4.5 控制信息

在许多方面, 系统的工作由缺省文件控制。见 [Default File of Tribon Planar Hull Modelling](#).



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## 5 交互TPHM特征



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[Interactive Tribon Planar Hull Modelling Characteristics](#)

### 5.1 TPHM菜单

The application is run in a window containing the available functions in collections of pull-down or pop-up menus. The upper right part of the window contains the Tribon Planar Hull Modelling specific functions, while the rest of the pull-down menus are common to all interactive Tribon systems.

The general part of the menu handles everything having to do with drawings, 2D-drafting and TBGD view handling. These functions are all described in *Tribon User's Guide Drafting*. Also, such things as drawing backup and creation of drawing forms are described here.



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## 6 交互TPHM功能

此章描述具体交互TPHM系统的功能, 此功能对所有交互Tribon运用程序是一样的。见 *drafting* 指导。

Drafting



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### 6.1 面板架编辑器



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#### 6.1.1 介绍

当用面板架scheme进行交互建模, 一个特殊editor对话框出现, 这对话框包含一个scheme文本的区域, 一个区域可用于生成错误, 及一个菜单条此语句作为以常规编辑中, 在此程度上用户能加或修改scheme语句。

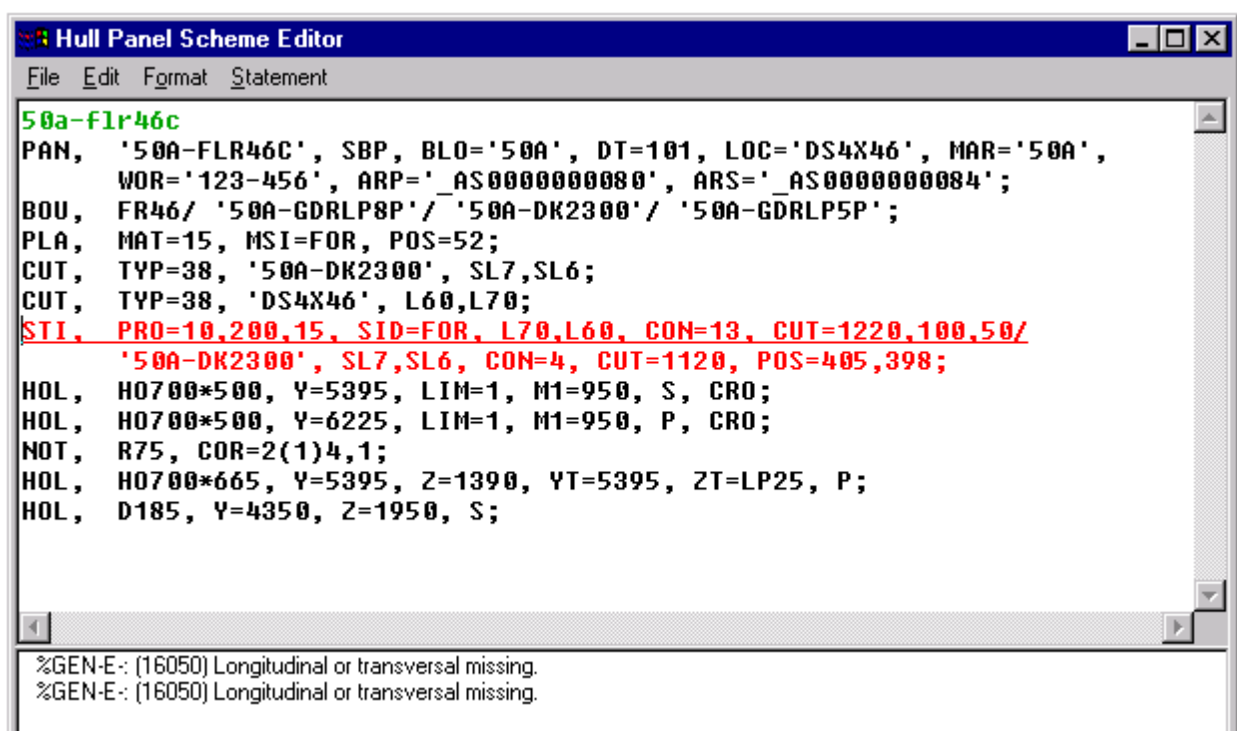


图 6:1. stiffener 产生错误的编辑器窗口

此对话框被打开, 如没有做, 所有功能需要进行如Planar/Scheme/Input、Planar/Scheme/Edit和Planar/Model/Edit。Scheme对话框也是一个建模对话框。这表示当对话框打开时用户能使用其他功能, 如Planar/Model/Create, 能更新Scheme对话框的内容。

此对话框配有开始新Scheme的功能, 打开已存在的一个保存的scheme文件, 还有剪切/拷贝及粘贴和查找/替换功能, statement菜单包含运行。



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### 6.1.2 The Scheme

一个平面板架式文本的平面板架定义, 每一个SCHEME描述一个板架目标, 并有板架目标具有相同的名字; 此SCHEME被分成如下语句。对于详细的平面板架设计语言的描述, 所有语句必须以分号结束, 除第一个外, 称作识别语句, 此语句为一行。

一般用单SCHEME编辑器表示单一激活的板架, 然而如大量相似的板架, 如肋板在双层底内, 他们能由EDITOR同时进行修改。SCHEME显示代表第一个激活的板架, 但任何修改都可进行。

一个折角板架主要包含子板架的收集(它有真实的定义), 如一折角板架被激活, 编辑器将仅显示主要的板架SCHEME, 但还有所有子板架的SCHEME, 现在用户能直接更改子板架, 注意: 在大多数情况下, 它必须运行主板架语句在更改子板架后。

相同的行为是对板架包含肘板板架有效, 此编辑器将仅显示肘板板架的SCHEME, 在主板架SCHEME后, 使它可能也更改肘板板架, 注意不相似的子板架, 肘板板架可用于多个主板架, 且可经其中一个主板架更改, 将影响所有运用它的主板架。



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### 6.1.3 语句

上述scheme由分号结束的语句组成, 一个';' 不会作为一个字符被增加或移除。使用editor菜单功能能增加或者移除语句。

新语句可加入, 在此仅分号出现, 用户要求输入语句文本的其他部分。一个语句在以后的修改中, 也可用粘贴功能粘贴。

当删除语句时, 有两种状态存在。第一种, 语句不会被运行, 当删除文本时, 简单去除SCHEME; 第二种, 当语句已运行过一次, 导致零件在板架中被加入, 语句DEL加入并运行, 删除板架上的零件。而语句保留在EDITOR中, 不作更改。



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#### 6.1.4 编辑器对话框

语句SCHEME文本像大多数EDITOR对话框, 能调整大小, 但有最小尺寸颜色及下划线用于添加语句状态的信息。

目前语句是带下划线, 通过移动光标, 使当前语句更改。

标识符语句显示绿色。如显示多个scheme文本, 标识符语句标出scheme文件的限制。

如更改一个语句, 它变为紫色, 如果成功运行, 颜色改成黑色。

如一语句生成错误, 变成亮红色; 如仅一个警告, 为深红色。

在scheme文本下是一个书橱生成错误, 双击一个错误将定位光标在引起错误的语句。



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#### 6.1.5 编辑器菜单功能

此Editor有下拉菜单File, Edit, Format及Statement, 此功能能有快捷菜单用Alt键与菜单中带下划线的字母进行。

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### • File 菜单

**File** 菜单包含New, Open, Close, Save和Exit。

**New** 提示用户板架名已为scheme名及标识符语句的内容, 一个新scheme 由标识符和用户通过Planar/Model/Create共同构成。

**Open** 提示用户选取一个现存的scheme 文件从SB\_SHIPSCH关联的目录下打开。scheme 文件被读取并加入编辑器, 光标被定位于第一个语句, 通常为panel语句。

**Close** 从编辑器去除当前scheme。如任一语句已被更改而没有运行, 可能保存首先的scheme文件。

**Save** 写入 SB\_SHIPSCH下的文件。

**Exit** 关闭scheme和editor对话框。

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### • Edit 菜单

菜单包含Cut, Copy, Paste 及Select All , 还有 Find, Find Next 及 Replace.

**Cut** 可剪切部分语句, 但不包括分号 ‘;’ 。

**Copy** 可拷贝部分语句, 但不包括分号 ‘;’ 。

**Paste** 可粘贴文本至一个语句, 只要它不包含任何一个分号 ‘;’ 。

**Select All** 选取所有editor中的文本。

**Find** 查找给定的文本。

**Find Next** 在先前查找后继续查找。

**Replace** 用给定的文本替代查找的文本。



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- **Format 菜单**

菜单包含有font功能。

**Font** 使用户更改scheme文本中的字体。



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- **Statement 菜单**

菜单有 **Run This**, **Run All** 及 **Run** , 还有 **Copy**, **Paste**, **Delete** 及 **New**.

**Run This** 运行当前的语句。

**Run All** 运行当前语句至scheme结尾。

**Run** 弹出小窗口要求选择 **run all**, **all changed** 和 指定的语句。

**Copy** 拷贝整个当前语句。

**Paste** 粘贴先前拷贝的语句。

**Delete** 删除一个语句。见以上语句的章节。

**New** 在当前语句后添加一个新的语句。



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### 6.1.6 控制scheme的布置

在某种程度上可制定scheme的布置。通过 Vitesse Hook 调用 \_TBhook\_PPanScheme, 它包含两个方法: **SplitIntoLines** 和 **FormatLine**。

**SplitIntoLines** 表示语句文本取得后, 返回它如重新布置输入和强制行分隔。行间断插入字符 <br>至每行间断处。它不必控制所有的行间断, 系统会增加额外的行间断确保行不超出最大的长度。

当系统从panel object data创建一个语句时调用SplitIntoLines, 有一个固定的布局。如果返回的语句不再是一个有效的语句, 那么运行它时通常已产生了错误。

**FormatLine** 用于使语句的部分以粗体显示。当一行显示在editor时, 添加一对字符<b>和 </b>将使它们之间的所有文字为粗体。



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## 6.2 模型生成和视图功能

此功能组将在后面进行描述, 是被用来建立及更改船体模型的平面构件, 还有创建及更新 THPM (Tribon Hull Planar Modelling) 视图。他们将在 Planar菜单中找到。



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### 6.2.1 模型

此功能作用于零件组, 可包含一个或多个零件。一组零件相应于一设计语言语句, 此功能要求一个或多个板架被激活。



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- 创建

交互生成零件组添加至激活板架。将在以后的章节中单独描述。



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- 修改

用于修改在子图中显示的已存在的零件组。交互非常相似，使用于创建相同的表格，当前 cutouts, notches, seams, stiffeners, pillars, beads, shrinkage, compensation 和 planes 与创建功能相似被处理，而剩余零件类型的部分见 Edit功能。



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- 编辑

当一个零件经Panel Scheme 语句修改时使用。首先操作者在显示图中指出零件，然后打开 Panel Scheme Editor ，从激活的板架中取回 scheme 文件，Editor 光标定位于代表零件的语句。

用“Options”在识别前替代点每一个零件表示操作者要求选零件的类型，此功能当不能识别正确的零件是可能有用。

对于肘板，识别可通过特殊的肘板子图发生（在单独生成时）。

见 Scheme / [Edit](#) 了解Editor中的进一步信息。。



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- 装配

此功能用于在建模时将零件加入一个现存的装配, 在显示识别一个零件时, 操作者要求键入装配名, 此装配名用于装换系统装配参考并加入零件。

对于零件参考一对零件组设定, 这表示组中所有零件将属于装配每次仅能给一个装配名。如零件属于不同的装配, 使用“Divide”功能, 在使用“Assembly”功能前分隔它们

如“Options”被给出, 零件类型(包括板架等级)能被定义, 已在图形杂乱状态, 且当整个板架必须加至装配时。

对于进一步的信息, 参见 *装配计划 (Assembly Planning)*。

[Assembly Planning](#)



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- 分隔

T此功能用于创建两个组, 交互拾取第一个组, 然后单个零件将补足新的组, 零件不被拾取, 保留在起初的组中。



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- 分离扶强材

此功能创建从一个现存的扶强材分成两个组, 通过线分离每一扶强材至两个扶强材, 交互定义或由一现存的零件由用户显示的行的选择及零件类型。相应于这些能用作板架生成, 连接扶强材按照扶强材语句, 例如另一个扶强材、孔缝及板架。

它能不是组中的所有扶强材与所给零件相交。如不交, 将不断开。仅相交的形成两个新的组。



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- 删除

此功能用于在板架及图中删除一组零件。

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## 6.2.2 板架

此功能在组中将板架作为一个整体, 同时可激活一个或多个板架。

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- 复制

此功能将复制激活的板架。新位置用板架位置语句的相同方法定义或采用沿一个主轴的增量值。新板架将用初始激活板架相同的定义数据, 在所有图中视图中可视化。复制后, 新的板架被激活。

新的板架需用新的名字。这可有两种方法, 其一通过Tribon的自动命名选项 (见 *Tribon Hull, General Concepts, About Naming in Tribon Hull, Automatic Tribon Names*), 其二通过一表格。即使Tribon的自动命名选项被激活, 它仍可能通过表格给出的名字被覆盖, 如当提示新板架的分段, 给出 **Options**。

如使用表格, 起初填入激活板架名字。用户将给每一个激活板架一个新的名字。为简化存在“AS OLD”和“NEW MODULE”。“AS OLD”将复制板架名之一个新的名字作为开始。而“NEW MODULE”将更改“MODULE”区以新名给出“NEW MODULE”区靠近form底部。如第一部分等于分段名, 也将作更改。在表格中, “MODULE”表示与“BLOCK”相同。“Check”按钮检查给出错误信息, 如新名字没有填入, 或新名字与老名字相同。

按钮“UP”, “DOWN”, “TOP”及“BOTTOM”用来在表格中操作, 若激活板架的页超出一页时。“OC”继续功能, “QUIT”结束, “INDICATE”与“QUIT”相同的结果。

当一个绝对位置能被定义, 使用在“location”表格中, 相对位置仅沿三个主轴定义。如减号“-”表示使用相对位置, 相应坐标降增量。例如: -FR30表示一个位置 30肋位向

后, +LP5 表示沿 Z 向上5个纵骨位置。相对位置由 "location"激活。

注: 当定义绝对位置时, 序始矢量必须保留。在其他情况, 如边界定义将不正确。如一块板架在它的位置创建为定义肋骨视图向前, 它将以三点表达。然后若一个相对位置为X轴给出, 正常矢量将转180度。然而如一个相对位置被使用, 正常的矢量将保持它的方向。

除了一个更新的纯坐标参考在定义数据中, 在生成新板架前, 名字参考被更新, 在三个主要平面及肋骨-纵骨位置上的筋也将按新位置进行更新。

还有板架及分段名在 "new name" 中定义, 用于字典。当更新板架中的名字参考是将生成。

板架能以两种方法复制到多个位置。首先为先前的复制品, 这些板架轮流被复制在定义新名及新位置后。

第二种方法用于重复新的名字及新的位置, 在这个位置、相同的语句用于重复的输入 scheme 语句, 为 'start' ('step') 'end'。例如肋位 21 至 23 为 FR21(1)23, 每米间距从 1 至 5 为 1000(1000)5000。在名中使用, 如名为 AB123-8<12(10)32>P 得到的结果为 AB123-812P, AB123-822P 及 AB123-832P。

注: 对一相对位置, 坐标不可包含重复循环, 如名字循环宁可多次使用相同的增量。

当用此法规定多个位置时, 在继续下一个位置时用户将被问是否保存创建的板架。如 "No" 给出, 复制下一个位置时将不受影响, 仅当前激活板架丢失。答复 "All" 不作进一步确认, 而是在相同的位置的其他的板架。

如在新板架中零件生成失败, 在窗口中显示错误信息, 不是零件从旧的复制到新的板架, 当修改板架时应确保输入 scheme 语句的抽取。



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### • 移动

此功能用于板架的移动。新的位置同复制一样可被定义。再生板架并在所有的视图中看到。移动后, 板架依然激活, 保持原有的名字。



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### • 分离

此功能用于按一个平面分离一个或多个板架至两个, 分离平面能由给定坐标值定义沿一个主轴 (X, Y 或 Z), 或在模型视图中交互提取一个线或提取一个相交平面。

当由一线定义平面时, 平面垂直于视图平面。即使线受到限制, 平面不受到限制。将使用符号至 3D 视图。

当由板架定义平面时, 板间的厚度将在分离时考虑。

当板架分离被激活, 分离平面被定义, 将对板架创建给新名字。

这可用两种方法进行, 既可使用Tribon 自动命名选项 (见 *Tribon Hull, General Concepts, About Naming in Tribon Hull, Automatic Tribon Names*), 或由表格进行。即使 Tribon 自动命名选项激活, 也可能覆盖它, 而由 form给出如 **Options** 给出, 当提示新板架的分段时。

如表格使用, 对称代码可设 (P, S, SP或SBP), 如一个激活板架与平面定义不相交, 将自动退出不显示表格。

表中第一个板架总是相对于第二个沿主轴的低坐标值的板架。如例如一板架被 x平面切取, 自尾端板架是第一个, 前端为第二个。如为z平面, 第一个为下面一个。如为y平面, 第一个为右侧一个。如为斜平面, 最近主平面使用这些规则被决定。

当扶强材被分离, 连接代码将从连接控制文件中选取, 如定义。如板架由一平面分离, 用型式5连接代码。如由一板架分离用型式4连接代码。选择最小的间隙。如没有定义连接控制文件, 代码40用于代码4, 而代码70用于代码5。端切将从端切控制文件中选取, 如定义, 否则端切从起初扶强材的另一端被使用。

连接及端切控制在相关的文件中描述。

Setup and Customisation Profile Endcuts in Tribon



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## • 去除缝

此功能去除缝, 并自动更新板架内的所有零件。如, 将两侧的板组合成一个。扶强材及面板参考缝或靠近也将组合。

如零件几何相同的组合, 但一种属性不同. 用户被给出表格包含两个零件组合的数据, 可以拾取其中之一。

在组合过程中处理的零件是缝、板、扶强材、面板。

为了组合缝, 他们的起点或终点必须接近, 相应的切矢量也必须相近。其他不同, 如坡口代码及余量, 由用户解决。

对于板, 靠近缝的两个角点应去除, 与板缝另一侧的角点必须相符。还有材料厚度及方向必须相同, 而由用户解决其他性能方面的不同。

对于扶强材及面板, 型材类型及尺寸必须与边、倾角、标签代码及对称代码相匹配。还有型线定义必须一致, 端点及切矢量必须相同。用户可解决材质、焊缝及坡口, 还有其他信息的不同。

对于板, 扶强材及面板的组合, 装配参照去除, 若他们不等。对扶强材及面板还有零件名无效。

注: 对于两个组相配, 必须有相同数量的零件也相配。在相同组内的板彼此组合, 然而板在组间也必须相配。

当数据不同的零件组合, 大量的表格用以帮助用户创建零件。每种表格有三列, 而左, 中清单数据为现在的零件, 而右边卫新组合零件。

每个单元的左边包括现在零件的数据, 而放置返回钮用于新的零件提取第一或第二个零件的数据。如两个现存的零件数据不相同, 返回钮为“on”, 第三列已作更新。

如一个值与现在的两个不同, 它应被输入。在此情况下, 返回钮应为 “off”。

菜单钮启用在每个表格的地步用于检查心零件数据的影响, 来自返回钮与键入值的组合。按钮OK继续组合而Quit将取消当前零件组的组合, 使两个现在的组与他们相同。

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### • 巨型分离

此功能用于分离巨型板架成零件板架。为用此功能, 巨型板架及基本零件板架必须存在于子图中。零件板架必须至少有一个边界定义。提取一个巨型板架可, 一个或多个零件板架在操作完成后开始分离。所有从巨型板架零件完全在零件板架内的将加给它。板、扶强材及面板与子板架边界相交将被切断。

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### • 再生

此功能用于对现在的定义再生大量的板架, 它比较有用。当板架的几何形状需要适合周围



板架的更改, 所有激活的板架将再生。这功能将使板架自动进行拓扑的分类。



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### • 拓扑

此功能用于可视化, 在平面板架内使用拓扑信息的模型目标之间的依赖性。

另外, 所示目标能被列出并激活 (仅平面板架), 一旦平面板架被激活他们能被再生并接受定义目标的更改通过上述的再生功能。

多个目标能给出并将合成目标作为一个新的开始。这表示他们之间的依赖关系能重复显示, 一级接一级, 为从中受益, 模型必须使用拓扑参考而不是纯坐标。

还有除平面板架外的物体能自动拾取, 只要他们在板架定义是使用, 这对外板曲线及表面是有效的。

拓扑概念见 (*General Hull Concepts / Topology in Tribon Hull*).  
[General Hull Concepts Topology in Tribon Hull](#)



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### • 比较板架

如在早期设计阶段当大板架 (如完整的甲板) 已经生成, 进一步假设这个大板架已被分成生产用的板架 (如分段)。在详细设计阶段将加节点并进行更改 (如尺寸及材质), 还有从起初大板架生成零件, 为确保这些更改不危害强度计算。

功能被开发是为帮助设计者将起初板架与生成的产品尺寸的板架作比较。此功能与大量的零件尺寸相比 (如肋、扶强材、焊接面板、支柱及肘板), 关于尺寸及材质。如表现不同将以图形和清单显示, 为识别不同 Tribon 必须能找到大板架内的零件, 与相同位置子板架相同类型的零件, 对扶强材, 额外的要求是他们必须在板架的相同侧并有相同的倾角。

在子板架视图, 下面的颜色用于显示不同/相同对于大板架:

- 尺寸较小或材质不同: 红色
- 尺寸较多且材质相同: 蓝色
- 尺寸及材质相同: 绿色

- 没有相应零件在大板架时: 白色

对于大板架

- 在子板架上没有相应的零件: 白色

零件的识别将被显示至使它容易找到相应的行, 在不同的清单应被显示, 此不同的清单包括零件的识别, 相配的尺寸与材质在子板架及大板架之间。例子如下:

Difference list:

Part panel Jumbo panel

Comp.	Dimensions	Qual.	Comp.	Dimensions	Qual.
S2	20, 200, 12	A	<	S2	20, 220, 12 A
S5	10, 200, 13	A	>	S5	10, 200, 12 A
F1	10, 300, 20	A	?		

清单也可以 CSV 文件输出。



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## • 带肘板的板架

在生成带肘板的板架时, 系统可产生不同的肘板图形。一般肘板的子图被显示, 此功能用于在两个子图间切换。如仅有一个子图, 此功能没有作用。

肘板子图属于所选板架被显示。此功能仅可使用当一板架在单独方式生成。



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## • 清单

此功能用于当用户需要生成一个输入scheme清单、板架及信息。

此清单表示当前状态的生成, 此功能主要用于向后兼容问题。



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- 删除

在用户确认后, 可删除激活板架从数据库及工作区中, 如用户不激活, 用户被提示激活板架, 存储并退出。回答“A11”抑制了进一步确认。

如 SBHM 缺省文件包含关键词 SCH\_DELETE, 当板架删除时输入 scheme 文件也被删除。

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### 6.2.3 Scheme

此功能是使用设定语言scheme作为界面。

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- 输入

板架 Scheme Editor 打开, 如没有, 经浏览对话框提出文件名。缺省文件来自 SB\_SHIPSCH 目录。此编辑器也可用于更改并运行语句。

注意 scheme 文件行不可超过72个字符。

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- 显示

此功能党从子图中点取板架是, 显示 scheme。如单个板架激活, 直接显示scheme 。

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- 编辑

板架 Scheme Editor 打开, 文件来自激活板架。

可由 Vitesse hook 命名 \_TBhook\_PPanScheme控制布置。进一步信息见 Tribon installation。

Editor用以更改、运行语句, 运行时, 语句实施于所有激活板架与之相配的零件组。

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- 运行模式

此功能使操作者控制大量方法的执行模式。

1. 确认

在此功能中, 操作者选择一个生成的零件在嵌入子图前是否显示(确认开)或将直接嵌入(嵌入关)

缺省为关

当创建一个 BOUNDARY 或一个 CURVE, 确认状态有特殊作用, 因此单独的 boundaries/curve段可用于检查, 一个接一个, 这用于追踪错误。当创建板架及曲线外几何时, 图形功能放大、缩小及原始尺寸用于查看角落地带。

2. 迹线

如关键字 TRACEON 在缺省文件中给出, 可将错误写入 log 文件。

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#### • 后台生成

此功能用于从input schemes 后台生成板架，当开始提示从 SB\_SHIPSCH 目录取文件时，生成经Job发射台开始、板架生成及创建list文件。

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### 6.2.4 视图

此功能用于创建及更新船体生成模型视图

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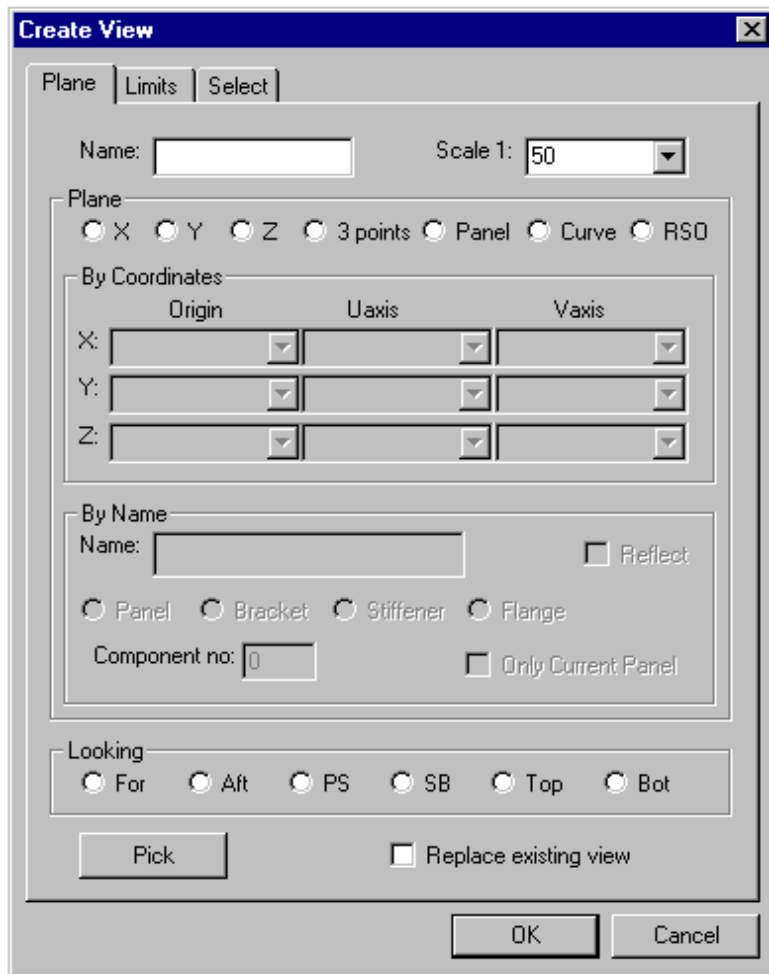
#### • 创建

此功能用于创建切取船体表面的视图（有所属的构建如外板型材和板缝）及平面上的内部结构。平面能以多种方法定义，可用定义框和分段、板架、装配名过滤中进行。

板架一符号方式出现，一般用于结构图，根据板架平面与图平面的角度，板架既可投影进视图平面或相交，零件如板架上扶强材，肘板总是根据相对图平面定位。

创建的视图可插入当前图中。

输入可经第一次定义视图平面的一表格对话框。



可任选视图名。

决定符号零件尺寸的比例并应显示视图目标尺寸比例。当嵌入图中相应于系统缺省值比例的初始值，将使用当嵌入模型视图时，如一平面由板架定义。

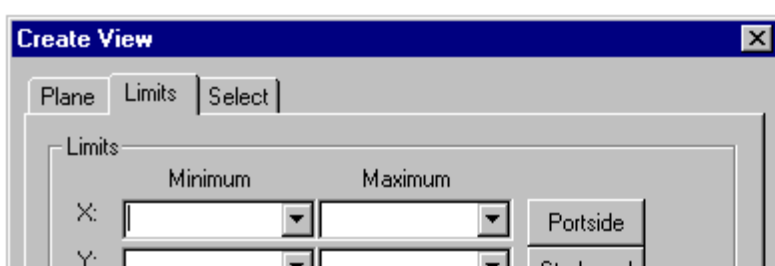
当有板架定义平面时，用平面上面的钮选择类型。根据选择某一区域应可用给出相应的坐标或目标名。

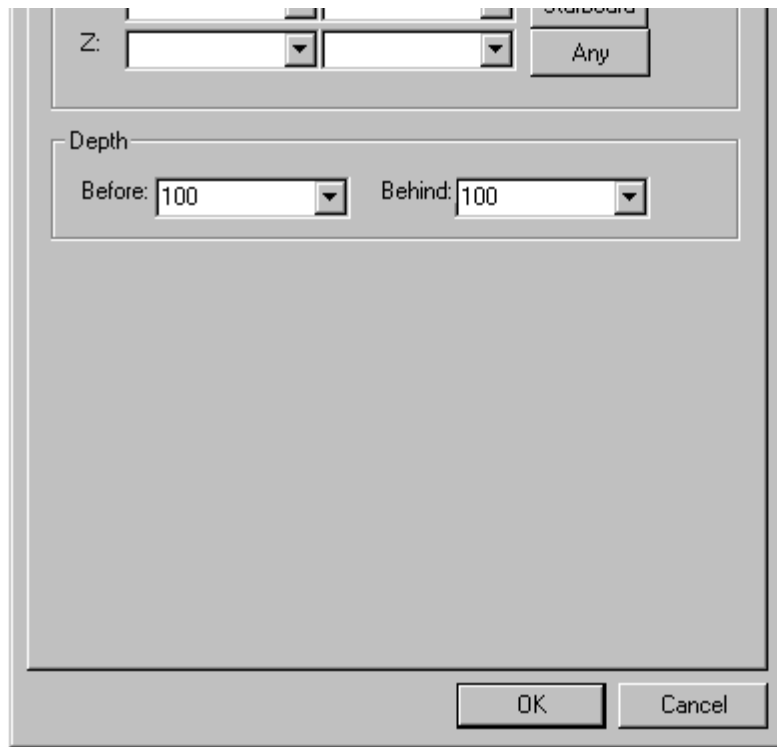
如平面由板架定义，可能让一肘板或扶强材的腹板或面板定义一个平面。在此种情况，零件数必须给出，“Only Current Panel”用于排除其他除定义平面的板架视图。

视向如不给给定，缺省将使用（或者视向由用户经缺省参数定义）

视向定义能由已存在的视图拾取，使用对话框下面的拾取按钮。

第二个表中包含限制。

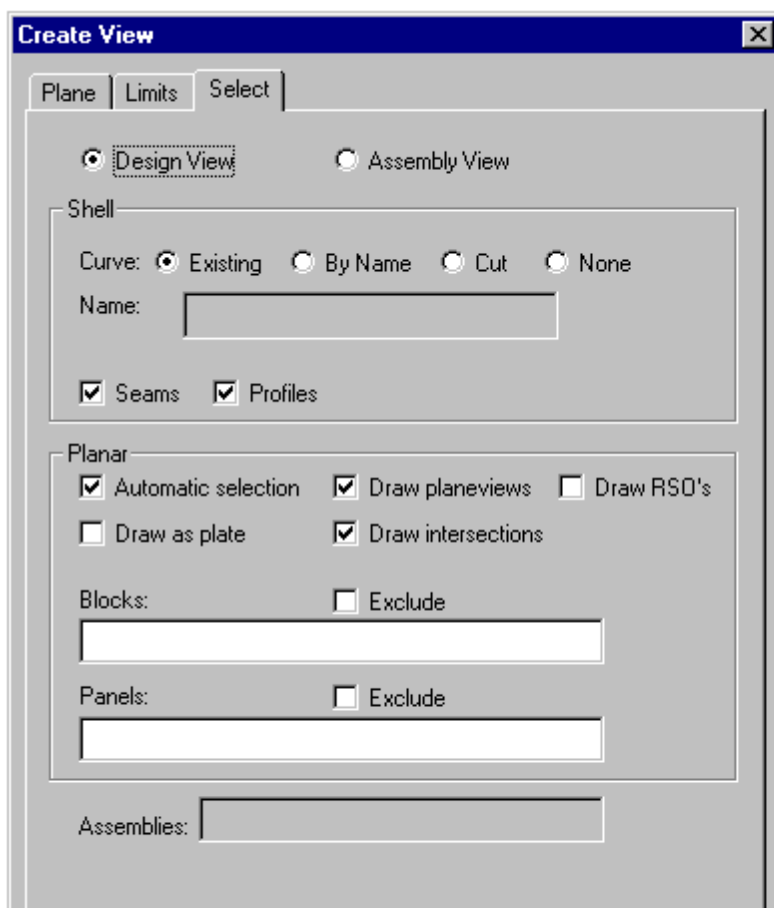




在界线部分，由主平面的限制能排除所有外面的目标。一个剪切视图将从箱中生成，在侧面的按钮仅快速定义对 CL。

深度值相对于图平面，派相互外面的目标。

第三个表包含选择





为了开始两种类图，一是设计视图，另一为装配视图。如一个装配视图被定义，选择限于给出装配名，及选择平面和/或板架相交视图被画出。

对于设计视图，外表应由外板曲线代表外板型材及外板符号。如“Existing”被选择，系统尽力找已存在的外板曲线来画平面。如发现曲线包括，否则主船体表面将被窃取、获取曲线。

对于平面板架，这里有大量选项控制内容及外表。

如自动选择使用，所有板架将在界限及深度内被包括。如不，板架将由分段、板架来选择。也可用自动选择时排除外板及板架。

板架仅画为板而不是外形及缝，对于装配视图也只画板。

RS0可包括在视图中，RS0为参考表面物体，在船舶初始细分时创建。当板架的位置由RS0定义，经常是一致的。为了使视图仅包括RS0，确保自动选择不被选中。



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## • 节点

此功能用于切取当前视图或模型获取详细子图。

当视图有模型生成，试图平面应由不同的方法定义。

- 根据所示加强材平面。
- 同上对面板。
- 同上对肘板。
- 垂直于缝的平面。

在这些情况，整个模型不扫描，仅带零件板架。

对于扶强材可有一个' top' 视图，显示面板的正确样子。

- 该平面能被定义为垂直当前视图，通过以定义行，在此整个模型将相交。

在空间的限制被自动从所示零件或定义平面中定义。

缺省，详图输入时以当前视图的两倍。

一些备注：

1. 详图在所有方面像其他的视图（如创建）
2. 当从零件创建详图时，不可能有明显的排除和包含。由两点创建的详图时可根据所选表格。

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### • 再生

此功能再生所与板架子图为适应模型中图形的更改. 此功能用定义视图中的原始数据。

如在提示中回答ALL，所有图中视图应再生。如一视图由封套取代，它将不作再生。

此功能创建那些元素的新图，这已包含在视图中，也将加一个新板架在视图极限下，在确认提示下可用于限制新板架的另外部分在确定提示下的选项，选项也可给所有视图与以前存储视图合并。然后除了显示一个视图，操作者应被要求键入存储视图的名字。一个空回车将使系统寻找视图寓所显示相同的一个。这个选项是有用的，如由 TBHMDWG批生成，也可较快像没有新视图生成的。在 OPTION 的两个特征可组合。

增加的信息如尺寸和 BL/CL 应保留。

如 UPDATE\_NOTE 以缺省文件给出(SJ001.SBD/TBCHM.DEF)，对于位置号，坡口及装配等建模注视将以正确的模型信息来更新。注意的设定保留，如模型参考已删除，仅参考线保留并颜色改为蓝色。

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### • 修改

此功能用于以新板架补充已存在的视图。可由三种方法进行：

1. 再生已存在的板架，如此做，系统能被告从 “intersection” 到 “plane view” 及 vice versa。
2. 对已存板架加一对称视图。
3. 由用户将新板架嵌入视图中。  
另外，当前子图的延伸能在功能中修改。

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- 选择

此功能用于选择视图，用于再生，单个或多个能被选择或用 `All` 按钮。

此功能用在 `include` 模式，交换由 `Reject` 按钮，包含的视图以一矩形标出，而排除视图一个表示。.

此选择在更改或图形擦除时有效，当一个包含模型的新图读取缺省所有视图被选。见缺省 `GEN\_VIEW` 在 [Default File of Tribon Planar Hull Modelling](#)中。.

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## 6.2.5 位置号

此组包含板件位置号的设定、修改和交互拷贝。

位置号的自动设定可由下面功能的不作处理，更多信息根据这如何获取，见相关文件包含 Tribon 自动设定位置号。

[Automatic Postion Number Setting](#)

一般概念位置号能在一定范围内用于定义单个零件，这个术语可看作是船的一部分，如模型部分（板架或分段）和/或装配，这表示在一定范围内，如具有相同形状的材质（在某一公差）及材料能供以相同位置号。

因为不同类型的零件一般单独处理（如板/扶强材/补板等），位置号能在零件类型之间再使用，它表示如某一扶强材可等于某块板而无冲突。

此规则用于决定是否或不，零件与 Tribon 自动位置号相同的模块。

一个模块可有前缀后缀，包含非数字字符围绕以整数。前缀/后缀被保留为附于每块板的“通用字母”，这表示这些字符不能用作其他目的。为确保使用前缀及后缀，SBH\_AN\_POSNO 必须设定。

共同的要求如下：

- 图以存在(除范围)。



- 范围已定义(除范围)。

因为位置号大多数情况要求单一，仅在相同的零件中。用户将被提示一零件类型：

- 肘板
- 板
- 型材(包括扶强材、面板、支柱)
- 补板
- 肘板加强材

This means that 这表示具体类型的零件可被考虑在特殊的功能下。

在需要选择是如扶强材仅代替成串选择以上型材，加如下一行：

PROF\_BUNDLE=NO

在船体缺省文件中，允许选择类型扶强材、面板或支柱而不仅是型材。



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## • 范围

此功能用于延伸目前的范围（起初位空）这样所有其他功能在此操作可能性如下：

- 增加属于目前范围的某种模型目标的零件。零件可由以下方式选择：
  - 板架
  - 分段
  - 装配（首先或所有等级，解释如下）
  - 所有零件（同选择所有分段）
- 列出内容（用户选择）为目前范围
- 重设目前范围

装配既可包括参考第一级的或以下任一级零件。

如任意板架，分段或所有被选，然后提示任意侧信息。一个菜单包括三个选择，包含的可能性：

- PS
- SB
- CL

他们能被从最近选择中过滤出特殊零件，表示零件与不包括在scope内的相配，按任一这些侧项目将在那些项目间转换，但当满足，按 *Cancel* 和模型目标内的侧具体零件将加至范围。这些侧说明的结合将保留为缺省用作下次的选择。

*Reset*功能去掉所有选择的范围, 因此保留scope 为空。

此功能关闭按*Cancel*, 因此scope 样式在之后使用。



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## • 设定

这能看作位置号的在线编辑器, 用户被提示在下面设定中有效的零件类型。现在位置号能键入(可能包含前后缀), 零件能被选择, 在*Operation Complete* 或 *Quit* 前位置号被提示, 选 *Options* 或 *Cancel* 能选择心得零件类型。

所有图中属于目前范围, 进行位置号与所给相同的将亮显。

此点检查能避免不良行为, 除非所有亮显零件认为相同。一个警告信息将显示在信息窗口上, 这表示不良位置号在目前范围的具体零件类型, 将导致进一步选择被拒绝, 由于不可能为新的零件与所有目前零件相同。

所有零件由用户(选择直至按 *Operation Complete*), 与零件已有位置号的相同, 如选择零件相同于已收集的零件, 它被接受, 它的位置号用于更新, (在板架目标内) 因此亮显此零件。

而选择零件, 按*Options* 将显示一个清单, 包含所有目前选择的零件。这些优先与\*, 另外, 所有目前范围内的零件已包含目前位置号的被列出, 这可有效的, 当由于等同性检验时否认的零件的选择时。

零件没有得到新位置号更新的(如所有条件被注定), 直至O C。用户终止此功能, 这表示总有可能仅将最新选择的零件, 这可当提示选择零件时按 *Cancel* 代替, 浙江不选最新认可的零件, 因此亮显被切换掉, 通过重复做, 所有目前部分能取消。

对于位置号更新不成功的零件, 窗口有信号, 如不通知, 板架已被更新。

一旦提供了空位置号, 既不与已存在的零件及所选零件类型中比较, 这表示零件位置号为无条件空白。



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- 变更

用户要求对一零件类型做下面有效设定, 之后已有位置号被提示。图中所有(零件在目前范围) 进行此位置号将亮显。程序要求一个新位置号。所有相配邻居执行旧位置号, 现已新位置号代替。先决条件时邻居必须更改, 必须相同于进行零件位置号的零件。

*Cancel* 或 *Options* 对选择总有效, 允许用户重复最近的选择。

位置号不更新出现警告, 显示一清单。

*Operation Complete* 或 *Quit* 结此功能。



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- 复制

此功能用于拷贝某一位置号从目前范围至一目标范围, 不是所有的位置号能从目前范围拷贝, 仅用户认为最终(决定这区别的规则如下) 新目标范围被提示。当目前范围决定时, 没有进一步信息要求, 此功能将向上拷贝零件位置号至目前范围内相同的零件。

注: 大的范围(尤其目标范围) 此功能需要一些时间来完成。

目标范围被扫描以检查位置号是否被拷贝已指定与零件新设定不同的零件。

由缺省文件可决定, 某中前缀和 / 或后缀, 规定最终位置号如:

POSNO\_PREFIX=A, E

POSNO\_SUFFIX=K

告诉程序所有位置号以 `A' 或 `E' 开始以 `K' 结构认为最终, 其他不是在这个内容中位置号内的正式可为任意值, 位置号被拷至目标范围中, 相同的零件, 但不覆盖目标范围的位置号(此种)。

在拷贝过程中, 所有错误将被收集并列出, 包括:

- 目标范围内的位置号已认为最终, 相同的位置号设与目前范围中不同的零件。
- 具体的位置号以分配至目标范围内的零件, 引起不名状态。

引起以上信息的位置号不作更新。



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- 自动

根据目前定义的范围，可创建一输入文件与 Tribon *autopos*一起使用，也可随意启动，这可自动设定目前范围内平面板架的位置号。

附加说明在运行时间可能要求在如下的格式中指定。更详细的见 *Tribon Hull, Manufacturing, Automatic Position Number Setting*.  
Automatic Postion Number Setting

在此格式中可具体规定:

- 此种情况应使用 (如超过一个)
- 前缀及后缀, 如有
- 零件类型
- 已经有位置号的类型应被更新
- 位置号更新与否
- 范围分割 (比较零件时)

范围可为目前定义的

填入相关信息后, 可:

- 退出此功能, 位置号不更新 (*Cancel*)
- 创建输入文件, 开始 autopos (*OK*)
- 重设所有区域 (*Clear*)



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## 6.2.6 选择

该功能可处理与数据库相对的板架, 在所有功能中多哥板架应作处理。



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### • 激活

此功能用于激活板架, 一个板架必须在更新前激活, 当被激活, 板架从数据库上读取, 并锁定更新用户防止其他用户更改相同的板架。

当一个板架被激活, 被矩形包围应亮显, 按板架围绕所有子图, 还有, 在矩形上上线被画出。字母 'S' (stored) 表示板架目标应同数据库内相同。'M' (modified) 表示工作区内的板架与数据库的一个已作更改。

板架已在图形上点取或按名字激活, 如 "Options" 按 "indicate panel" 提示, 一个表格应弹出给出可能包括或排除板架或分段以通配符废除。一个界限箱可随名字一起定义。

激活可由名字混合点取交互。

如多个板架由名字激活，它们可按分段内次序分类，这个次序也反映板架生成的次序，这也可能是正常拓扑分类的近似。



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- 保存

此功能用于存储激活板架，如“A11” 要求其他激活板架的确认。

如板架有一个“M” 以前亮显矩形，它可改至“S”在分类板架，板架已标“S”不被存储。

如SBHM 缺省文件包含 SCH\_CREATE，一个新的输入scheme 文件被创建当板架存储时。



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- 跳过

此功能用于不存储激活板架。如被更改，它们从子图及工作区去除，对于存储， 回答“A11”抑制进一步确认。



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- 存储并离开

此功能用于存储并自动离开。



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- **激活清单**

此功能用于列出所有激活板架，当板架被激活不出现任何视图，或确保没有板架的板架，在后者情况显示一个空的列表。



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## 6.3 船体工具

此功能组用于所有交互船体的运用。



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### 6.3.1 备注

此功能组用以嵌入船体具体备注在图中，信息也可以从模型中取得，它可要求视图与数据库更新。



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- **位置号**

此功能用于创建并嵌入一个注释, 并包括位置号, 而不是零件名。

在板架零件显示后, 取得位置号, 由操作者可定义一字符串。位置号防止此字符行的最后一段, 还有这段的长度。

最后一段自动接受位置号文本, 当一个选项可用相同位置号的几个组成部分创建 POSNO, 连接它

图中位置号零件有相同的材质, 还有 TBGD位置号功能关于颜色、层、id 等, 且以相同的方法处理。

如果 TB 零件名控制有效, 零件名短名用于位置号功能。对于详细如何规定零件名, 如不作规定, 零件名为位置号。

图中位置号外表能在一定程度上由用户控制, 这可经键盘及值, 在船体缺省文件中。TBGD 缺省文件连至逻辑名 TBD\_DEF1。

TBD\_DEF1 关键字定义尺度:

POS\_SYM\_HEIGHT 符号定义高度 (mm)

POS\_TXT\_MINH 在位置号符号中的最小文本高度

TEXT\_STD\_HEIGHT 标准文本高度

首先符号的高度由POS\_SYM\_HEIGHT定义, 然后最大文本高度及宽度由符号第一个符号文本位置, 用于计算真实文本尺寸, 不小于POS\_TXT\_MINH。如无符号存在, 文本高度设置TEXT\_STD\_HEIGHT。

尺寸文字的大小在符号的右面应根据符号文本的位置, 如无符号存在, 它为2/3位置号文本的高度。

它可能选择包括注释的信息, 在提示选择Option, 显示一个表格。这里术语的类型应该包含在注释中, 对于不同零件类型能单独选择或不选。

先前在腹板与面板之间的分隔符, 尺寸为\*字符。现在, 逻辑名为 SB\_PROF\_DELIM能包含新的分隔符, 注: 分隔符为一个字符。如逻辑名不设, 将使用旧的分隔符。

当激活英制, 板厚被板重以每平方英尺的英镑代替, SBH\_QUALITY\_LIST材质文件的处理将以单独文件处理。

Setup and Customisation Customer Set-up of Material Qualities



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交互TPHM功能

- 装配

此功能与位置号相似除了装配名不使用, 符号使用经缺省文件的一套关键词控制。



TB/PS 具体装配名, 将根据所显示的板件获取。



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- 坡口

如逻辑名 TBH\_BEVEL\_CTRL 被定义作坡口控制文件, 然后坡口注释能按此设定创建 (见相关文件), 交互作用见相关的注释功能。



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- 设定配置

此功能用于在图中嵌入拥护配置注释, 注释包括一套注释类型, 具有一套特征。关于内容及外表, 配置经Vitesse hook。

创建的注释能由通用注释功能处理, 如删除及去除参考。

如参考关键词用 UPDATE\_NOTE 被给予注释的内容被更新。

操作者应拾取一个模型部分被创建一个注释参考字符串。通过 OPTIONS 在提示下可以激活某一注释类型的自动设定在整个视图或子图, 在此情况下, 注释放置是没有参考字符串。



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- 移动配置

此功能用于移动图中由set功能插入的注释。移动一注释, 点击后放置。

注意提示中有 OPTIONS可移动注释, 且同时根据最初位置创建参考行。此 option 仅能用于苍术市没有参考行的情况。



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### 6.3.2 曲线

此组包含用于更新曲线数据库的功能。



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#### • 创建曲线

此功能用于切取船体表面用一个或几个平面。一获取一个或几个曲线。曲线被存储在所给名字在船形数据库与逻辑名 SB\_CGDB相连。

在一个主平面能定义多个平面。任意地, 肋骨, 水线及纵剖线表被更新。

#### - 输入

输入经 Tribon 表格系统。表格分成共用向上部及根据定义平面的下部。

#### - 公共部分

表格的公共部分有下述方面:

```
+----- CREATE HULL CURVE -----+
!
! Surface name:
!
! Curve name :
!
! Limits
! Xmin:           Xmax:
! Ymin: 0         Ymax:
! Zmin:           Zmax:
!
+ Plane: X-Y-Z-Three points-Panel +

Exit      PF4      Reset      PF2      Continue PF3
```

**区域的描述:**

Surface 船体表面目标名得自船形。

名:

Curve 名: 曲线名被创建, 如仅一个曲线被定义, 然而, 多个曲线以被创建。名字根据下面表格:

<prefix><start>([<step>])<end>

而 <前缀>是以一个字母起始的行, <start>, <step> 及 <end> 都是数值。

使用十进制。如 <step> 为空, 步长假定为1。

例有效数字:

SBX34()46

CUR10(0.2)10.8

Limits: 曲线极限, 缺省Ymin = 0 且其他没有极限。

Plane: 从平面定义部分。

Exit PF4 退出功能

Reject PF2 拒绝

Continue 连续平面定义部分

PR3

#### - 在主轴上定义平面

如果X, Y 或 Z 被选择定义平面, 下述部分将出现:

```

!                                     !
! Plane: X Y Z Three points Panel   !
! Coordinate value:                  !
!                                     !
! Update table: Y N                  !
+-----+
Exit      PF4      Reject  PF2      Create   PF3

```

**区域的描述:**

坐标 定义平面的值, 该值必须下述格式

值:

[<prefix>]<start>([<step>])<end> [+<offset>]

这里 <前缀> 如肋骨, 纵骨术语使用是有效。 <start>, <step>, <end> 及 <offset> 为数字值。小数是允许的。

注: 从一个表达生成的数值必须等于曲线名区域的设置。

有效的例子如下:

2700

360(720)3960

FR25()28

LP1.5(0.5)3.0

FR52(2)60+375

更新 肋骨、水线、纵剖表能被更新。然而, 这要求曲线由肋骨、水线及纵剖组合组成,

表: 根据轴选定且一个整数, 另外, 必须使用却省限制。

创建 激活曲线的创建。  
PF3

#### - 由板架定义一平面

```

!
! Plane: X Y Z Three points Panel
! X1:                X2:                X3:
! Y1:                Y2:                Y3:
! Z1:                Z2:                Z3:
+-----+

Exit      PF4      Reject    PF2      Create    PF3
    
```

区域的描述:

X1 - Z1:起点  
X2 - Z2:第二点  
X3 - Z3:第三点

#### - 由板架定义平面

```

!
! Plane: X Y Z Three points Panel
! Panel name:
!
! Reflected: Y N
+-----+

Exit      PF4      Reject    PF2      Create    PF3
    
```

区域的描述:

板架名:平面板架名用以定义曲线平面  
对称: 如它是对称板架, 对称图像也能用于定义平面。



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#### • 保存曲线

此功能存储目前图中的曲线作为一个 CAT目标在选择数据库。曲线将被存储在目前视图的坐标系统中, 当此为一个 Tribon Planar Hull Modelling 视图。

曲线的名字必须由用户规定，图必须以所给名字更新。

此功能用于如下位置：

1. 创建非标切口及孔。如围绕图的原点。
2. 存储长及复杂的曲线创建于图中由许多板架的边界。
3. 存储相交曲线于船体视图中（如创建节点视图），用作板架边界。



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### 6.3.3 功能描述

功能描述的概念在线文件 *Tribon Hull M2/ Setup and Customisation/ General/ Functional Description*.

此功能支持功能描述的交互斟定，用于板架及零件，板架级的功能描述对所有零件皆有效。然而，它可由零件定级的分配来规定。

在所选目标显示后，此功能将出现一个可用功能清单，用于交互提取。



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### 6.3.4 收缩信息

此功能用于显示收缩量定义平面板架的模型，此功能将亮显图中，所有板架有收缩率，如这些板架的一个被显示，这个板架的收缩量将显示。主要收缩方向一实线显示，而垂直方向以虚线显示。对于每一个板架的板，显示收缩因子，垂直于主方向，以主方向及沿板缝。所有的值为（mm/m）。

板架的收缩量可由收缩物体定义，此种情况收缩目标必须以船体建模的缺省文件经缺省参数 "SHRINK\_OBJ" 定义。



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### 6.3.5 板架相交

此功能用于放置符号在图中。为了显示相交平面的一个是穿越的。不同的符号被使用，如一个板架被穿越或连续。

符号的尺寸由符号高度决定，而在绘图缺省文件中定义。符号的颜色为缺省注释的颜色。



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### 6.3.6 重新初始化

此功能执行某种重新初始化，如重新初始化 gentab 文件，也可重设某一状态变量。当船体模型已启动，如显示的层。



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### 6.3.7 Hull PPI

见 *Tribon M2 Hull, Manufacturing, Tribon Hull Production Program Interface.*  
[Production Program Interface](#)



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### 6.3.8 Vitesse

此功能由 SB\_PYTHON 给出目录。具体见 *Tribon Vitesse User's Guide.*  
[Vitesse](#)

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### 6.3.9 油漆面积

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- 概述

此章描述油漆面积的定义，系统能以批量模式或交互模式执行。在批模式输入由用户简单在输入scheme，交互模式交互创建输入。

在两种情况实际的计算在单独的批程序下执行，此程序输入一个 Tribon 交互语言 (TIL) 格式， 结果为一个计算面积的清单及一个选项创建不同零件的详细清单，此结果也存在油漆面积数据库(参见 PADB文件)。

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- 方法

- 表面及房间

用于能以两种不同方法计算面积。

表面的计 一个表面既可是平面或曲面板架或一个表面的一部分（外板或曲面甲板），一算 一个板架可以，也可不限制，表面必须受限制。

房间面积 房间总是极限定义，不必于实际壁一致。一般在定义房间的零件将由系统自动的计算 选择。

随意的，板架可手动包含或从计算中排除，能做一个选择的板架侧面应油漆，对于在限制平面内的板架，一般仅面向房间的表面被包括。

在两种情况, 计算的表面/板架, 将被限制至表面或由用户给出的房间。

相应的, 零件 (板及型材) 仅在所给极限内面积的零件。

表面及房间的计算面积可组合成的单元, 这用于房间的分隔具有复杂关系, 分成小的简单单元。

#### - 拓朴考虑

一个房间的拓朴可以是复杂的, 该系统将, 然而又某种限制, 一个房间可有多么复杂的几何。

主要的, 一个房间应为箱形, 如有六个壁, 他进一步假定为艏、艉、左、右方向的限制, 还有上下, 然而该限制不必于主平面平行。

另一方面, 一个棱形房间 (如一边舱) 在艏部也可由外板在朝 PS, 在前面及向下。

用户假设房间以复杂拓朴分成小房间。

如今已不假定定义房间的所有板架应被计算 (除了简单的排除), 如不可能定义一个房间在另一个房间内, 从计算中排除。注意, 在输入内的可能性减掉一些表面/房间。

#### - 有复杂边界的房间

也可定义更多复杂的边界, 如一个边界由大量主平面组成, 通用平面, 板架或连续极限的曲线。

复杂边界能进定义前及后方向, 或左右舷, 或向上及向下方向。他自然可能的定义一个极限仅由一个选择的方向。

区他限制, 又复杂边界是两个相邻平面的相交线, 不许与  $x$ ,  $y$  或  $z$  轴平行。

系统应自动对一个房间分隔, 以一个复杂边界, 在一个或两个方向。分成小房间, 向和谐房间也存储在数据库中, 将组成一个大的单元。

在复杂边界的房间可以交互方式定义。



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#### • 缺省

大多数重要的缺省设定所给区域的相乘因子, 单独的因子用于油漆、喷沙处理、机械除锈及后处理。

缺省处理见 [Painting Area Calculation Default File](#).





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## • 输入及输出

### - 输入

输入到程序是应被计算的区域，计算能由存储在 Tribon Hull Form及 Structure 数据库的信息来执行，这表示下述部分应包括：

- 板
- 肘板
- 扶强材
- 面板
- 支柱
- 外板型材
- 外板/甲板表面的限制区域

计算能根据平面及区面板架进行，在选择表面上（外板及甲板）不必如板架描述，面积根据分离板件来决定，如一个板架没有被分离。

选择可手动在板架等级上进行或经由所给房间的自动板架包含。

每一个计算面积可喷沙、油漆等等。简单的乘积因素可给出如缺省值不能被使用。

### - 结果

数据

结果主要是计算面积，出现在清单中，根据这些面积，程序也计算及清单总时间，使用时间因子给出输入或缺省。 defaults.

对于试验及检查目的，详细的零件面积清单，可按要求生成。

计算的结果被存储在 CAT 目标 PADB 重新取得，下述数据被存储：

- 计算面积
- 起初计算处理及被使用的因子
- 结果时间，使用这些因子的计算
- 每个零件的名字及面积

为参考以前计算的结果，如在一个输出清单中的总结。计算的结果包含单独存储一部分区域（见输入）将一般不被存储，为避免相同区域被存储在多个区域。

文件

两个合成文件被创建，当输入和缺省文件被解释，他们又相同的名字，为输入和输出文件且被存储在 SB\_SHIPPRINT 及扩展名 .lst。

计算结果被以逗号分隔的文件存储在SB\_SHIPPRINT及扩展名 .csv 。下述属于被存储在这个文件中（每个计算为一行），此数字参见术语的订货号：

No.	属性	格式
1	Key	string
2	船号	string
3	语句类型	string

Painting data:

No.	Attribute	Format
4	Area in square millimetres	real
5	Area in square metres	real
6	Time in minutes	real
7	Time in hours	real
8	Time factor	real

Blasting data:

No.	Attribute	Format
9	Area in square millimetres	real
10	Area in square metres	real
11	Time in minutes	real
12	Time in hours	real
13	Time factor	real

Cleaning data:

No.	Attribute	Format
14	Area in square millimetres	real
15	Area in square metres	real
16	Time in minutes	real
17	Time in hours	real
18	Time factor	real

Derusting data:

No.	Attribute	Format
19	Area in square millimetres	real
20	Area in square metres	real
21	Time in minutes	real
22	Time in hours	real
23	Time factor	real

After treatment data:

No.	Attribute	Format
24	Area in square millimetres	real
25	Area in square metres	real
26	Time in minutes	real
27	Time in hours	real
28	Time factor	real


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## • 限制

### - Level of Detailing

The system has certain restrictions on the accuracy of the calculations. The restrictions are listed below.

- End cuts of profiles are not taken into account.
- When profiles cross a limit, the "cut" is assumed to be perpendicular even if the profile passes the limiting plane at an angle.
- Areas of brackets are always calculated for the whole bracket even if it crosses a limit. Exception: A bracket in the same plane as the panel it belongs to will be calculated only on one side if that has been specified for the 'mother' panel.
- The painting area will not be reduced for the common area of an overlapped profile and bracket. The same is true for overlapping profiles. However, the area of the root of profiles will be subtracted from that of the plates.
- Clips will not be included in the calculations.
- In the calculation of a shell region, there is always assumed to be two opposite limits parallel to a principal plane, e.g. two parallel frame planes. This restriction is not valid for a curved panel which may be of any shape.

### - Level of User Control

It is supposed that the lowest level of user control is at the panel level, i.e. it is not possible to calculate the area of only plates and profiles, and to exclude brackets, etc. The only factors that would affect the result are if a certain component is within or without the given limits or if it is on the selected side of the surface.

This is also true for the shell. The shell profiles will always be included if the surface on which they are located is calculated.

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Interactive Tribon Planar Hull Modelling Functions

## • 创建输入

### - General

This section describes the calculation of painting areas in interactive mode, where the input scheme is created. It is possible to edit this input scheme manually after creating it interactively.

It is also possible to perform the calculations for the created input in a background process, thus letting the user define new rooms while the previous ones are being calculated.

The definition of limits is done via pointing in ordinary 2D views or in 3D pictures. If 2D views are used, normally two different views are required to define all the limits of a room.

In a similar way, panels are selected interactively to be included/excluded by pointing in pictures.

### - Creation of Input Scheme

#### Selection of Panels

In all functions where panels are to be identified the function **SELECT PANELS** is used. With this function it is possible to select the panels in different ways:

- by pointing
- by name
- all panels in a view
- all panels belonging to the same block and view as an identified panel
- all panels with the same assembly name

By default, panels are selected by pointing. If **OPTIONS** is selected it is possible to switch selection mode. The selection of panels is terminated with **Operation Complete**.

If the field **EXCLUDE** is chosen, the menu to be used for panels to be excluded will be displayed. It is also possible to display all panels excluded so far.

To switch back to the Selection menu the field **SELECT** must be chosen.

The field **EXCLUDE** is not relevant for the **SURFACE** statement.

When a curve or a panel is to be used as a limit, the panel or curve can only be given by pointing or by name. The selected panel/curve must be verified by the user. If the name of a symmetrical panel has been given the user is prompted to give the ship side.

If the name of a curve has been given and the curve is not in the drawing or both the reflected and unreflected curve exist in the drawing, the user is prompted to give the ship side.

### Rooms with Complex Limits

By default, the complex limit is defined by an interactive identification of the panels constituting the limit. If a part of the complex limit is a principal plane, general plane or a curve **OPTIONS** will give the user the opportunity to switch to the proper type.

**OPERATION COMPLETE** will terminate the definition of the complex limit.

If **EXIT FUNCTION** is given, the complex limit defined so far will be deleted.

If **REJECT** is given as an answer to the prompt for the indication of a panel, the last plane/panel/curve is deleted from the current limit. It is possible to delete the whole limit in this way.

To change a part of a complex limit this part must be deleted together with all planes/panels/curves which have been defined after the one to be changed. This is done as stated above.

At any time the planes in the limit can be listed or displayed.

### Input to the Function

The interactive creation of the input scheme is made using the Tribon form system. This allow to:

- provide all required statements in the correct order
- reduce user input to file names and limit restrictions
- minimize the possibility to produce syntax errors

Each keyword and most of the attributes will have at least one form of its own. A lot of attributes can be created by simply giving **Yes** or **No**.

Some forms contain a special function **INFO** which makes it possible for the user to extract information from the picture. The following information is available:

- all graphical functions
- 3D-coordinate
- 3D-linear
- distance between two points
- distance between point and plane

- model info
- name info
- attribute info

The functions of all forms are described in detail below. Common for all forms are the functions **EXIT** and **QUIT**.

**EXIT** means that the given values are saved and the calling form is displayed.

**QUIT**, which has been implemented only as CTRL Z, means that all values given in the current form are cancelled and that the values which were valid entering of the form are still valid. The only exception is the forms used defining the limiting box.

**QUIT** from the **LIMITING STATEMENTS** form means that all changes made to the limiting box are cancelled.

#### - Screen Based Reference

### Calculate Painting Areas

Description of the form:

**Input file:** Name of the input file. Default directory and extension are SBH\_PAINT\_AREA\_INP and \*.dat respectively.

**Detailed list:** Y if a detailed list of the resulting areas is wanted.

**Level:** Detail level of the list above.

**List file:** Name of the file for the detailed list. Default directory and extension are SB\_SHIPPRINT and \*.lst respectively.

**Default file:** Name of the default file. Default directory and extension are SBH\_PAINT\_AREA\_DEF and \*.def respectively.  
This information is displayed only if the paintareas default file contains the statement DISPLAY\_DEFNAME (see DISPLAY\_DEFNAME Statement).

**PADB:** Name of the Painting Area Data Base. Default directory is SBH\_PAINT\_AREA\_DB respectively.

This information is displayed only if the paintareas default file contains the statement DISPLAY\_PADBNAME (see DISPLAY\_PADBNAME Statement)

**Room:** ROOM statement.

**Surface:** SURFACE statement.

**Combine:** COMBINE statement.

**Sum:** SUM statement.

**Delete:** DELETE statement.

**Exit:** Exit Function.

**List:** List the PADB.

**Defaults:** List/create the default file.

**Calculate:** Start the execution of the background program to calculate the painting areas and times.

### List Painting Data Base

The results of the painting area calculations are stored in the Painting Area Data Base (PADB). A special list program has been developed to list the PADB.

The input is made using the Tribon Form system.

It is possible to create a CSV file from one or all objects in the PADB. Objects can also be deleted.

Description of the form:

**Key:** Name of the record.  
**Ship:** Ship number.  
**Valid:** Valid treatments are given in one string with one letter for each treatment. E.g. PBC means that painting, blasting and cleaning are valid.  
**Type:** Statement type generating the record. The type can be COMBINE, ROOM, SUM or SURFACE.  
**Created:** The creation date and time for the record.  
**Revised:** The revision date and time for the record. The revision number is also given.  
**Painting:** Area, time and time factor for painting.  
**Blasting:** Area, time and time factor for blasting.  
**Cleaning:** Area, time and time factor for cleaning.  
**Derusting:** Area, time and time factor for derusting.  
**After treat:** Area, time and time factor for after treatment. The time factor is only relevant for records of type ROOM or SURFACE.  
**Print file:** The name of the output file when records or the complete PADB are printed.  
**Exit:** Exit Function.  
**List:** The record with the given key is listed. It is not necessary to specify the whole key. The program finds the key which is alphabetically greater than or equal to the given key.  
**First:** The first record is listed.  
**Next:** The next record is listed. Using next it is possible to list the whole PADB sequentially.  
**Select:** Records on PADB can be selected to be used in the SUM statement.  
**PrintRec:** Print current record on file (CSV file).  
**PrintAll:** Print all records on file (CSV file). The list will be brief with only record key and record type.  
**Previous:** All listed records are temporarily stored in a sorted list. Previous will list the previous record in this list.  
**Delete:** Delete the current record from the PADB. The record must first be read with List, First, Next or Previous before it can be deleted.

Define Treatment

Description of the form:

**Name:** Record key.  
**Common Difficulty Factor:** Global difficulty factor. Method specific difficulty factor, which will be multiplied in the paintareas default file.  
**Painting:** Y if the difficulty factor is to be defined.  
**Number:** The number of coats of painting.  
**Blasting:** Y if the difficulty factor is to be defined.  
**Method:** Blasting method.

**Cleaning:** Y if the difficulty factor is to be defined.  
**Derusting:** Y if the difficulty factor is to be defined.  
**Method:** Derusting method.  
**After treatment:** Y if the difficulty factor is to be defined.  
**Exit:** Treatment has been defined.

## Defaults

Description of the form:

**Default file:** Name of the default file.  
**Painting:** Time factor ( $\text{m}^2/\text{min}$ ).  
**Blasting:** Time factor ( $\text{m}^2/\text{min}$ ).  
**Method:** Blasting method.  
**Cleaning:** Time factor ( $\text{m}^2/\text{min}$ ).  
**Derusting:** Time factor ( $\text{m}^2/\text{min}$ ).  
**Method:** Derusting method.  
**After treatment:** Time factor ( $\text{m}^2/\text{min}$ ).  
**Blasting:** Next blasting method.  
**Gold Blasting:** Previous blasting method.  
**Derusting:** Next derusting method.  
**Gold Derusting:** Previous derusting method.  
**Exit:** Exit Function.  
**Reset:** The first defaults values are listed.  
**Read:** Read and interpret default file.

## List Resulting Statements

Description of the form:

**Next:** Next page (displayed only if an other page follows).  
**Previous:** Previous page (displayed only if a page precedes).  
**Yes:** The statement is accepted.  
**No:** The statement is not accepted. Return to main form.

## Comments to Input Scheme

Description of the form:

**Exit:** Accept and return to list form.

## Panel Statement

Description of the form:

**Exit:** Return to main form.  
**Next:** Next page (displayed only if an other page follows).  
**Previous:** Previous page (displayed only if a page precedes).  
**Identify:** Identify panels.

All identified panels will be listed. It is possible to define the version for



symmetric panels. The side attribute specifies the side to be calculated if only one side is treated. If any panels are to be removed the valid field should be set to **N** for these panels and the function **Identify** selected. New panels can be identified or **Exit** can be given, resulting that the marked panels are removed from the list.

#### List panels in Limiting Box

Description of the form:

**Next:** Next page (displayed only if an other page follows).

**Previous:** Previous page (displayed only if a page precedes).

**Exit:** Return to main form.

#### Room Statement

Description of the form:

**Room** Record key.

**name:**

**Type:** Room type.

**Continue:** Continue with the form according to the chosen type. If **New** or **Combine** is selected and the record exists in PADB or **workspace** a question is displayed to confirm changing the record. The statement will be continued only if the answer is **Y**.

**Exit:** Return to main form. For rooms of type New and Combine the system checks if the limits have been defined.

#### Room Statement - New

Description of the form:

**Room name:** Record key.

**Store:** **Y** if the result shall be stored on PADB.

**Automatic:** **Y** for automatic selections of panels.

**Limits:** Add limit statements.

**Panel:** Add panels explicitly.

**Treatment:** Put treatment.

**Exit:** Return to main form.

#### Room Statement - Combine

Description of the form:

**Room name:** Record key.

**Automatic:** **Y** for automatic selections of panels.

**Type:** The room is to be added or subtracted.

**Limits:** Add limit statements.

**Panel:** Add panels explicitly.

**Exit:** Return to main form.

#### Room Statement - Old

Description of the form:

Room name Record key.

**Store:** Y if the result shall be stored on PADB.

**Treatment:** Put treatment.

**Exit:** Return to main form.

#### Surface Statement

Description of the form:

**Surface** Record key.

**name:**

**Type:** Surface type.

**Continue:** Continue with the form according to the chosen type. If **New** or **Combine** is selected and the record exists in PADB or **workspace** a question is displayed to confirm changing the record. The statement will be continued only if the answer is **Y**.

**Exit:** Return to main form. For surfaces of type **New** and **Combine** the system checks if the limits have been defined.

#### Surface Statement - New

Description of the form:

**Surface name:** Record key.

**Store:** Y if the result shall be stored on PADB.

**Limits:** Add limit statements.

**Panel:** Add panels explicitly.

**Treatment:** Put treatment.

**Shell:** Add shell statement.

**Deck:** Add deck statement.

**Exit:** Return to main form.

#### Surface Statement - Combine

Description of the form:

**Surface name:** Record key.

**Type:** The surface shall be added or subtracted.

**Limits:** Add limit statements.

**Panel:** Add panels explicitly.

**Shell:** Add shell statement.

**Deck:** Add deck statement.

**Exit:** Return to main form.

#### Surface Statement - Old

Description of the form:

**Surface name:** Record key.

**Store:** Y if the result is to be stored on PADB.

**Treatment:** Put treatment.

**Exit:** Return to main form.

## Shell Statement

Description of the form:

**Surface**      Record key.  
**name:**  
**Side:**        Side of surface.  
**Number:**     The surface number if not the main surface. If the number is equal to zero the statement is deleted.  
**Exit:**        Return to main form.

## Deck Statement

Description of the form:

**Surface**      Record key.  
**name:**  
**Side:**        Side of surface.  
**Number:**     The surface number if not the main deck. If the number is equal to zero the statement is deleted.  
**Exit:**        Return to main form.

## Combine Statement

Description of the form:

**Combination** Record key.  
**name:**  
**Store:**        Y if the result is to be stored on PADB.  
**Add:**        Add surface/room.  
**Subtract:**    Subtract surface/room.  
**Treatment:**   Put treatment.  
**Exit:**        Return to main form. If the record exists in PADB or **workspace** a question is displayed to confirm changing the record. The statement will be saved only if the answer is Y.

## Combine Statement - Add

Description of the form:

**Combination** Record key.  
**name:**  
**Combination list:** All available records are listed in this enumerated field. If the number of records exceeds the maximum number of rows for the field, **CURR**, **NEXT** and **PREV** will be visible.  
**Select:**        Selects a record to be added from the **Combination List**. The selected records are listed in the form. When the form is full a new page will be used.  
**Next:**        Next page of **Combination List** (displayed only if an other page follows).  
**Previous:**     Previous page of **Combination List** (displayed only if a page precedes).

**Valid:** If selected records are marked N in the valid field they are removed when the functions **Select**, **Next**, **Previous** and **Exit** are used.

**Exit:** Return to main form.

When the combination statement has been accepted and stored, all selected records will be deleted from the combination list.

#### Combine Statement - Subtract

Description of the form:

**Combination** Record key.

**name:**

**Combination** All available records are listed in this enumerated field. If  
**list:** the number of records exceeds the maximum number for the field, **CURR**, **NEXT** and **PREV** will be visible.

**Select:** Selects a record to be added from the **Combination List**. The selected records are listed in the form. When the form is full a new page will be used.

**Next:** Next page of **Combination List** (displayed only if an other page follows).

**Previous:** Previous page of **Combination List** (displayed only if a page precedes).

**Valid:** If selected records are marked N in the valid field they are removed when the functions **Select**, **Next**, **Previous** and **Exit** are used.

**Exit:** Return to main form.

When the combination statement has been accepted and stored, all selected records will be deleted from the combination list.

#### Sum Statement

Description of the form:

**Sum** Record key.

**name:**

**Add:** The given rooms/surfaces will be added to a total.

**PADB:** The given rooms/surfaces stored on the PADB will be added to a total.

**Exit:** Return to main form. If the record exists in PADB or **workspace** a question is displayed to confirm changing the record. The statement will be saved only if the answer is Y.

#### Sum Statement - Add

Description of the form:

**Sum name:** Record key.

**Sum list:** All available records are listed in this enumerated field. If the number of records exceeds the maximum number for the field, **CURR**, **NEXT** and **PREV** will be visible.

**Select:** Selects a record to be added from the **Combination List**. The selected records are listed in the form. When the form is full a new page will be used.

**Next:** Next page of **Sum List** (displayed only if a page follows).

**Previous:** Previous page of **Sum List** (displayed only if a page precedes).

**Valid:** If selected records are marked N in the valid field they are removed when the functions **Select**, **Next**, **Previous** and **Exit** are used.

**Exit:** Return to main form.

#### Sum Statement - PADB

Description of the form:

**Sum name:** Record key.

**PADB List:** All records on PADB which previously have been selected from PADB are listed in this enumerated field. If the number of records exceeds the maximum number for the field, **CURR**, **NEXT** and **PREV** will be visible.

**Select:** Selects a record to be added from the **Combination List**. The selected records are listed in the form. When the form is full a new page will be used.

**Next:** Next page of **PADB List** (displayed only if an other page follows).

**Previous:** Previous page of **PADB List** (displayed only if a page precedes).

**Valid:** If selected records are marked N in the valid field they are removed when the functions **Select**, **Next**, **Previous** and **Exit** are used.

**Exit:** Return to main form.

#### Delete Statement

Description of the form:

**Name:** Record key.

**Exit:** If the record key exists on PADB an additional question to confirm the execution is displayed in the form. Only if the answer is **Y** the statement will be deleted.

If the record key does not exist on PADB no message will be displayed and no changes will be made. The program returns to the main form.

#### Limiting Statements

Description of the form:

**Name:** Record key.  
**Forward:** Define a limit in the forward direction.  
**Aft:** Define a limit in the aft direction.  
**Portside:** Define a limit in the portside direction.  
**Starboard:** Define a limit in the starboard direction.  
**Upwards:** Define a limit in the upward direction.  
**Downward:** Define a limit in the downward direction.  
**List:** List the plane panels situated inside the defined limiting box.  
**Display:** Display the plane panels situated inside the defined limiting box.  
**Exit:** Return to main form. The validity of the limiting box is checked and if all limits have been given correctly the resulting box can be displayed.  
**Yes:** Display the limiting box.  
**No:** Do not display the limiting box.

#### Limiting Statements - Principal Plane

Description of the form:

**Direction:** The current direction.  
**Name:** Record key.  
**Plane:** Principal plane.  
**Coordinate:** The x, y, or z coordinate  
**Info:** Get additional information from the drawing.  
**Next:** List next plane in complex limit (displayed only if the plane is a member of a complex limit).  
**Previous:** List previous plane in complex limit (displayed only if the plane is a member of a complex limit).  
**Exit:** Return to main form.

#### Limiting Statements - General Plane

Description of the form:

**Direction:** The current direction.  
**Name:** Record key.  
**X1, Y1, Z1:** The first point in the general plane.  
**X2, Y2, Z2:** The second point in the general plane.  
**X3, Y3, Z3:** The third point in the general plane.  
**Info:** Get additional information from the drawing.  
**Next:** List next plane in complex limit (displayed only if the plane is a member of a complex limit).  
**Previous:** List previous plane in complex limit (displayed only if the plane is a member of a complex limit).  
**Exit:** Return to main form.

#### Limiting Statements - Panel

Description of the form:

**Direction:** The current direction.

**Name:** Record key.

**Panel name:** Name of the limiting panel.

**Reflect:** Y if the selected panel is reflected.

**Point:** A point in the given panel plane.

**Normal:** The normal to the given panel plane.

**Identify:** Get panel from picture.

**Info:** Get additional information from the drawing.

**Next:** List next panel in complex limit (displayed only if the panel is a member of a complex limit).

**Previous:** List previous panel in complex limit (displayed only if the panel is a member of a complex limit).

**Exit:** Return to main form.

#### Limiting Statements - Surface

Description of the form:

**Direction:** The current direction.

**Name:** Record key.

**Type:** Surface type: SHELL or DECK.

**Number:** Surface number if not main shell or main deck. If the number is equal to zero the statement is deleted.

**Exit:** Return to main form.

#### Limiting Statements - Curve

Description of the form:

**Direction:** The current direction.

**Name:** Record key.

**Curve name:** Name of the limiting curve.

**Reflect:** Y if the selected curve is reflected.

**Point:** A point on the given plane curve.

**Normal:** The normal to the given curve plane.

**Identify:** Get curve from picture.

**Info:** Get additional information from the drawing.

**Next:** List next curve in complex limit (displayed only if the curve is a member of a complex limit).

**Previous:** List previous curve in complex limit (displayed only if the curve is a member in a complex limit).

**Exit:** Return to main form.

#### Limiting Statements - Complex

Description of the form:

**Direction:** The current direction.  
**Name:** Record key.  
**Complex limit:** Select type of complex limit part.  
**Define:** Define the limit of the selected type.  
**Display:** Display all planes and panels in the current complex limit.  
**List:** List the planes/panels/curves in the current complex limit.  
**Exit:** Continue complex limit definition with panels.



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## • 计算

### - General

This section specifies the batch input format, by which the calculation of painting areas may be specified by the user.

The input syntax is supposed to be written in accordance with the general input format as described in the *Tribon User's Guide Basic Features, Getting Started, Tribon Interpretative Language (TIL)*.

[See Also](#)

In the syntax and the examples below the keywords may be abbreviated according to the general rules of TIL.

### - Statement Types

The input language contains the following different statement types.

Calculation statements

(see [Calculation Statement Syntax](#)):

COMBINE combine or subtract areas which are already calculated.

ROOM calculate the area of a room and define the surface treatment.

SUM calculate the sum of previously performed calculations.

SURFACE calculate the area of a surface and define the surface treatment.

Limiting statements

(see [Limit Statement Syntax](#)):



AFT\_LIM define the restriction in the aft direction.

FOR\_LIM define the restriction in the forward direction.

PS\_LIM define the restriction in the portside direction.

SB\_LIM define the restriction in the starboard direction.

UPP\_LIM define the restriction in the upwards direction.

LOW\_LIM define the restriction in the downwards direction.

## Selection statements

(see Selection Statement Syntax):

DECK specify that a deck surface should be included in the calculations.

NO\_AUTOMATIC inhibit automatic panel selection in a room.

PANEL include or exclude panels explicitly or specify the side of the panels in the calculations.

SHELL specify a shell surface that should be included in the calculation.

## Miscellaneous statements

(see Miscellaneous Statement Syntax):

DELETE delete any record from the PADB.

PART\_LIST create a detailed listing of the part areas for testing and checking purposes.

## Calculation Statement Syntax

Below, the complete syntax of each calculation statement type is described.

### COMBINE Statement

The COMBINE statement is used to combine/subtract the areas of surfaces and rooms, calculated earlier in the same scheme/session. It also specifies the surface treatment of the calculated area. The result will be listed and stored in the PADB unless otherwise stated.

---

COMBINE, <name> [/ADD= (<name1>, ..., (<name10>)]

[/SUBTRACT= (<name1>, ..., (<name10>)]

[/NOSTORE]

[<treatment>];

---

<name> is a string, max 26 characters.

/ADD Specification of names of areas (and times) to be combined. The ADD attribute can be given any number of times.

/SUBTRACT Specification of names of areas (and times) to be subtracted. The SUBTRACT attribute can be given any number of times.

/NOSTORE The calculated area is not stored in the PADB and the room/surface <name> is not given in the list.

<treatment> Specifies the way the surface should be treated and its degree of complexity.

For each of the treatments (and methods) a default file of the program will specify the basic time factor (see Painting Area Calculation Default File). In addition a difficulty factor may be applied (cf. below).

---

```
<treatment>::= [/FACTOR=<com_factor>]
                [/PAINTING
                [=<paint_f>[/NUMBER=<no_p>]]]
                [/BLASTING =( <method>[<blast_f>])]
                [/CLEANING [=<clean_f>]]
                [/DERUSTING =( <method>[=<derust_f>])]
                [/AFTER_TREAT [=<after_f>]]
```

---

/FACTOR Used to define a global difficulty factor

<com\_factor> which is assumed to be valid for all of the other items if not specifically given. The default value is 1.

/PAINTING Specifies that painting activity should be included.

<paint\_f> is the difficulty factor for painting if different from the global one (cf. FACTOR).

/NUMBER specifies the number of times the painting should be performed. Default value for <no\_p> is 1.

/BLASTING Sand blasting activity is to be included.

<method> specifies the blasting method. The selected method must have been specified in the default file (see Painting Area Calculation Default File).

<blast\_f> is a difficulty factor for blasting if different from the common factor.

/CLEANING Cleaning activity is to be included.

<clean\_f> is a difficulty factor for cleaning if different from the common factor.

/DERUSTING Derusting activity is to be included.

<method> specifies the derusting method. The selected method must have been specified in the default file (see Painting Area Calculation Default File).

<derust\_f> is a difficulty factor for derusting if different from the common factor.

/AFTER\_TREAT After treatment activity is to be included.

<after\_f> is a difficulty factor for after treatment if different from the common factor.

**Example:**

```
COMBINE, 'Deck parts with opening'

      /ADD=(' DECK1', ' DECK2', ' DECK3')

      /SUBTRACT=' ISLAND

      /PAINT;
```

## ROOM Statement

The purpose of the ROOM statement is to name the calculated area of a room to be specified and to define the surface treatment. The statement may also be used to retrieve the area of an already calculated room.

If the ROOM statement does not contain the attribute /OLD it must be followed by "limit statements" (see below), defining the room. It may also be followed by statements explicitly selecting or excluding a certain panel to/from being included in the calculations (see below).

---

```
ROOM, <name> { [ /COMBINE ]
               [ /OLD ] [ /NOSTORE ] [ <treatment> ] };
```

---

<name> is a string, max 26 characters.

/COMBINE means that the area should be combined with those of other rooms. Consequently it should not occur as an entity of its own in the listings (cf. the COMBINE statement below).

If not given, <name> will occur on its own in the listing.

/OLD The result is fetched from the room <name> which is stored in the PADB.

/NOSTORE The calculated area is not stored in the PADB.

<treatment> specifies the way the surface should be treated and its degree of complexity.

For each of the treatments (and methods) a default file of the program will specify the basic time factor (see Painting Area Calculation Default File). In addition a difficulty factor may be applied (cf. below).

---

```
<treatment>::= [/FACTOR=<com_factor>]
```

```
    [/PAINTING [=<paint_f>[/NUMBER=<no_p>]]]
```

```
    [/BLASTING =( <method>[<blast_f>])]
```

```
    [/CLEANING [=<clean_f>]]
```

```
    [/DERUSTING =( <method>[=<derust_f>])]
```

```
    [/AFTER_TREAT [=<after_f>]]
```

---

/FACTOR      Used to define a global difficulty factor <com\_factor> which is assumed to be valid for all of the other items if not specifically given. The default value is 1.

/PAINTING    Specifies that painting activity should be included.

            <paint\_f> is the difficulty factor for painting if different from the global one (cf. FACTOR).

            /NUMBER specifies the number of times the painting should be performed. Default value for <no\_p> is 1.

/BLASTING    Sand blasting activity is to be included.

            <method> specifies the blasting method. The selected method must have been specified in the default file (see Painting Area Calculation Default File).

            <blast\_f> is a difficulty factor for blasting if different from the common factor.

/CLEANING    Cleaning activity is to be included.

            <clean\_f> is a difficulty factor for cleaning if different from the common factor.

/DERUSTING   Derusting activity is to be included.

            <method> specifies the derusting method. The selected method must have been specified in the default file (see Painting Area Calculation Default File).

            <derust\_f> is a difficulty factor for derusting if different from the common factor.

/AFTER\_TREAT After treatment activity is to be included.

            <after\_f> is a difficulty factor for after treatment if different from the common factor.

Leaving out the <treatment> altogether would lead to a calculation of the area only and no times will be calculated.

**Example:**  
ROOM, 'Side tank sect A41' /COMBINE;

SUM Statement

The SUM statement is used to sum up the result of a number of previously performed calculations, optionally including some of those of the current scheme. However, the factors may not be changed.

The result of the SUM statement will not be stored in the PADB unless explicitly requested by the user.:

---

```
SUM, <name> /ADD= (<name1>, ..., (<name10>)[/STORE];
```

---

<name> is a string, max 26characters.

/ADD Specification of names of areas (and times) to be summed up. The ADD attribute can be given any number of times.

/STORE The resulting area and time will be stored in the PADB.

## SURFACE Statement

The purpose of the SURFACE statement is to name the calculated area and to specify the surface treatment for it. The statement may also may also invoke the result of an already stored surface.

The SURFACE statement must be followed by statements, specifying the names of the panels or surfaces to be calculated. Consequently, there is no automatic searching for panels to be included. This statement may also be followed by statements specifying the restrictions by which the given surfaces should be limited (see below).

However, the restrictions are compulsory only for the calculations of real surfaces (in the shell or in shaped decks).

---


$$\text{SURFACE, <name> } \left\{ \begin{array}{l} [/COMBINE] \\ [/OLD] [/NOSTORE] [<treatment>] \end{array} \right\};$$


---

<name> is a string, max 26characters.

/COMBINE means that the area should be combined with those of other surfaces. Consequently it should not occur as an entity of its own in the listings (cf. the COMBINE statement below). If not given, <name> will be output in the listing.

/OLD The result is fetched from the surface <name> which is stored in the PADB.

/NOSTORE The calculated area is not stored in the PADB.

<treatment> specifies the way the surface should be treated and its degree of complexity.

For each of the treatments (and methods) a default file of the program will

specify the basic time factor (see [Painting Area Calculation Default File](#)). In addition a difficulty factor may be applied (cf. below).

<treatment>::= [/FACTOR=<com\_factor>]

[/PAINTING [=<paint\_f>[/NUMBER=<no\_p>]]]

[/BLASTING =( <method>[<blast\_f>])]

[/CLEANING [=<clean\_f>]]

[/DERUSTING =( <method>[=<derust\_f>])]

[/AFTER\_TREAT [=<after\_f>]]

---

/FACTOR	Used to define a global difficulty factor.  <com_factor> which is assumed to be valid for all of the other items if not specifically given. The default value is 1.
/PAINTING	Specifies that painting activity should be included.  <paint_f> is the difficulty factor for painting if different from the global one (cf. FACTOR). /NUMBER specifies the number of times the painting should be performed. Default value for <no_p> is 1.
/BLASTING	Sand blasting activity is to be included.  <method> specifies the blasting method. The selected method must have been specified in the default file (see <a href="#">Painting Area Calculation Default File</a> ). <blast_f> is a difficulty factor for blasting if different from the common factor.
/CLEANING	Cleaning activity is to be included.  <clean_f> is a difficulty factor for cleaning if different from the common factor.
/DERUSTING	Derusting is to be included.  <method> specifies the derusting method. The selected method must have been specified in the default file (see <a href="#">Painting Area Calculation Default File</a> ). <derust_f> is a difficulty factor for derusting if different from the common factor.
/AFTER_TREAT	After treatment activity is to be included.  <after_f> is a difficulty factor for after treatment if different from the common factor.

Leaving out the <treatment> altogether would lead to a calculation of the area only and no times will be calculated.

**Example:**  
 SURFACE, 'Upper deck betw #75 and #90'  
 BLAST /DERUST /PAINT;

The upper deck is to be blasted, derusted and painted once.

### Limit Statement Syntax

The limit statements are used to define the restrictions of the given surfaces or to define the extensions of a room.

The limit is always valid in a certain direction (aft, forward, etc.). The total restriction in a certain direction may consist of one plane or surface only.

Each limit may consist of the shell/deck, a plane panel, a general plane or a principal plane.

A limit may also consist of a named curve in the shell/deck. The plane of a general plane curve may be used as an explicitly defined plane or as a plane defined by a panel. A general ("proper") space curve can be used only to restrict a surface in the shell.

If the limits are undefined in a certain direction this implies no restriction in that direction. (If the total area should be calculated of a given panel, then no restrictions need be given at all. The surface of a shell region must always be restricted).

### \*\_LIM Statements

---


$$\left\{ \begin{array}{l} \text{AFT\_LIM} \\ \text{FOR\_LIM} \\ \text{PS\_LIM} \\ \text{SB\_LIM} \\ \text{UPP\_LIM} \\ \text{LOW\_LIM} \end{array} \right\} \left\{ \begin{array}{l} \langle \text{princ\_pl} \rangle \\ \langle \text{gen\_plane} \rangle \\ \langle \text{panel} \rangle \\ \langle \text{surface} \rangle \\ \langle \text{curve} \rangle \end{array} \right\} ;$$


---

X

$\langle \text{princ\_pl} \rangle ::= \{ \quad Y \quad \} = \langle \text{coord} \rangle ;$

Z

$\langle \text{princ\_pl} \rangle$  defines a principal plane where a constant X, Y or Z coordinate is given.

$\langle \text{coord} \rangle$  constant x,y or z coordinate

`<gen_plane>::= /PLANE = (<x1, y1, z1>;<x2, y2, z2>; <x3, y3, z3>)`

`<gen_plane>` defines a general plane where `(x1, y1, z1)`,

`(x2, y2, z2)`, `(x3, y3, z3)` are three points in the plane.

`<panel>::= /PANEL = <name> [/REFLECT];`

`<name>` is the name of the limiting panel. If `/REFLECT` is given the panel is reflected in CL.

`/SHELL`

`<surface>::= { } [/NO=<number>];`

`/DECK`

`/SHELL` and `/DECK` specify the type of surface. If there is more than one shell or deck surface, then the surface number can be specified. If not given, the main surface / deck is assumed.

`<curve>::= /CURVE = <name> [/REFLECT];`

`<name>` is the name of the limiting curve. If `/REFLECT` is given the curve is reflected in CL.

All coordinates are real numbers, but *x*coordinates may be given as frame terms and *y* and *z*coordinates as LPterms.

#### Example:

```
AFT_LIM /X='FR107+50';
PS_LIM /SHELL;
FOR_LIM /X='FR120';
SB_LIM /PAN='AB123-4' /REFL;
```

## Selection Statement Syntax

The selection statements are used to specify the surfaces/panels to be calculated.

For a calculation, initialized by the SURFACE statement (cf above), it is necessary to specify **all** the surfaces/panels to be calculated.

For the calculation of a room, the parts to be calculated are supposed to be selected automatically, unless otherwise stated. However, a part of the shell to be included must always be requested by the user, even if the shell has been specified as a limit.

Curved panels may be treated as well. Such a panel will always be calculated as a whole, without taking into consideration the limits. If the limits should be taken into account, then the surface should be specified via the SHELL statement (see below).

Only the parts of plates, profiles, etc. located within the given limits will be included in the calculation.

If a plane panel is parallel to, and within a certain distance from, a given



limit in a room, then by default only the inwards side will be calculated.

#### DECK Statement

The DECK statement specifies that the calculation of a deck surface should be included. In such a case, the surface must always be restricted in all directions.

---

```
DECK [/NO=<number>] [/SIDE=<direction>] ;
```

---

/NO <number> specifies the surface number (if not the main deck).

/SIDE specifies the side of the surface. If not given, both sides are calculated.

<direction>::= AFT | FOR | PS | SB | TOP | BOT

#### NO-AUTOMATIC Statement

The NO\_AUTOMATIC statement is used to inhibit the automatic selection of panels in the current room. It is relevant only in relation to a room calculation.

Curved panels are never automatically included.:

```
NO_AUTOMATIC;
```

---

#### PANEL Statement

The PANEL statement is used to explicitly include (or exclude) a given panel in (from) a certain calculation. Further, a certain side of a panel may be specified.

---


$$\text{PANEL, <name> } \left\{ \begin{array}{l} [/EXCLUDE ] \\ [/PS | /SB | /BOTH] \\ [/SIDE=<direction>] \end{array} \right\};$$


---

/EXCLUDE means that the given panel should be excluded from the calculations. This attribute is relevant only in relation with room calculations.

/PS /SB /BOTH are mutually exclusive and define the ship side of the symmetric panel for which the calculation should be performed.

/SIDE The side attribute specifies the side to be calculated if only one side is painted. Otherwise, both sides will be calculated unless a panel coincides with a limiting plane.

<direction>::= AFT | FOR | PS | SB | TOP | BOT

The SIDE attribute is assumed to be valid for both ship sides of the given panel if the attribute BOTH has been given. Otherwise two statements must be given.

## SHELL Statement

The SHELL statement specifies that the calculation of a shell surface should be included. In such a case, the surface must always be restricted in all directions.

---

SHELL [/NO=<number>] [/SIDE=<direction>] ;

---

/NO <number> specifies the surface number (if not the main surface).

/SIDE specifies the side of the surface. If not given, both sides are calculated.

<direction>::= AFT | FOR | PS | SB | TOP | BOT

## Miscellaneous Statement Syntax

These statements handle the PADB and the output lists for testing purposes.

### DELETE Statement

The DELETE statement may be used to delete any record from the PADB.:

---

DELETE, <name>;

---

<name> is a string, max 26characters.

### PART\_LIST Statement

The purpose of the PART\_LIST statement is to produce a detailed listing of the area of each part for testing and checking purposes. The detail level can be specified. If the PART\_LIST statement is omitted no detailed list will be produced. If the statement is given twice (with different level) both types of list will be created.

---

PART\_LIST , <name> [/LEVEL = <level>];

---

<name> is a string, max 80 characters, used to set the name of the list file.  
The default directory is SB\_SHIPPRINT and the default extension is .LST.

/LEVEL Used to define the level of the listing. Valid values for <level> are:

= List only those objects that were marked as panels (not including  
1 bracket panels).

= List all objects.

2

= **Only interactively**

3

One list with level 1 and one list with level 2 will be produced. The corresponding file names are <name>\_<level>.LST.

The default value is 1.

### - Example

Below follows an example of an input scheme for calculation of one room and one surface, which then are combined into one area.

```
Example:
ROOM, 'SIDET_1' /COMBINE;
!
! Limits
!
      AFT_LIM  /X=FR170;
      FOR_LIM  /X=FR180;
      SB_LIM   /Y=12300;
      PS_LIM   /SHELL;
      LOW_LIM  /PANEL='AA1234';
!
! Panel to be excluded
!
      PANEL, 'AA2345' /EXCLUDE;
!
! Calculate surface separately with modified limits, add one panel
!
      SURFACE, 'SIDE_SHELL' /COMBINE;
!
! Limits
!
      AFT_LIM  /X=FR170;
      FOR_LIM  /X=FR180;
      LOW_LIM  /PAN='AA1234';
      UPP_LIM  /Z=8000;
!
      SHELL;
      PANEL, 'AA3456' /SIDE=PS;
!
! Combine the results
!
      COMBINE, 'Total area, side tank' /ADD=( 'SIDET_1','SIDE_SHELL');
```



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[Interactive Tribon Planar Hull Modelling Functions](#)

## • 油漆面积计算缺省文件

### – General

This appendix specifies the input format for the time factors upon which the calculation of estimated time for different activities is based.

The input syntax is supposed to be written in accordance with the general input format as described in the *Tribon User's Guide Basic Features, Getting Started, Tribon Interpretative Language (TIL)*.

[See Also](#)

In the syntax and the examples below the keywords may be abbreviated according

to the general rules of TIL.

#### - Default File Statements

##### PAINTING Statement

In the PAINTING statement the time factor for painting an area is specified.  
PAINTING, <real>;

---

<real> is the time factor, given in minutes per square meter.

##### BLASTING Statement

In the BLASTING statement the different methods for blasting an area and their corresponding time factors are specified. The statement should be given once for each of the used methods.:

BLASTING, <name> /FACTOR = <real>;

---

<name> is the name of the method with maximum 32 characters.

/FACTOR <real> is the corresponding time factor, given in minutes per square meter.

##### CLEANING Statement

In the CLEANING statement the time factor for cleaning an area is specified.  
CLEANING, <real>;

---

<real> is the time factor, given in minutes per square meter

##### DERUSTING Statement

In the DERUSTING statement the different methods for derusting an area and their corresponding time factors are specified. The statement should be given once for each of the used methods.:

DERUSTING, <name> /FACTOR = <real>;

---

<name> is the name of the method with maximum 32 characters.

/FACTOR <real> is the time factor, given in minutes per square meter.

##### AFTER TREAT Statement

In the AFTER\_TREAT statement the time factor for after treatment of an area is specified.:

AFTER\_TREAT, <real>;

---

<real> is the corresponding time factor, given in minutes per square meter.

## PANEL\_LIMIT Statement

In the PANEL\_LIMIT statement the maximum distance between a panel and a limit is specified. If a panel is situated within this distance from a limit only the inside will be treated.

PANEL\_LIMIT, <limit>;

---

<limit> is the maximum distance in mm.

## DISPLAY\_DEFNAME Statement

The DISPLAY\_DEFNAME statement is used to control the appearance of the default file name in the forms used in the interactive mode. If given, the file name will be presented.:

DISPLAY\_DEFNAME;

## DISPLAY\_PADBNAME Statement

The DISPLAY\_PADBNAME statement is used to control the appearance of the data base name in the forms used in the interactive mode. If given, the file name will be presented.:

DISPLAY\_PADBNAME;

### - Example

**Example:** PAINTING, 1  
BLASTING,           `SA2.5` /FACTOR=2;  
  
BLASTING,           `PSA2.5` /FACTOR=3;  
  
BLASTING,           `PSA2.0` /FACTOR=4;  
  
CLEANING,           5;  
  
DERUSTING,          `ST2` /FACTOR=3;  
  
DERUSTING,          `ST3` /FACTOR=4;  
  
AFTER\_TREAT,        3;  
  
PANEL\_LIMIT, 1      0;  
  
!DISPLAY\_DEFNAME;  
  
!DISPLAY\_PADBNAME;



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## 7 模型的平面视图 - TBHMDWG



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[模型平面视图 - TBHMDWG](#)

### 7.1 视图生成的概述

TPHM包括生成平面视图在背景经TBHMDWG, 结果视图应具有相同得种类, 并包含相同得信息, 并可交互获得TPHM功能。VIEW/CREATE 或 VIEW/DETAIL (见图中的信息及信息结构。)。TBHMDWG 然而结果子图应储存于子图数据库 (SBD\_PICT) 在以后的阶段, 包括在图中。

也可能再生已存在的图, 更新所有模型视图, 在交互TPHM中, 相应为VIEW/RECREATE

在程序在 Tribon Job Launcher中, 调用程序 SJ002

缺省文件的名字为 SJ002.SBD , 可包含在 [Default File of Tribon Planar Hull Modelling](#).



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### 7.2 输入

输入程序可以任意名的文本文件, 当开始程序时给出文件名。缺省目录是 SB\_SHIPDATA.

输入以特殊语言如下



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## 7.3 结果

结果是储存在逻辑名 SBD\_PICT相关的数据库。当一个清单文件创建, 包含可能的语句错误, 文件名为 SB<jobno>.LST。日志文件为 SB<jobno>.LOG。



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## 7.4 语法

此种解释用的一般原则在单独文件中描述

[Basic Features Getting Started Tribon Interpretative Language \(TIL\)](#)

:

[ ] 选项 (仅用, 其中一个必须选择)

... 进行术语可重复几次

{ } 选择

< > 数据



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## 7.5 语句类型

包含如下语句类型

NAME 创建新的子图名  
 PLANE 定义模型的图纸平面  
 LOOKING 定义方向, 模型认可与图形平面相交  
 DEPTH 定义图纸深度  
 LIMITS 限制模型空间的边界  
 SELECT 定义分段、板架及曲线  
 RECREATE 自动更新图


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## 7.6 Scheme 语法

在输入文件中可生成不同的语句类型:

```
{ NAME PLANE [LOOKING] [DEPTH] [LIMIT] SELECT }...
```


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## 7.7 语句语法

完整的语法将在下面描述


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### 7.7.1 NAME 语句

```
NAME, ' <name of resulting view>' [/SCALE= <scale factor>];
```

<name of resulting view> 是数据库中结果图名

<scale factor> 是当创建结果图时应用所有信息的一个可选比例因子。如果没有给定将使



用缺省1



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## 7.7.2 PLANE 语句

---

```

, <x1>, <y1>, <z1>, <x2>, <y2>, <z2>, <x3>, <y3>, <z3>

, CL [+<value>]

, BL [+<value>]

, FR<frame no> [+<value>]

PLANE {, X:=<x-coordinate>                                X};

, Y:=<y-coordinate>

, Z:=<z-coordinate>

/PANEL='<panel>' [/REFLECT] ->

/BRACKET=<bracket no>

-> [ { /STIFFENER=<stiffener no> } ]

/FLANGE=<flange no>

/CURVE='<curve_name>' [/REFLECT]

```

---

<x1>, <y1>, <z1>, <x2>, <y2>, <z2>, <x3>, <y3>, <z3> 是三点确定一个平面, 这里 <x1>, <y1>, <z1> 是图的坐标系统的原点, <x2>, <y2>, <z2> 是U轴上正数的点, <x3>, <y3>, <z3> 是V轴上任意正数的点

CL [+<value>] 表示一平面垂直于给定y坐标的y轴, <value> 是正实数

BL [+<value>] 表示一平面垂直于给定z坐标的z轴, <value> 是正实数

FR<frame no> [+<value>] 表示一平面垂直于给定肋位号的x轴, 如果 <frame no> 是一负数或包含十进制, 实际肋位术语必须由撇号(')包围, 例 'FR105.5'+100.

X:=<x-coordinate> 表示一平面垂直于给定坐标的x轴

Y:=<y-coordinate> 表示一平面垂直于给定坐标的y轴

Z:=<z-coordinate> 表示一平面垂直于给定坐标的z轴

<panel> 是定义图平面时的板架名

REFLECT 是一选项用来被反射位置板架定义的平面

<stiffener no>, <bracket no> and <flange no> 是板架上构件的组合数字

<curve\_name> 是保存在SB\_CGDB 中的曲线名



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### 7.7.3 LOOKING 语句

---

```
PS
SB
AFT
LOOKING, { };
FOR
TOP
BOT
```

---

PS 表示向左舷看

SB 表示向右舷看

AFT 表示向后看

FOR 表示向前看

TOP 表示向上看

BOT 表示向下看

如果没有给定, 相关的缺省值将被使用



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### 7.7.4 DEPTH 语句

DEPTH, <distance 1>, <distance 2> ;

<distance 1> 图上平面前的距离

<distance 2> 图上平面后的距离

如果无给定就对两者使用缺省值100



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### 7.7.5 限制语句

---

LIMITS, <xmin>, <ymin>, <zmin>,

<xmax>, <ymax>, <zmax>

{ [XMIN= <xmin>,] [YMIN= <ymin>,] }

[ZMIN= <zmin>,] [XMAX= <xmax>,]

[YMAX= <ymax>,] [ZMAX= <zmax>,]

<xmin>, <xmax> 用来沿X轴的限制.

<ymin>, <ymax> 用来沿Y轴的限制.

<zmin>, <zmax> 用来沿Z轴的限制.

如果沿一个轴无限制坐标, 在此轴上将没有限制被使用.

---



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### 7.7.6 选择语句

---

```

/AUTOSELECT [/BEXCLUDE=(' <block>',...)] ->
SELECT {
    [/PANEL=(' <p>',...)] [/BLOCK=(' <b>',...)] ->
->    [/PEXCLUDE=(' <panel>',...)]
        }->
->    [/PEXCLUDE=(' <panel>',...)]
        CUT
->    [/SHELL [= { NONE          }] ] ->
        EXISTING
        (' <curve>',...)
        PANELS NONE
->    [/PROFILES={          }] [/NOPLANEVIEWS] ->
        DRAWING
->    [/NOINTERSECTIONS] ->
->    [/AS1=(' <a>',...)] [/AS2=(' <a>',...)] ->
->    [/AS3=(' <a>',...)] [/AS4=(' <a>',...)];
```

---

/AUTOSELECT 指定分段及板架，在图形的平面上或与之相交，应被自动选择。

/BEXCLUDE 及 /PEXCLUDE 分别指定分段和板架，被排除在自动搜索外。

/PANEL 及 /BLOCK 在图中选择指定板架及分段。

/SHELL

CUT 指定外板曲线应源于船体型线与平面的相交。

NONE 指定外板曲线不画出。

EXISTING 指定如已经存在于数据库中相应的结构、船体纵剖线或水线将被使用，否则外板曲线是相交的。

许多的曲线名(<curve>) - 最大12 - 能被给定在语句中，曲线假定已经存在数据库中。

/PROFILES

NONE 指定外板型材横截面不画出。

DRAWING 指定外板型材应和外板曲线一起画出（这是缺省）。

NOPLANEVIEWS 指定无板架平面视图画出。

NOINTERSECTIONS 指定无板架横截面画出。

/AS1, /AS2, /AS3 及 /AS4 定义当创建视图或概念是使用遮蔽, 在模型平面中指派这些关键字。



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### 7.7.7 再生语句

RECREATE, '<d>',...;

<d>表示图形的名字。可使用通配符, '\*'可代替许多字符, 而 '%'代替一个字符。



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## 8 模型的生成、概述

此章表示系统主要功能的总的看法, 即创建一个3D模型, 详细的名称及限制在相关的章节中给出。



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[模型产生, 概述](#)

### 8.1 板架

3D模型的基本元素是板架, 板架有几个目的, 一个是主要数据储存容器, 如板架被激活创建、储存并跳出。板架在SB-OGDB中表明自身。当创建一个新板架时, 板架被收集在分段中, 但分段的处理被限于拾取板架所属的分段。

另一个板架的目的是创建其零件的模型上下文。零件可以是缝、板、扶强材及肘板，在3D板架模型可用的零件被描述于下述设计语言，板架总有一个位于主板内的平面及封闭的外形叫边界。在3D建模中，参考边界及平面频繁进行，如一个扶强材总附于板的表面，常与板架边界相连。

零件生成在组内，在一个组内的零件具有相同的类型。享有大多性质，除了板架的位置，当更改或删除零件，实际的组将受影响，当然，组能包含一个特殊情况，一个零件。

虽然板架目标是一个数据容量，这边有描述板架的补充方法，这可使用设计语言文本文件（hlscheme），能充分明了地表达板架的品质。一个输入scheme文件及板架目标完整的描述了板架，可用输入scheme创建。

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## 8.2 The Input Scheme

一个scheme仅描述一个板架

为文本文件，可以不同的方式建立及修改：

- 任一计算系统编辑器能在单独的过程中创建或修改scheme
- TPHM能抽取scheme用以检查
- 输入scheme能被创建，如缺省文件中加入了scheme-create时，当储存板架时写至一个文件

一个输入是在TPHM外主要是两种，一个是scheme-input，任一错误将与scheme文本一起显示

另一个方法是后台生成scheme-gen在后台，多个板架能选，这些文本可用JL访问。

当选择一个scheme在逻辑名 SB\_SHIPSCH 目录下

常规对于相似板架，仅拷scheme文件并修改它，INPUT-SCHEME能自由选择。

SCHEME由一定的语法组成，一些为板架特征，其它为零件组

TPHM设计语言 详见第三章（THM的设计语言）

一般板架生成相关结构，如强肋骨。该环境应在屏幕上显示。

然而也可生成作为单独板架。这当scheme-input为当前屏无图时使用。



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## 8.3 输入

可交互或SCHEME输入TPHM

一般参考数据库内的信息, 可为船形、板架等。

输入系统的静态特征为不同的缺省文件信息, 当开始新语句时创建。这些文件当开始之时, 读入系统。



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## 8.4 结果

根据运行模式, 生成阶段的结果可有些不同, 操作者对于某种程序上讲, 控制类型及生成的信息量。

下述项目也可生成。

- 板架
- 源于板架图既可为单独目标或为视图及图的一部分
- 生成肘板的单独图形。
- 创建或更新输入scheme。
- 列出生成的板架
- 打印生成板架
- 更新视图, 一个视图, 不必是一个图的一部分。

在后台模式, 系统将自动储存板架, 板架子图及肘板, 制造图和清单

在交互模式, 所有信息被保存, 并由操作者控制, 用户可很好地生成一个板架, 使它包含在图中等。没有存任何信息, 还生成除临时子图外的任一文件。

一些信息如下: 在不同的信息方面, 在生成阶段生成, 进一步节点在不同的模式下描述。



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### 8.4.1 板架

板架按下述协定及相关的信息储存, 如:

- 孔
- 缝
- 板
- 加强筋
- 肘板
- 切口

在板架内, TPHM也为储存的平台, 可在板架生成零件及生成的scheme文件之间连接

在板架生成时, 系统可在结构数据库内生成标准肘板节点



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### 8.4.2 子图

一般, 系统与板架生成平行, 也生成一个板架子图, 所有不同的零件按一般绘图标准.

板架子图的内容在单独生成的板架及一个生成视图的板架之间不同, 在后者没有单独的板架子图被存

肘板可以用下述不同的方法来画 :

- 在板架同平面的肘板与板架一起画
- 肘板与板架有角度的根据型线显示
- 肘板不与板架一起画 (不是标准肘板), 将一起套料, 并存在单独视图中

当时板在图中生成既可按型线, 也可按外形画, 这需根据与视图的不同方向

子图名中板由以下述方面生成。 :

- 对于板架子图加一个\* (#P)
- 对于肘板加上货币符号 (#B)



子图目标被存于单独子图数据库, 也可取回。如板架UPDATE模式。



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### 8.4.3 输入SCHEME

SCHEME可全部在系统内创建, 如已在系统外EDITOR创建, 在存前应更新。

更新由更改, 在执行时的操作者进行 (仅在交互模式下)



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### 8.4.4 清单

在后台模式下, 系统除非另外要求生成一个清单、文件, 也包括错误信息及SCHEME。

在交互模式, TPHM创建相同的清单根据操作者要求, 一般在SCHEME结束时, 在常规文件中的清单, 名字与LST中的文件应相同。

例如:

如abc1234.sch清单为abc1234.lst

该清单包括不同的信息:

- 在一个框架下的输入scheme识别的空白头
- 在系统信息表格下scheme的log执行
- 一个加标签的scheme
- 列出板架的内容, 这已从scheme中生成, (这也能由input影响)

在语句执行的错误以文本写出。



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### 8.4.5 打印

生成板架及单独肘板的子图。如存在Tribon打印文件下, 给以任意名打印。当在后台下运行, 系统自由创建子图的打印。(除非输入是说明) 在交互模式, 打印总由操作者控制生成

打印名是:

- 对于板架为板架名 (如AB123-4)
- 对于单独肘板图, 板架名直接以-BKT (如AB1234-BKT)



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### 8.4.6 图

当交互生成视图, 可单独保存或存于图中, 当生成板架子图更新时自动更新。



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## 9 按模式生成模型

TPHM一般在交互模式下进行, 还有当图进行, 生成阶段。然而, 系统的模型生成部分也可在后台运行LTBMGM, 某种限制适合于相关的任务。

- TBHMGEM仅生成输入SCHEME的板架, 在系统开始起动前
- 板架能仅以单独单元生成, 见交互模式。

巨型板架也可按批模式分成生产用板架。

当在后台运行TBHMGEM, 由JL起动

缺省文件为SJ011.SBD, 包含建模时的缺省值Default File of Tribon Planar Hull Modelling.



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## 9.1 输入

SCHEME文件可由JL收集, 形成输入文件, 如一个板架, 在板架已存在时使用, 它将由一个SCHEME生成的新板架代替。



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## 9.2 结果

生成的板架、板架子图、肘板模式子图, 清单, PLOT在模型生成概述中。



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## 9.3 错误处理

当抽取图形信息生成模型, 解释输入宏时可能产生错误, 错误将登记并在合成清单中, 系统可处理单独的语句, 但一些语句可能引起接下来语句的错误, 尤其如在PANEL或BOUNDARY语句中, 进行SAVE之前发生。

除了实际错误、系统也可生成警告。当违反时, 警告可生成零件, 而错误不能。



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## 10 交互模式模型生成

TPHM一般在TB工作中交互运行，这仅可能在单纯的图形开发下。然而，它也是模型生成阶段的运行模式。

不同型式下的交互特征能使用：

- 对于一般的图形活动，如生成目标的零件放大
- 对于生成板架的项目识别如个性零件
- 作为一个交互板架建模的帮助
- 所有一般绘图功能，还有TPHM的视图生成功能，即使有单独的模式下



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### 10.1 交互运行系统

WORKSPACE包括图中的不同视图如3D或符号视图。

目标及零件的拾取在交到时一般由这些视图生成，与形式无关。一般在所有视图中亮显

在目标或零件的创建功能，这些目标在所有相关视图中出现，然而注释由VIEW-SELECT控制

虽然workspace是图，当不必有form，这对图的创建、删除、保存也较方便。



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#### 10.1.1 两种模式

对于交互生成的两种模式（单独成视图，生成板架子图的内容是不同的。

因为一个或多个板架能在两种方式下进行，当用相同的input-scheme必须对两种模式有一

个基本的了解。

在两种模式时, 选择由系统自动进行, 如激活一个图, 图生成, 否则, 选择单独生成。



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## 10.2 单独生成一个板架

在这个板架开始生成时空屏, 这个板架子图生成, 如零件的生成, 环境的部分被显示是边界的横截面, 生成的结果是相同的, 当在批模式下进行 (见模式生成, 批模式) 仅有较小的偏差。

- 系统的方向 (见TPHM的设计语言) 不在交互模式下工作。
- 生成的输出总在直接操作者控制下产生 (更新模式及输入SCHEME, 打印及列表)

当然, 操作者能从相关错误的交互作用获益。

某些方面, 与视图中单独生成不同, 着重如下:

- 生成单独的子图, 包含一个肘板属于板架的模式。
- 板架子图包括所有边办及相交型材的横剖面自动为每一板架计算
- 次序数 (S—和F—数) 为扶强材及法兰显示
- 板架子图在板架的W系统内描述, 从W正向看。
- 当保持板架在模型数据中, 板架子图及时板子图, 同时存在子图数据库中



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### 10.2.1 可用菜单功能

这里对单独生成在图中生成的菜单功能没有不同

另外, 所有开发功能也可在单独生成中可用, 然而在处理文本如尺寸, 文本高度设至模型坐标, 否则, 它将太小 (设置值为100mm左右)

单独生成视图功能也可用。



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## 10.3 在视图中生成一个板架

在TPHM, 板架能生成所属上下文, 视图也可作为图的一部分或单独, 一个图可包括几个视图, 如几个强肋骨, 板架也生成所选视图, 缺省所有图视图被选择, 但它能被“Planar—View—Select”功能。



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### 10.3.1 限制

这有几个限制在一个视图的输入Scheme:

- 每个板架域(如板架语句)可处理一个板架
- Scheme应仅有一个(主要)板架域。



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### 10.3.2 视图的选择

当生成一个板架, TPHM检查与视图平面相关的板架位置及方向, 两个可能性存在:

- 板架至少在视图平面, TPHM, 如必要, 板架子图, 在视图平面上, 选择视图方向(影响线型等)
- 板架与视图平面相交, TPHM相交板架与图纸平面及相关的零件, 如它们通过平面视图

当在一个视图中生成时, 一个板架一般在视图平面内生成, 在某种更新状态状态, 然而它可以有益于也生成一个相交

TBG0视图, 总是投影一个板架还有具体的视图平面。



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### 10.3.3 平面视图子图

当生成一个平面视图, 板架子图对于单独的生成子图非常相似:

- 在视图子图可因投影被破坏
- 图的“正面”可为板架的反面, 引起不同的扶强材、肘板等线型
- 在视图中, 大多数单独板架子图的视图已预先存有, 回此, 这信息可在板架上为空, 如板架周界内有扶强材、纵骨、横材的横剖面
- 子图上没有余量材料
- 扶强材及面板的S—、F—号被位置号代替, 如没有, 他们一般储存在一个可空出的层
- 没有单独的肘板子图生成

仅从这些事实, 它是明显相同板架子图单独生成在一个视图中, 彼此不可交换



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### 10.3.4 SCHEME输入

当由SCHEME输入生成一个板架, 板架子图从开始创建时, 为防止与已存在子图板架混乱, 子视图被去掉。



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### 10.3.5 激活已有板架

当激活已有板架，大量不同的状态可能发生：

1. 板架被明显包含在视图中
2. 板架已在视图中存在，但数据库中的模型是后于最新保存版本或模型后于目前部分的启动时间
3. 板架模型比图中的旧

在case1或2，一个板架子图新版自动生成确保与模型对应，这要求一些时间

case3与目前板架子图相连.



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### 10.3.6 实施图纸功能

在生成视图时正常一个视图（或图）在屏幕上，然而可用正常的图纸开发功能，在两种状态以输入scheme进行



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## 10.4 输入scheme，模型及板架子图的完整性

一个或多个板架被单独生成或在视图中（如板架以交互或后台模式没有区别），这可能引起问题

如，下述事件的次序：

- 板架被单独生成及板架的接收子衅被存在数据库中
- 视图的板架被创建
- 在视图中板架经生成时进一步更新，板架的更新版被存于数据库中

如上指出，板架子图在视图中生成，对一个板架子图不可交换，因此没有板架子图存在后者的情况，为确保模型及板架子图的完整性，Tribon板架船体模型删除从一个已存在的板架接受子图在数据库（及如有肘板子图属于它）

下述一个接受一个不同行动的总结，以维持板架模型及板架的子图完整性



- 当保存图中生成的板架，单个板架及时板图被从数据库中删除
- 当如此板架单独生成，板架子图丢失，TPHM自动从模型中再生子图
- 同样地，当在更新模式下建一个现存板架的模型，它可能子图比储存的板架模型旧，TribonPHM生成板架子图

然而，可能取得不一致的模型版本及没方向的子图

- 为了生成一个视图，更新并储存视图，而不存更新模型，TPHM不会探测它，后者更新时可能引起问题
- 一个通常方法单独更新板架或在一个视图更新，忘记使其它视图更新。如纵舱壁可能存在于我个肋位上
- 然而每次板架在一个视图更新，系统探测并再生子图

在所有情况可更正状况由：

- 再生模型（不是所有情况都必要）
- 模型再生板架子图(例在功能“Planar-View-Recreate”及“Planar-View-Modify”中)。操作可批处理见文件在 TBHMDWG.



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## 11 交互建模

在TPHM中板架能以多种方法创建或更新，下述为如何交互创建板架。



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### 11.1 如何交互输入

菜单Model-Create用于开始该功能，此功能操作者被指导不同的路径

缺省以Input创建，并加至已存在板架，者表示操作者需创建一个新的板架，这由Option提示显示一个板架

Raner-Model-Create表示一个板架，边界及零件是以正确的次序而不同的零件语句的次序

由操作者负责。

当不同的零件创建, 信息被部分键入, 而切实可行的, 这也有可能支出所选项目, 如一个曲线或板架被使用作为一个边界, 沿一个边界设定一个扶强材, 型材部分而生成切口等。

在许多情况, 几个项目可选择如几个型材部分, 一个识别项目一般以更新模式重复

在用标准功能QUIT, OC及CANCEL如下:

QUIT

目前生成的零件完全删除TPHM进行命令模式

OP. COMPLETE

在某一状况如位置定义, OC终止程序

CANCEL

在拒绝之前给出的输入将被取消

重复取消将引起由输入取消输入自至整个零件被取消

如一种状态, 几个位置已被定义, 各个识别已做TPHM将回至最后一个

一个空回车党HPHM要求键入时为Cancel



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## 11.2 点及线的定义

在TPHM的板架模型中允许点及线被以大量的方式设定, 选取坐标系、端点等, 定义位置及线时P-M-C在相同的可能性存在, 另外, 大多数情况, 一种选择路位置被键入或它是否以十字光标指出, 概述状况, 缺省位置即可键入, 也可点出对于板定义, 正常是用光标选区, 当定位一个孔时, 而定位孔时光标选取是不够的。缺省是键入

在所有状态, 图形活动被使用, 它可在两种模式下转换:

- 当键入时按空回车
- 按CANCEL

当坐标被键入及点在视图中识别可用Create参考拓扑如下

如任一位置已定义, Cancel将回至最后给定值, 当所给值已为空时, 模式开关被发生

如可能, 键入的点及线被显示

如一些点应键入, 这由几种可能性。点被X及Y坐标定义和它们是 (1, 10) (2, 10) 及 (3, 10).

## Example 1

X:1 <ret>

Y:10<ret>

X:2 <ret>

Y:10<ret>

X:3 <ret>

Y:10<ret>

X: ;

相应坐标可成对键入

在如此次序的结尾可以分号键入

## Example 2:

X:1-3<ret>

Y:10 <ret>

X: ;

## Example 3

X:1,2,3<ret>

Y:10 <ret>

X: ;

两个最后的例子表示一个回车几个项目或重复术语能键入

## Example 4:

X:1-3<ret>

Y:10 <ret>

X:5 <ret>

Y:11;<ret>

允许组合将出现下述结果:

... X = 1-3, 5, Y = 10, 10, 10, 11

**注意:** 坐标对必须以 “; ” 结束, 第一个坐标回车将出现第二个对

孔回车可为CANCEL, 即最后一个输入对被收回.

FR、LP术语能键入



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### 11.2.1 参考拓扑点



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- 键入点参考

每一个地方坐标能被键入，也可见如一个术语参考拓扑点，，这能有完整的FR、LP术语分析来进行。

例：

P5

P1-100

P10(2)18 +200

这些类型的参考能用于坐标及与点相关某方向角的参考

当键入方向角TA- or TB-terms可用

例：

TA1()5 (equal to P1()3)

TB10(2)18

当键入参考相同的拓扑点，如u, v及T(或 x 及Y, 等)，足以为第一个输入（如U），空回车为第二个（如V）等，表示相同的参考将自动拾取。



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- 拓扑点的拾取

如你转由在视图中点取位置，它可能自动由创建拓扑点参考。第一个点定义模式为“已存在”，然后拓扑点的点，拓扑参考在所取点拓扑点将被创建。

(这是目前在此没有方向角采点取点)



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## 12 巨型板架及巨型板架的分离

由甲板、舱壁、纵桁等组成的框架，框架尺寸及位置在设计早期阶段，当然，它被描述为一个相当粗的等级，在此阶段，主要结构是主要从视图的功能性点构造节点被仅考虑至有限的范围。例如：生产分隔不可以生成。然而，主要结构在模型生成时起主要作用，因为它们将组成由腹板支撑的框架

TPHM提供了处理架板、舱壁灯的可能细能够，作为一个大单元，称作巨型板架也可分成的生产单元。



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[巨型板架及巨型板架分离](#)

### 12.1 巨型板架与常规板架

从技术的观点，在巨型板架及常规板架之间没有区别，它们以完全相同的方法生成，这也表示巨型板架与其它板架具有相同的限制，即不可有折角且位于同一平面内。

一个可能的巨型板架的定义为“巨型板架是一个初始版本，在后可能分成生产单元”

某段间隔为巨型保留了数据类型，巨型板架的数据类型必须在[800, 899]

在一个巨型板架分割生成尺寸板架，一个或多个板件可被巨型板架描述，且被一个常规板架

因此，建议收集巨型分段至相应的分段，以便在不同状态下分类，也可让巨型板架属于不再目前船正常结构中的分段。

常规分段包含限制量，巨型分段可包含甲板并延伸至船的大部。如此分段也可认为保持组织路而不是几何单元，然后，空间限制必须包含所有结构



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## 12.2 巨型板架分离

巨型板架分成生成板架，生成的板架如常规板架叫做part panels



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### 12.2.1 前提条件

当一个巨型板架被分离，它必须与其余板架一起可用

一个零件板架至少包含一个边界，分离时所有附加零件被去除，从巨型板架中的零件被替代。



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### 12.2.2 结果

巨型板架分成零板架

基本的零板架被定义名字、位置及外形，TPHM检查所有巨型板架上的零件，这些完全或部分在板架将移至子板架。

穿过子板架边界的扶强材将在边界处被分隔

在分离后，巨型板架与子板架没有逻辑连接。因此，他们彼此单独更改，用户应对差异引起的问题负责

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### 12.2.3 模式的选择

巨型板架是生成模型的一种方法，像其它正常模型生成一样，在以前章节中已描述。既可在批模式也可在交互模式分离

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### 12.2.4 批模式

在批模式，批处理文件的使用，允许分离的信息及产品生成和/或巨型板架混合

另外，如对前述的批文件，可包含具体的巨型板架分离的命令，他们是%SPLIT和%END。命令及数据输入为每行一个

%SPLIT命令开始分离，%END为终止。在这两个命令外，TPHM工作在正常操作模式外。

在两个命令之间的数据是：

1. 巨型板架名
2. 一个或多个子板架SCHEME名，每一个SCHEME必须包含三个语句
  - IDENT
  - PANEL
  - BOUNDARYCOMMENT及CURVE命令是允许的，如在BOUNDARY之前输入所有紧跟BOUNDARY的语句被删除

一套数据将引起巨型板架的分离，如超过一个巨型板架被分隔

由此两个部分的一个新设定应被输入

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## 12.2.5 交互模式

对交互模式相同的要求及批模式的基本行为是有效的

交互巨型分离从JUMBO SPLIT开始在PLANAR PANEL菜单, 为使用此功能, 包含巨型板架的必须存在, 子板架包括边界由指出巨型板架, 然后是子板架, 最后分离开始

如分离成功, 图形视图更新为包含子板架



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# 13 图中信息及信息结构

图中信息为模型视图是组织良好的结构, 一个结构部分对用户是清晰的。然而, 系统的有效使用要求大量概念的基本知识及图中结构的基本理解。这章用以给出基本的理解

所有图中信息属于一个单元, 当图存于数据库中, 图本身被分成大量视图



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## 13.1

视图可以为:

- 图形FORM
- 模型视图
- 草图视图

一个视图及所属信息能被作为一个单元处理, 如能被作为一个单元删除移动





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### 13.1.1 图格式

图FORM一般取自一个标准数据库，并包含表格，标准文本等，在TPHM中的图形表格也能被创建



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### 13.1.2 模型视图

模型视图被定义为一个由3D模式生成的子图，它可包含大量的模式零件。在Tribon平面建模时，两种不同的视图存在，TPHM模型视图及TBGD视图，他们不同的船体零件出现，但信息被安排在相同的树状结构中

所有包含变换及信息的模型视图，使之可能更新他们以新或更改的模型目标



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### 13.1.3 模型子图

每一个出现在模型视图的目标，由一模型子图出现，模型目标的零件出现，并在模型子图内，使之可访问任何模型目标在模型视图中

作为单个子图，TPHM模型视图起初包含下述信息

- 板架平面视图
- 板架相交子图
- 外板相交曲线
- 外板型材

不同类型的子图的内容描述如下



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### 13.1.4 平面板架、平面视图

平面板架的平面视图包括：

- 板架外形（切口、切角以外）
- 切口及切角
- 孔
- 沿缝带坡口符号的板架上的缝，缝在孔中不画出

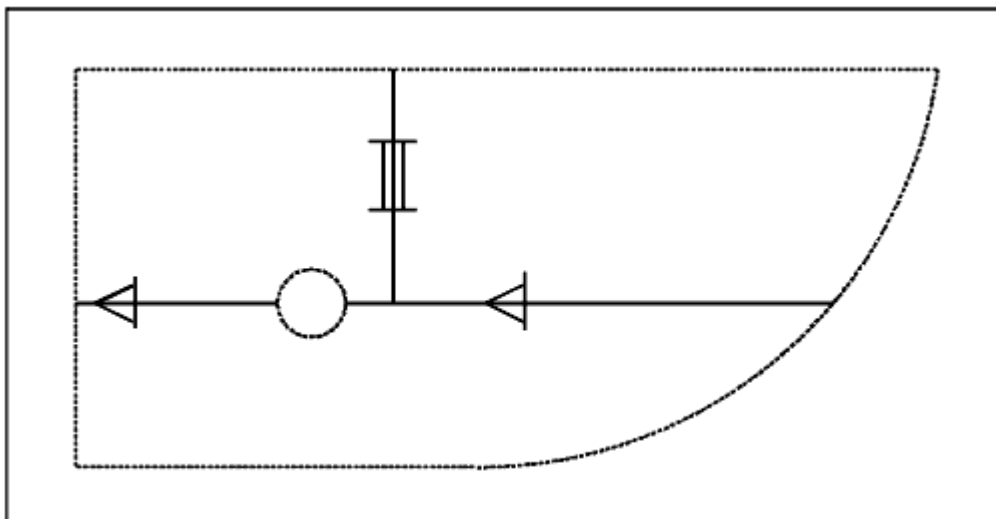


Figure 13:1. Seams in a view.

- 沿外形的坡口符号

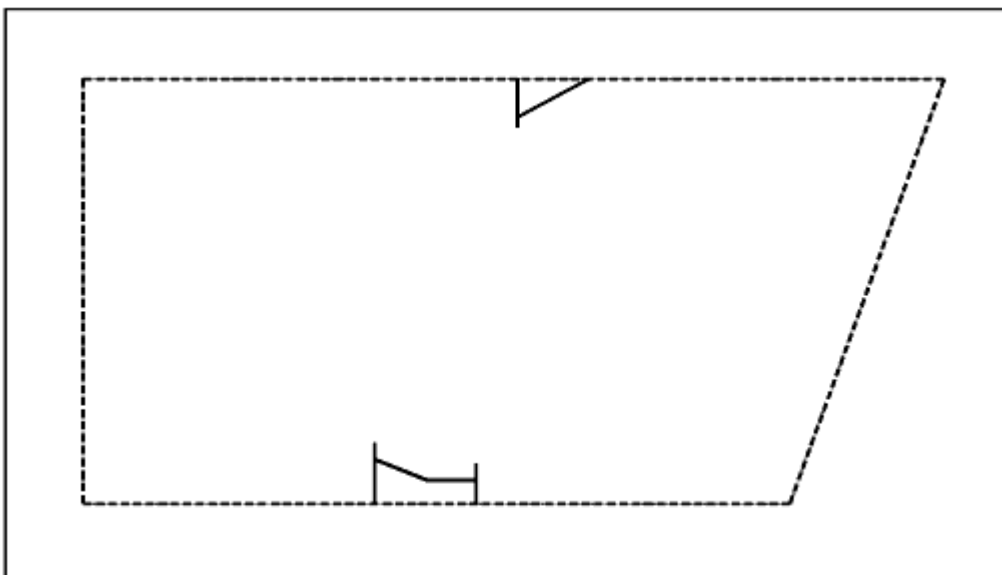


Figure 13:2. Bevel along panel limits.

- 加强筋，每根加强筋以型线代表，端切及相对于型线的材料侧的材料符号，型线及端切符号应按设计标准绘出
- 如定义，扶强材的位置号就设为一个层上的文本，一般不作显示，如下图

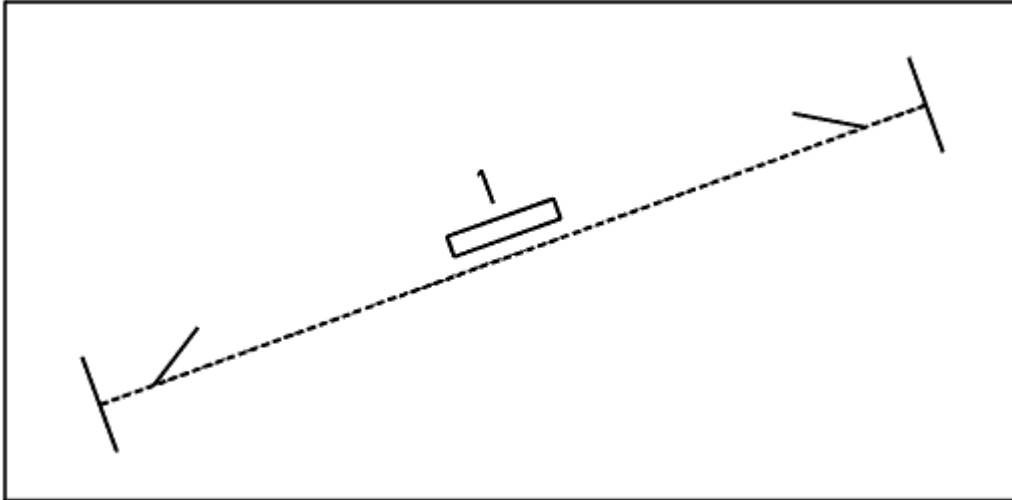


Figure 13:3. Symbolic view of stiffener.

- 不在板架相同平面的肘板，应以型线代表及材料标记，型线按标准给出
- 如设定的位置号被绘出（短零件名）一般不表示

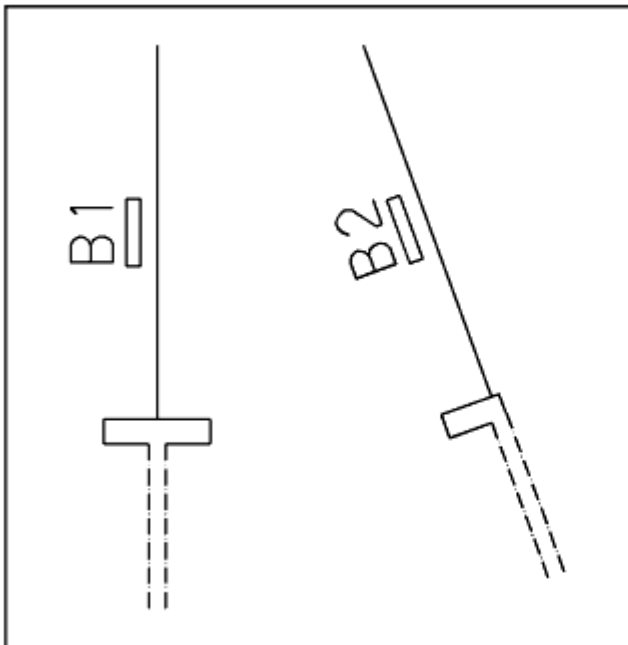


Figure 13:4. Symbolic views of brackets.

- 面板以不同的方法根据不同类型画出
- 如一个面板既可为焊接或为一弯曲面板

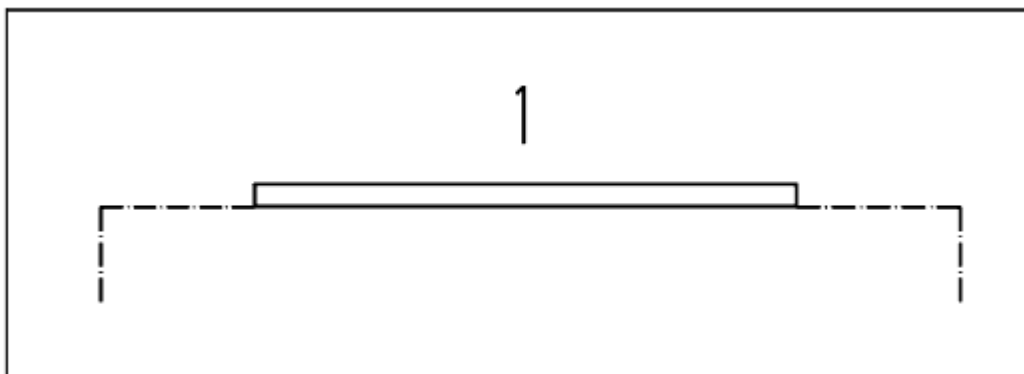


Figure 13:5. Symbolic view of flange.

- 补板: 补板按设计标准中的规则计算, 见下图的例子:
- 补板的尺寸以下述文本在一个层上, 通常不显示, 能由缺省文件控制

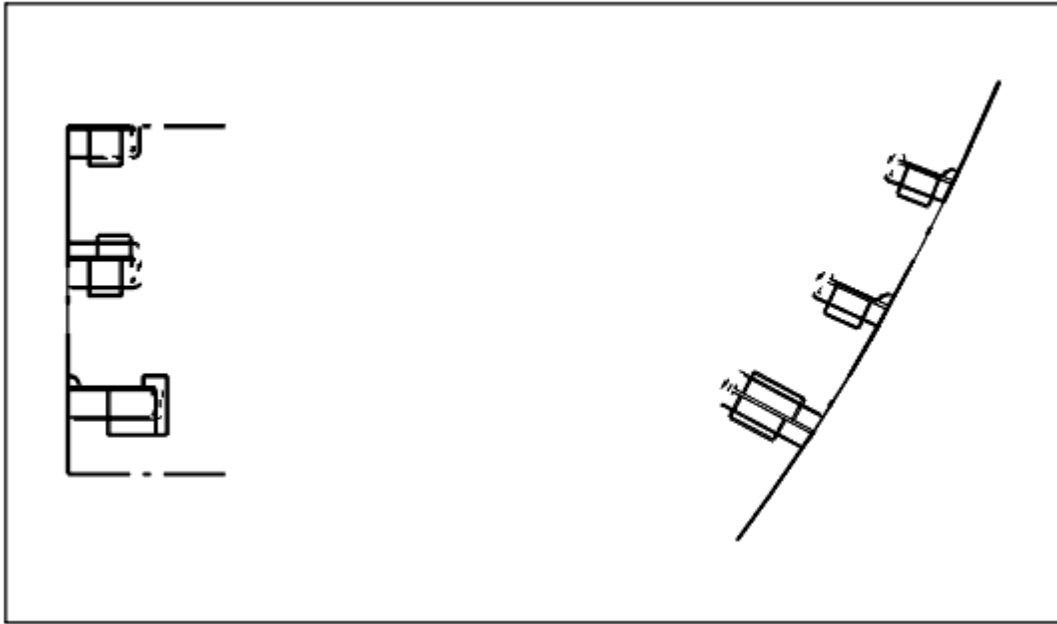


Figure 13:6. Views of cutouts with clips.

- 肘板在相同平面, 将在平面视图中定位并绘出
- 肘板及肘板名称的位置号 (短零件名) 应存作一个层上的文本, 一般不显示

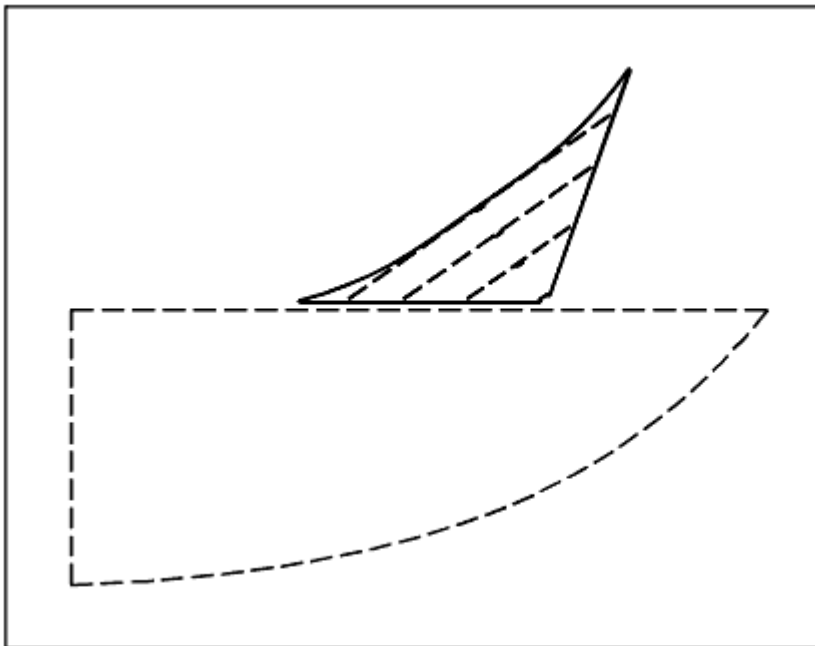


Figure 13:7. Side (planar) view of bracket.

通过缺省参数TDHM它可以控制一个零件的类型是否绘出



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### 13.1.5 平面板架, 相交

与平面板架相交的子图包含下述信息

- 平板面的相交曲线

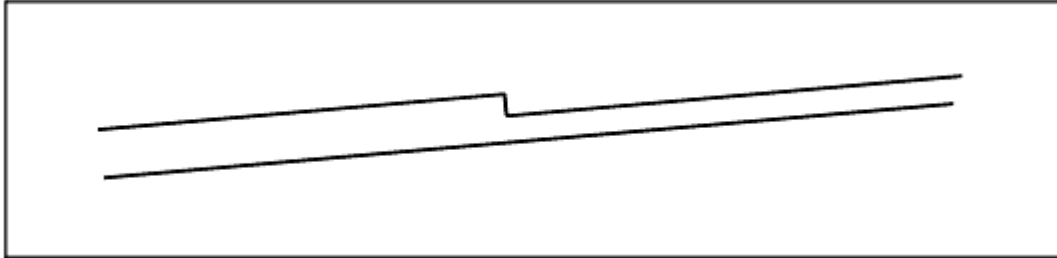


Figure 13:8. Section curve of panel (with different plate thicknesses).

- 显示缝的剖面, 符号, 如定义在缺省文件中
- 型材的侧视图 :
  - 边缘曲线
  - 端切外形
  - 显示型材面板的外形

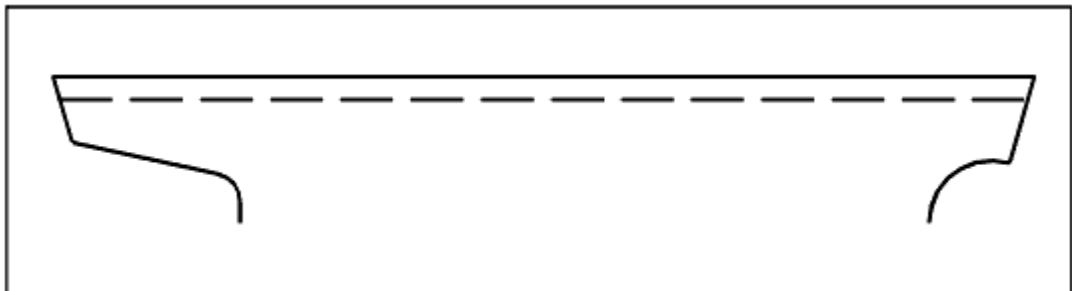


Figure 13:9. Side view of stiffener.

- 在图形平面的肘板侧视图 (如上)
- 对于图形平面的肘板迹线剖面
- 在板架与平面相交的型材横剖面 (见以上平面视图)



### 13.1.6 与船体相交

与船体相交的子图, 包括下述信息 :

- 船体曲线本身, 曲线可为已存在的船体曲线, 或它能有表面切取。这将受输入影响
- 显示缝剖面的符号如在缺省文件中规定
- 与外板型材相交的横截面或缝, 型材有一个乘以5的数字型材标识为文本提供

- 靠近图平面的侧视图包括：
  - 边缘曲线
  - 端切外形
  - 显示型材面板的外形

如下例

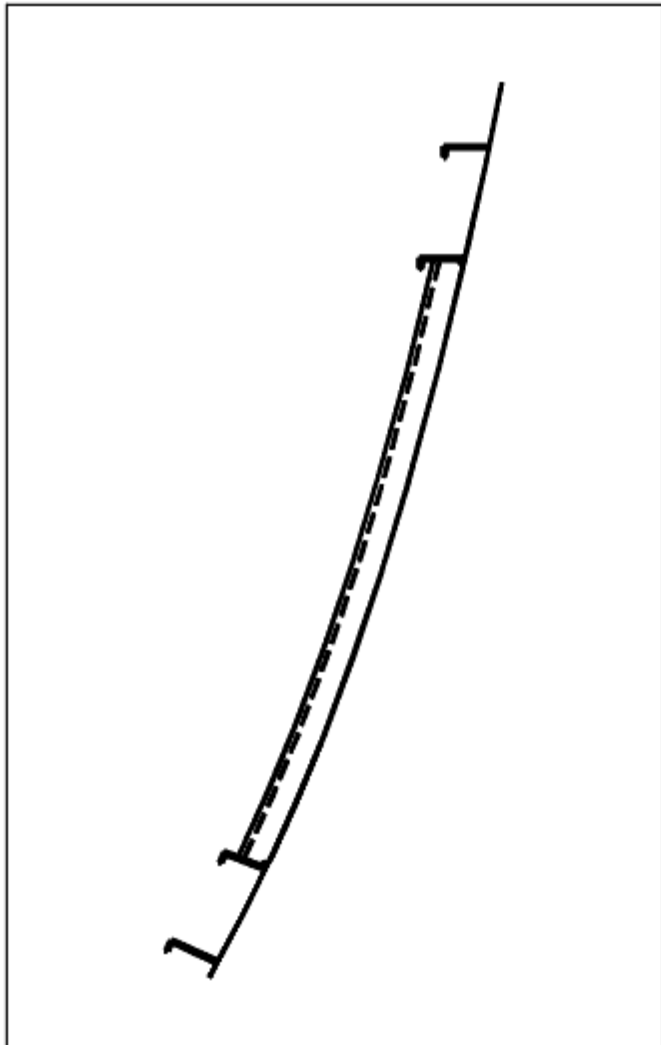


Figure 13:10. Side view of shell profile.

除了这些，不同的信息方法能加至模型视图，如下

模型信息的信息仍反映板架信息结构，一个扶强材可被作为一个加强筋，且口为切口等。  
TPHM典型例子的模型视图围强肋骨



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## 13.2 图中加入的信息

所有在途中描述的信息来自模型，然而，不同的信息能在图的开发中交互加入



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### 13.2.1 模型相关信息

一组增加的信息为一与模型相关的信息，如尺寸备注及规则他们一般与视图，或子图识别创建增加的信息过程相连。例如一个注释时在平面板架子视图下



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### 13.2.2 任意信息

其它信息组为任意信息如线，文本符号不与模型视图连接，这种信息一般收集在一般绘图视图中

被加入的信息组织经目前功能影响，但这些功能的使用不受推荐，在这种一般功能下，从TBGD继承，这有重复子图目标的功能，这些功能仅为一个纯2D绘图视图，因为他们完全破坏了一个模型视图的结构，对于模型目标界面是无用的



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### 13.2.3 Envelope

在许多情况下，为减小显示在屏幕上的信息，一种是用ENVELOPE取代一个或几个视图。

对于包含FORM的子图, 封套是它的主要结构及包围后的结构。对于所有其它子图, ENVELOPE与目前子图中最小最大矩形一致

- 它大大减少了屏幕上的信息量, 因此子图再生较快
- 系统拒绝加任何信息至空白子图, 如所有子图空白, 除了用于加信息。操作者应防止自由将信息加至一个不用的子图

当子图ENVELOPE显示的, 属于它的信息部分为空白



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## 14 在开始TPHM前执行初始化

在这些附则, 给出检查清单, 对不同初始化的在TPHM开始前进行



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[使用 Tribon 平面模前执行的初始化](#)

### 14.1 环境

TPHM的环境应被决定, 在单独的文件中  
[Administrator's Guide](#)

下述零件必须在此章处理

- 用于数据库, SCHEME等的目录
- SCHEME表的决定
- 数据库的建立及初始化 (如下)
- 激活目前工程的不同标准如切口、折边面板、坡口等



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## 14.2 数据库

TPHM要求三种不同的数据库初始化, 两种是TBH, 另一种为通用

- FORM数据库
- 结构数据库
- 标准数据库

以下他们的初始化描述及使用的工具如下:



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[使用 Tribon 平面模前执行的初始化](#)

- **FORM数据库**

1. 建产旧SBS与船型的连接
2. 定义船型参考目标SF30/D, 经由INTHULL
3. 创建与表面相交的船体曲线(肋骨、水线、纵剖及其它)
4. 创建缝及对接缝, 对接缝开切口或如要求生成外板展开图



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- **结构数据库**

1. 创建结构参考目标
2. 创建船体结构目标
3. 创建分段目标
4. 生成外板型材, 原则上TPHM没有他们, 但实际中他们必须可用, 因为他们被以常参考
5. 一个端切表必须创建, 否则在扶强材侧视图上的端切不会正确给出, 端切一般从其它功能中拷贝而来
6. 创建压筋, 收缩量的目标必须建立
7. 包含肋骨位置, 纵骨及横向纵标极限及纵骨船中剖面的位置的gentab建立

以上内容由INTHLL支持, 除了F14由曲面模来进行

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#### • 标准数据库

些标准数据库，必须包括标准FORM，数据库一般对其它工程是一样的。经由TPHM初始化进行，（如FORM能被创建和储存）或其它交互TB程序中。

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## 14.3 其他文件

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#### • 缺省文件

一对文件在TPHM特征中描述，总体上必须专门对一确定的工程

缺省文件必须从目前的工程中创建，它的内容详述如下[Default File of Tribon Planar Hull Modelling](#).

缺省文件按常规文本文件创建，在计算机的编辑器系统中，也可以早期工程处拷贝

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- 标准的设定

单独的文件或目标可以不同的方法创建控制及限制系统的使用，他们在单独的文件中以节点描述，情况如下：

- 材质
- 坡口信息
- 型材类型及尺寸
- 连接代码
- 缺省端切
- 等等

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- Tribon环境变量表

SBH\_PROFSYMB分配视图中扶强材的真实材料符号

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## 15 TPHM中的缺省文件

TBHM, (SJ001), TBHMDWG (SJ002)及TBHMGGEN (SJ011)的某些方面控制大量缺省文件内容。此章描述什么缺省文件它包含文件名为SJ001.SBD, SJ002.SBD 及 SJ011.SBD

注：通用功能对所有TB运用程序是一致的，通用缺省文件为SBD\_DEF1，描述在Drafting Guide中。

如文件名SBD\_SBHM.DEF存在于SBGD\_DEF给出的目录中，这文件将代替SBD\_DEF1给出的。

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## 15.1 缺省文件的组织

缺省文件是常规文本文件，能由标准**editor**创建并维护

此文件包含大量不同参数，某些情况分配值，如一个参数在此文件中给出，这表示由此参数控制缺省行为或与此参数相关的缺省值被代替，相反，在缺省文件中此参数不给出，系统的缺省行为及值有效

下述规则必须接受当参数规定在文件中：

- 分配值必须以=进行
- 多个值必须以逗号分隔
- 从其他程序分隔的参数及值由CR进行
- 参数间次序无关



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## 15.2 参数

因为参数量教大，不同的参数也被分成组



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### • 通用目的

HULLFORMREF = <hull reference object>

一般不必给出，名字将取自**SB\_HREF**变量表

STRUCTUREREF = <structure reference object>

定义目前船的结构参考目录, 由**SB\_SREF**给出

ENDCUT TABLE = <end cut table name>

定义角切表, 然而, 该名取自**SB\_ECUT**环境变量

LP\_TERM\_OUT

如纵骨位置被定义, **Y**、**Z**可以**LP**术语语句

- 1 无**LP**术语使用
- 0 **LP**术语及偏移使用
- 1 **LP**术语仅在偏移为**0**中使用
- 2 同**1**, 但半**LP**给出

系统缺省是**LP\_TERM\_OUT = -1**

BKT\_OLDPROF

仅当**NEW\_BKT**给出时相关

设置系统型材计算按延伸肘板的相同方法, 当用于旧的肘板组合处理时

BKT\_NODEF

仅**NEW\_BKT**给出时相关

它对肘板上无切口的设置有影响, 除非由用户设置由延伸肘板处理中包括

CHAMFER\_ADJUST=<dist>

当计算板架截面曲线时考虑切角

<slope>是一实数, 定义切角的斜度 (例: 数字**3**表示斜度**1/3**), 如果数值不在**0.5**和**10**之间, 将使用缺省设置**1/4**

CHAMFER\_STEP=<thick-diff>

控制当斜面使用时最小的板厚差

<thick-diff>是两板间的板厚差, 如缺省为**3mm**

KNUCKLED\_STIFFENERS

激活折角扶强材的处理

MAX\_KNUCKLED\_ANGLE=<angle>

控制允许折角坡口在两个板架间的最大角，板架间最大角 $30^{\circ}$  缺省

NEW\_BKT

激活延伸肘板处理，一般被设（见 Generation of Brackets）.

QCSIZE = <size code>

初始光标大小：

=-1 小光标

=-2 大光标（缺省）

<-9 光标尺寸负值（光栅尺寸）

SURFACES = <surf\_no>, <surf\_no>, ...

可处理多个表面，在船体参考目标中的表面数<surf\_no>，几个表面数可给出，缺省为1和-1，表示原始船体及甲板

SURFACE\_REFERENCE = <value>

控制在边界定义中的表面参考方案

可有下列值：

**EXISTING**表示船体曲线无论是在与参考的表面相同的平面，它将被使用而不是与表面相交

**CUT**表示表面将总被相交，而与现存船体曲线无关

船体曲线是在肋骨水线、纵剖线坐标表内的曲线

SWEDGING = <swobj>

<swobj>是一个在结构数据库内的名字用于定义波形舱壁

STI\_TAG\_EXCLUDE = <tag\_ctrl>

控制扶强材的标签设定，<tag\_ctrl>如下：

NONE （缺省）所有扶强材取得标签

FICT 假想扶强材不取标签

TEMP 临时扶强材不取标签

FIC\_TEMP 假想及临时扶强材不取标签

ALL 所有不取标签

TRACEON

如给出, 试验打印将在log创建时由程序生成, 此参数仅用于系统维护



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- **板架建模**

BOU\_HL\_COL = <colour>

当板架建模时TPHM亮显, 此参数的颜色可控制。可能值为GREEN, BLACK, CYAN, BLUE, MAGENTA, RED, YELLOW, WHITE 和 NONE.

EARLY\_DESIGN

早期用来限制警告信息, 如当一个新板架与现存板架名一致, 或当扶强材没有给定端切

GEN\_VIEW = <view>

控制一个或多个视图使用, 当绘一个板架生成收到子图中。可能<view>值为:  
SINGLE 仅用户选择的单个视图

ALL 所有有关联的视图

下述三个参数控制建模时位置号的设定, 位置号设定见6.1.5章

POSNO\_PREFIX

POSNO\_SUFFIX

PROF\_BUNDLE

下述参数控制输入**scheme**及结果文件的处理

EXTENSION = <view>

输入**scheme**缺省文件类型

LSTSCH

当给定, 板架建模收据清单存在**scheme**相同的目录中

REDUCE\_HOOKS

当一个板架选择作为另一个板架的边界时, 合成选择外形伸出实际的板架。由**"hooks"**为

了确保相邻边界相交，当两个板架边界彼此平行时，及在复杂几何时，缺省**hooks**总加上。

当**REDUCE\_HOOKS**给定时，**HOOKS**仅需要时加上，也就是当两个相邻板架边界平行（或接近平行）。在所有其他情况，**HOOKS**由边界在端切方向的边界延伸代替。延伸长度为**1000 mm**

缺省参数总是被设定

SCH\_CREATE

当给出时，功能"**Panel Store**"被使用，**scheme**将由板架创建，这仅可由当板架已作修改，没有**scheme**更新时。

SCH\_DELETE

当给出时，功能"**Panel Delete on DB**"被使用，**scheme**也随板架一起被删除。

SHORT\_SCH\_NAME

影响**scheme**的存储，在生成板架时如给出，仅文件名部分被存，如不给为全名

SHRINK\_OBJ= <object>

定义 **SB\_OGDB**中的收缩量名

SPIGOT

此参数控制孔上的套管板被设，如单独输入，可设定套管板

SPLIT\_PLA\_MEAS= <dist>

在板架分离功能中，一个栅格用于定义板、点间的距离，由此参数控制，缺省值为50 mm，此值不应小于最小的板条。

STORE\_FR

当沿X轴肋号给出时，此坐标在存之前转成单独数。这当肋骨表被更改时，这个数将转成另一个肋骨数，为避免STORE\_FR，用户储存肋骨数，这将合板架定义接受肋骨表的更改。

STORE\_LP

同STORE\_FR相应为纵骨表

STD\_CLIP\_TCODE

=1内嵌补板将作为单个零件，该零件将取得一个位置号而被存为板件

=0(或STD\_CLIP\_TCOD为空)，这些补板作为标准零件（即他们不会储存为板件，不会给出位置号）



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## • 子图的生成

缺省参数在此章将控制船体模型的子图布置及内容

除缺省参数外，这有与Tribon环境变量具有相似的功能，如SBH\_PROFSYMB被指定，任意值，沿迹线的扶强材符号将被真实的型材剖面代替。

ABUT\_PROF\_DIST=<dist>

靠近图形平观，但不穿过平面，仅画在符号视图中. 如扶强材端部的（dist）靠近图平面时，缺省值为（dist）30mm。

ALL\_SH\_PROF

一般，当画型材横截面时，找型材仅为纵骨，如画靠近肋骨或靠近横材的其它平央时，当画型材的侧视图时，状态相反。然后给ALL\_SH\_PROF限制了此约束，使系统在所有情况下找外板型材。

BEV\_LINE\_SYMBOL

当给出坡口符号将在符号视图以单独生的给出，即使延伸坡口处理被使用。

BRACKET\_COLOUR=<colour>

用于设定将出现的肘板的缺省颜色，注意这仅在建模时分给肘板颜色，而已生成的肘板不会变色

可用值：

<not set>（缺省值）

GREEN

BLACK

CYAN

BLUE

MAGENTA

RED

YELLOW

WHITE

CLIP\_COLOUR=<colour>

设定补板颜色

CURR\_BLOCK

激活符号视图中目前分段的显示

当一个或几个分段为指定的“current”，用此功能View/Create选Auto.select并给出当前所包含的分段

当创建一个属于当前分段的视图，此分段所有零件以正常方法绘图，属于其它分段的零件以点划线给出

DIN

当给出时，线型按DIN标准

DOUBLE\_COLOUR=<colour>

用于设定复板的颜色

DRAWINGSCALE = <inverse scale>

当图如给出时，文本尺寸、切角符号等采用正常使用的比例。此参数用于告诉系统正常用于目前船的比例，以1: 50表示DRA=50使用，缺省如参数为空，是100

DRAW\_EXCESS = <code>

控制余量的绘出方式，下述代码可用

=0 不绘任何余量

=1 仅给余量尺寸，文本在单独生成时给出

=2 仅给余量符号，如没有符号给出（或定义）余量为1

=3 给出余量符号和尺寸

在2、3余量总给出（单独生成，视图中创建视图中）

DRAW\_PAN

控制视图中板架视图

= DEFINED 如给出，风、穿越孔、切口作为零件

= PLATES 给出板边形，在外形中包括切口和穿越孔

EXC\_TYPE\_1 \

EXC\_TYPE\_2 > = <name>, <type>

EXC\_TYPE\_3 /

这些参数用于规定三种不同的余量等级，识别如超过装配等级当将余量去除

<name> 这是余量类型可在平面板架生成输出时使用，它可作为空字符（注意逗号必须给出）否则是唯一的

<type> 余量类型，也可用作符号数在余量图中使用的，数字必须单一

(EXC\_TYPE\_1的<type>时缺省类型，如不给，将为0)

为了使用绘图符号可设符号字体92，可用的，包括的符号类型参照由缺省参数EXC\_TYPE\_1等

FIC\_ELEM\_LINE\_TYPE (SOLID/DASHED)

当给出虚线，虚拟孔及切口以虚线给出

FLA\_MIDRAD

如用户已定位面板弯曲的划线，则应给出，否则划线靠近面板基准线

FLA\_UNFOLDED

一般折边面板与弯曲面板一起划出，这表示看不到面板的详细形状，使用此参数表示面板在单独生成时已不折边画出，对一周板，一般单独肘板图形经Planar/Panel/Pan/Bkt访问

FLA\_MINTH = < d >

此参数，控制面板侧视图中两线之间最小可接受的距离

缺省是0.5 mm

d=0总给出宽度的真实图形

重要：任何其他值可能会引起与模型的不一致（依赖图形比例）

FLANGE\_COLOUR=<colour>

设定面板缺省颜色

HLAY\_PROF\_COL=<colour>

用于定义扶强材、面板、支柱隐藏系统定义层的颜色（131及133）

可能的值为:

GREEN (缺省值)

BLACK

CYAN

BLUE

MAGENTA

RED

YELLOW

WHITE

HLAY\_PLATE\_COL=<colour>

用于定义板隐藏系统定义层的颜色 (136)

可能的值为:

GREEN (缺省值)

BLACK

CYAN

BLUE

MAGENTA

RED

YELLOW

WHITE

HLAY\_PROFDIM\_DRAW=<YES or NO>

当从平面板架创建符号视图, 视图包含某些信息缺省被指定隐藏层, 如此信息以板不显示

对于扶强材位置号被画于隐藏层

若HLAY\_PROFDIM\_DRAW设为<YES>型材尺寸被加至系统隐藏层

此特征限制图中视图 (即由单独模式生成的视图不可用)

设置YES或NO（缺省）

MIN\_STI\_MTRL\_SYM=<length>

材料符号应被显示的最小长度<length>缺省为500mm

NOBKT1

当给出，板架上肘板无型线

NOBKT2

当给出，图平面上无肘板画出

NOBKT3

当给出，板架单独生成时，不生成单独肘板图形

NOCHAMFSYMB

当给出，沿缝及板架外形没有坡口符号给出

NOCLIPS

当给出，没有补板

NOCLIPSTEXT

当给出，没有补板识别字符串

NOCUTOUTS

当给出，没有穿越孔

NOENDCUTSYMB

当给出，扶强材端部无端切符号（与NOSTIFF是否给定无关）

NOHOLES

当给出，没有孔被画出

NOLONGNO

当给出，没有外板型材的识别字符（与NOPROFSECT是否给定无关）

NOMATSYMB

当给出，没有符号表示扶强材、面板及肘板的材料侧边被画出（与NOSTIFF/NOBKT1是否给定无关）

NOPLATEID

当给出, 不显示板的位置号及厚度

NOPROFHOLE

当给出, 扶强材及面板的孔、切口和切角不显示

NOPROFNO

当给出, 若板架单独生成, 在相邻板架上没有型材的识别字符 (与NOPROFSECT是否给定无关)

NOPROFSECT

当给出, 当前视图平面的型材跨越或邻接的横剖面不绘出

NOSEAMS

当给出, 不显示缝

NOSTIFF

当给出, 无扶强材及面板绘出

NOSTIFFNO

当给出, 扶强材及面板的位置号不绘出 (与NOSTIFF是否给定无关)

PAN\_MAT\_SYMB

在符号视图对接板架线绘出材料侧, 就像面板、加强筋及肘板 (除非关键字NOMATSYMB被设)

PILLAR\_COLOUR=<colour>

用以设定支柱缺省颜色

PILCROSS = <drawing code>

控制板架平面的支柱横截面, 图代码为三个数字, 第一个数字指支柱在板架前面, 第二个支柱在板架后面, 第三个为支柱穿过板架

=1 横截面

=2 十字线

=3 双十字线及横截面

=4 横截面虚线

(缺省为121)

PLA\_SYMBOL

这将使程序对每块板加一个板符号不管板架是否在平面或剖面视图。这也表示画板架（如定义）符号将增加，当画板板架截面（如板）也有板的符号（这在平面视图中板以有这个代号）

PLOT\_BOUNDARY

在TPHM中的所有边界将被给出

PRO\_MINT

此参数用以控制显示扶强材侧视图上面板的线

缺省0.5

RADIUS = <radius>

面板弯曲工具的弯曲半径（缺省为25.0）仅影响子图

REF\_LINE\_LT=<line type value>

用以定义显示参考线的线型（Tribon参考平面与钢结构相交结果）可能值为：

SOLID       (缺省值)

DASHED

DASHED\_DOT

DASHED\_DOUBLE\_DOT

SHORT\_DASHED

WIDE\_SOLID

WIDE\_DASHED

WIDE\_DASHED\_DOT

WIDE\_DASHED\_DOUBLE\_DOT

WIDE\_SHORT\_DASHED

REF\_LINE\_COL=<colour>

用以定义显示线及文本的颜色，可能值为：

GREEN       (缺省值)

BLACK

CYAN

BLUE

MAGENTA

RED

YELLOW

WHITE

REF\_PLANE\_DRAW\_SYMB=<YES or NO>

用于定义是否显示船体视图的参考线

设置YES 或 NO (缺省)

REF\_PLANE\_DRAW\_3D=<Yes or NO>

用来定义3D视图中是否画出参考线

设置 YES 或 NO (缺省)

SEAM\_FONT = <font number>

此参数选择字体从显示缝剖面的符号 (缺省是8, 仅当SEAM\_SYMB0不设为0是相关的)

SEAM\_SECTION\_FONT= <font number>

对于缝剖面能使用特殊的字体 (如不设) 用SEAM\_FONT

SEAM\_SECTION\_SYMB\_NO= <symbol number>

同SEAM\_SYMB\_NO但用于作为剖面缝记号, 不设 SEAM\_SYMB\_NO将被使用

SEAM\_SYMBOL = <action>

此参数用于定义是否缝剖面符号画出

<action> = 0 关掉缝符号 (缺省)

<action> = 1 在船体曲线及板架上看到缝符号

<action> = 2 在船体曲线上看到缝符号 (仅)

<action> = 3 在板架上看到缝符号 (仅)



SEAM\_SYMB\_NO = <symbol number>

此参数用于选择显示缝剖面的符号，该字体可与SEAM\_FONT一起选择（缺省符号是100-仅当SEAM\_SYMBOL不为0时相关）

SKIP\_LAYER= <layer>

控制子图中哪一个层被跳过

可能值如下：

TEXTS          跳过零件名文本

NONE          显示所有层

PLA\_SYMBOL    跳过板符号

SKIPFICT

跳过虚拟扶强材的型材

SNOFICT

跳过虚拟扶强材的识别数

SPC\_SYM BNO = <symb\_no>

在符号字体8中的符号数字表示一个套管与孔相关，缺省是符号96



图15:1. 为符号96在字体8中

SPC\_DISPLAY = <value>

套管符号被放在它自己的层(-1130)，由缺省控制层的显示，缺省NO表示隐藏。改为YES，符号再生后显示，直至SPC\_DISPLAY 改为NO后才不可见。

STIFF\_COLOUR=<colour>

定义扶强材颜色。

TRANSNO10

在单独生成时横向数字除以10绘出

VIEWX = <code>

用于定义当平面在或靠近肋骨平面哪一侧可看到：

=1 从平面前侧

=-1 从平面后侧

(缺省值 1)

VIEWY = <code>

靠近纵垂直平面是, 哪一侧可看到

=1 从平面左侧

=-1 从平面右侧

(缺省值-1)

VIEWZ = <code>

定义靠近水平面是从那可看到

=1 从平面上侧

=-1 从平面下侧

(缺省值 1)

VIEW\_DET\_SEL = <sel>

控制创建详图时的选择, 可能值如下:

AUTO 自动设定选择

ORIG 继承原来视图的选择



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Tribon平面模定义文件

## • 图形开发

下四个参数用以控制坡口注释的外形

BEV\_REF\_SYMB

定义符号用以设定坡口注释的参考线起点

可由关键字得到:

- ARROW 一个小箭头

- NONE 没有  
(缺省是 ARROW)

BEV\_SYMB\_FONT

定义包含在坡口注释中的符号字体

(缺省是90)

BEV\_SYMB\_HEIGHT

控制符号的高度

(缺省是10 mm)

NO\_BEV\_TEXT

禁止坡口注释的文本

所有下属缺省参数用于开始POS控制POS注释

POS\_LIN\_SYMB=<value>

定义一个符号设于参考线的开始, 当零件出现由一根线, 如扶强材及肘板的符号线

POS\_SUR\_SYMB=<value>

当一个表面被识别是, 例如在平面视图的板及肘板

这些值由两个关键字得到

ARROW      小箭头

BAR          垂直于参考线的小线

DOT          小圆点

NONE        没有参考符号

下述词用于定义围绕位置号的符号

POS\_PRO\_SYMB=<value>

定义型材的符号

POS\_PLA\_SYMB=<value>

同板

POS\_BRA\_SYMB=<value>

同肘板

POS\_CLI\_SYMB=<value>

同补板

由三个关键字可得到

CIRCLE

SQUARE

TRIANGLE

NONE      无

这些关键字定义额外的信息加在位置号的后面:

POS\_PRO\_TEXT=<value>

定义型材的信息

POS\_PLA\_TEXT=<value>

同板

POS\_BRA\_TEXT=<value>

同肘板

POS\_CLI\_TEXT=<value>

同补板

由四个关键字得到

DIMENSION    零件尺寸

SYMBOL      材料符号（仅对型材有效）

SYMB\_O\_DIM    材料及尺寸（仅对型材有效）

NONE      没有额外信息

关键字定义材质代号在备注后面

POS\_PRO\_QUAL=<value>

加型材材质

POS\_PLA\_QUAL=<value>

同板

POS\_BRA\_QUAL=<value>

同时板

POS\_CLI\_QUAL=<value>

同补板

可由三个关键字得到

YES 材料被加至备注后备由一个空格, 如尺寸线出现, 否则没有空格

NONE 材质将不出现

T系统设定相应关键字在缺省文件中

POS\_LIN\_SYMB=ARROW  
POS\_SUR\_SYMB=DOT  
POS\_PRO\_SYMB=TRIANGLE  
POS\_PLA\_SYMB=CIRCLE  
POS\_BRA\_SYMB=CIRCLE  
POS\_CLI\_SYMB=CIRCLE  
POS\_PRO\_TEXT=SYMB\_O\_DIM  
POS\_PLA\_TEXT=DIMENSION  
POS\_BRA\_TEXT=DIMENSION  
POS\_CLI\_TEXT=DIMENSION  
POS\_PRO\_QUAL=NONE  
POS\_PLA\_QUAL=NONE  
POS\_BRA\_QUAL=NONE  
POS\_CLI\_QUAL=NONE

定义装配各注释的装配名

AS\_REFSYMB\_LINE=<value>

当识别零件在图中被线描绘时, 定义设在参考线起点的符号, 例如扶强材或肘板当作一个对称线画出

AS\_REF SYMB\_SURF=<value>

当确定surface时同上, 例板或肘板在平面中画出

由两个关键字得到

ARROW 小箭头

BAR 垂直于参考线

DOT 小圆点

NONE 没有参考符号

控制识别标注的关键字

AS1\_SYMB=<value>

AS2\_SYMB=<value>

AS3\_SYMB=<value>

AS4\_SYMB=<value>

注释符号用于GPS

注释： 字符用在用户具体的方法，传统用于定义装配名，对装配时不相关的，当 Tribon 装配计划程序用于装配定义时

AS\_SYMB=<value>

同上用于Tribon 装配

有效值是相同对于位置号注释加下述值：

RECTANGLE

OCTAGON

RIGHT\_ARROW\_NOTEBOX

LEFT\_ARROW\_NOTEBOX

缺省的装配注释是 NONE.

UPDATE\_NOTE

当给出时，混乱的注释如位置号、坡口及装配将以正确的模型信息更新当视图再生时，注释的设定将保留，如模型目标参考已被删除，仅参考线保留，颜色改成蓝色。

PIPECROSS = <value>

在标准孔中心定义在孔的十字线将显示

有效值为

PER[MANENT]

TEM[PORARY]

NO (缺省)

下述两个参数可以显示角焊缝的尺寸，这可以对板架处轮廓及扶强材区域进行

WELDINFO= <mode>

有效值 <mode> 是：

NONE 没有焊接信息（缺省）

TEMPORARY 在生成时显示

PERMANENT 加至图中

WELDTEXT= <text>

<text> 出现在焊脚长度前面的引导性文本



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## 设计语句的概述



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# 1 设计语言的概述

此文件规定用于建模的设计语言

此规格由基本定义，句法规则及备注及与句法相连的例子组成



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设计语言的概述

## 1.1 Schemes 介绍



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### 1.1.1 输入 Schemes

输入组成单元叫 **input schemes**, 没一个用于一个板架生成, 被存在单独的文本文件, 与板架有相同的文件名及扩展名 `sch`.

在系统处理时, `schemeshi` 是单独处理, 可相同的`run`进行

英制可见单独文件

[Basic Features Imperial Units Syntax Description](#)



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### 1.1.2 语句

**statements** 可分成语句, 没有语句用语句关键字并由分隔符结束。

**statement** 识别别语句的第一个非空行 (没有语句关键词)



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## 1.2 基本定义



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### 1.2.1 语句法的标记

使用如下标记

< > 表示数据

[ ] 任选数据

{ } 或 | 用列出的项目中的一个. { } 经常用组合括号使用

(N ... M) 重复, 至少重复n次, 最大m次, 如n没有0为下限, m没有, 没有上限。



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### 1.2.2 字母设定

所有语句结构可由下述字符语句, 如下:

<letter> ::= A|B|C|D|E|F|G|H|I|J|K|L|M|N|O|P|Q|R|S|T|  
U|V|W|X|Y|Z|V|W|X|Y|Z

注意仅上述情况可用

<阿拉伯数字> ::= 0|1|2|3|4|5|6|7|8|9  
<特殊字符> ::= #|\$|%|&|\*|+|-|/|:|<|=|>|\_|' space'



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### 1.2.3 词汇单元及空格约定

词汇单元次序是scheme, 次序分隔成行, 词汇单元的间距不影响scheme。词汇单元时分隔符, 数字常数、字符及名称, 没个词汇单元为一行。除名字外空格被忽略



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## • 分隔符

如下:

<分隔符> ::= = | , | / | ; | :

- = (等号) 及 , (逗号) 用于分割术语, 可完全互换, 下述章节它们将交替使用。
- / (斜线) 用于划出连接项目次序。
- ; (分号) 用于语末结束。
- : (冒号) 在重复语句中用于名字字符的分隔符。

某些功能, 第一个在关键词后面的值是由=(等号), 在随后值为, (逗号)或:(冒号)。



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## • 数字常数

<unsigned\_integer> ::= <digit> (1...)

<integer> ::= [+|-]<unsigned\_integer>

<real> ::= <integer>[.<unsigned\_integer>]

<number> ::= <integer>|<real>



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## • 字符

一个字符是由一系列字母/数字和\* (星号) 组成, 以字母开始。字符中空格忽略。

<string> ::= <letter>(<letter>|<digit>|\*) (0...23)

名字字符是一个词汇单元由省略号包围, 包含一个名字, 大多数情况是一个目标

<name\_string> ::= ' <letter>|<digit>|<special\_character> (0...24)'



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## • 术语

一术语是在两个分隔符之间的最小的词汇单元

$\langle \text{term} \rangle ::= \langle \text{number} \rangle | \langle \text{string} \rangle | \langle \text{name\_string} \rangle$

一个空术语可发生但被忽略



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## 2 Schemes 的一般特征



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[写入schems的一般特征](#)

### 2.1 Scheme布置

一个scheme 可以一般术语描述, 如下:

$$\langle \text{scheme} \rangle ::= \langle \text{identifier} \rangle \left\{ \begin{array}{l} [\langle \text{only\_stm} \rangle \langle \text{comment\_stmt} \rangle (1\dots)] \\ \langle \text{PANEL\_stmt} \rangle \\ \left\{ \begin{array}{l} \langle \text{comp\_stmt} \rangle (1\dots) \\ \langle \text{COMMENT\_stmt} \rangle (1\dots) \end{array} \right\} \end{array} \right\}$$

一个板架域是一个生成一个或几个板架以相同方法的scheme单位。

零件语句是生成板架零件的所有语句类型。

```

<comp_stmt>::=<BOUNDARY_stmt> |
                <SEAM_stmt> |
                <PLATE_stmt> |
                <HOLE_stmt> |
                <NOTCH_stmt> |
                <CUTOUT_stmt> |
                <STIFFENER_stmt> |
                <FLANGE_stmt> |
                <PILLAR_stmt> |
                <BRACKET_stmt> |
                <DOUBLINGPLATE_stmt> |
                <BEAD_stmt> |
                <EXC_stmt> |
                <CMP_stmt> |
                <WELD_stmt> |
                <MARKING_stmt> |
                <SHRINKAGE_stmt> |
                <POINT_stmt> |
                <CURVE_stmt> |
                <PLN_stmt> |

<statement>::=<identifier> |
                <PANEL_stmt> |
                <ONLY_stmt> |
                <comp_stmt> |
                <COMMENT_statement>

```

所有不同语句将在此文件中详细描述。



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## 2.2 语句的布置

每一个语句（除表识语句外）以一个关键词开始，以分隔符；（分号）结束。

所有语句由下述方法组合

```

<statement>::= <stmt_keyword>
                [, <stmt_value>]
                <clause>
                ((, | /) {<reference> } ) (...)
<value>

```

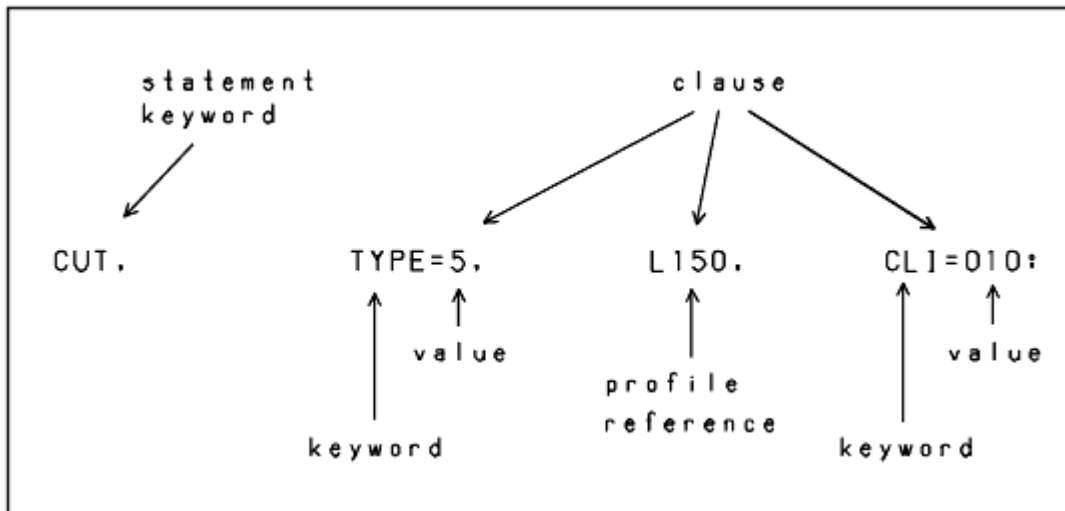


图 2:1. 不同条款的语句及术语的类型

除非另外说明，在条款及参考之间的次序是无关的。

**关键词** 是预定义的语句，如TPHM组织，若大于3个字母，可缩小为3个字符。

```

<keyword> ::= <string>
<stmt_keyword> ::= <keyword>
  
```

**条款** 由关键词组成，接以分配的关键词，一个条款也可是一个静态的关键词，将引起信息本身。

```

<clause> ::= <keyword> [= <value> [( , | : ) <value> (...)] ]
  
```

**Example:**  
 U1=1500,2000  
 ALONG  
 SIDE=AFT  
 AS1='A': 'B'

**值** 是一般属于分配给关键词的条款，一个值可由某一语句类型的位置取得他的意义。

```

<value> ::= <number> |
           <string> |
           <name_string>

<stmt_value> ::= <value>
  
```



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### 2.2.1 重复语句

一个重复语句用于以简明的方法定义几个数字值。

$\langle \text{rep\_term} \rangle ::= \langle \text{start} \rangle [- \langle \text{step} \rangle] - \langle \text{end} \rangle \quad |$

$\langle \text{start} \rangle ([ \langle \text{step} \rangle ]) \langle \text{end} \rangle$

$\langle \text{start} \rangle ::= \langle \text{step} \rangle ::= \langle \text{end} \rangle ::= \langle \text{number} \rangle$

如步长为空，将设步长 = 符号（结尾-开始）。如开始=结尾，那么步长=1。

重复术语可用于语句，数字允许的条款。

**Example:**

10-15 = 10, 11, 12, 13, 14, 15

6-2-14 = 6(2)14 = 6, 8, 10, 12, 14

1.5(0.3)2.1 = 1.5, 1.8, 2.1

备注:

如不必要

$\text{end} = \text{start} + N * \text{step}$  (N 是一整数)

E. g. 5(5)16 = 5, 10, 15



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### 2.2.2 参考

一个参考是一个或几个静态的术语，用于参考某些目标（如板架型材等）由一个名字或一个数字

$\langle \text{reference} \rangle ::= \left\{ \begin{array}{l} \langle \text{name} \rangle [, \langle \text{prof\_ref} \rangle ] \\ \langle \text{prof\_ref} \rangle \\ \langle \text{curve\_ref} \rangle \\ \langle \text{bracket\_ref} \rangle \\ \langle \text{hole\_ref} \rangle \end{array} \right.$

( <seam\_ref> )

如参考超过一个术语，这些术语可以随意次序，不必连续。

参考可与单个关键词REF[LECT] 表示术语参考项目，对通过船中线垂直平面对称 (y = 0)，可在所有参考术语（或所有参考在相同的斜侧）

**名字** 一般用于参考不同的目标，也可用语定义板架内的某些字符。

```
<name>::=  <name_string> |
            <B-term> |
            <D-term>
```

```
<B-term>::=      B<i>, (i=1, 2, ..., 12)
```

B-术语，表示写在相交边界语句的边界名，边界必须在目前scheme中执行，否则为空字符。

```
<D-term>::=  D<i>, (i=0, ..., 9)
```

D-术语，写一个在D语句早定义的目标名，一个未定义的语句包含一个空字符。

例：

例：

1. Name\_str: 'AAR1-2', 'XYZ-111-45\*1'
2. B-terms: PAN, ... ;
 

BOU, .../.../'ABC' /... ;

.

.

.

CUT, TYPE=, ... , B3, ... ;

Here, B3 means the same as 'ABC'.
3. D-terms: D5 = 'AA123-4' ;
 

.

.

.

PAN, D5, ... ;

Here, the use of D5 means the same as writing 'AA123-4'.

**曲线参考** 指主平面曲线（肋骨、纵剖、水线）按它们的数字（TPHM将从这些数字，源于曲线的目标名）

$$\langle \text{curve\_ref} \rangle ::= \left\{ \begin{array}{c} \text{FR} \\ \text{BT} \\ \text{WL} \end{array} \right\} \quad \langle \text{integer} \rangle | \langle \text{rep\_term} \rangle$$

例：  
FR75  
FR101(3)107  
WL2  
BT0

**肘板参考** 用于相同板架上扶强材与肘板的连接。

$\langle \text{bracket\_ref} \rangle ::= \text{BR} \langle \text{integer} \rangle | \langle \text{rep\_term} \rangle$

例： BR5

**孔参考** 用语相同板架扶强材与一个孔的连接

$\langle \text{hole\_ref} \rangle ::= \text{HOL} \langle \text{integer} \rangle | \langle \text{rep\_term} \rangle$

例： HOL3

**缝参考** 用于相同板架内扶强材与缝相连。

$\langle \text{seam\_ref} \rangle ::= \text{SEA} \langle \text{integer} \rangle | \langle \text{rep\_term} \rangle$

例： SEA2

**型材参考** 按他们的数字进行型材（对于扶强材，作为一个替代，按他们的位置）型材可指扶强材、面板及支柱-既可在目前板架或其他板架，及外板上的纵骨及肋骨。

$\langle \text{prof\_ref} \rangle ::= \langle \text{int\_prof\_ref} \rangle | \langle \text{ext\_prof\_ref} \rangle$

一个**内部型材参考**指目前板架上的扶强材及面板。

$\langle \text{int\_prof\_ref} \rangle ::= \langle \text{F-ref} \rangle | \langle \text{S-ref} \rangle | \langle \text{PI-ref} \rangle$

一个扶强材参加，仅可以扶强材数字，也可按扶强材标签数。对于后面的节点，见专门的章节。

$\langle \text{S-ref} \rangle ::= \langle \text{Sno-ref} \rangle | \langle \text{SL-ref} \rangle | \langle \text{SF-ref} \rangle | \langle \text{ST-ref} \rangle | \langle \text{PI-ref} \rangle$

**外面型材参考**，表示不存在目前搬家中的型材。

$\langle \text{ext\_prof\_ref} \rangle ::= ([\langle \text{name} \rangle, ] \langle \text{shell\_prof\_ref} \rangle) | (\langle \text{name} \rangle, \langle \text{int\_prof\_ref} \rangle)$



$\langle \text{shell\_prof\_ref} \rangle ::= \langle \text{L\_ref} \rangle \mid \langle \text{TR-ref} \rangle \mid \langle \text{T-ref} \rangle$

所有的型材参考术语在最小级有下述语句组合:

$\langle \text{prefix} \rangle \langle \text{integer} \rangle \mid \langle \text{rep\_term} \rangle$

前缀如下:

F      面板

PI     支柱

S

SF    } 扶强材

SL

ST

L      纵骨

T    } 撑材

TR

备注:

1. 不允许将不同类型的参考语句混合在一个语句的子部分, 即在斜杠语句的相同侧, 这里斜杠可为分隔符。
2. 如, 在语句描述, 重复语句是对型材允许的。

$\langle \text{ext\_prof\_ref} \rangle (1 \dots 25)$

这应解释为下述方面:

1. 所有参考必须对相同板架或表面的型材进行
2. 对要求表面名的外板型材参考应给出, 如型材位于其他表面
3. 参考的型材的总数必须以 (1, 25) 给出。

Example:

S1-10 = S1, S2, ..., S10 = S1-3, S4-7, S8-10

- 参考可由几个术语给出, 次序无关, 不必形成一个单元。
- L-术语下重复术语的步长不直接给出, 绝对值应为10。
- SL-术语, 纵骨号不应乘以10
- TR 及 T 是可内部交换 (即1和2, 而 TR 必须使用)
- 负的TR数不可使用。
- 参考支柱目前限制为点语句 (如下)

例:

#### 1. 内部型材参考:

例:

```

S1
S2-4    (=S2, S3, S4)
F1
SL1(2)5 (SL1, SL3, SL5)
SF175
ST1

```

## 2. 外面型材参考:

例子中在OUTER下假定的主表面。

例:

```

'INNER', L10-30 (=L10()30 = L10, L20, L30)
['OUTER',] TR1-3 (=TR1()3 = TR1, TR2, TR3)
'DECK', SL1-5
'BULKH', SL35
'PANA', S5
'PANB', PI7

```



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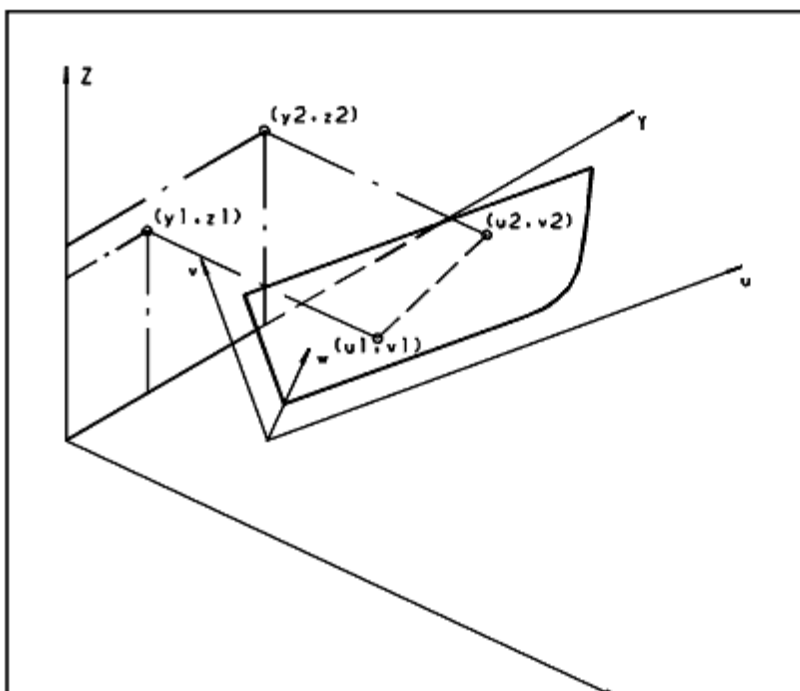
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## 2.3 坐标, 点及线

板架边界及不同的零件的位置, 可以坐标及线的倾角。TPHM提供给用户既可在局部 uvw-系统或在主要 xyz-系统板架系统工作, 下面两页说明从xyz-系统转至uvw-系统的线, 及坐标, 呢一个板架被保存。



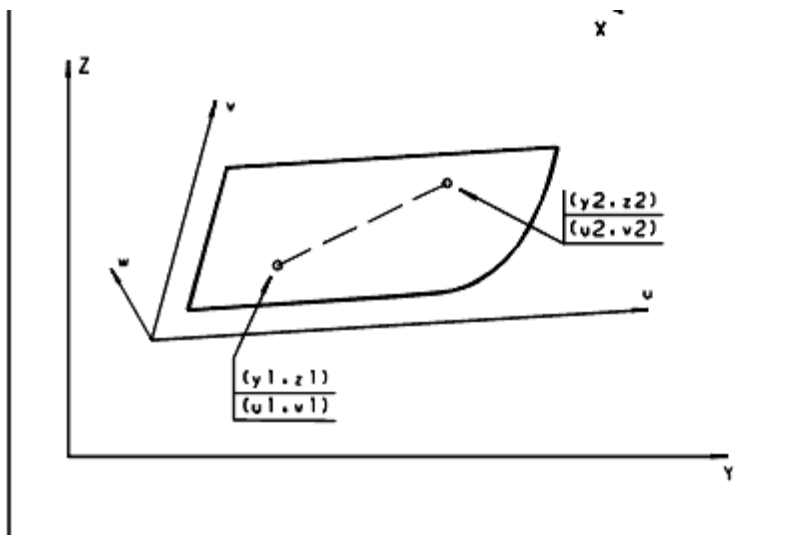


图2:2. 广义坐标系 (xyz) 转为局部坐标系 (uv).

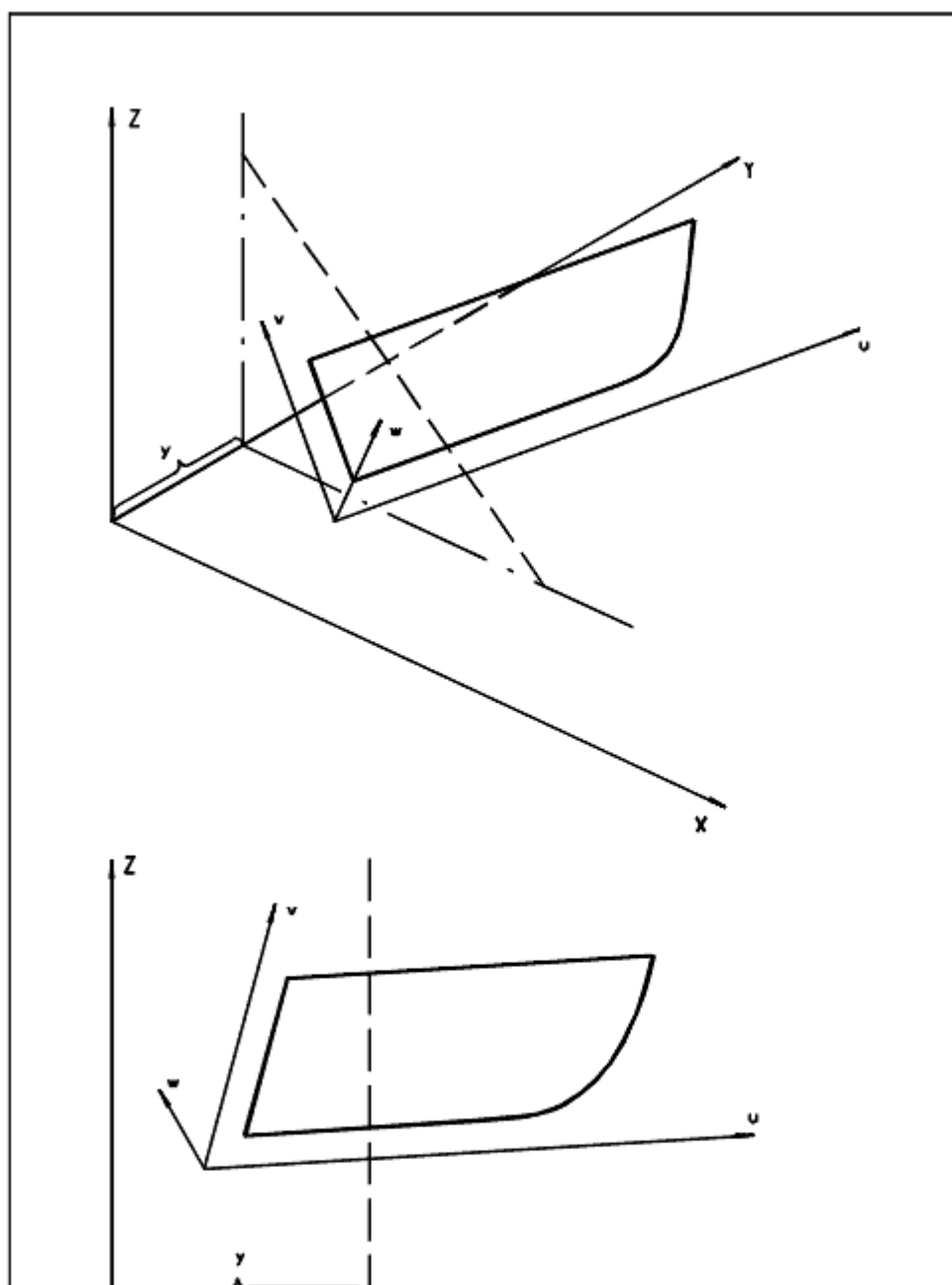




图2:3. 由y-坐标定义的线转为 uvt



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### 2.3.1 坐标

坐标可明确的给出坐标值，然而也可能提供相关坐标定义的不同可能型。

由两种方法：

1. 参考船舶主平面，如肋骨位置
2. 根据拓扑点

一般坐标可像

`<coord> ::= <number> | <ref_term>`

`<ref_term>` 布局比较相似，但所以情况前缀应根据参考类型

此处：

`<ref_term> ::= <plane_ref> | <point_ref>`

具体的这些术语的布置见下面



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#### • 参考肋骨及纵骨位置

有如下的选项：

- 定义沿X轴的位置（肋骨术语）
- 定义沿Y和Z轴的位置分别参考理论纵骨位置在船中（LP-术语从LP）  
参数这些定义的位置（在GENTAB程序（SF406D），见节点文件

$\langle \text{plane\_ref} \rangle := \langle \text{FR-term} \rangle \mid \langle \text{LP-term} \rangle$

$\langle \text{FR-term} \rangle$  及  $\langle \text{LP-term} \rangle$  有相同的语法构件, 在下面描述  $\langle \text{FR-term} \rangle$ .

$\langle \text{FR-term} \rangle ::= \text{FR} \langle \text{start} \rangle \left[ \left( \left[ \langle \text{step} \rangle \right] \right) \langle \text{end} \rangle \right] \left[ +|- \langle \text{dist} \rangle \right]$

$\langle \text{start} \rangle ::= \langle \text{step} \rangle ::= \langle \text{end} \rangle ::= \langle \text{dist} \rangle ::= \langle \text{number} \rangle$

如步长给出, 计算以相同的  $\langle \text{rep\_term} \rangle$ .

在FR/LP-术语中的不是整数, 位置必须有两个最靠近的肋骨/纵骨位置插出

一个负的纵骨号表示负的纵向坐标将被评估 (仅对Y轴的位置)

$\langle \text{dist} \rangle$  是偏移量, 相关于肋骨/纵骨号

例:

FR123	Frame pos 123.
FR123.5	Halfway between frame pos 123 and 124.
FR123()126	Frame pos 123, 124, 125, 126.
FR123(0.5)126	Frame and "half-frame" pos between frames 123 and 126.
FR123(5)133 + 500	500 mm forward of frame pos 123, 128, 133.
LP15	Long pos 15.
LP10.5	A position, halfway between long pos 10 and 11.
LP-15	Negative y-position of long no 15.

FR-术语仅可沿X轴定义, LP术语定义沿Y轴

另外, FR-术语可用于U坐标如U轴与X轴一致, LP术语可用于U及V值, 如相关的轴与LP术语一致。

离开这些规则将产生错误的结果, 而不给出错误的标记。



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## • 坐标参考及拓扑点

参考拓扑点:

$\langle \text{ref\_term} \rangle ::= P \langle \text{start} \rangle [([ \langle \text{step} \rangle ])] \langle \text{end} \rangle [+|- \langle \text{dist} \rangle]$

$\langle \text{start} \rangle ::= \langle \text{step} \rangle ::= \langle \text{end} \rangle ::= \langle \text{integer} \rangle$

可与FR及LP有相同的布置

$\langle \text{start} \rangle, \langle \text{step} \rangle$  and  $\langle \text{end} \rangle$  根据拓扑点的次序

例:  
P5  
P5-100  
P5()7+100      (=P5+100, P6+100, P7+100)



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## 2.3.2 点

点一般按照局部坐标 (UV) 或全球坐标 (X, Y, Z)，由单独的键盘指定输入。

也有选项按所有拓扑点坐标中关键词指定 (UV, U1V, U2V, XYZ, X1Y, X2Y, XTY) 可由拓扑点接受

$\langle \text{point} \rangle ::= \langle \text{by\_coord} \rangle \mid \langle \text{point\_ref} \rangle$

$\langle \text{by\_coord} \rangle ::= (U = \langle \text{coord} \rangle, V = \langle \text{coord} \rangle) \mid$   
 $(X = \langle \text{coord} \rangle, Y = \langle \text{coord} \rangle) \mid$   
 $(X = \langle \text{coord} \rangle, Z = \langle \text{coord} \rangle) \mid$   
 $(Y = \langle \text{coord} \rangle, Z = \langle \text{coord} \rangle)$

一个点可由uv-系统或xyz-系统两个坐标来定义。

$\langle \text{point\_ref} \rangle ::= UV \mid XYZ = P \langle \text{start} \rangle [([ \langle \text{step} \rangle ])] \langle \text{end} \rangle$

因此，布置与拓扑点的坐标参考相同，仅没有偏移。

备注：

1. 拓扑点的完全参考可用来反馈上下的关系，如指定关键词ORI, VAX 及VAX i在肘板的语句中和在曲线语句中（没有任何关键词）。详细的见语句章节
2. 点参照于 UV, U1V, U2V 也可定义一个方向  
 $\langle \text{point\_1} \rangle$  与 $\langle \text{point} \rangle$  有相同的语法，加 '1' 后 UV 被代替成 U1V, XYZ by X1Y.

$\langle \text{point\_2} \rangle$  与 $\langle \text{point} \rangle$ 有相同的语法，加 '2' 后 UV 被代替成 U2V, XYZ by X2Y.

例:

1.  $U=1000, V=2000$
2.  $U=LP1, V=P5+100$
3.  $UV=P5$  (equal to:  $U=P5, V=P5$ )
4.  $X2Y=P3$  (equal to e. g. :  $X2=P3, Z2=P3$ )



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### 2.3.3 方向

Directions are required to specify the directions of lines. The direction is defined as the angle between the positive u-axis of the coordinate system and the positive direction of the line. It is positive in the positive circulation direction.

Directions are given as angles when restricted lines are created using coordinates in the local coordinate system (U, V, etc.). For unrestricted lines using global coordinates (X,Y,Z) an additional "direction point" is used.

(For directions perpendicular to the axes of the coordinate systems there are certain rules, cf. below)

`<direction_angle>::=<angle> | <top_ref>`

`<angle>::=<number>`

`<top_ref>::=P|TA|TB<start> [[(<step>)] <step> [+|-<delta>]`

The general layout of reference to the direction of a topology point is the same as for coordinate references.

前缀P及TA参考拓扑点的主方向, TB参考次要方向

Examples (of angles):

Example:

1.  $T=45$
2.  $T2=30$
3.  $T1=P1()3+30$

(equal to  $T1=P1+30, P2+30, P3+30$  i.e. the primary direction of point number increased by 30).



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### 2.3.4 线

A line may either be defined by a point and an inclination in the local coordinate (uv-) plane of the panel or by two points in the xyz-space of the ship. If the line lies in a plane perpendicular to a coordinate axis in the system, where it is described, then only one coordinate need be given (see the figures above). The resulting line in the local uv-system will be directed so that the component of its direction vector which has the greatest absolute value **in the system used in input** will be positive.

Additionally, the direction of unindexed lines can be reversed by a special keyword, REV[ERSE].

To put it formally:

$$\langle \text{line uvt} \rangle ::= \left\{ \begin{array}{l} \text{U} = \langle \text{coord} \rangle [, \text{T} = \langle \text{angle} \rangle] \\ \text{V} = \langle \text{coord} \rangle [, \text{T} = \langle \text{angle} \rangle] \\ \text{U} = \langle \text{coord} \rangle, \text{V} = \langle \text{coord} \rangle, \text{T} = \langle \text{angle} \rangle \\ \text{UV} = \langle \text{point\_ref} \rangle \end{array} \right\} [, \text{REF}]$$

$\langle \text{angle} \rangle$  is the inclination of the line in degrees, measured from the positive u-axis.

$\langle \text{line\_uvt1} \rangle$  equal to  $\langle \text{line\_uvt} \rangle$  with '1' added to all keywords and U1V replacing UV.

$\langle \text{line\_uvt2} \rangle$  equal to  $\langle \text{line\_uvt} \rangle$  with '2' added to all keywords and U2V replacing UV.

$$\langle \text{line\_xyz} \rangle ::= \left\{ \begin{array}{l} \text{X} = \langle \text{coord} \rangle \\ \text{Y} = \langle \text{coord} \rangle \\ \text{Z} = \langle \text{coord} \rangle \\ (\langle \text{point defined by X, Y or Z} \rangle | \text{XYZ} = \langle \text{point\_ref} \rangle) \\ \langle \text{point defined by XT, YT or ZT} \rangle | \text{XTY} = \langle \text{point\_ref} \rangle \end{array} \right\}$$

Also in the last alternative, the line will be unrestricted and directed



from (X, Y, Z) to (XT, YT, ZT).

$$\langle \text{line\_xyz2} \rangle ::= \left\{ \begin{array}{l} X2 = \langle \text{coord} \rangle \\ Y2 = \langle \text{coord} \rangle \\ Z2 = \langle \text{coord} \rangle \\ (\langle \text{point defined by } X1/Y1/Z1 \rangle | X1Y = \langle \text{point\_ref} \rangle) \\ (\langle \text{point defined by } X2/Y2/Z2 \rangle | X2Y = \langle \text{point\_ref} \rangle) \end{array} \right\}$$

Also in the last alternative, the line will be unrestricted and directed from (X1, Y1, Z1) to (X2, Y2, Z2). (However, check unrestricted lines below).

$\langle \text{line} \rangle ::= \langle \text{line\_uvt} \rangle \mid \langle \text{line\_xyz} \rangle$

$\langle \text{line\_1} \rangle ::= \langle \text{line\_uvt1} \rangle$

$\langle \text{line\_2} \rangle ::= \langle \text{line\_uvt2} \rangle \mid \langle \text{line\_xyz2} \rangle$

A restricted line may be defined by two points in the uv-plane:

$\langle \text{line\_two\_uv-points} \rangle ::= U1 = \langle \text{coord} \rangle$   
                                   , V1 =  $\langle \text{coord} \rangle$   
                                   , U2 =  $\langle \text{coord} \rangle$   
                                   , V2 =  $\langle \text{coord} \rangle$

A restricted line may also be set, using two points in the xyz-space (currently used only in the BOUNDARY statement).

$\langle \text{line\_two\_xyz-points} \rangle ::=$

$\langle \text{point defined by } x1, y1 \text{ or } z1 \rangle \mid X1Y = \langle \text{point\_ref} \rangle$   
                   ,  $\langle \text{point defined by } x2, y2 \text{ or } z2 \rangle \mid X2Y = \langle \text{point\_ref} \rangle$

Note: that a  $\langle \text{line\_two\_xyz-points} \rangle$  and  $\langle \text{line\_xyz2} \rangle$  may look the same. If it is restricted or unrestricted depends on the statement in which it is used.

Remarks:

1. All lines are unrestricted except  $\langle \text{line\_two\_uv-points} \rangle$  and  $\langle \text{line\_two\_xyz\_points} \rangle$
2. The use of the keyword REV is restricted to statement types, where the direction of a line has any significance, i.e.:
  - CURVE statement, fillet curve
  - SEAM statement
  - STIFFENER statement
  - BRACKET statement
 The effect of the keyword REV is not retained to a SAVE statement.

Below, a number of examples of the definition of lines are given.

Examples:

## 1. &lt;line&gt;:

**Example:**

```

U = 5000 (equal to: U = 5000, T = 90)
U = 8000, T = -90 (equal to: U = 8000, REV)
U = P3-100
V = 2000
U = 8000, V = 2000, T = 45
UV= P5
X = FR175-200
X = 5000, Y = 2000, XT = 5300, YT = 2700
Z = 5000
XYZ= P1, XTY=P2

```

(equal to X=P1, Y1=P1, XT=P2, YT=P2 (or any suitable combination of these)).

**Note** that T must not be used together with X, Y, Z.

## 2. &lt;line\_1&gt;:

**Example:**

```

U1 = 5000
U1 = FR75, V1 = 2000, T1 = 50
UV = P4

```

## 3. &lt;line\_2&gt;:

**Example:**

```

U2 = 3000, V2 = 2000, T2 = 30
U2 = P5
X1 = 5000, Z1 = 2000, X2 = 7000, Y2 = 6700
X1Y= P3, X2Y = P4

```

(In the last example, the panel must not be parallel to any principal plane.)

## 4. &lt;line\_two\_uv-points&gt;:

**Example:**

```

U1 = FR75, V1 = 2000, U2 = FR85, V2 = 3000

```



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## 2.4 扶强材标签处理

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### 2.4.1 背景

When generating, it is normal to refer to the surrounding structure when creating a new panel. It is very usual that these references include references to stiffeners on an adjacent panel (e.g. in setting cutouts) and/or on the current panel (e.g. in generating stiffeners and brackets).

These references can take place via the **stiffener numbers** which are related to the numbers of the attributes in which the stiffeners are stored. A severe disadvantage of this method is that the stiffener numbers are normally not stable, i.e. as a panel is changed, the stiffener numbers may change. This requires corresponding changes in the input schemes of dependent panels. If the original change is made, e.g. on a deck or a bulkhead, which is referred to from many other panels, this might cause considerable problems.

To overcome this, Tribon Planar Hull Modelling has been given the facility of referring to stiffeners via "tags", which are stable and, for instance, are defined by the position of the stiffeners.

The tag need not be unique for a certain stiffener, but Tribon Planar Hull Modelling will automatically, from a given tag, search for the corresponding stiffener. This searching is performed in a way very similar to the one when a shell profile part is searched for, defined by a longitudinal/transversal number.

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### 2.4.2 标签类型

有三种不同的扶强材标签，两种自动设置，第三种用户定义

1. Stiffeners that lie in planes, which are close to horizontal or vertical, and the end points of which are close to the longitudinal horizontal distance from the CL or to the longitudinal vertical distance from the BL are given a tag which is identical to the **longitudinal number**. 可按纵骨号给出

The longitudinal positions used are the theoretical midship positions for longitudinals that are defined in the initialization of a new project. A longitudinal position can be defined, even if there is no physical longitudinal, e.g. in the position of a girder or a stringer.

Stiffeners located on the position of longitudinals on the starboard side are given the negative longitudinal number as the tag. The figure below illustrates how the tags are set:

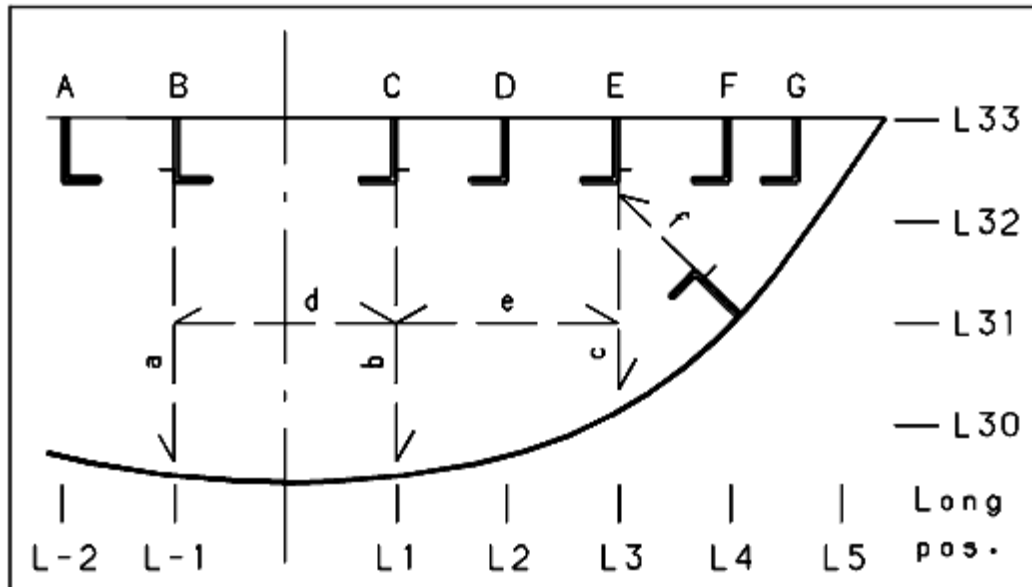


Figure 2:4. Stiffener tags, Example

Stiffeners	Longitudinal tag No.
A	- 2
a, B	- 1
b, C	1
c, E	3
F	4
G	none
d, e	31
f	none

2. 靠近肋骨平面的扶强材给肋位数标签
3. Quite a number of stiffeners will not be given any tag automatically, because they do not follow the conditions above. Nevertheless, it may be desirable to be able to refer to them with stable references, e.g. a stiffener on a platform which is not parallel to CL or stiffeners on a sloping hopper tank top. Then the user, in generating a stiffener, can assign a tag as an integer number in the interval 1-999, using the keyword TAG. Such a user defined tag always overrides an automatically selected tag. 用户标签总覆盖自动选择的标签在1-999



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### 2.4.3 参考标签

Stiffeners can be referred to via reference terms, S-numbers. For instance, a reference to stiffener No.3 on panel ABC may be achieved via:

--- , 'ABC', S3, ---

参考扶强材标签可以相似的方法进行

- o Reference to a longitudinal tag is made via SL<no> (Stiffener at Longitudinal position <no>), e.g. SL5. **Note** that the longitudinal number should **not** be multiplied by 10.
- o Reference to a frame tag is made via SF<no> (Stiffener at Frame position <no>), e.g. SF135.
- o Reference to a user defined tag is made via ST<no> (Stiffener with Tag <no>), e.g. ST99.

In all cases, repetitions can be used and the reference terms can be combined with the keyword REFLECT , e.g.:

SL5-10, REF

Reference to stiffeners on the starboard side of a deck or a platform is made via the negative longitudinal number (e.g. the stiffener b, c, A, B, C in the figure above):

SL-10, SL-1(-2)-7

The tag reference terms can be used in **all situations** (= all statements) where stiffener references are allowed.



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## 2.5 重复效果

可以处理几个（最大25个）零件（扶强材，孔等）在一个语句中，通过指定一个或多个关键词大量的值（或用几个参考），规则如下

假定几个零件（孔）生成在一个语句中，对于每个关键词分配的数必须等于下述值

1. = 0 此种, 缺省值用于所有N个孔
  2. = 1 单个值对所有孔有效
  3. = n N孔每一个有一个值
- 违反了规则将导致错误!

例:

HOLE, D500, U = FR76, FR79, V = 1000;

设两个孔, 位于FR76和FR79。两个孔 v-坐标为1000 (尽管仅一个值指定V), 缺省值值)。

注: 允许值具体对每一个关键词及语句



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## 2.6 缺省值

板架及零件生成的一些性能可以相同的或不需要给出 (例如, 材质代码, 位置号等) 如不说明, 值不给定0。 (如必要值不给, 给出错误信息)



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## 2.7 文件语句的原则

描述不同的语句。他们有共同的布置:

- 语句的目的
- 使用元语言定义的正式及严格的语法
- 句法解释的意义
- 给出例子

备注:

正常语法有时有意识地不太严密, 以免太繁重。例如, 分隔符如不直接说明通常重复出现。

A general rule is: Terms are always separated by one delimiter

**Example:**

```
1. /[ <endcut>]
   [, CON = <con_code>]
   [, ...
```

In this case, no extra delimiter should precede CON if the endcut is left out.

```
2. U = <coord> (1 ... 25)
```

should be interpreted as:

```
U(=|, <coord>) (1 ... 25)
```



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## 2.8 零件颜色的控制

Tribon使用内置颜色对于不同的零件，颜色在不同零件间可不同，可通过在相关的文件中指定关键词COL[OUR]覆盖系统定义的颜色。

颜色语法如下：

```
COLOUR = <colour>
```

<colour> 可取下面的值：

GREEN

BLACK

CYAN

BLUE

MAGENTA

RED

YELLOW

WHITE

如关键词为空，系统定义的颜色如下表，颜色能控制的零件（除板外）即扶强材、支柱、面板、肘板和复板，所有零件由一个及相同的语句将取得相同的结果。

例：

STI, PRO=20, 150, 12 ... /CON=15, CUT=2100, COLOUR=BLACK;

Component	type	Symbolic view	3D view
Stiffener	Green		Red
Flange (welded)	Green		Red
Pillar	Green		Red
Bracket	Green		Cyan
Clip	Green		Black
Doubling plate	Green		Green

不在上表中的以绿色出现

(这些颜色在背景为白色是有效)



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## 3 表识语句

scheme第一行为表识语句

仅1-72为相关 (注意语句不以分号结束及没有使用关键词)

表识符发生在清单及打印中 (仅前面的12个字母) 用于识别, 并减弱分配结果

Example:  
246 OP UPPER DECK, DWG 12345/78  
  
|-----|

First 12 characters occur on plots from separate generation for identification purpose.



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## 4 板架语句





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## 4.1 概述

一个板架语句定义由零件语句定义包含这些零件的板架，板架语句识在识别语句之后的第一个语句

一个正常的板架语句定义下述数量：

- 板架名字
- 对 (PS, SB, 等) 有效的板架
- 所属分段
- 板架数据类型

此外，板架的位置可被定义，生产及装配识别也可加上。

在板架的特殊变量中，一个板架能从数据中删除



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## 4.2 板架类型

这有几种不同的板架类型，有船体模型不同处理：

- 常规平面板架
- 折角板架。折角板架一个或多个折角在位于不同平面板件。
- **子板架** (f对于折角). 一个折角板架由大量子板架组成，每一个位于折角板架的平面内  
对于折角板架一般信息，见相关文件  
[Setup and Customisation Knuckled Pieces and Swedgings](#)
- 肘板板架。用于创建由船体模型肘板标准不覆盖的肘板  
G创建板架仅用任意几何的工具，由不同的语句组成  
肘板板架应作为一个肘板处理
- **巨型板架** 是大板架一般是非生产单元，然而，将作为常规板架处理



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## 4.3 板架名

(在此章 SB 表示右舷, PS 表示左舷, CL 为中)

板架名能自由定义

板架名结构表示由名字直接定义的其他条件

`<panel_name> ::= ' <block>-<pan>'`

If not otherwise specified (see below), the panel is supposed to belong to the block with the name `<block>` that forms the part of the name before `-`.

`<pan>` is panel specific part of the name.

肘板板架不需要板架名



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## 4.4 数据类型

提供分类板架的方法

(DT) 整数

$100 \leq DT \leq 499$

$700 \leq DT \leq 999$

在  $800 \leq DT \leq 899$  表示巨型板架

957 为肘板板架, 958 为折角板架

假定  $DT = \langle X \rangle \langle Y \rangle \langle Z \rangle$ .

那么: :

Y = 9 为水密壁  
Y = 8 为非水密壁  
Y = 0-7 为其他板架

第二个数字用于TPHM选择适当的线型, 绘制隐藏迹线, 对接板架



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## 4.5 保存板架

一般在uv, 在xyz内变换

可在SB特殊板架相应于左舷(如拷贝和修改scheme)

下述可能性存在:

1. 板架对称
2. 左舷
3. 右舷
4. over/in CL ("SP-panel").

左舷板架可有板延伸置右舷

用户必须注意保存, 参考仅对保存的板架

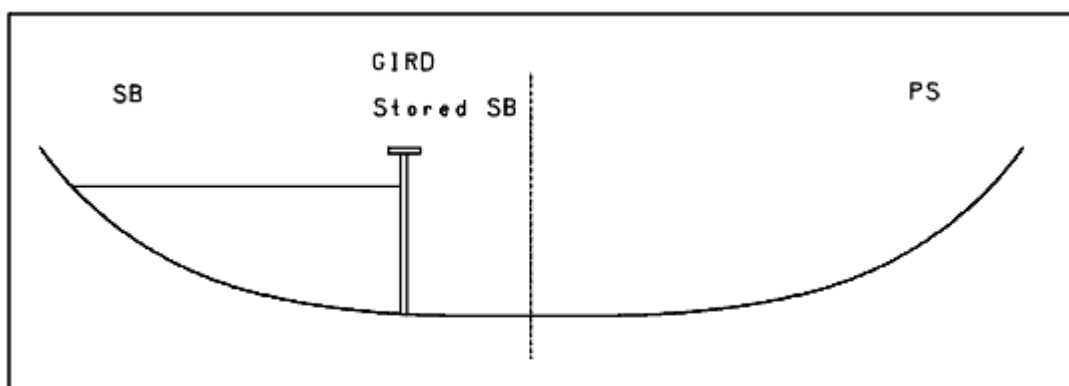


Figure 4:1. Starboard girder, stored starboard side.

BOU, ... /'GIRD'/ ... ;

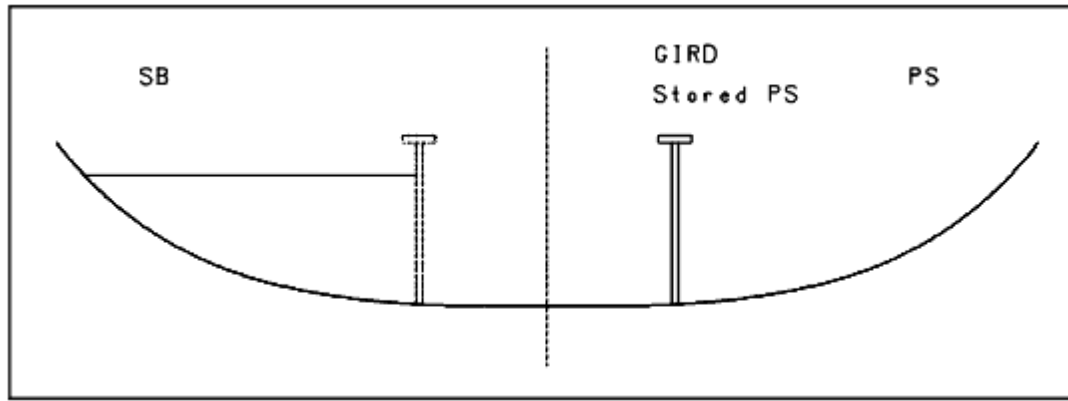


Figure 4:2. Starboard girder, stored (generated) on port side.

BOU, ... /'GIRD',REF/ ... ;

对于对称板架上的许多零件可定义为仅左或仅右，可用于定义对称板架上的木的偏差，可以同时定义及修改两侧零件的主要部分，如一侧有额外的孔

然而，当两侧不同较大时，必须分成一左一右板架，对于一侧板架仅是拷贝并修改名字

一般，对称板架的零件单侧使用当零件必须为一侧时，如零件在两侧，但有不同的特征，两个不同板架定义应使用以免产生间距。



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## 4.6 常规板架语句

This syntax is used when a normal panel is generated. A panel **must not** occur in more than one statement of this kind. (Violations of these rules cause erroneous connections between generated components and the statements of this kind.)

Syntax:

```
PANEL      ,<pan_name>,<pan_loc>
            [,BLOCK=<bl_name>]
            ,<data_type>
            [,<location>]
            [,<store_code>]
            [,GT=<geo_type>]
            [,<id's>]
            [,<assembly>]
            ;
```

## Description of syntax

<pan\_name>      板架名

<pan\_name>::=<name>

<pan\_loc>      定义那一侧有效, 必在板架后 (肘板板架无关)

<pan\_loc>::= SBP[S] | S | P | SP

SBPS means that the panel is valid for PS and SB (two panels, which are mirror images of each other)

S means SB specific.

P means PS specific.

SP means a panel over/in CL.

BLOCK

紧跟板架, 如没有, 按板架名efines the block which the panel belongs to. If not given, the block name is supposed to be derived from the panel name (see Panel Names above).

When given, the block clause must follow immediately after the panel name and the location code, if any.

<bl\_name>::=<name>

<data\_type>      defines the data type of the panel but may also identify the panel as a panel bracket or as a curved panel.

<data\_type>::= DT=<dtype> |  
                  BRA[CKET\_PANEL] |  
                  CURVED

For data types, see section Data Types above.

(<dtype>::=<integer>.

BRACKET\_PANEL implies a bracket panel.

CURVED indicates that the panel is a curved panel. On such a panel, only brackets can be generated (i.e. the panel domain must consist of BRACKET and COMMENT statements only).

<location>      定义板架空间defines the position in space of the panel. If not given, the position is supposed to be fetched from boundary one in the BOUNDARY statement.

<location>::=

X=<coord> |  
Y=<coord> |  
Z=<coord> |  
<three points> |  
<curve references> |  
LOC=<obj\_name>

<three points> defines the location via three points in space; the first in the origin of the uvw-system, the second on the positive u-axis and the third a point in the uv-plane with a positive v-coordinate (not necessarily on the v-axis), cf the figure below.

```
<three points>::=
```

```
ORI=<point>,
UAX=<point>,
VAX=<point>
```

```
<point>::= <coord>, <coord>, <coord>
```

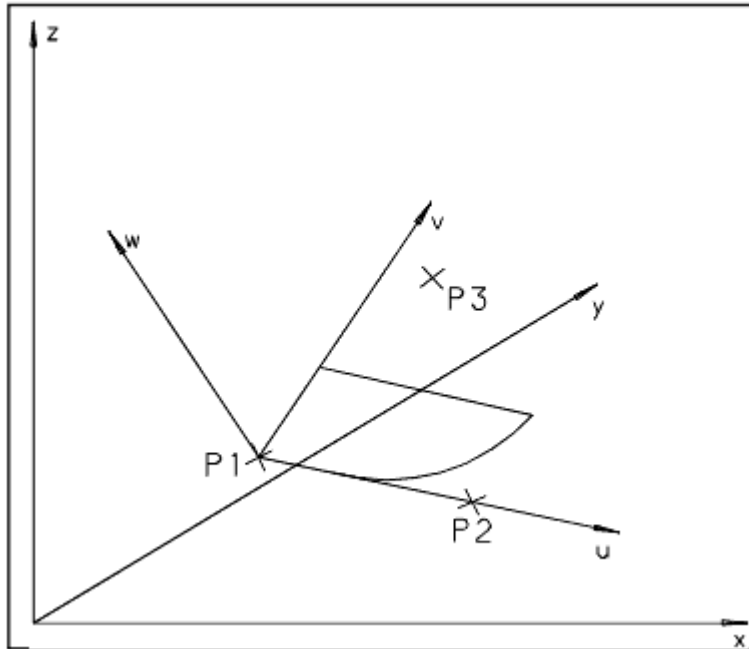


Figure 4:3. Panel, located by three points.

P1='ORI', P2='UAX', P3='VAX'

Example:

```
URI=FR75, 2000, 3000,
UAX=FR76, 2100, 3000,
VAX=FR75, 3000, 3200
```

LOC is used to define the name of an object from which the location of the current panel should be fetched. The object must contain transformation information defining a plane. This is true for e.g. planar Shell curves, Panels, Reference Surface Objects (RSO:s) and Plane objects.

```
<obj_name>::= <name>
```

Example:

```
LOC='DECK_CURVE'
```

The panel, e.g. an inclining deck panel, will get the same local coordinate system as DECK\_CURVE.

**Curve references** can be used to define the location in a similar way.

<store\_code> is used, explicitly to define if the panel is stored PS or SB.

This is normally evaluated automatically but, in some cases, it might be somewhat uncertain. Then it is possible explicitly to tell Tribon Planar Hull Modelling that the panel has been described as though it were stored PS or SB  
 <store\_code>::=ST0=PS|SB

When given, the storing code is supposed to be valid for all panels of the statement.

GT The geometry type is used to control the generation of certain "special side webs" (see the BOUNDARY statement).  
 <geo\_type>::=<integer>

Default value is 101.

90为板架型材, 用于生产时作型材处理Geometry type 90 is reserved for "Panel Profiles", which are Panels that can be reated as profiles in production.

958是折角板架Geometry type 958 is reserved for a knuckled (main) panel.

<id's> define a number of items, that may be used to form part names etc. They may also be used in MIS connections in ways that may be very specific to a specific customer.  
 The <id's> set in the panel statement are normally supposed to be valid for all parts of the panel. However, in certain cases the definition on panel level may be overridden on part level (cf. the Component statements).  
 <id's>::=[, MAR=<marking>]

[, WOR=<drawing\_name>]

[, LIS=<parts\_list>]

[, AS1=<name>]

[, AS2=<name>]

[, AS3=<name>]

[, AS4=<name>]

<marking> 用作零件名的一部分。<marking> 和<assembly\_name>是相互排斥的。is a string that may be used as the common part of part name. The use of <marking> and <assembly\_name> for this purpose is normally mutually exclusive.  
 <marking>::=<name>

<drawing\_name> is the name of the drawing in which the panel occurs.  
 <drawing\_name>::=<name>

这两个字符一般设在零件清单程序中These two strings are normally set in a run of the component list programs.

LIS           零件清单用于设定分段名或装配名, 将覆盖缺零设置。The name of a parts list may be set equal to the block name or to any of assembly names as specified in the default files of the Parts List Hull system.

However, independent of these settings a part will belong to a parts list whose name is explicitly assigned to LIS, i.e. use of LIS causes override of the default setting.

<parts\_list>::=<name>

AS<i>'s       General Purpose strings used in a customer specific way, traditionally used to define assembly names.

<assembly\_name>::=<name>

The AS<i>'s are irrelevant as assemblies when the Tribon WOP system is used for assembly definition.

<assembly>   参考将含板架的装配, <assembly>对所有零件有效, 除非被零件级装配覆盖 is the reference to the assembly containing the panel. The <assembly> in the panel statement is valid for all parts of the panel unless overridden by an <assembly> on part level (cf. the Component statements).

<assembly>::=[AR=<ass\_ref>] |  
                  [ARP=<ass\_ref>]  
                  [, ARS=<ass\_ref>]

AR用于非对称板架, 对于对称板架, 属于相同的装配。对于对称板架, 两侧不同的装配, ARP用于左舷, ARS用于右舷, 交互输入 <ass\_ref>::= <name>, 可由用户定义的装配名设于schem中。AR is used for non-symmetrical panels and for symmetrical panels where both the portside and starboard instance belong to the same assembly. For symmetrical panels with different assemblies for the two sides, ARP is used for the portside assembly, and ARS for the starboard assembly.

<ass\_ref>::= <name>

The assembly reference is a system generated identifier corresponding to a user defined assembly name. The assembly references are normally not handled directly by the user. They are rather the result of some function working with the user defined name. The assembly reference can be set in the panel object, via an interactive function, and then automatically transferred to input scheme clauses, or they can be set in the scheme via a function translating it to the user defined assembly name.

#### Example:

```
PAN, 'AA334-6', Y = 6503, DT = 104;

PAN, 'AA999-9', ORIGIN = FR111, 1000, 0, 333,
    UAXIS = FR113, 1100, 0,
    VAXIS = FR111, 2000, 100, DT = 999;

PAN, 'PANEL_BKT', BRA;
```



In all these cases, a BOUNDARY statement must follow, defining the contour of the panel.



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## 4.7 语句的删除

一般交互删除，可用于scheme删除

当删除时使用此语句

Syntax:

```
PANEL , <pan_name[, BLOCK=<bl_name>], DELETE;
```

(cf. Normal Syntax above)

板架删除一般在（临时）输入scheme或其他scheme的临时修改

板架一般不由Tribon 数据库中删除，因为从分段的板架的参考不会被删除

Example:

```
PAN, 'AA123-4', BLO = 'AA223', DEL;
```



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## 4.8 子板架的语句

此语句用于当生成折角板架的子件时，与常规板架相似，但有些条款对它无意义

Syntax:

---

```

PANEL      , <pan_name>

            , SUB

            [, <location>]

            [, GT=<geo_type>]

            [, <id's>]

            [, <assembly>]

            ;

```

---

SUB作为静态关键词，表示为一子板架，否则将具有相同的意义。



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## 4.9 折角板架语法

如下:

Syntax:

---

```

PANEL (, <pan_name>

      [, BLOCK=<b1_name>])

      , <data_type>

      [, <store_code>]

      SUB=(<subpanel> (1... 25)

      ;

```

---

大多数同普通语句，SUB接以子板架，按任意次序，可接一组以\*号的名字，子板架为25

后者，所有组名的板架被包含，原则上数量不受限

Example:

The following input schemes generate two subpanels which then are combined into one knuckled panel.

**Example:**

Sub-panel 1

PAN, 'TB123-SUB1', SUB, Z=15000;

BOU, X=50000/Y=0/X=55000/Y=4000, CON;

SEA, Y=2600;

PLA, MAT=10, Y=2000, 3500, X=52000;

Sub-panel 2

PAN, 'TB123-SUB2', SUB,  
 ORI=50000, 4000, 15000,  
 UAX=60000, 4000, 15000,  
 VAX=50000, 8000, 14500;

BOU, X=50000/Y=4000, CON/X=55000/Y=7500;

SEA, Y=5000;

PLA, MAT=10, Y=4500, 6000, X=52000

Main panel

PAN, 'TB123-1', SBP, DT=343,

SUB= 'TB123-SUB1': 'TB123-SUB2' ;

(or PAN, 'TB123-1', SBP, DT=343, SUB='TB123-\*' ;)



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## 5 仅语句

当一个或多个COMMENT语句在PANEL语句前

句法很简单:

ONLY, <pan\_name>;

定义基本板架, 没有位置及数据类型, 仅为 COMMENT语句的容器, 在其他任何语句类型, 常规语句包含与ONLY语句相同的板架名



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## 6 Boundary 语句

BOUNDARY语句被用来生成当前板架中封闭几何的轮廓.

它的语法有三种主要可供

1. 正常句法中外形来自周围的结构, 像板架、曲线、线等, 船体模型, 系统将切这些零件以形成封闭形状
2. 在句法变量中, 一个边界可为自由侧, 由比邻的边界长度及大量的参数控制
3. 第三个代替由几个特殊侧面腹板的生成一套参数



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### 6.1 正常句法

在正常的句法中, 一个密闭的形状由最多几个不同的边界, 每个边界可与其他独立

从局部uvw系统, 边界必须以逆时针给出。

美意个边界可以大量不同的方法给出, 可能性如下:

- 曲线参考 (肋骨、水线、纵剖面) 参考术语仅可在第一个边界中使用
- 线 (限制或非限制)
- 曲线, 既可在Curves语句建立, 也可从数据库读取
- 表面参考, 由名字及数字
- 平面, 既可PLN-语句或从数据库读取
- 板架, 与目前板架平面相交
- 一个板架的边界或面板靠近目前板架
- 相交型材的横截面, 既在外板或一个相交板架
- 沿型材边缘的外形
- 沿型材搭接的外形

某些边界类型将以两种形状（双）船体建模将自动选择使用的一个。

如不由 PANEL 语句定义，板架位置取来自第一个边界，这可由许多边界类型，但不是下述的一个：

- o Lines
- o Curves, established in CURVE statements
- o Surface references
- o Intersecting panels
- o Planes
- o Profile crossections

#### Syntax Description:

BOU, <boundary\_1>(/<boundary>) (1...11);

Example:

```
BOU, FR105/' TANKTOP'/' BULKH' ;
```

```
<boundary_1>::= <boundary> | ( <curve_ref> (1...10),
                                [CNO=<cont_no>]
                                [<paral_displacem>]
                                [, REF | SYM] )
```



`<boundary>::=`

<code>&lt;profile_boundary&gt;::=</code>	<code>&lt;boundary_crossection&gt;  </code>  <code>&lt;along_profile&gt;  </code>  <code>&lt;overlap_prof_end&gt;</code>
<code>&lt;boundary_1&gt;</code>	differs from the remaining boundaries syntactically in one way: the boundary can be defined by the use of curve references.
<code>&lt;paral_displacem&gt;</code>	Some boundary types can be displaced parallel to themselves before being used as boundaries. <code>&lt;paral_displacem&gt;::= COR= &lt;dist&gt;</code>  <code>&lt;dist&gt;::= &lt;number&gt;</code>
CON	Used only for those boundaries of subpanels that should be connected to another subpanel along a knuckle line. If no value is assigned to CON, the default bending type (=9999) will be used. <code>&lt;bending-type&gt;::= &lt;integer&gt;</code>



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### 6.1.1 线

限制, 非限制线可用



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### 6.1.2 曲线

CNO By default contour 0 of the curve will be used. Any other contour can be selected using CNO.  
`<cont_no>::= <integer>`

parallel move When a curve is moved parallel to itself, the displacement will be to the right (in the circulation direction of the curve if positive, to the left if negative.

`<paral_displacem>::= COR=<dist>`

`<dist>::=<number>`

REF All boundary types (except explicit lines) can be reflected in the vertical plane in the CL before being used. REF[LECT] is used for this purpose.

SYM When boundary\_1 is a curve, the use of SYM means that the curve will be reflected in the CL-plane, and then the reflected curve will be connected to the unreflected curve to form one boundary over the CL.

SYM can only be used for curves, starting in the CL, like frames.

Example: BOU, FR105, SYM/ ... ;



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### 6.1.3 表面

The surface reference can either be a number or a name.

`<surface>::= SURF = <surf_no> | <surf_name>`

`<surf_no>::= <integer>`

`<surf_name>::= <name>`

1为主船体, -1为缺省甲板表面, 额外表面为 CGDB启动的, 定义的附加表面数

The names are the surface object names like "SURF='AAHULL'".

Limits can be given along the principal axes to trim the curve resulting from the surface reference. This is necessary e.g. when the curve consists of multiple contours as a boundary limit curve should have only one contour.

`<limits>::= [XMIN = <coord>  
[, XMAX = <coord>  
[, YMIN = <coord>  
[, YMAX = <coord>  
[, ZMIN = <coord>  
[, ZMAX = <coord>`

If none of the keywords above are given "YMIN=0" is assumed. When

referring the reflected surface the keywords above should be given relative to the original position.



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## 6.1.4 相交平面

平面既可从数据库中作为边界，也可从SF400D程序创建，于PLN语句（见平面语句）  
`<intersect_plane>::= <name>`

$CORR < 0$  给出位移，创建较小表面，  $CORR > 0$  较大表面



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## 6.1.5 相交板架

一般产生两个曲线，（双侧），自动选择正确侧

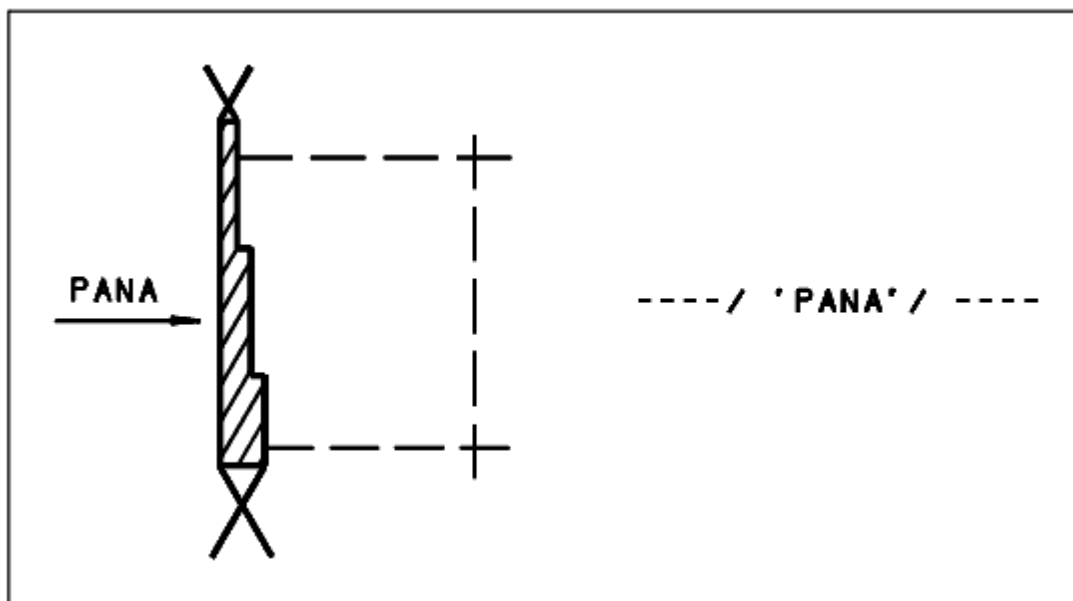


Figure 6:1. Section curves from panel used as a boundary.



大多数情况，可方便选择所用曲线，通过定义船的主方向

合成外形将延伸至相交板边外缘，CHAMFER\_ADJUST 和 REDUCE\_HOOKS缺省参数控制  
当用CORR使用时总是直的，“非限制”曲线，线的位置将从最后的板计算（在板架  
的侧面，该线被放置）

<intersect\_panel>::= <name>

<side\_info>::=

SID= AFT |

FOR |

SB |

PS |

TOP |

BOT

**Example:** ... / 'BULKH', SID=PS / ...



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### • 板架边界的削斜过渡

当一个板架平面的选择用作其他板架的边界时，相交板界的将考虑（见下图）

然而，板厚的不用应考虑，板应削斜

这能在建模生成阶段进行CHAMFER\_ADJUST（见 Default File of Tribon Planar Hull Modelling）.

相似的变化将发生在对接板的边界处，在此种情况削斜与板厚差是独立的

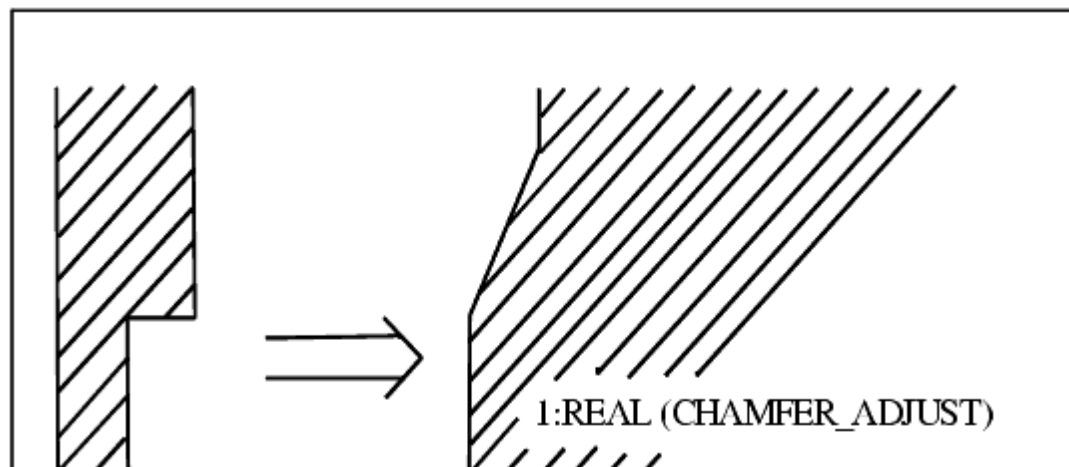




Figure 6:2. Chamfered boundary curve from panel with a chamfered joint.



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### 6.1.6 相同平面内的板界

一般, 当一个板架用作边界, 它被相交

也有用一个接近目前板架平面有板架作为边界

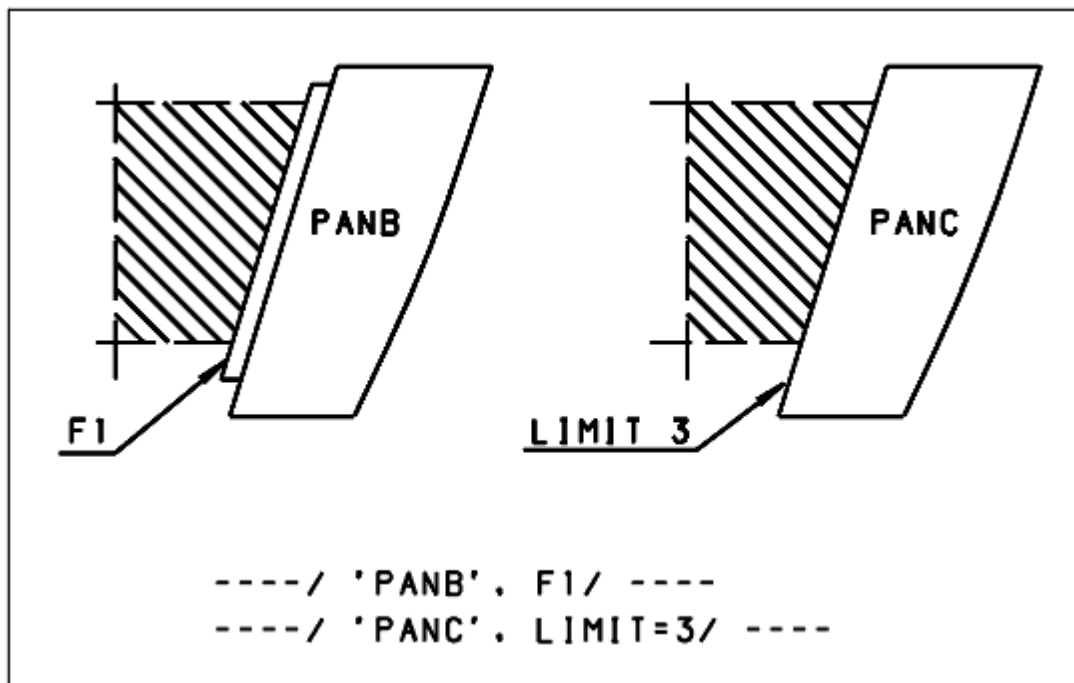


Figure 6:3. Panel boundary from limit or flange.

用户必须规定这个板界的边界或面板

`<coplanar_panel> ::= <name>`

`<lim_no> ::= <integer>`



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### 6.1.8 沿型材的边缘

在这种边界，边界曲线沿所给型材的边缘，这种面板情况，结果有两个曲线，曲线平行边缘。

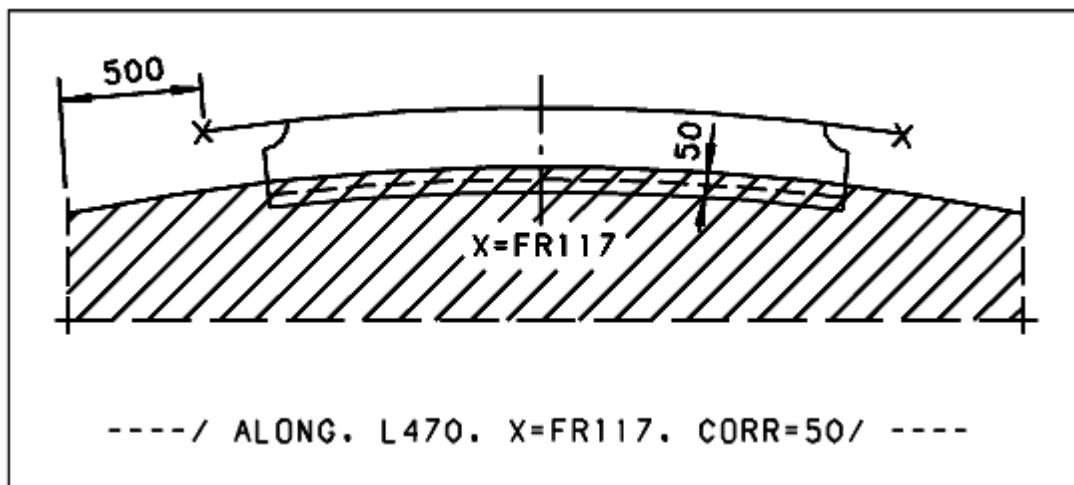


Figure 6:6. Boundary along edge of profile.

<along\_profile>::= ALONG,

$$\left\{ \begin{array}{l} \langle \text{shell\_prof\_ref} \rangle (1 \dots 10), \langle \text{xyz-line} \rangle \\ \langle \text{adj\_pan} \rangle, \left\{ \begin{array}{l} (\langle \text{stiff\_tag\_ref} \rangle \\ [, \langle \text{xyz-line} \rangle] \\ \langle \text{Sno-ref} \rangle \\ \langle \text{F-ref} \rangle \end{array} \right\} (1 \dots 10) \end{array} \right\}$$

[, <panel\_displacem>]

<shell\_prof\_ref>/  
<stiff\_tag\_ref>

General Layout of a Statement

<xyz-line>

定义平行于主平面的平面，用于选择使用的型材，对外板型材是必须的，如一个扶强材标签参考不单一为选项

<xyz-line>::= X|Y|Z = <coord>

<adj\_pan>::= <name>

<panel\_displacem>

如上

正值表示搭接，负值为间隙

备注:

1. 合成迹线应延伸出外板型材500mm在型材两端, 否则为1000mm
2. 如以边界数为1, 板界的局部坐标系由边界定义, 如下:
  - 迹线的起点
  - v轴是型材平面和主平面的相交, 对于外板型材, 所选直线应由主平面定义
  - w轴为“自然”方向, 即, y轴负向应根据xyz的最大零件
 因为, 在如此情况, 用户对局部坐标系有较小的控制, 建议使用板架的其

Examples:

```
... / ALONG, L470, X=FR117, COR=50 / ...
```

```
... / ALONG, 'ADJ-PAN', SL15, X=FR75 / ...
```



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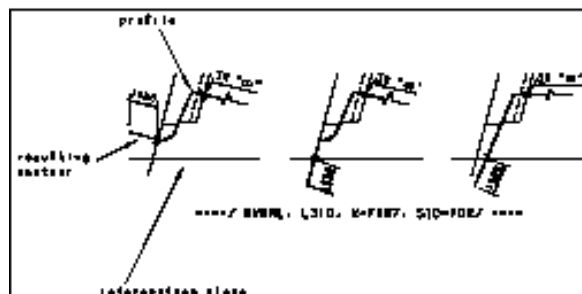
### 6.1.9 型材端部

外形来自所给型材的端部搭接（外形型材或扶强材），实际外形由许多的参数控制。

在此语句，三个不同的事件如下定义：

- 型材搭接
- 平面搭接曲线评估的地方
- 曲线的形状

下图说明三种不同的情况也定义两端外形的范围



Click picture to enlarge

Figure 6:7. Boundary contours from overlap of profile ends.

Syntax Description:

$\langle \text{overlap\_profile\_end} \rangle ::= \text{OVERLAP}$

,  $\langle \text{profile} \rangle$

,  $\langle \text{intersect\_plane} \rangle$

,  $\langle \text{contour\_param} \rangle$

$\langle \text{profile} \rangle$  defines the profile to overlap

$\langle \text{profile} \rangle ::=$

$$\left\{ \begin{array}{l} \langle \text{shell\_prof\_ref} \rangle (1 \dots 10), \langle \text{side\_info} \rangle \\ \langle \text{adj\_pan} \rangle, \left\{ \begin{array}{l} ( \langle \text{stiff\_tag\_ref} \rangle (1 \dots 10) \\ [, \langle \text{side\_info} \rangle] \end{array} \right\} \\ \langle \text{Sno\_ref} \rangle (1 \dots 10) \end{array} \right\}$$

$\langle \text{shell\_prof\_ref} \rangle /$

$\langle \text{stiff\_tag\_ref} \rangle$  见 [General Layout of a Statement](#)

$\langle \text{adj\_pan} \rangle$  扶强材定位的相邻板架名

名字必须在**OVERLAP**后立即给出

$\langle \text{adj\_pan} \rangle ::= \langle \text{name} \rangle$

$\langle \text{side\_info} \rangle$  用于显示相交平面寻找型材端部

如扶强材标签参照不是唯一的，对外板型材是必须的。

$\langle \text{intersect\_plane} \rangle$  定义搭接外形评估的平面  
可由不同的方法

- 由一板架
- 由一平面
- 由给出位置主甲板的平面
- 在给定的位置相切平面

$\langle \text{intersect\_plane} \rangle ::=$

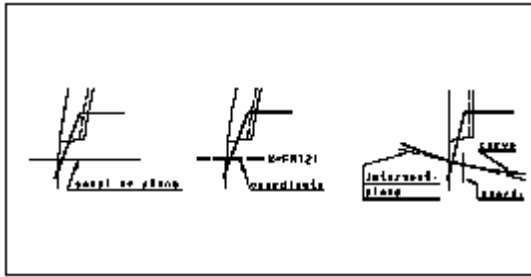
$\langle \text{panel} \rangle \mid$

$\langle \text{plane} \rangle \mid$

$(\langle \text{curve} \rangle, X|Y|Z = \langle \text{coord} \rangle) \mid$

$(X|Y|X = \langle \text{coord} \rangle)$

如下图说明



Click picture to enlarge

Figure 6:8. Overlap contour without lug.

<contour\_param> 定义控制外形的参数

<contour\_param>::=

[, R[=<radius>]]

[, M1=<measure>]

[, M2 | M3=<measure>]

[, M4=<measure>]

<radius>::= <measure>::= <number>

R When given, the resulting contour will include a lug. The radius at the end of the lug can be controlled (default value: 50).  
No radius:

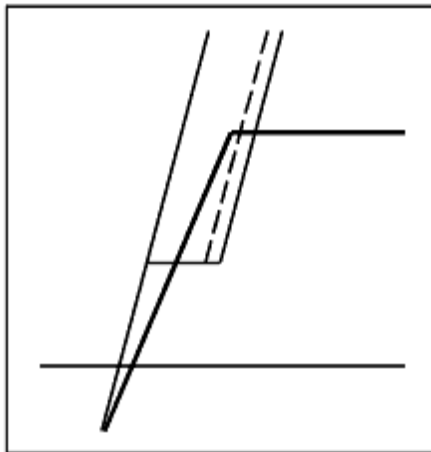


Figure 6:9. Overlap, no lug (R missing).

With radius (R>0):

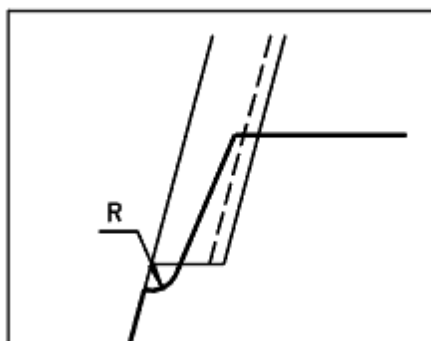
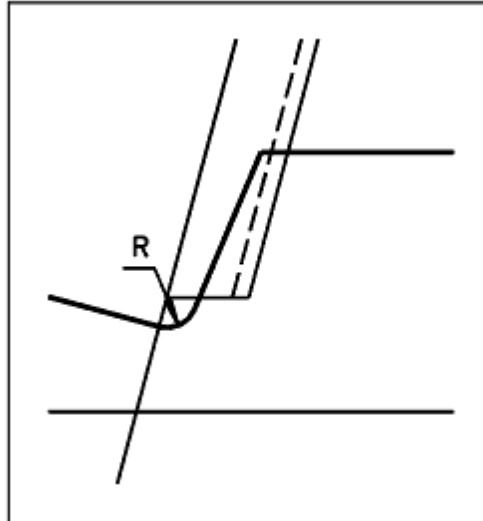


Figure 6:10. Overlap with lug ( $R>0$ ).

正值表示搭接沿型值迹线，  
 否则表示搭接部分垂直于迹线

With  $R < 0$ :

Figure 6:11. Overlap with lug ( $R<0$ ).

M1 定义靠近型材边缘的折角点的距离  
 缺省值为50

$M1 > 0$ :

外形延伸平行于相交平面

$M1 < 0$ :

垂直于型材边缘的外形



Figure 6:12. Interpretation of parameter M1.

M2, M3 此参数定义以不同方法的搭接  
 M2 定义从相交平面至合成外形与边缘交点的距离

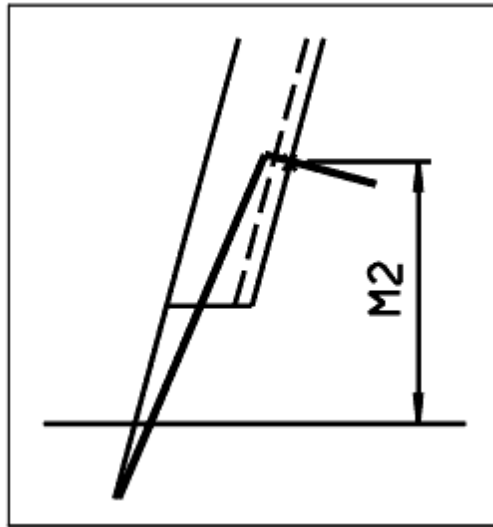


Figure 6:13. Interpretation of parameter M2.

M3 控制下图的实际搭接, 搭接计算沿型材边缘, 小于5为一个因子,  $M3 \cdot H$ ,  $H$  是型材高度

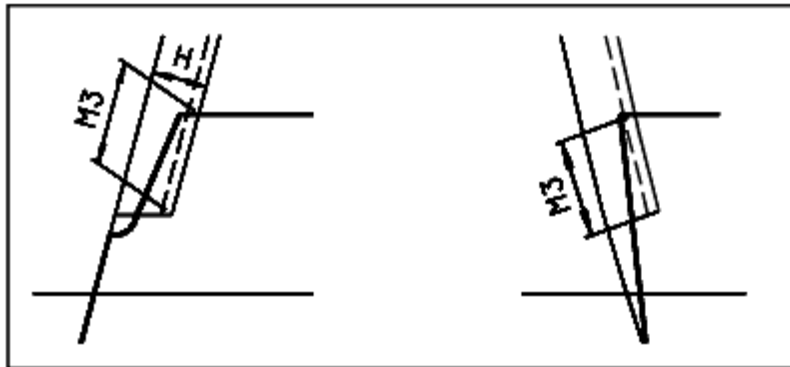


Figure 6:14. Interpretation of parameter M3.

如M2、M3 没有给出, 缺省  $M3 = 1.5$

计算搭接将考虑的型材的端切

M4

M4 对于有无耳板有不同的定义

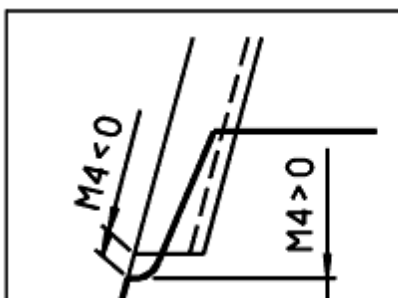
有耳板:

$M4 > 0$ :

M4 从相交平面与耳板外形折角点

$M4 < 0$ :

M4 沿型材的迹线, 从型材端部至耳板弧起点的距离





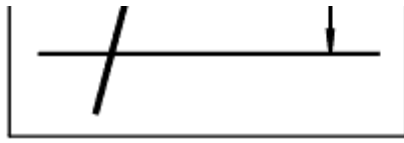


Figure 6:15. Interpretation of M4 (contour with lug).

缺省:  $M4 = -50$

没有耳板的外形:

M4 为型材迹线与相交外形的距离

See the figure:

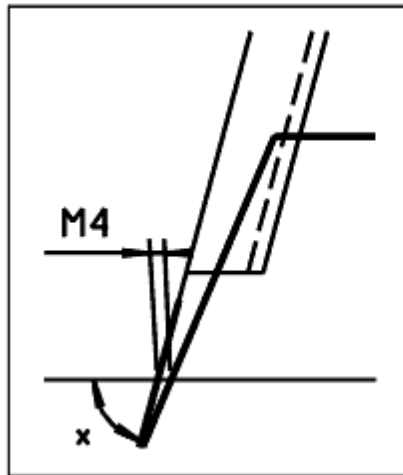


Figure 6:16. Interpretation of M4 (contour without lug).

缺省应根据迹线与相交平面的夹角

$x < 110$  度:  $M4 = 100$

$x \geq 110$  度:  $M4 = 75$

备注:

1. 从相交平面至型材边缘的外形长度将可用的, 当为自由边缘BOUNDARY语句中CEN条的H值, 见自由侧语句
2. 如板架位置由型材搭接定义, 原点必须在相交平面与型材迹线的相交点, u轴沿相交平面, v轴搭接型材的方向。uv与型材端部平面一致。当评估循环方向, 应记住。建议避免局部(uv)坐标输入



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### 6.1.7 型材横截面

在这种类型的边界, 边界曲线--从型材的一侧, 生成一个给处型材及目前板架平面的相交

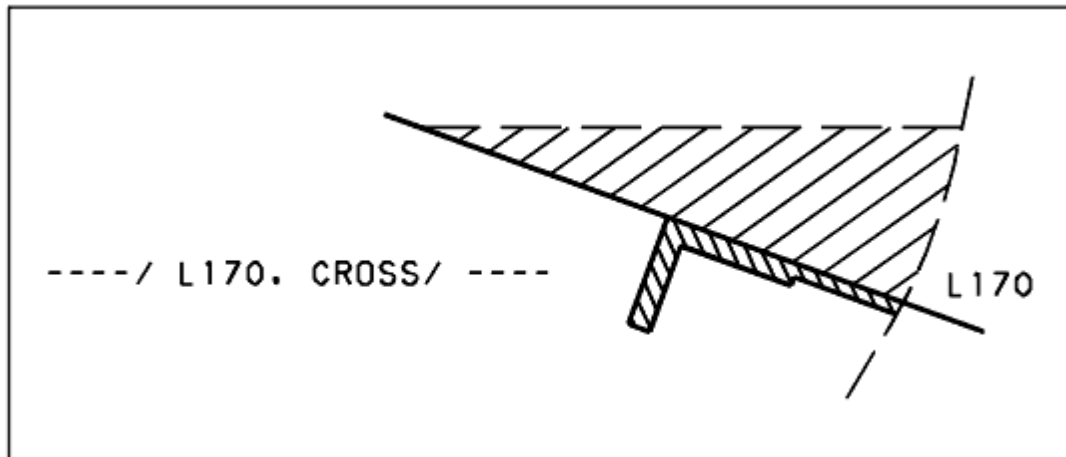


Figure 6:4. Profile section curve used as boundary.

`<profile_crossection>::=`

`CROSS`

`, <ext_prof_ref> (1...10) [, REF]`

`[, SHORT]`

`[, <paral_displacem>]`

`<ext_prof_ref> ,`

`<paral_displacem>`, see above. The displacement is always positive in this case, i.e. creating a gap at the profile.

SHORT 一般, 合成非常长, 用SHORT, 外型仅延伸半个型材, 如下:

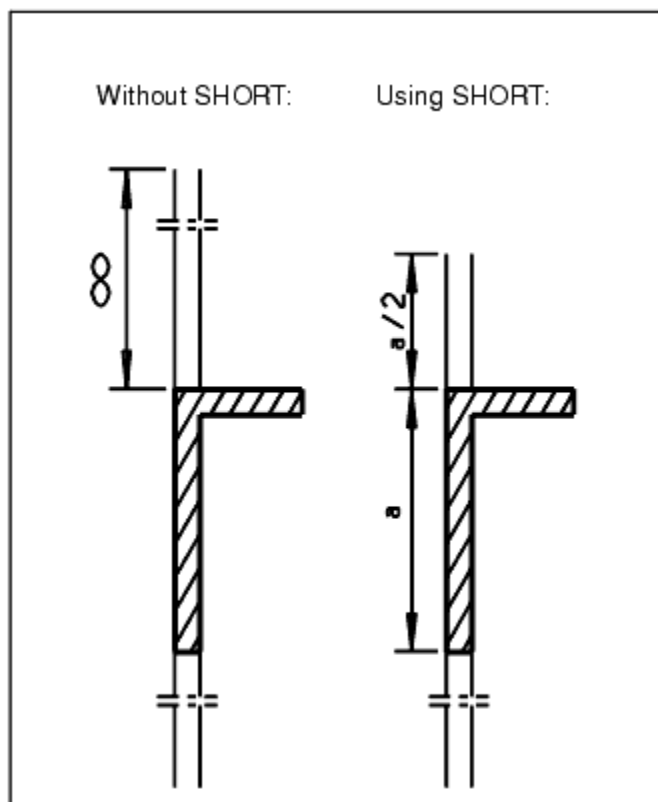




Figure 6:5. Use of keyword SHORT.

Examples:

... / CRO, L140, COR=50 / ...

... / CRO, 'AA124', SL14, SHORT / ...

注:

型材高度将在 LEN-条款, 自由侧的BOUNDARY语句中的H值



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### 6.1.10 例

正常语句如下:

Example 1:

Penetration of two bottom webs.

Example:  
PAN, 'AA161-7', 'AA161-71', DT=101;  
BOU, FR117, FR122/'ZPLANE',  
BOU=-20/'AA461-3';

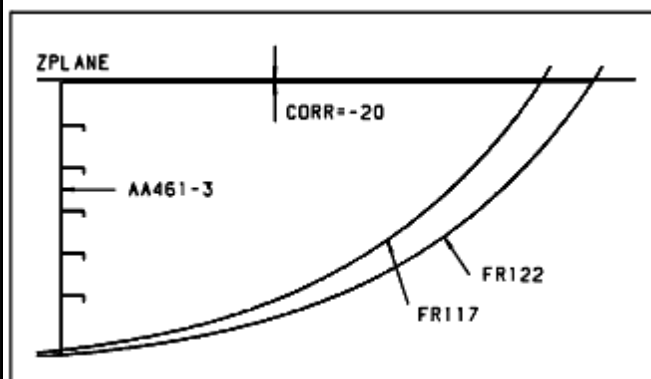


Figure 6:17. Two panels generated by the same input.

Two panels will be generated. The material thickness of AA461-3 will automatically be taken into consideration.

Example 2:

Generation of the same two panels:

Example:

BOU, FR117, FR122/V=5200/U=13006;

If possible, the solution of Example 1 should be chosen.

Example 3:

Generation of webs against a longitudinal bulkhead.

Example:

PAN, 'AA461-7', 'AA461-71', DT=104, FR117, FR122;

BOU, 'AA461-3' /Z=5220/Y=16006/V=29350;

Note: that, in this case, the position of the panels is defined by giving the frame numbers in the panel statement, since the frames do not make part of the contour of the webs.

Example 4:

Generation of a carling against the shell.

Example:

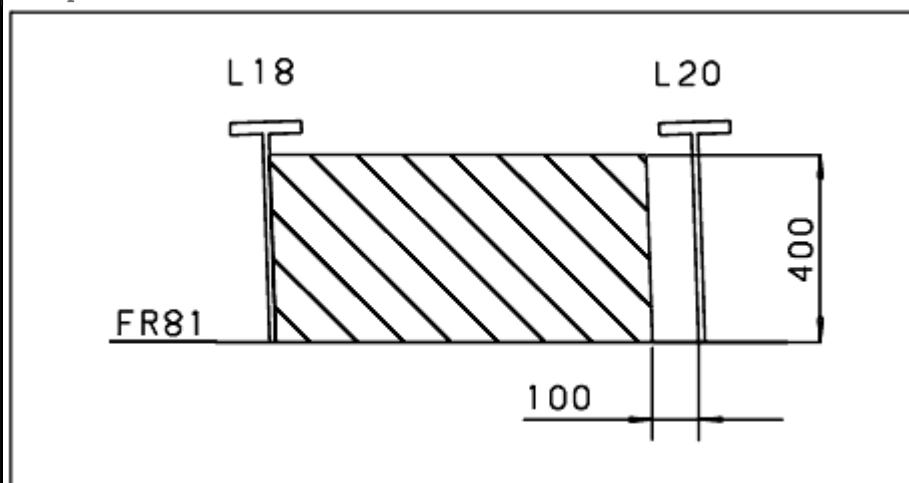


Figure 6:18. Small panel (bracket) between longitudinals.  
PAN='CARLING', BRACKET;

BOU, FR81/L200, CROSS, CORR=100/V=400/L180, CROSS;

Example 5:

Generation of a stringer overlapping a longitudinal.

Example:

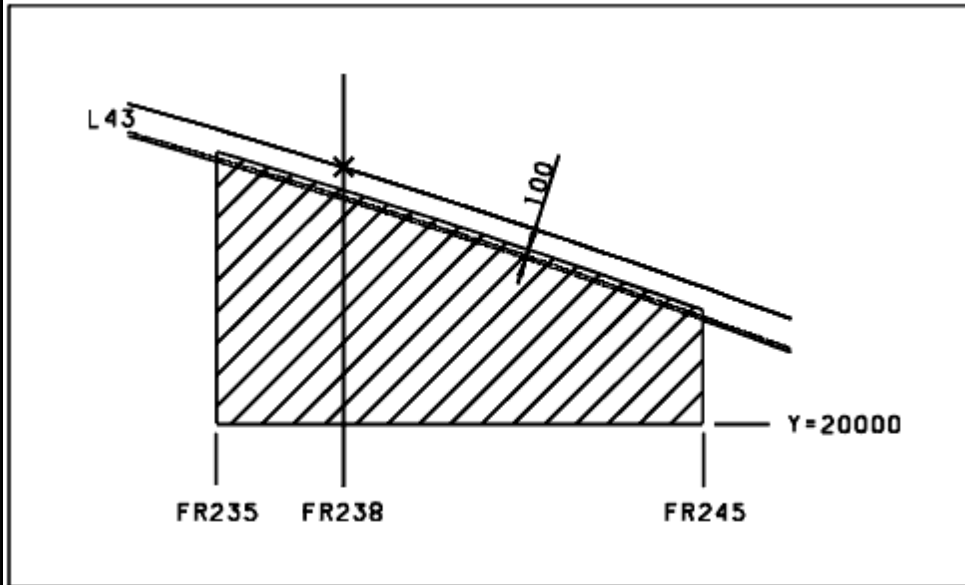


Figure 6:19. Panel overlapping along longitudinal.

PAN='STRINGER', DT= ... ;

BOU, L43, ALONG, X=FR238, CORR=100/X=FR235/Y=20000/X=FR245;

In this case, normally the position of the panel is defined by the longitudinal which it overlaps.

For more examples, see the Free Side Syntax below (which is an extension of the Normal Syntax).



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## 6.2 自由侧语句

自由侧是当一边自由，不与任何边界文件对接，典型是肘板

可进行如下定义：

Syntax:

---

BOUNDARY, <boundary\_1>

(/<boundary>) (0 ... )

/<boundary\_n-1>

/[<boundary\_n>]

/<boundary\_n+1>

(<boundary>) (0 ... );

---

### Description

<boundary\_1> and <boundary> 同正常 BOUNDARY 语句定义 <boundary\_n> is the boundary which is 'free'. <boundary\_n-1> and <boundary\_n+1> 在自由边界之前、之后的边界, 各自的。The free side may be quite empty.

<boundary\_n> may be the first boundary and, in this case, <boundary\_n-1> 是最后一个边界

<boundary\_n> may as well be the last boundary and, in this case, <boundary\_n+1> is the first boundary of the panel.

<boundary\_n-1>::= <boundary\_n+1>::=

<boundary\_1>|<boundary>, LENGTH=<length\_of\_limit>

<boundary\_1> 仅为第一边界时出现

<length\_of\_limit>::= <length>| (H+| -<dist>)

<length>::= <dist>::= <number>

在<profile\_crossection> (见常规语句), H 是型材高度

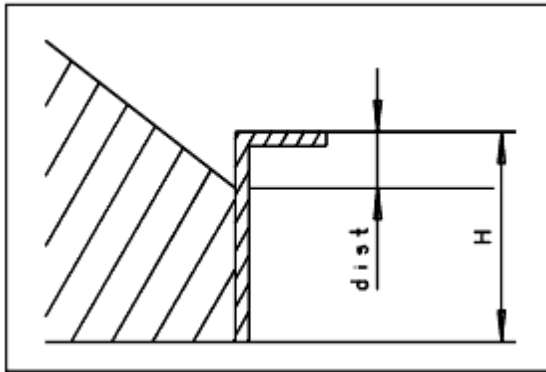
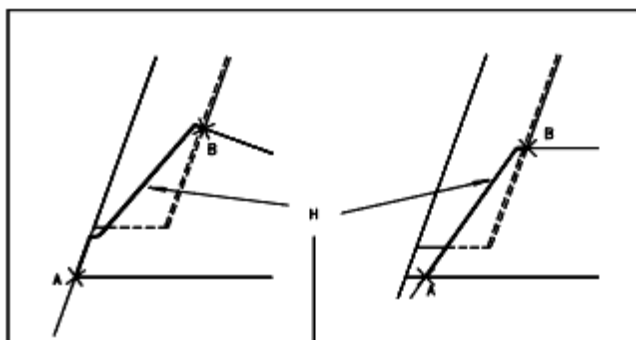


Figure 6:20. Use of parameter H for profile crossection boundary.

<overlap\_profile\_end> H 为A、B两点之间的长度



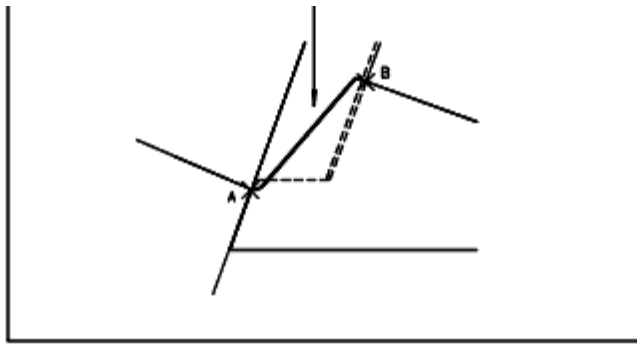


Figure 6:21. Contour A-B is length H for overlap boundaries.  
H is the length of the boldly marked parts of the figure.

$\langle \text{boundary } n \rangle ::=$

```

<preliminary_boundary>
[, FREE]
[, M1=<m1>]
[, M2=<m2>]

```

$$\left\{ \begin{array}{l} ([, R1=<r1>[, <v1>]] \\ [, R2=<r2>[, <v2>]] \\ R=<r>[, <t1>, <t2>] \end{array} \right\}$$

$\langle \text{preliminary\_boundary} \rangle ::= \langle \text{boundary} \rangle$

The meaning of  $\langle l1 \rangle$ ,  $\langle v1 \rangle$  etc. will be explained in the figures and the remarks below.

1. 关键字 FREE 用于识别自由侧，一般，船体模型用于评估输入的其余部分，但下述情况如FREE不给，不明确的情况较普遍

- 有四个边界
- 自由侧像正常边界（即不空且没有参数）

边界3和4不作为自由侧，除非自由 FREE 给出，也有可能有这种情况，当它是多余的

2. 如常规语句相同规则，边界必须形成一个初步封闭的外形，如除  $\langle \text{boundary}_n \rangle$  外满足这个要求。  $\langle \text{preliminary\_boundary} \rangle$  可丢失，如1, 2, 4, 5形成初步外形，  $\langle \text{preliminary\_boundary} \rangle$  不必对边界3必须给出

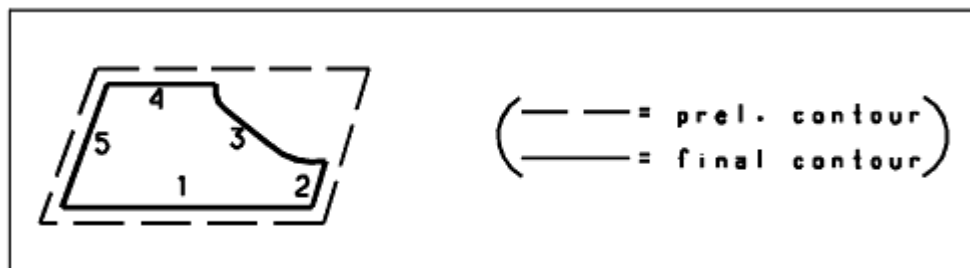


Figure 6:22. Panel with free side, no preliminary free side boundary required.

(此图是边界数)

如不满足下图, 初步边界必须给出,  $\langle \text{preliminary\_boundary} \rangle$  是边界2, 因为边界1、3不形成封闭外形,  $\langle \text{preliminary\_boundary} \rangle$ 对边界2必须给出



Figure 6:23. Panel with free side, preliminary boundary 2 required.

3. 初步外形创建后必须修改至最后形状如下:

1.  $\langle \text{boundary\_n-1} \rangle$  缩短至 $\langle \text{length\_of\_limit} \rangle$  (或可能延伸), 从起点开始计算
2.  $\langle \text{boundary\_n+1} \rangle$  缩短至 $\langle \text{length\_of\_limit} \rangle$  (或可能延伸), 从终点开始计算  
如边界的长度小于需要的, 外形将延伸相关端点的切线
3. 因此, 自由边界 $\langle \text{boundary\_n} \rangle$  的端点被定义, 它的详细形状由 $\langle \text{boundary\_n} \rangle$  说明, 这有两种情况

#### Case A

The free boundary has two toes connected with a line segment.  
(Keywords R1 and R2 are used.)

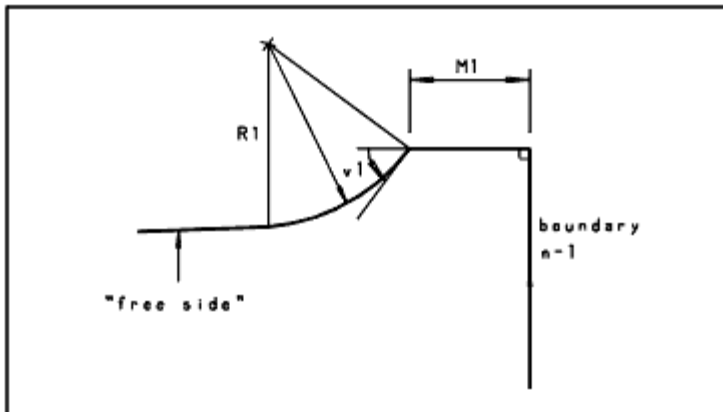


Figure 6:24. Parameters at start of free side.

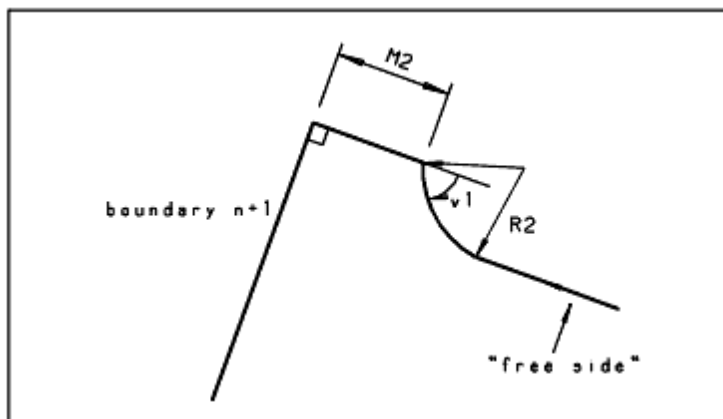




Figure 6:25. Parameters at end of free side.

此参数定义两个“趾端”在自由侧的每一侧

<m1>/ 垂直于<boundary\_n-1>(</boundary\_n+1>)趾端的长度可省略  
<m2>

<r1>/ 趾端弧的半径, 可省略  
<r2>

<v1> 为相对于先前线段弧1的正向, 逆时针方向测量  
缺省:

m1 = 0 v1 = 80

m1 > 0 v1 = 0

注: 如 v1=0, m1 应为端部长度而不是高度

<v2> 为弧2对于线段反向倾角, 从顺时针方向测量  
缺省值:

m2 = 0 : v2 = 80

m2 > 0 : v2 = 0

#### Case B

自由边界由一个半径连接的两个“趾端”(R 可用)

两种情况可发生

I. <t1> 及 <t2> 被忽略  
这表示两个趾端由弧<R>连接

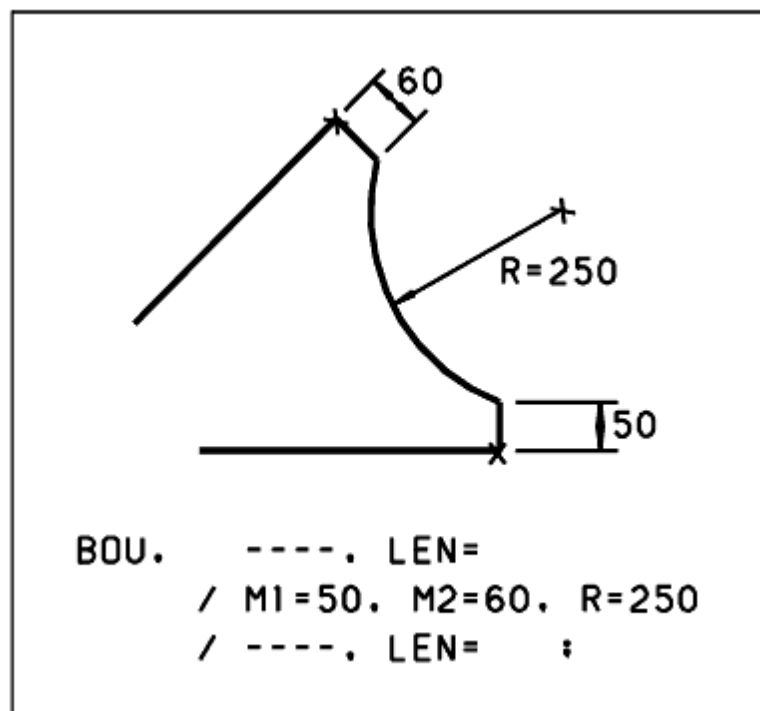


Figure 6:26. Free side, consisting of toes and one arc.

II

&lt;t1&gt; 及 &lt;t2&gt; 都给定

弧<R> 作为两根线之间的圆角。这些线的偏角 <t1>(=80) 及 <t2>(=85) 分别设定

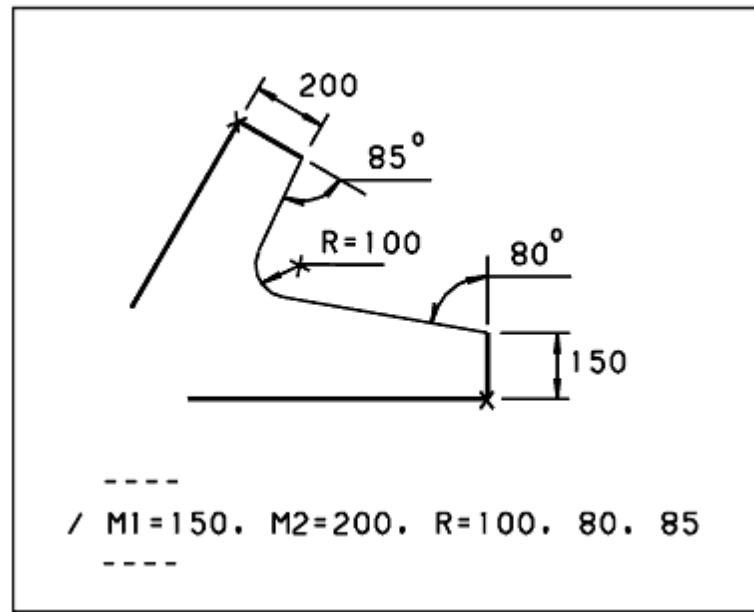


Figure 6:27. Free side, consisting of toes and fillet between straight lines.

4. 当生成有一个自由边的板架的建议次序:

1. 决定最终板架有多少个边界, BOUNDARY 且有一个斜杠在新的行用于边界2、3等

```
BOU,
/
/
/ ...
;
```

2. 决定自由边界数并写其他边界, 如在大多数情况下不要求加 FREE (不错)

```
BOU, 'A'
/ 'B'
/ FREE ('free side')
/ 'C'
/ ...
;
```

3. 检查边界形成一个封闭外形, 如不, 加一个粗糙沿自由边的初步边界, 封闭该形状

4. 沿周围边界的 'length\_of\_limit' a

```
BOU, 'A'
/ 'B', LEN = ...
/ ('free side')
/ 'C', LEN = ...
/ ...
;
```

5. 加趾端高度, 半径等, 为自由边

```
BOU, 'A'
/ 'B', LEN = ...
/ M1 = ... , R1 = ...
/ 'C', LEN = ...
/ ...
;
```

注: 自由边可为空(如没有趾端)

下面大量例子也包含自由边的语句

Example 1:

连接两梁之间的肘板

Example:

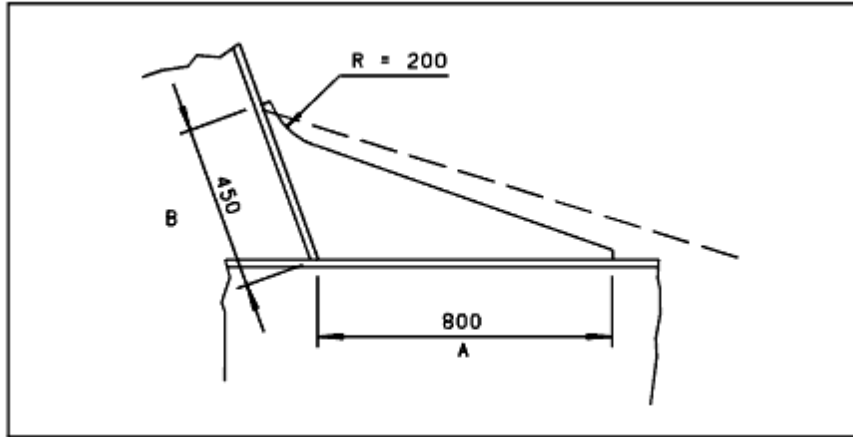


Figure 6:28. Bracket panel, generated with a free side.  
PAN= ... ;

```
BOU, 'A', F1, LEN=800
/U=20500, V=5000, T=150, M1=15,
M2=15, R2=200, 80
/'B', F1, LEN=450;
```

Example 2:

结束纵骨肘板与外板 <preliminary\_boundary>不必要

Example:

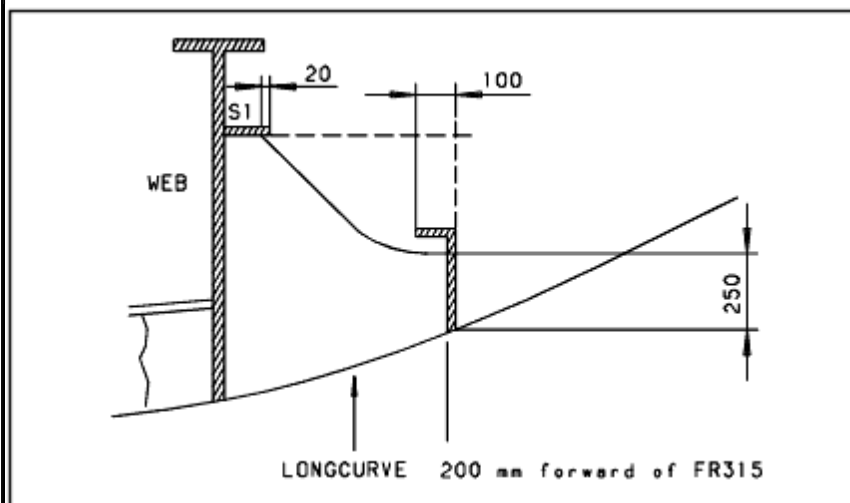


Figure 6:29. Complicated bracket panel, generated with free side.

```
PAN= ... ;

BOU, 'LONGCURVE'
/X=FR315+200, LEN=250
/M1=100, R1=150
/'WEB', S1, LEN=H-20, CROSS
/'WEB' ;
```

Example 3:

纵骨与肋骨曲线之间

Example:

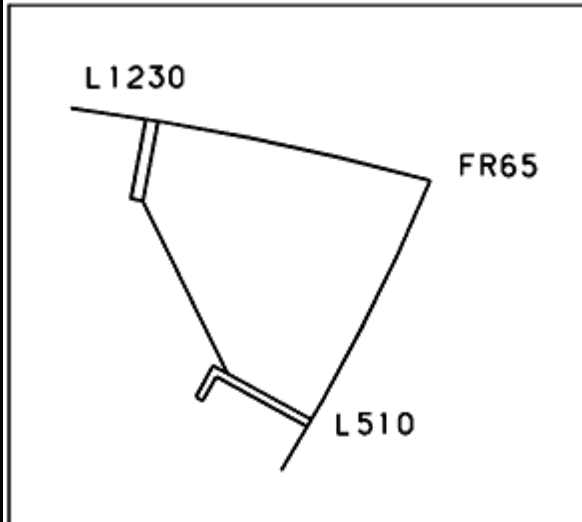


Figure 6:30. Panel bracket, generated with simple free side.

```
PAN= ... ;
```

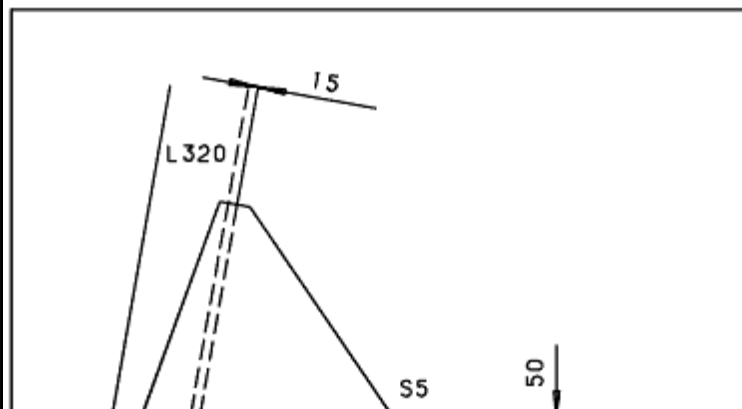
```
BOU, FR65
/L1230, CROSS, LEN=H-20
/FREE
/L510, CROSS, LEN=H-20
;
```

注： 此例中 'free side boundary' 完全是空的

Example 4:

产生肘板板架与型材搭接

Example:



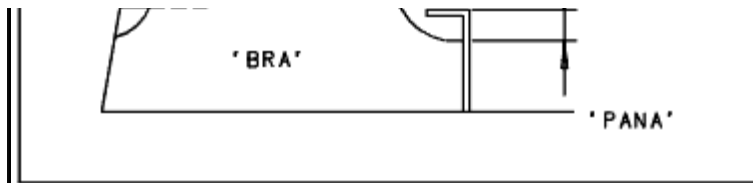


Figure 6:31. Panel bracket generated with overlap boundary and free side.  
PAN, 'BRA', BRACKET;

```
BOU, OVERL, L320, SID=FOR, 'PANA', R, M1=-50, LEN = H+15
/B1
/B1, S5, CROSS, LEN=H-50
/M1=100, R1=100
;
```

此例中, 使用几个缺省值在 OVERLAP 边界



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## 6.3 特殊复板的边界的语句



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### 6.3.1 概述

侧面复板由特征尺寸定义, 如不超过板的宽度, HM提供了在下术条件生成的可能性, 可由特殊几何类型控制



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### 6.3.2 限制

对特殊复板, 必须满足下述要求:

1. 复板必须由4个边界
2. 第一个边界必须是肋骨曲线
3. 自由侧, 由尺寸定义位置, 必须是边界3
4. 边界2和4必须是直线 (然而, 可从平面相交板架等取得)
5. 允许几何类型为 102, 103 和 104.



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### 6.3.3 一般句法

#### 特殊复板

PANEL, ... , GT = <geo\_type>

;

BOU, <frame\_reference>

```

/<straight_boundary>
/<straight_boundary>
/<free_side>
/<straight_boundary>
;

```

<geo\_type> ::= 102|103|104

<straight\_boundary>                      边界 (一般句法) 导致一个线段

<free\_side>                                定义边界的位置尺寸及坐标



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### 6.3.4 句法, 几何类型102

```
<free_side>::=
    , M1 = <m1>
    [, M2 = <m2>]
    [, M3 = <m3>]
    , M4 = <m4>
    [, M5 = <m5>]
    [, M6 = <m6>]
```

```
<m1>::= <m2>::= <m3>::= <m4>::= <m5>::= <m6>::= <number>
```

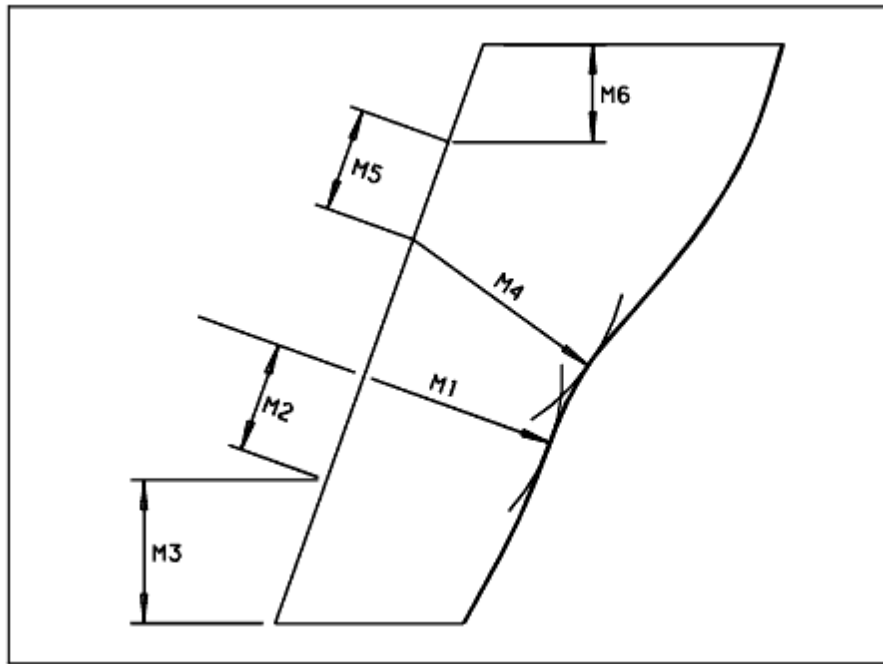


Figure 6:32. Parameters, controlling side web with geometry type 102.

尺寸的意义按上图

m2, m3 (m5, m6) 用于定义m1 (m4) 弧的起点, 与肋骨曲线相接触, 任一 m2, m3, m5, m6 可跳过, 缺省值为0

```
Example:
PAN, ...      GT = 102, ...;

BOU, FR97/' PAN', F1/
    M1 = 2000, M2 = 2000,
    M3 = 1000, M4 = 2050, M5 = 500,
    M6 = 5500/
    V = 13000;
```



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### 6.3.5 句法, 几何类型103

---

```
<free side>::= M1=<m1>
```

```
<m1>::= <number>
```

---

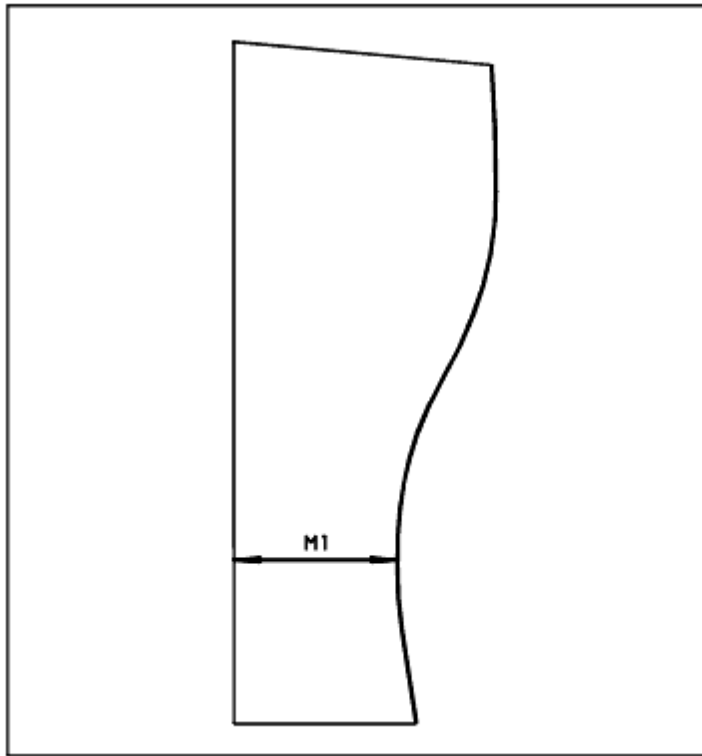


Figure 6:33. Parameter, controlling side web with geometry type 103.

此情况自由边, 由一垂直线组成, 从肋骨曲线的距离定义为 M1.

**Example:**

```
PAN, ... GT = 103, ... ;
```

```
BOU, FR97/U = 20000, V = 26000, T = 170/M1 = 1200
```

```
/Z = 13000;
```



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### 6.3.6 句法, 几何类型 104



---

```
<free side>::= M1 = <m1>
```

$$\left\{ \begin{array}{c} U1 \\ Y1 \\ U2 \\ Y2 \end{array} \right\} ::= \text{<coord>}$$

```
<m1>::= <number>
```

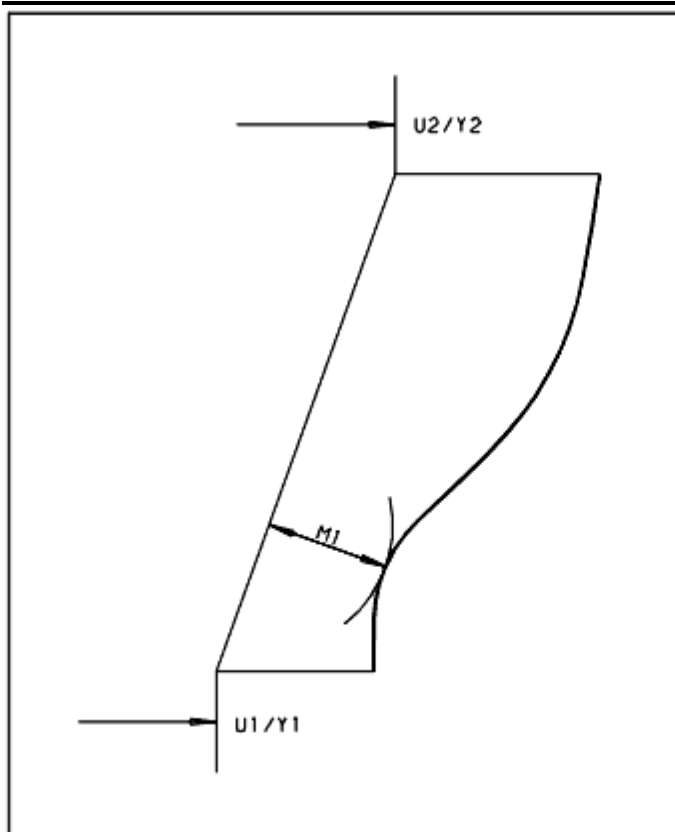


Figure 6:34. Coordinates and parameter, controlling side web with geometry type 104.

意义如上图，自由侧由最小的距离（m1）距肋骨曲线及从中心线至上、下端的距离

The distance at its lower end is given by using U1 or Y1, at the upper end by using U2 or Y2.

**Example:**

PAN = ... , GT = 104, ... ;

BOU, FR101/Z = 28000/M1 = 12000, Y1 = 19750

/Z = 13000;



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## 7 零件语句



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### 7.1 公共特征

此语句用于一个板架不同零件的生成（扶强材、面板、肘板等）至最大程度，能单独处理。然而，有一些共同的特征作如下解释。

1. 重复  
大多数情况，几个（最大25）零件能在一个语句中生成，零件数由大量指定值定义（或按最大参考数），见 [General Layout of a Statement](#).
2. 位置的定义  
位置可以直接或间接定义  
**明确的** 由坐标直接给出扶强材端点位置，即可以板架 uv-系统或 xyz-系统  
**含糊的** 间接是参照已存在的零件或邻接板架，纵骨或拓扑点等  
为了扩大范围，使用间接定义，零件需要装在一起，输入一个拓扑结构
3. 输入数据的分离  
许多输入数据类型-典型例子是扶强材的端点特征及肘板两臂的方向，至一个大的范围，对称及句法等同，这表示应用相同的关键词。一个必须单独的数据考虑两个端点等，这由分隔符进行。  
相应的，考虑扶强材一端的条款及参考及肘板臂必须在斜杠前给出，及在斜杠后另一个数据  
除了这，在条款与参考间的次序是相当自由的。



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## 8 Seam 语句


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### 8.1 概述

SEAM 语句用来在板架内构件间产生缝，关于缝额外的信息应作描述，还有坡口。

缝可为直线或曲线，必须通过整个板架或在另外的缝开始/结束

注：所有的缝必须在第一块板生成之前生成

Syntax:

---

SEAM[, <beveling>]

```
[, BVT=<string>]
[, <excess>[<exc_type>]]
<seam_along_line> |
<seam_parallel> |
<perpendicular_seam> |
<seam_for_panel> |
<seam_along_curve>
```

---

Example:

SEAM, Z=1500, BEV=002;

Description:

<beveling> 用于定义沿缝的坡口，使用坡口代码，见 Design Standards.

The beveling may be symmetric on both sides of the seam or unsymmetric.

<beveling>:=

(BEV=<bev\_code> | ([, LBEV= <bev\_code>] [, RBEV=<bev\_code>])) [, SID=<direction>]

<bev\_code>::= <integer>

<direction>::= AFT|FOR|SB|PS|TOP|BOT

BEV 用于对称坡口， LBEV 用于缝的左面， RBEV 用于右面

SID 定义坡口侧

BVT 在符号视图中沿缝迹线的任意字符

<excess> 用于定义沿缝的零件上的余量  
余量可对称，这将在两侧分割  
值可不对称  

$$\langle excess \rangle ::= EXC = \langle size \rangle \mid ([, REXC = \langle size \rangle][, LEXC = \langle size \rangle])$$

$$\langle size \rangle ::= \langle number \rangle$$

正余量表示沿缝的板，负余量表示间隙  
EXC 用于对称余量  
LEXC 定义左面的余量及间隙，REXC 为右边

<exc\_type> 用于规定沿缝的余量

$$\langle exc\_type \rangle ::= \left\{ \begin{array}{l} TYPE = \langle type \rangle \\ ([LTYPE = \langle type \rangle] \\ [RTYPE = \langle type \rangle]) \end{array} \right\}$$

$\langle type \rangle ::= \langle number \rangle \mid \langle string \rangle$

余量对称视所用型式，LTYPE 及 RTYPE 是两边不对称时用

(定义类型应按余量的定义)  
如余量类型不给出，缺省参数 EXC\_TYPE\_1 的类型数应使用

对于坡口及余量，左、右是相对于缝的方向



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## 8.2 沿线的缝

缝与所给的线一致

$\langle seam\_along\_line \rangle ::=$

$\langle line \rangle (1 \dots 25) [, REV] \mid$

$\langle line\_two\_uv\_points \rangle (1 \dots 25)$

$[, FROM = \langle from\_seam \rangle]$

$[, TO = \langle to\_seam \rangle]$

FROM/TO 在板架内的缝，缝应生成在起/止处  
 $\langle from\_seam \rangle ::= \langle to\_seam \rangle ::= \langle integer \rangle$

缝根据所给线, 可在相交处开始 (FROM) 在另一缝处结束 (TO).

如不规定, 缝应假定在开始/结束在外形上

注: 不允许这样设置:

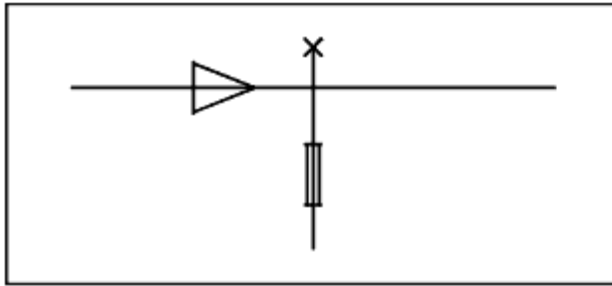


Figure 8:1. Incorrect (free) end of seam.



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## 8.3 平行于其他缝的缝

在子语句中, 一个或多个缝与已存在的缝或边界平行

`<seam_parallel>::=`

`(LIM= <limit_no>[, <line>]) |`

`(SEAM= <seam_no>)`

`, M1= <dist>`

`[, M2= <spacing>]`

`[, NUMB= <number_of_seams>]`

`[, FROM= <from_seam>]`

`[, TO= <to_seam>]`

**LIM** 缝与之平行的边界

`<limit_no>::= <integer>`

**SEAM** 已存在的缝, 新缝应设与之平行

`<seam_no>::= <integer>`

**M1** 第一个缝从边界/已存在的缝的距离

`<dist>::= <number>`

M2 如几个缝被设, 缝之间的分隔, 缺省值 = M1.  
 $\langle \text{spacing} \rangle ::= \langle \text{number} \rangle$

NUMB  $\langle \text{number\_of\_seams} \rangle ::= \langle \text{integer} \rangle$

如缝与边界平行, 边界部分与缝平行能用相交线选取, 否则, 缝将设为与边界的最长]

缝具有与边界或缝相同方向, 当 LIM 或 SEAM 为正时, 否则为相交方向

当缝与其他缝平行时,  $M1 > 0$  表示新缝应与为旧缝的左面,  $< 0$  为右面

M2 应永无符号

如几个缝设定, 第一个为 M1, 第二个为  $M1 + M2$ , 等

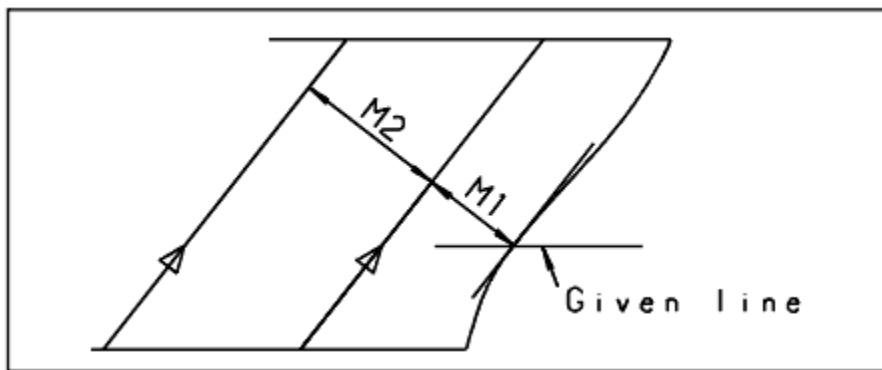


Figure 8:2. Seam parallel to tangent of limit in given point.

缝平行于边界

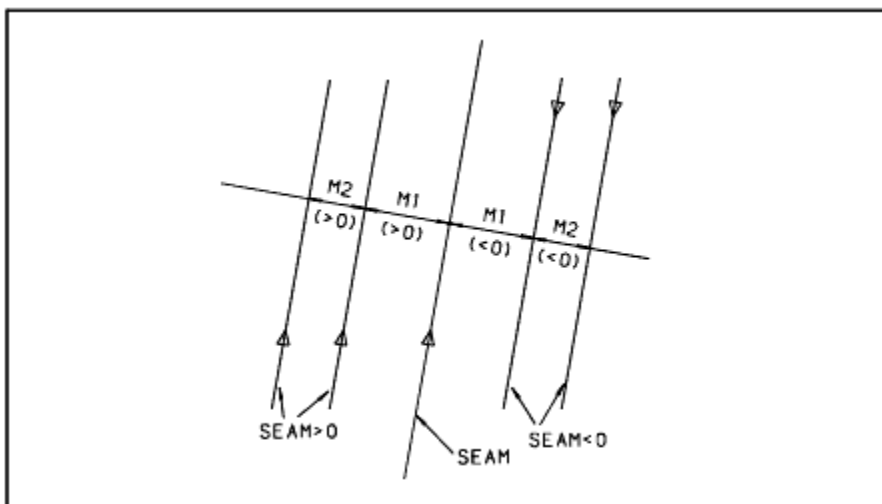


Figure 8:3. Parameters, controlling seams set parallel to another seam.

缝平行于其他缝

缝可沿线在其他缝上结束/开始于其他缝



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## 8.4 垂直缝

一个缝应由板架极限垂直

`<perpendicular_seam> ::=`

`, <one_coord_line>`

`, LIM= <limit_no>`

`[, FROM= <from_seam>]`

`[, TO= <to_seam>]`

`<one_coord_line> ::= U|V|X|Y|Z = <coord>`

LIM. 缝的开始边界

`<limit_no> ::= <integer>`

The given line intersects the given limit LIM. The system then searches for a limit opposite to this intersection point. The seam is generated through the intersection point, perpendicular to the limit opposite to the given one, cf. the figure below.

**FROM/TO:** As in seam along line.

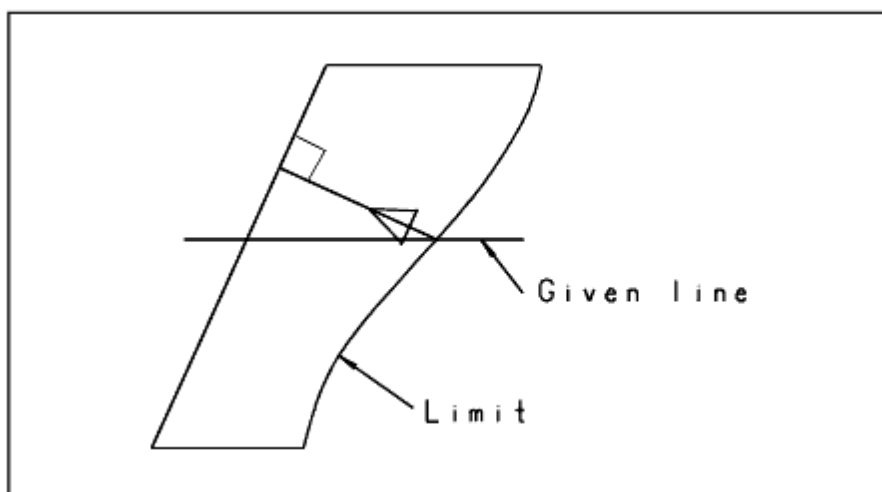


Figure 8:4. Seam perpendicular to opposite limit through given point.

The resulting seam will be directed from the intersection point towards the selected limit.



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## 8.5 板架的缝

与目前的相交的板架，一般每个板架将生成两个缝，板架每侧一个

`<seam_for_panel>::=`

`<panel_name> (1...25)`

`[, REF]`

`[, DIR=<direction>]`

`<panel_name>::=<name>`

REFL 板架必须对称Indicates that the given panel(s) should be reflected in the CL-plane. All panels must be reflected

DIR 当由不对称坡口及余量，缝的方向非常重要。

`<direction>::=AFT|FOR|SB|PS|TOP|BOT`



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## 8.6 缝曲线

沿曲线生成的缝，一般为 `curves` 语句，输入scheme。一般在与外形或其他缝的交点处切断。

`<seam_for_curve>::=`

`<curve_name> (1...25)`

`[, REF]`

`[, DIR=<direction>]`



For the interpretation, cf. <seam\_for\_panel>. However, DIR is always optional for a curve. If given, it defines the direction of the tangent of the curve in its starting point.

**Example:**

```
SEAM, Z=2100, BEV=018;

SEAM, V=2200, LBEV=022, RBEV=018, EXC=30;

SEAM, Y=1100, 3100, FROM=1;

SEAM, LIM=1, U=17000, FROM=1;

SEAM, 'PAN_1', 'PAN_2';

SEAM, 'CURVE_1', REFL;
```



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## 9 板语句

定义板架上板，最终分离时生成板架

注： 在第一板生成时所有缝必须生成时所有缝必须生成。

语句:

PLATE[, <point> (1 ... 25)]在板上给出一点（如仅一块，可为空）

, <material>定义表沿Y轴表面位置（因此板厚）

[, <material\_location>]

[, QUAL = <quality>]材质= (integer) (string) 空为低碳钢

[, DEST=<destination>]定义装配板的车间 (name) 由 限制

[, SURF=<surface\_treatment>]生产过程中的表面处理 (name)

[, RAW=<raw\_plate\_name>]定义的板名不对内容检查 (name)

[, POS = <pos\_no> (1 ... 25)] (integer)

[, <id's>] (position)LIS AS1-AS4 板架定义=(name)

[, <assembly>]

[, <COL[OUR] = <colour>] 定义在语句中板的颜色

---

Example:

PLATE, U=15000, V=2550, MAT=12.5;

Description:

<point>      每块板由给出板上意义一点定义

如板仅由一块板组成, 那么可以没有点

<material>    沿板架的uvw-系统的w-轴定义板表面的位置 (板厚)

<material>::= MAT =

(<side\_1>[, <side\_2>],) (1 ... 25)

<side\_1>::= <side\_2>::= <number>

如板的任一侧与板架型平面一致, MAT仅需要指定一个数字 (总是一个坐标), 否则是

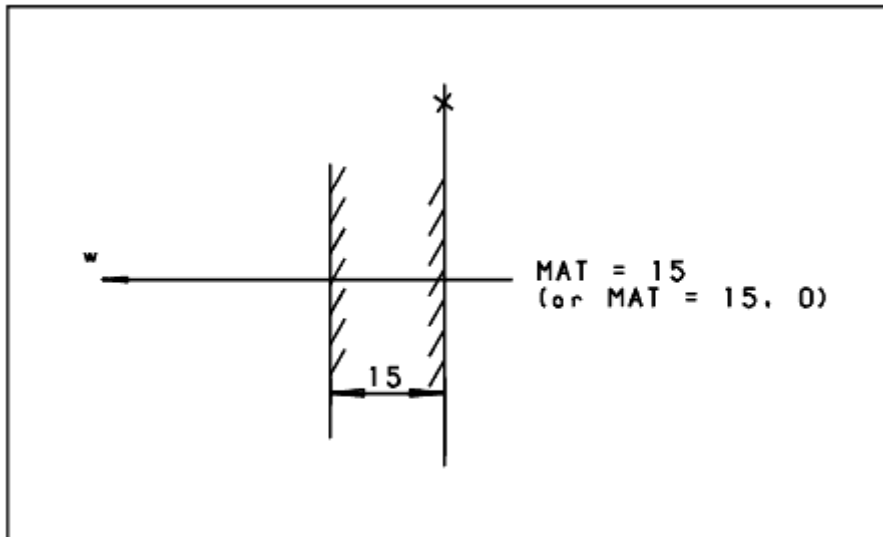


Figure 9:1. Position, one value >0.

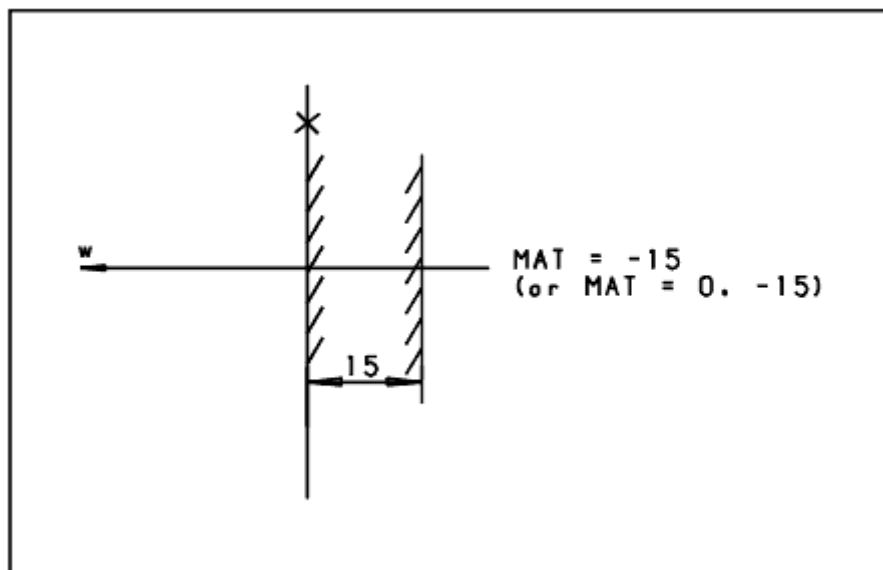


Figure 9:2. Plate position, one value &lt;0.

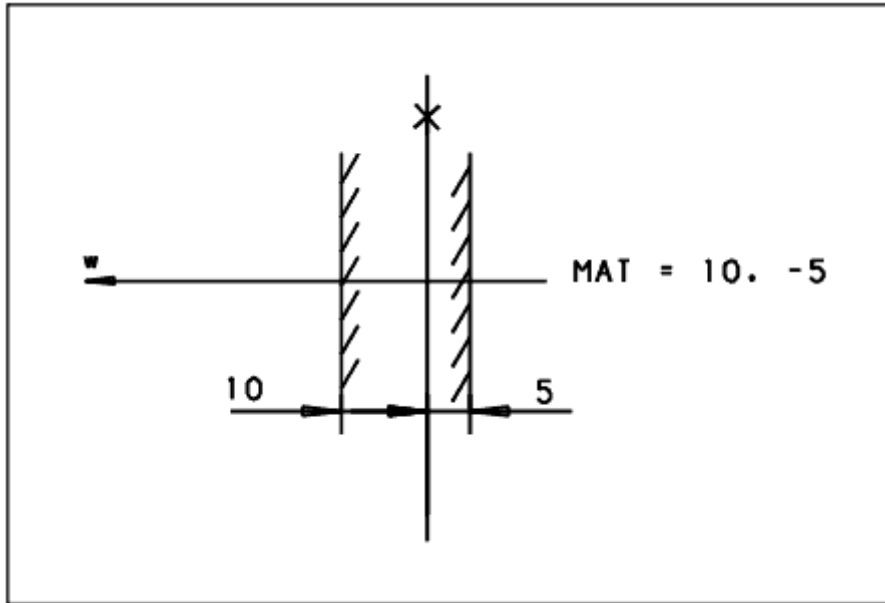


Figure 9:3. Plate position, two values (coordinates).

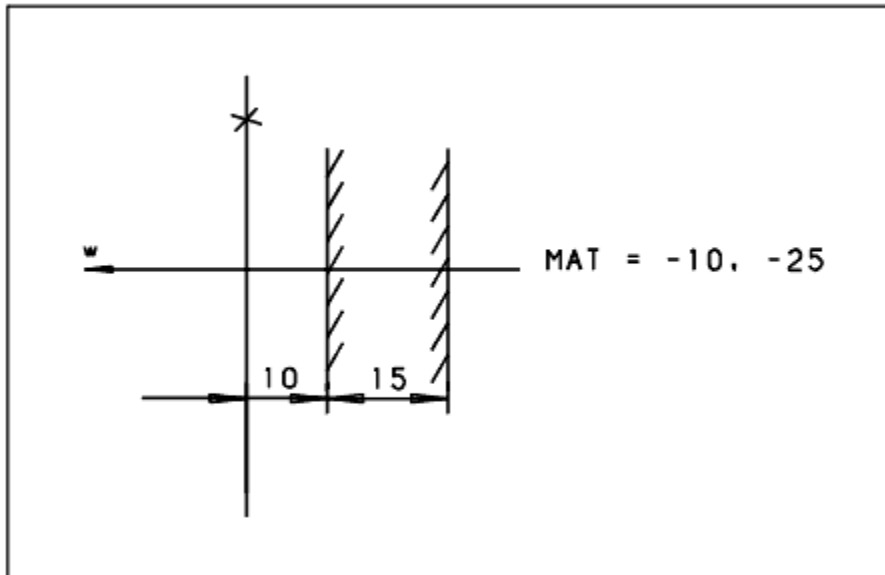


Figure 9:4. Plate position, mould plane outside plate.

坐标总沿正规板架给出

备注:

如在同一语句中生成两块板且MAT指定了值, 那么一个值将被使用对于每块  
<material\_location>

通常从正的w-轴定义

然而, 当定义"this side" 及"other side"时用户可选择板架的视图方向  
<material\_location>::=

MSIDE=AFT|FORE|SB|PS|TOP|BOT

QUAL 定义板的材质

$$\langle \text{quality} \rangle ::= \left\{ \begin{array}{l} \langle \text{quality\_code} \rangle \\ \langle \text{quality\_string} \rangle \end{array} \right\}$$

$\langle \text{quality\_code} \rangle ::= \langle \text{integer} \rangle$

$\langle \text{quality\_string} \rangle ::= \langle \text{string} \rangle$

如不定义将使用低碳钢

材质在选项行中给定, 然而, 用户必须选择其中之一定义之。

Setup and Customisation Customer Set-up of Material Qualities

DEST 定义何处施工场地装配此板

$\langle \text{destination} \rangle ::= \langle \text{name} \rangle$

此值必须在用户定义的目标行中选择指定

Setup and Customisation Destination Definition

.

SURF 定义生产阶段前的板的表面处理

$\langle \text{surface\_treatment} \rangle ::= \langle \text{name} \rangle$

此值必须在用户定义的表面处理行中选择指定

Setup and Customisation Surface Treatment Set-up

RAW 定义未加工板名, 不检查行的内容

$\langle \text{raw\_plate\_name} \rangle ::= \langle \text{name} \rangle$

POS 定义在生产中标记的板的位置号。

$\langle \text{pos\_no} \rangle ::= \langle \text{integer} \rangle$

$\langle \text{id's} \rangle$  在板架语句中相应的项目指定关键词LIS, AS1-AS4

$\langle \text{id's} \rangle ::= \text{LIS}=\langle \text{parts\_list} \rangle,$

AS1= $\langle \text{name} \rangle$ ,

AS2= $\langle \text{name} \rangle$ ,

AS3= $\langle \text{name} \rangle$ ,

AS4= $\langle \text{name} \rangle$

在板架级的板语句将覆盖相应的名字

在板架级上取消名字的设定替代为另外的名字, 相应的关键词应单独给定

$\langle \text{assembly} \rangle$  如板属于不同装配板架, 装配可在这里指定

COLOUR 语句中定义的板的颜色

Navigation icons: back, forward, search, etc.

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此语句生成由设计标准包含的标准切口，也有用任意曲线定义板和型材上notch的不同，将分别描述。



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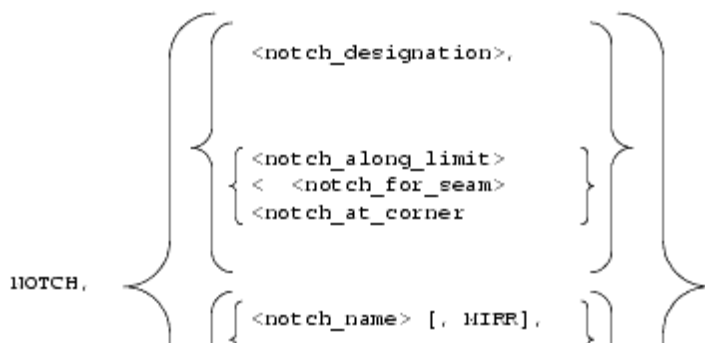
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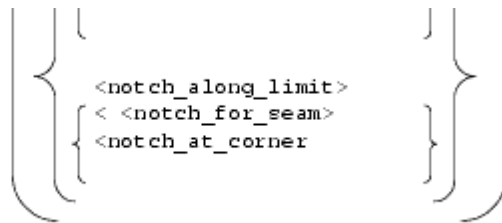


Notch :

板上的Notches可位于不同方位：

- Syntax:





## Description

<notch\_designation>      标准notch的名称字符

<notch\_designation>::= <string>

如:

<notch\_name>              R75  
数据库或由CURVE创建的名字, 可直接给出位置。  
<notch\_name>::=<name>

MIRR                      means that the notch should be reflected in its v-axis. Irrelevant for standard notches.

<symmetry>              Normally notches on a symmetric panel are supposed to be valid both portside and starboard.  
However, it is possible to indicate that a notch should be used portside only or starboard only. This clause is relevant on a symmetric panel ("SBPS panel") only.  
<symmetry>::= P | S

P means portside specific,  
S means starboard specific.



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[Notch](#)

### 10.1.1 沿边界的Notch

在边界与所给的线相交的notch .

<notch\_along\_limit>::=

,LIM=<limit\_no>

,U|V|X|Y|Z= <coord> (1 ... 25)

[,ALONG]

(<limit\_no>::= <integer>)

---

ALONG 一般NOTCH与边界垂直, ALONG用于中心定位所给的线即V轴与线一致。

Example:

NOT, R50, LIM=1, Y=10000(400)12000;



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[Notch](#)

### 10.1.2 缝的Notch

notch用于外板或相邻板架上的缝。

---

<notch\_for\_seam>::=

[, <adj\_name>]

, SEAM= <seam\_no>, (1 ... 25) [, REF]

---

<adj\_name> 相邻板架及表面的名给出, 如不填假定在主外板表面上的缝。

<adj\_name>::= <name>

<seam\_no>::= <integer>

Example:

NOT, R75, 'OUTER', SEA=71;

NOT, R50, 'BULKH', SEAM=2;



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### 10.1.3 在角部的Notch

定义角部的notches.

起点号同目前板架号

---

`<notch_at_corner>::=`

`, COR= <corner_no> (1 ... 25)`

`[, LIM= <limit_no> (1 ... 25)]`

`<corner_no>::= <limit_no>::= <integer>`

---

对于不对称notches, 必须规定哪个边界不对称, notch需改1.

Example:

NOT, VUF200\*75\*50, COR=1, LIM=3;



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[Notch](#)

## 10.2 扶强材上的Notch

Notches in stiffeners can be located in different ways:

- o at intersections with seams in the same panel.
- o at given distances from the end of the stiffener.
- o at the intersection with given lines.

Syntax:

---

NOTCH, <notch\_designation> | <notch\_name>

`[, INC=<inclination>]`  
`[, MIRR]`

`{`  
`<notch_for_seam>`  
`<notch_at_distance>`  
`<notch_at_line>`  
`}`

`;`

---

<notch\_designation> and <notch\_name> see Notch in Plate.

MIRR means that the notch should be reflected in its v-axis.

INC Normally, the notch is set parallel to the stiffener. INC is the angle the notch should be turned compared to its normal orientation. The positive direction is in the direction of the mould line of the stiffener.




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### 10.2.1 缝的Notch

在相同板架的缝的notch

`<notch_for_seam>::=`

`, SEAM= <seam_no>, (1 ... 25)`

`<S-ref> (1 ... 25)`

`[SID= <direction>]`

---

`<seam_no>` 放notche的缝号

`<S-ref>` 选择板架内扶强材应生成

Note that if the stiffener is selected on a tag reference, several different stiffeners may be selected.

SID Relevant only in cases when the stiffener is identified by a tag reference and stiffeners with the same tag exist on both sides of the panel.

The direction is specified either relative to the w-axis or as a main ship direction.

`<direction>::= -1 | 1 | AFT|FOR|SB|PS|TOP|BOT`

注意: notch 将会在所有缝与扶强材的组合处。


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### 10.2.2 在Line上的Notch

Notches are set at all intersections between given lines and selected stiffeners.

---

`<notch_at_line>::=`

`U | V | X | Y | Z = <coord> (1 ... 25)`

`, <S-ref>`

`[SID= <direction>]`

---

Intersections must exist between all the given lines and all the selected stiffeners, otherwise an error will be issued. (However, when stiffeners are selected on tags not all individual stiffeners need intersect, only one "representative" of each tag.)



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### 10.2.3 一定距离的Notch

Notche在给定的扶强材距端部假定距离

---

`<notch_at_distance>::= D= <dist> (1 ... 25) <S-ref> (1 ... 25)`

---

D          从扶强材端点的距离

    > 0                                  从起点

    < 0                                  从端点

<S-ref> Tag references are not allowed when notches are set in this subsyntax.

如notch距离超出扶强材, 相应notch给出, 不通知。

Example:

NOT, R30, SEAM=1-3, SL1-10;

NOT, R25, D=50(300)4000, S1-5;

NOT, R35, X=FR75.5()85.5, SL1, SL3;

Note, the syntax is very powerful and a large number of notches can be set in a large number of stiffeners in one statement. For example, in the last example above, several different stiffeners with longitudinal tag numbers 1 and 3 may be intersected by the given lines.



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## 10.2.4 备注

Since the stiffener itself and its notches are generated in different statements in certain situations all of the involved statements might have to be rerun to get a correct result. If not done, the system will issue a warning message and "make the best possible" of the current situation.



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# 11 Hole语句

在板及加强材上生成孔，孔一般用参数控制的孔标准，然而，任何封闭外形可作为孔

。相当复杂的孔标准在Tribon，能不需初始化就可访问，可经vitesse扩展自己的孔标准。

Tribon的孔，内嵌标准及延伸孔标准的选项，见 *Tribon Hull, Set-up and Customisation, Holes and Notches, Hole Standards in Tribon*.



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[Hole](#)

## 11.1 板上的孔

Holes will be generated in the order they are set, starting in 1 for the first hole rulers otherwise specified.

**Syntax:**


---

```

HOLE,      <stand_hole>, <position> (1 ... 25)) |

          (<object>[, <position> (1 ... 25)])

          [, FIC[TITIOUS]]

          [, <PIL=<pno>]

          [, <M1=<DIST>]

          [, <symmetry>]

          [, CRO[SSMARKING]]

          [, SPC=<comp_name> [, POS=<pos_no>]                [, SI2=<side>]]

          [, BEV=<bevel> [, SET=<set_no>]]

          [, <id's>]

          ;

```

---

**Example:**

```

HOLE, D500, U=FR75, V=1000;

HOLE, H0800*600, U=4000, V=2000, T=90, SPS=' SPLATE2', SI2=FOR,      POS=18;

HOLE, ' PIP_LINE1', M1=30, BEV=911, SET=2;

HOLE, ' PANEL1', PIL=2, M1=25, BEV=250;

```

**Description:**

<stand\_hole> is a parameterised designation of standardized holes according to the standards.

<stand\_hole>::= <string>

**Example:** H0600\*300

<object> is either the name of an object containing in contour 0 a closed contour or the name of an object, penetrating the current panel. Tribon will automatically find out based on its object code.

<object>::= <name>

**Example:** ' SPEC\_HOLE'

PIL This keyword can only be given when <object> is a panel with a penetrating pillar.

<pno> is the pillar number of the penetrating pillar in <object>.

M1	<p>If the the hole is made for a penetrating object (such as a pipe/ventilation or pillar) then M1 is the parallel displacement of the hole compared to the section countour. This it is incompatible with M1 when &lt;position&gt; is given.</p>
SPC	<p>This keyword defines that a spigot plate is attached to the hole.</p> <p>&lt;comp_name&gt; is an arbitrary text string to indicate the type of spigot plate.</p> <p>&lt;pos_no&gt; is the position number of the spigot plate</p> <p>&lt;side&gt; is the side of the panel where the spigot plate is positioned.</p> <p>Possible values are AFT, FOR, PS, SB, TOP and BOT.</p>
BEV	<p>Defines the bevelling of the hole contour. The bevel is valid for the complete hole.</p>
SET	<p>If &lt;set&gt; is of a varying type (dotori) then specifies the bevel set it belongs to.</p>
<position>	<p>defines the location and orientation of the hole. If a hole contour has been created in its proper location, it can be left out.</p> <p>&lt;position&gt;::= (&lt;hole_at_limit&gt;                    &lt;point&gt;[,&lt;inclination&gt;])</p> <p>&lt;inclination&gt; may be defined by an angle if uv-coordinates have been used, otherwise by an additional point.</p> <p>&lt;inclination&gt;::= (T=&lt;angle&gt;)   &lt;point_T&gt;</p> <p>&lt;point_T&gt; is a point defined by XT/YT/ZT.</p> <p>If no inclination is given, the inclination angle is set to 0.</p> <p>&lt;hole_at_limit&gt; defines the position of a hole related to a given limit of the panel. The hole is located at a certain distance from the limit and may be turned parallel to the limit.</p> <p>&lt;hole_at_limit&gt;::=</p> <pre>     &lt;line&gt;     ,LIM=&lt;limit_no&gt;     ,M1=&lt;dist&gt;     [,ALONG]     [,PARALLEL] </pre> <p>&lt;limit_no&gt;::= &lt;integer&gt;</p> <p>&lt;dist&gt;::= &lt;number&gt;</p> <p>The centre of the hole is located on the given line at the distance M1 from the given limit LIM.</p> <p>If ALONG is given, the distance will be measured along the line, otherwise perpendicularly to the limit.</p> <p>If PARALLEL is given, the hole will be parallel to the limit, otherwise to the line. For further details, see the figures below.</p>
FIC	<p>Giving this keyword means that the generated hole will not be considered as a hole in the splitting. The hole will rather be treated as a marking contour.</p>

<symmetry> Holes in symmetrical panels ("SBPS-panels") are normally supposed to be valid portside and starboard.  
 This clause may be used to indicate that a certain hole is relevant portside only or starboard only. It is relevant only for symmetrical panels.  
 <symmetry> ::= P | S

P means port side specific  
 S means starboard specific.

CRO Giving this keyword means that the generated hole will get a cross placed in the centre point. (Only for standard holes and a parameter, PIPECROSS, must be defined in the default file).

<id's> General purpose strings.

[AS1=<name> ,]

[AS2=<name> ,]

[AS3=<name> ,]

[AS4=<name> ,]

Correspond to the items assigned to the keywords AS1-AS4 in the panel statement (cf. that statement). The General Purpose String can be defined if the environment variable SBH\_HOLE\_GPS is given any value. The strings given may e.g. identify the name of the pipe for which the hole is made.

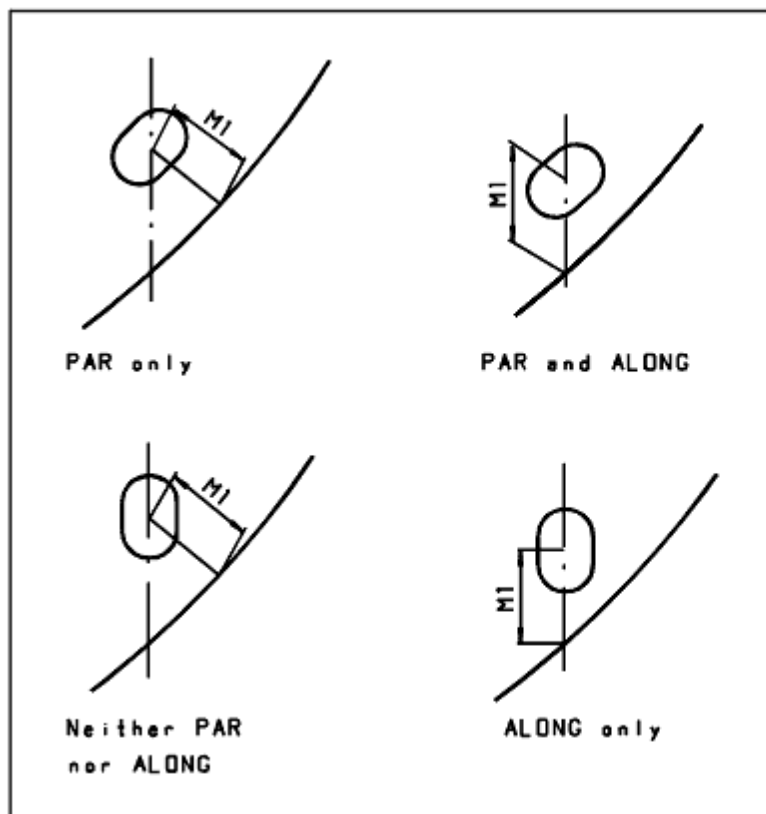


Figure 11:1. Parameters for control of hole along limit.

```

Example:
HOLE,          H0900*600, U=10000 (900) 12700,
               V=700, T=90;

HOLE,          ' SPEC_HOLE' ;

HOLE,          D700, X=FR75, Y=1000;

HOLE,          HE200*75, X=100, Y=200, XT=200,
               YT=300;

HOLE=          HE150*80, LIM=1, X=FR75( )83,
               M1=60, PARALLEL;

HOLE,          H0800*600, U=4000, V=2000, T=90, SPC=          ' SPLATE2', SI2=FOR,

HOLE,          ' PIP_LINE1', M1=30, BEV=911, SET=2;

HOLE,          ' PANEL1', PIL=2, M1=25, BEV=250;
    
```

## 11.2 扶强材中的孔

与板中的孔的操作一样。定义它们位置的方法尽管有一点不同，可设置：

- 假定线的交叉处.
- 从假定的扶强材的端部至某点距离

```

语法:
HOLE, (<stand_hole>|<hole_object>)

      D = <dist> (1 ... 25)

      , {
          U|V|X|Y|Z = <coord> (1 ... 25)

          ,M1 = <distance>

          ,INC = <inclination>

          <S-ref> (1 ... 25)

          [,SID = <direction> ] ;
    
```

描述

<stand\_hole> <hole\_object> Cf. holes in plates.

D is the distance from any of the end points of the stiffener.  
> 0 from the starting point.  
< 0 from the ending point.

As an alternative, the position is defined as the intersection point between the stiffener(s) and given one-coordinate lines:

M1 The distance from the plate surface (= foot point of the stiffener) to the centre of the hole.

INC Inclination of the hole. Normally, it will be set parallel to the direction of the stiffener.

INC is the angle from the positive direction of the stiffener to the u-axis of the hole.

<S-ref> is used in the current panel to select the stiffeners in which the holes should be inserted.

Note: If the stiffener is selected on a tag reference, several different stiffeners may be selected for each number.

SID is relevant only in cases when the stiffener is identified by a tag reference and stiffeners with the same tag exist on both sides of the panel. The direction is specified either relative to the w-axis or as a main ship direction.

<direction>::= -1 | +1 | AFT|FOR|SB|PS|TOP|BOT

例如:

HOLE, HE150\*75, M1=100, D=200(250)2000, S1;

HOLE, D50, M1=75, X=FR75()80+25, SL1-5;

注: Since the syntax is very powerful a large number of holes may be set in an unrestricted number of stiffeners in the last example above.

Important: Since the stiffener itself and its holes are generated in different statements in certain situations all of the involved statements might have to be rerun to get a correct result. If not done the system will issue a warning message and "make the best possible" of the current situation



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## 12 Cutout语句

在型材或生成切口

可在外部表定义、变量、激活文本、文本应由SBH\_CUTSTD0BJ逻辑名指定



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[Cutout 1](#)

### 12.1 板上Cutout

Cutouts in plates are made for stiffeners in other panels or for shell profiles. In addition to the actual cutouts, the statement may also define the clip arrangement in the cutout.

Clips can be generated either via the Tribon built in standard or as customer defined clips. Customers may define their own clip standard via geometry macros. Clip handling via geometry macros is documented separately

[Setup and Customisation Clips via Geometry Macros](#)

.

The intersections of certain small panels with a flange, like girders or side webs, look very much like a big T-bar. Cutouts can be made for such a panel in the same way as for a real profile.

Syntax:

```
CUTOUT, [TYPE=] <type_code>
        [, <symmetry>]
        , <ext_prof_ref> (1 ... 25)
        {
            <inters_pan>
            [, REF]
            [, C= <slope>]
            [, M1= <width>]
            [, CLIP= <clip_code>]
            [, CL1= <clip_dim>]
            [, CL2= <clip_dim>]
            [, CL3= <clip_dim>]
            [, AREA= <con_area>]
            [, CT1 = <clip1_sel> ]
            [, CT2 = <clip2_sel> ]
            [, CT3 = <clip3_sel> ]
            [, SID[E] = <direction> ]
            [, P01 = <posno_clip1> ]
            [, P02 = <posno_clip2> ]
            [, P03 = <posno_clip3> ]
            [, N01 = <number_clip1> ]
            [, N02 = <number_clip2> ]
```

```
[ ,NO3 = <number_clip3> ]
[ ,MAT = <dist1>,<dist2> ]
[ ,WEL[D] = <weld_size> ]
[ ,WCL[IP] = <weld_size> ]
[ ,WPR[OF] = <weld_size> ]
[ ,WSH[ELL] = <weld_size> ]
[ ,BCL[IP] = <bevel_type> ]
[ ,BWE[B] = <bevel_type> ]
[ ,BCW[EB] = <bevel_type> ]
[ ,BFL[A] = <bevel_type> ]
[ ,BCF[LA] = <bevel_type> ]
[ ,BSH[ELL] = <bevel_type> ]
[ ,BCS[HELL] = <bevel_type> ]
[ ,SUR[FACE] = <string> ]
[ ,DES[TINATION] = <string> ]
[ ,QUA[LITY] = <quality> ]
[ ,EXC[ESS] = <dist> ]
[ <assembly_info> ]
[ ,COL[OUR] = <colour> ]
;
```

---

## Description

TYPE is the standard type of a certain cutout.  
 <type\_code>::= <integer>

**Note** that this keyword can be left out altogether so that the cutout type is treated as a statement value, assigned directly to the statement keyword.

<symmetry> Normally cutouts on a symmetric panel are supposed to be valid both portside and starboard.  
 However, it is possible to indicate that a cutout should be used portside only or starboard only. This clause is relevant on a symmetric panel ("SBPS panel") only.  
 <symmetry>::= P | S

P means portside specific,  
 S means starboard specific.

<ext\_prof\_ref> defines the profile for which the cutout should be made. See General Layout of a Statement.

Cutouts for flanges cannot be made, however, see below.

<inters\_pan> defines a small T-profile like a panel with a flange intersecting the current panel. **Note** that only the panel name should be given.  
 <inters\_pan>::= <name>

C Certain cutout types have one sloping edge, the slope of which is controllable. The slope is controlled by the measure C in the cutout standards, cf the figure below.

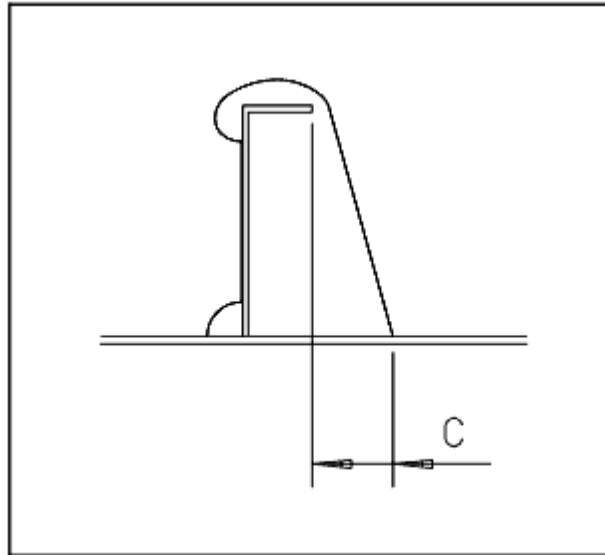


Figure 12:1. Use of parameter C.

`<slope>::= <number>`

For customer defined cutouts the following specific rules are related to the control of the slope:

- The slope can be controlled in all cases except on the side where the cutout has a "lug", i.e. is supposed to be welded to the profile.
- The measure assigned to C should always be the deviation from the point where the cutout would cut the base line were C not given.
- For cutouts which are open on both sides, any of the sides might get the slope.

$C > 0$  places the slope on the non-mould line (flange) side,  $C < 0$  on the mould line side

M1

is relevant only for cutouts defined in the external cutout definition. It may be used for all open cutouts.

M1 is the distance from the **mould line** to the cutout contour on the free side as indicated in the figure below:

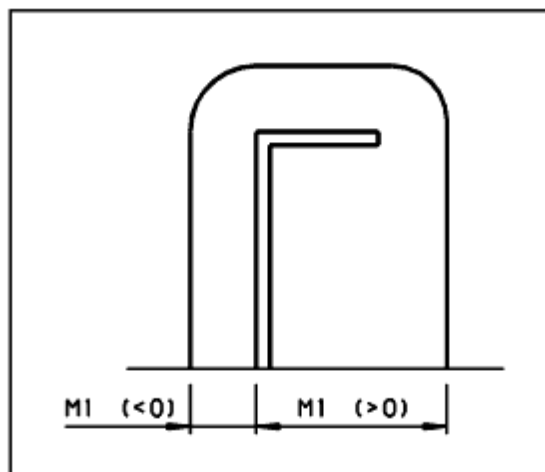


Figure 12:2. Use of parameter M1.

For cutouts which are open on both sides,  $M1 > 0$  defines the distance on the non-mould line (flange) side of the profile,  $M1 < 0$  on the mould line side.

$\langle \text{width} \rangle ::= \langle \text{number} \rangle$

CLIP Defines the clip arrangement according to Tribon built in standard.

$\langle \text{clip\_code} \rangle ::= \langle \text{integer} \rangle$

clip dimensions CL1-CL3 are used to define the dimensions of the clips, if they are not to follow the rules stated in the Design Standards. CL1 corresponds to the first (leftmost) figure of the three-figure clip code assigned to CLIP, CL2 to the second one, etc.

CL1-CL3 may only be used when the corresponding figure of the clip code is not equal to zero.

$\langle \text{clip\_dim} \rangle ::= [[\langle \text{breadth} \rangle, \langle \text{length} \rangle, \langle \text{thickn} \rangle]$

$\langle \text{breadth} \rangle ::= \langle \text{length} \rangle ::= \langle \text{thickn} \rangle ::= \langle \text{number} \rangle$

Three numbers assigned to one of the keywords will be interpreted as the breadth, the length and the thickness respectively of the clip – two numbers as the length and the thickness and one number as the thickness. In the latter two cases, the missing measures will be calculated according to the rules of the standards.

AREA When clips are dimensioned automatically, their sizes might be controlled by the fact that the cutout should have a total connection area against the profile section.

(Relevant only for built-in Clips standard).

The area should be given in square cm's.

$\langle \text{area} \rangle ::= \langle \text{number} \rangle$

CT1 This is the type of a customer defined clip.

CT1 is valid for the clip on the mould line side of the profile (or for a clip covering the whole cutout).

$\langle \text{clip\_sel} \rangle ::= \langle \text{value} \rangle$

CT2 Ditto for a clip on the non-mould line side of the profile.

CT3 Ditto in the event that there is a separate clip on top of the profile.

The keywords CT1, CT2 and CT3 cannot be used in combination with the keyword CLI.

SIDE	<p>Used to control on which side of the panel the clip(s) should be located.</p> <p>If the SIDE keyword is not used, the clip will still be forced to be located on the non-moulded side of the panel if the logical name SBH_CLIP_PANEL_SIDE is assigned value NON-MOULD. The other valid value of SBH_CLIP_PANEL_SIDE is MOULD. Please observe that the SIDE keyword always overrides any setting of SBH_CLIP_PANEL_SIDE.</p> <p>&lt;direction&gt;::= AFT FOR SB PS TOP BOT</p> <p>If not given the clip(s) are placed on the moulded side of the panel.</p>
P01	The position number of clip number 1 (valid for the clip selected via CT1).
P02, P03	Ditto for the second and third clip (if any).
N01	The internal number of clip number 1 (valid for the clip selected via CT1).
N02, N03	Ditto for the second and third clip (if any).
MAT	<p>One value is given: The thickness of the clip. Not relevant for standard clips. If omitted then the clip will get the same thickness as the plate to which it is welded, unless otherwise defined by the macro.</p> <p>Two values are given: The material thickness may also be defined by two coordinates to the faces of the clip in the direction of the positive and negative w-axis, respectively. In this case the clip thickness is given by <math>\text{dist1} - \text{dist2}</math>.</p>
WELD	Defines the weld size in general for welding of the clips. Unless otherwise specified this weld will be valid for all welds of the current clip.
WCLIP	In case there is a need separately to control the welding of a seam within a clip this keyword can be used. Otherwise handled as WELD.
WPROF	In case there is a need separately to control the welding against the profile compared to other welds of the clip this keyword can be used. Otherwise handled as WELD.
WSHELL	Ditto welding against the plate that is carrying the profile (which, for longitudinals and transversals, is the shell). Otherwise treated as WELD. (Irrelevant for clip 3.)
BCLIP	Bevel type when two clips are welded together and have to be bevelled beforehand.
BWEB	Bevel type against the web of the profile section.
BCWEB	Bevel type against the web of the profile section if coinciding with cutout contour. Default is BWEB.
BFLA	Bevel type against the flange of the profile section.
BCFLA	Bevel type against the flange of the profile section if coinciding with cutout contour. Default is BFLA.

BSHELL	Bevel type against the shell (or plate carrying the profile).
BCSHELL	Bevel type against the shell (or plate carrying the profile) if coinciding with panel contour. Default is BSHELL.
SURFACE	The surface treatment of the clip(s) before the production phase. The value to be assigned must be selected among the surface treatment strings defined by the customer. See <i>Surface Treatment in Set up and Customisation</i> . Default is plate surface treatment. <u>See Also</u>
DESTINATION	The workshop destination showing where the clip(s) are to be assembled. The value to be assigned must be selected from the destination strings defined by the customer. See <i>Destination Definition in Set up and Customisation</i> . Default is plate destination. <u>See Also</u>
QUALITY	Quality of clip(s). If not given, it is assumed to be equal to that of the plate onto which they are welded.
EXCESS	Excess on the edge of the clip(s) abutting the shell (or plate carrying the profile).
<assembly_info>	Specifies the name of the assembly in which the clip(s) will be used. The default assembly will be selected by Tribon as the lowest assembly level common to both the current panel and the panel carrying the profile provided that the environment variable SBH_CLIP_DEF_ASS is set to COMMON.
COLOUR	Colour of all clips defined in the statement.

Some parameters may be defined by the clip macros. If not given as input the values set in the macro will be used as a default.

**Example: (Tribon standard clips):**

```
CUT, TYP=53, CLI=012, AREA=60, L110-230;

CUT, 3, 'AA462-7', SL2, CLI=777;

CUT, TYP=53, L110, REF, CLI=010, CL2=340, 15;

CUT, TYP=5, 'GIRDER' ;
```

**Example: (Tribon customer defined clips):**

```
CUT, TYP=10, CT1=101, CT2=102, L120(1)5, SID=FOR,MAT=8;

CUT, TYP=10, CT1=100, CT2=103, L130(10)200, SID=AFT,

MAT=10, QUA=A36, P01=100-107, P02=108-115,

N01=1-8, N02=9-16;
```



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## 12.2 相交板架的切口

9999用于相交板架的 egg-box 的连接

Both of the two panels involved in the crossing must have a cutout for the other panel, and the cutouts must be set individually.

Syntax:

CUTOUT, [TYPE= ] 9999

, <interc\_pan> [, REF]

[, DIR=<direction>]

[, R1=<radius\_1>]

[, R2=<radius\_2>]

[, M1=<width\_1>]

[, M2=<width\_2>]

[, M3=<height\_1>]

[, M4=<height\_2>]

;

Description

<interc\_pan> 穿过目前板架的名

REF	Indicates that the cutout will be made for the reflected image of the intercrossing panel.
DIR	The direction of the v-axis of the cutout (see figure below). The v-axis is located in the mould plane of the intercrossing panel. (Unless the mould plane is located inside the panel. In that case the v-axis will be located on the plate surface in the negative direction of the w-axis of the intersected panel). The direction to be given must be one of the global ship directions FOR, AFT, PS, SB, TOP or BOT. When the two panels have different heights the cutout will automatically be located at the common limit in the bigger panel and in this case DIR need not be given. DIR is compulsory in other cases.

- R1 The radius R1 (see figure below). A positive value indicates a radius, a negative value a KS-notch. Default value is -10, i.e. a KS10 notch.
- R2 Like R1 (see figure below). R2 is set to R1 if not given.
- M1 The notch width (see figure below).
- M2 Like M1. M2 is set to M1 if not given.
- M3 Height of the notch on the mould line side (see the figure below)
- M4 Like M3. M4 is set to M3 if not given.
- M1 and M3 will be set to R1 if smaller than R1. Likewise M2 and M4 will be set to R2 if smaller than R2. If R1 (R2)  $\leq 0$  then M1 and M3 (M2 and M4) are set to 0.
- R, M1 and M3 are valid for the side of the cutout welded against the moulded side of the intersected panel, R2, M2 and M4 for the opposite side.

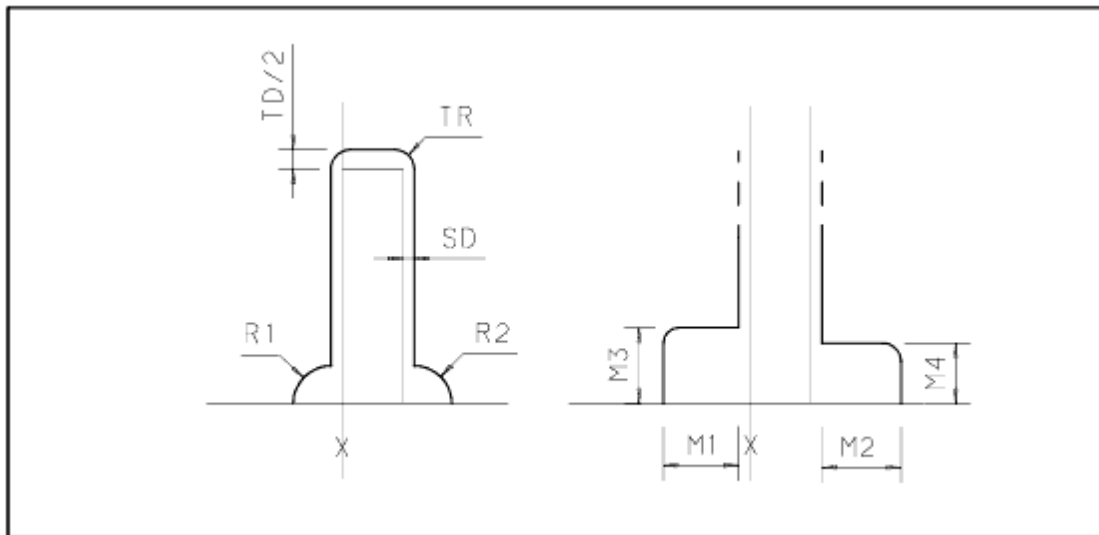


Figure 12:3. Controlling parameters of "egg-box" cutout.

This cutout has a number of parameters which are possible to control via logical variables. The three distances TD, SD and TR denote the free space between the panels at the top of the cutouts, the gap along the cutouts and the top radius, respectively. The logical names are:

TD: SBH\_INTERCROSS\_CUTOUT\_TOPDIST (default: 5 mm)  
 SD: SBH\_INTERCROSS\_CUTOUT\_SIDEDIST (default: 1.5 mm)  
 TR: SBH\_INTERCROSS\_CUTOUT\_TOPRADIUS (default: 3 mm)

Note: that TD will be shared equally between the two interlocking cutouts. E.g. if the panel heights are 1000 then the cutout heights will be 502.5 (supposing the cutouts are equal and the default value of TD is used).

Condition for this cutout to be set is that the panels have a common point in at least one of their limits.



The heights of the cutouts will be calculated so that the welding height is equal in the interlocking cutouts (considering e.g. the height of the notches at the root of the cutout).

**Example:**

An input scheme describing two intercrossing panels.

```
PAN, 'A', SP, X=300, DT=101;
BOU, U=-3000/ V=0/ U=3000/ V=500;
PLA, MAT=30;
CUT, 9999, 'B',
    DIR=BOT,
    R1=50, R2=100
.
.
PAN, 'B', SP, Y=0, DT=101;
BOU, U=0/ V=0/ U=600/ V=500;
PLA, MAT=40;
CUT, 9999, 'A',
    DIR=TOP,
    R1=-50, R2=100;
.
.
```

**Remark:**

The cutout statement in panel A has to be entered after the creation of panel B.

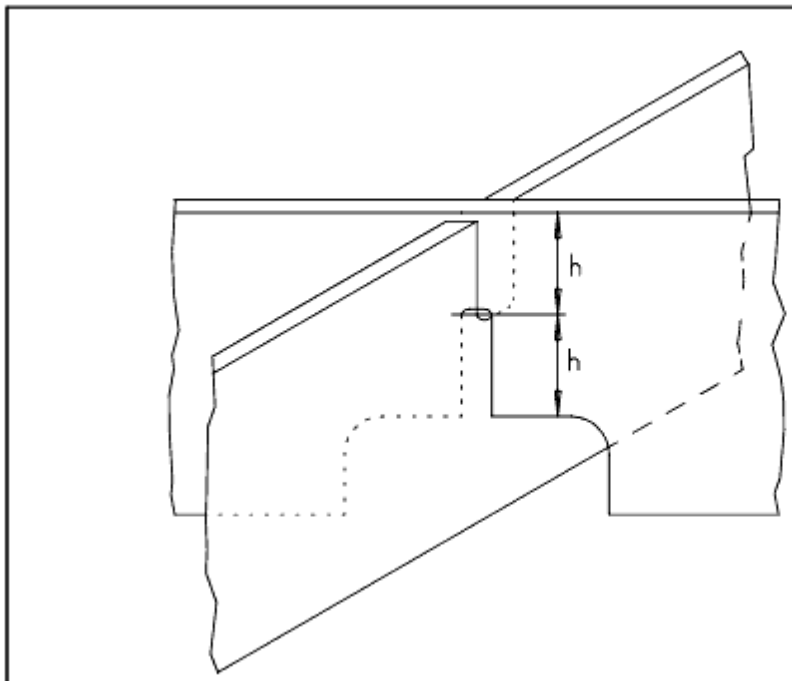


Figure 12:4. Two intercrossing panels.

When splitting a panel containing cutouts of the type 9999, a warning will be given in case the opposite cutout has not been defined or if it has been defined but not with the opposite direction.



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## 12.3 加强筋上的切口

加强筋上的切口与板上切口相通

主要的不同点:

- 扶强材上的切口仅可为相同板架上的其他加强材设
- 在扶强材上不可定义补板

Syntax:

```
CUTOUT , [TYPE=]<type_code>
        , <inters_prof>
        /<curr_prof>
        [SID=<direction>] ;
```

Description

<type\_code> 切口类型。 **注意**是由语句直接指定

<inters\_prof> identifies the profiles for which the cutouts should be made.

**Note:** this should be given before the slash.

<inters\_profile> ::= <S-ref> (1...25)

<curr\_prof> selects the profile in which the cutouts should be inserted.

**Note:** Should be given after the slash.

SID is relevant only in cases when any of the involved stiffeners exist on both sides of the panel with the same tag number.

The direction is specified either relative to the w-axis or as a main ship direction.

<direction> ::= -1 | 1 | AFT|FOR|SB|PS|TOP|BOT

**例:** CUT, 5, SL1-10/ SF105(3)111;

**注:** 一个语句中可设定多个切口（最大300），组合将自动评估

**备注:**

Since the stiffener itself and its cutouts are generated in different statements in certain situations all of the involved statements might have to be rerun to get a correct result. If not done, the system will issue a warning message and "make the best possible" of the current

situation.



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## 13 型材的处理

型材在设计及建造时有许多不同的可能, 根据他们的功能, 大多数情况适于不同的零件类型

外板型材 (纵骨/横骨) 在不同的模式生成



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### 13.1 零件类型

平面板架上型材的不同零件:

- 扶强材
- 面板
- 支柱



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#### 13.1.1 扶强材

焊于平面板架的型材为**stiffeners**。在STIFFENER语句中描述

型材, 从功能点看, 见折边材如扶强材生成如不是扁钢

扶强材按标准肘板应为肘板标准部分, 不由STIFFENER语句生成, 但可在BRACKET语

句中修改或删除

扶强材可为直线、曲线或折边

压筋板如扶强材生成（见下面）



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型材的

- **曲线Stiffener**

由迹线不直的曲线定义。横截面与迹线垂直并等于型材名义尺寸

这表示一扶强材折垂直于迹线，不是折角扶强材，如下图

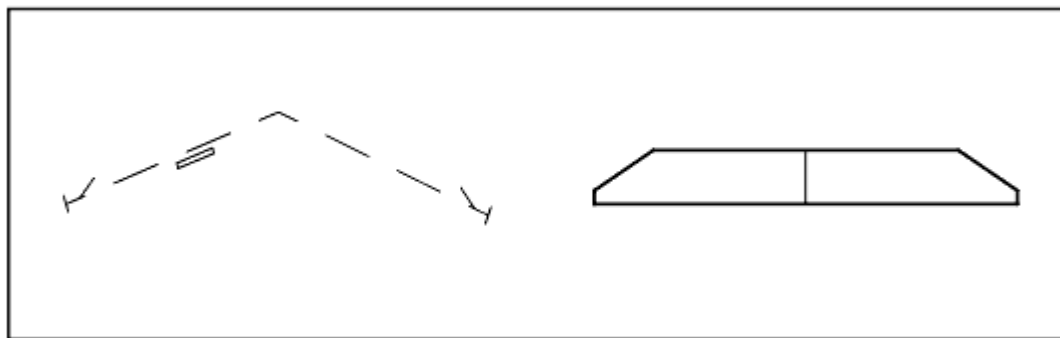


Figure 13:1. According to definition curved (not knuckled) stiffener.

Curved stiffeners may be set parallel to limits, holes and arbitrary curves stored in the panel.



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- **折角 Stiffener**

折角扶强材有一个对角折线，既可对角延伸跨扶强材，或仅一部分折角线，不必与扶强材迹线相交。因此，折角扶强材必须为一直线

下图为典型折角扶强材

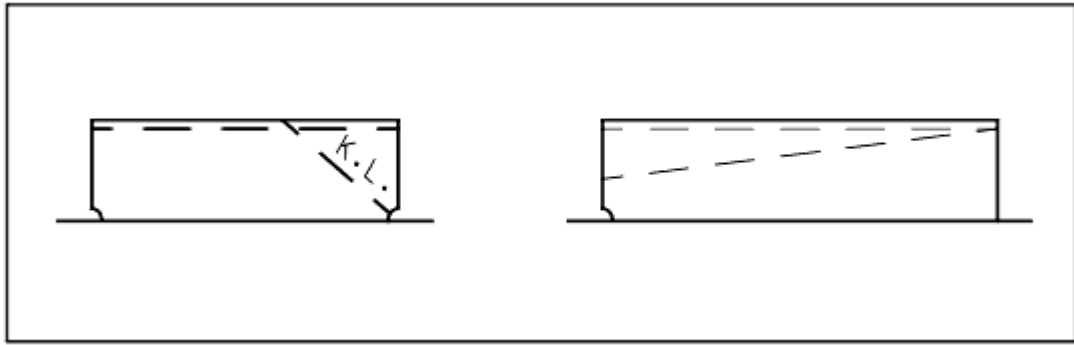


Figure 13:2. Examples of knuckled stiffeners.

折角扶强材的生成由KNV 缺省参数，在缺省文件KNUCKLED\_STIFFENERS中，可有三种情况：

1. 扶强材在其它两个之间，如在舱壁上的水平扶强材或升高纵骨

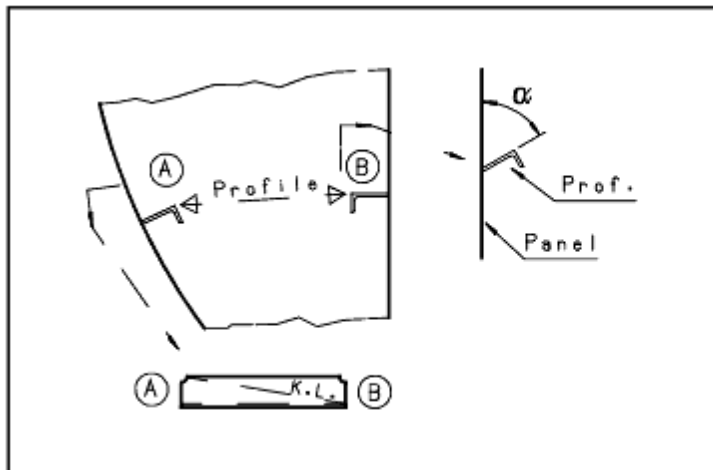


Figure 13:3. Knuckling caused by location of connecting profiles.

此时，折角自动发现，折角线沿扶强材对角放置（不需特殊输入）

2. 1、第二种是（倾斜）扶强材，在所给平面内结束。见下图。（Tribon支持扶强材折入主平面）

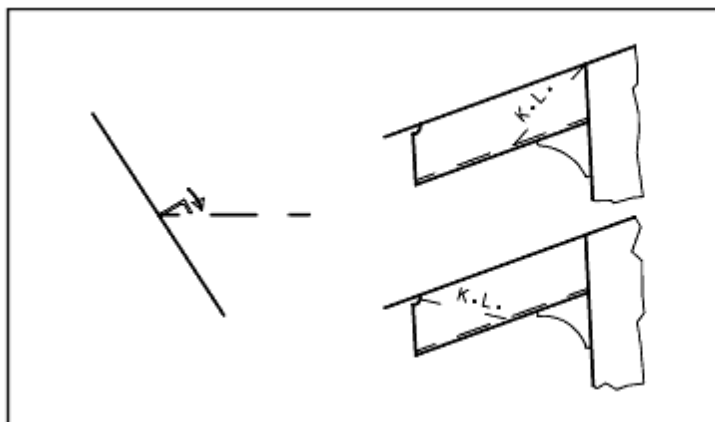


Figure 13:4. Knuckle when stiffener should end in a given plane.

折线在迹线开始，计算三角件，位于指定平面

扶强材端部和位置平面必须由用户定义

3. 1、 每三种情况是折角线位置由用户控制, 还有弯曲角度, 见下图。

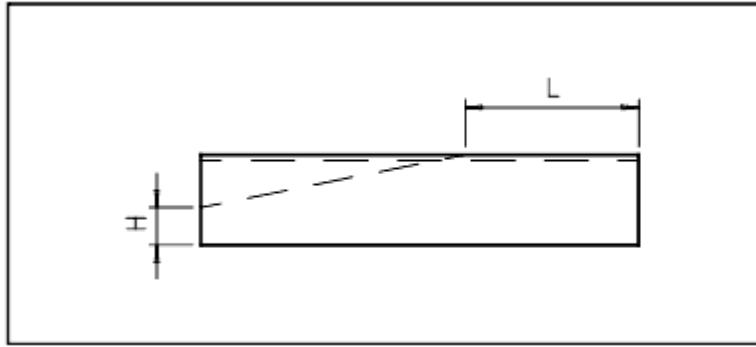


Figure 13:5. Manually controlled knuckle line.



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### 13. 1. 2 折边

在Tribon船体系统, 两个不同零件定义为折边:

- 面板: 直或曲线, 焊于板缘沿板架或孔外形。  
可不对称, 必须与板表面垂直。
- f折边法兰沿外形, 当折边面板生成, 板形状自动修改  
折边法兰有型材的功能, 不是天生的。

折边材如须生成加强筋, 如他们不是扁钢或不垂直于板表面

在标准肘板上的折边材认为肘板标准一部分, 他们的尺寸仅受肘板语句影响。



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### 13. 1. 3 支柱

任何型材的型材能生成支柱。然而, 一般目标是自动型材, 仅在端部连接, 支柱用于支撑开敞的板

支柱由PILLAR语句

由板件组成, 必须生成为板架



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## 13. 2型材数据

型材一般完全生成生产要求的信息

除位置方向外，下述信息能定义

- 按设计标准的型材类型及参数
- 材质代码
- 余量
- 端切（类型及参数）按设计标准，一般端切直接角将自由计算，当连接时
- 沿迹线坡口及型材端部坡口
- 孔、切口、切角（仅扶强材）
- 焊接信息
- 位置号
- 装配信息
- 表面处理
- 等

当然，与零件有关的信息与折边材无关。



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### 13. 2. 1型材上的孔、切角及切口

In addition to the end cut definition holes, notches and cutouts can be set in the interior of the profile. However, this facility is restricted to stiffeners, i.e. no holes etc. can be set in flanges and pillars.

The generation of holes etc. in stiffeners is done in a similar way as for plates. Special variants of the HOLE, NOTCH and CUTOUT statements are used for this purpose. Cf. these statement types for details.

Normally when an item in a panel is generated there is a one-to-one or one-to-many relation between the input statement and the component(s)

that it generates, i.e. normally all information in a certain component has its origin in one statement. (Exception: The outer contour which may be modified by a folded flange.)

However, in stiffeners with holes, etc. the stiffener itself is generated by one statement and the holes may be generated by several other statements. This must be taken into consideration when stiffeners are regenerated/changed/deleted. Then, in some cases, several different statements may have to be modified or rerun. However, in each situation the system tries to take the most natural action. In any case, as soon as a stiffener with holes is regenerated, a warning message will be issued.


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## 13. 3型材的位置

型材空间位置由端点坐标规定，一般在板架坐标补充描述。型材所属的板架（或肘板），通常端点根据其它结构自动计算。

腹板，假定位于型线左面。因此，型材方向由型线方向定义

如支柱，描述线一般位于型材剖面的对称线，型材方向由单独数据控制。


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## 13. 4压筋

小槽形叫压筋，非常像加强材，压筋为型材100-110。特征由用户定义的外部表规定。

当然，生成压筋时，扶强材的属具仅对于截然不同的扶强材。端切、位置号、材质等，除了扶强材许可可用，压筋将修改所处零件几何，此修改将在板件分离时产生。因此，模型几何是正确的。





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## 14 Stiffener语句

在板架压筋上生成加强材，连接扶强材及曲线扶强材语句完全不同

语句不同是：

- 1、 型线—扶强材型线首先定义，如后定，则计算端点
- 2、 “先端点”，如与相交型材的连接，还有定义一个端点及方向
- 3、 连接扶强材、其高度自动化，较少输入
- 4、 由扶强材语句



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[Stiffener](#)

### 14.1 除连接扶强材的扶强材

必须以正确次序给出

**Syntax:**

---

```
STIFFENER, <profile>
  [, <symmetry>]
  ,SID= <direction>
  [, POS= <pos_no> (1 ... 25)]
  [, TAG= <tag_no> (1 ... 25)]
  [, QUAL= <quality>]
  [, DEST=<destination>]
  [, SURF=<surface_treatment>]
  [, WELD= <throat_thickn>]
  [, INC= <inclination>]
  [, <knuckle_data>]
  [, NO= <stiff_no> (1 ... 25)]
  [, NOM]
  [, TEMP]
  [, UNSYM= <hangout>]
  [, <id's>]
  [, <assembly>]
```

```
[,<excess 1>]
[,<excess 2>]
[,<bevel 1>]
[,<bevel 2>]
[,<end cut 1>]
[,<end cut 2>]
[,TBE=<bevel>]
[,COL[OUR]=<colour>]
<mould_line_first> |
<end_point_first>
;
```

Even if not explicitly stated in the syntax above, data valid for end 1 of the stiffener should precede a slash (/), data for end 2 should follow the slash.

**Example:**

```
STI, SID=AFT, PRO=10, 200, 12, L40, CON=3,
CUT=1100/CON=14, CUT=1302, 15;
```

**Profile data** The profile type and the parameters are given. The profile types are according to the Design Standards.  
 <profile>::= PRO=

<prof\_type>

, <prof\_param> (0 ... 6)

<prof\_type>::= <integer>

<prof\_param>::= <number>

The profile parameters should be given in the correct number and correct order as compared to the standards.

**Example:**

```
PRO=10, 200, 10
```

```
PRO=31, 350, 125, 10, 12
```

For swedging, profile types in the interval 100–110 may be used if defined in the swedging object. Depending on its definition, it may or may not have one size parameter.

<symmetry>

Normally stiffeners on a symmetric panel are supposed to be valid both portside and starboard.

However, it is possible to indicate that a stiffener should be used portside only or starboard only. This clause is relevant on a symmetric panel ("SBPS panel") only.

<symmetry>::= P | S

P means portside specific,

	S means starboard specific.
SID	<p>defines the side of the panel on which the stiffener is located, either relative to the w-axis (=+1 -1) or as a main ship direction.</p> <p>&lt;direction&gt;::= AFT FOR SB PS TOP BOT</p>
POS	<p>the piece number with which the stiffener shall be marked in production.</p> <p>Can be defined by other subsystems of Tribon Hull, e.g. the component list programs.</p> <p>&lt;pos_no&gt;::= &lt;integer&gt;</p>
TAG	<p>See Tag Handling for Stiffeners in <u>Tag Handling for Stiffeners</u>.</p> <p>Often, the stiffener tags are calculated automatically. If a tag is not set automatically, then a user defined tag should be given so that reference via stiffener numbers can be avoided.</p> <p>A given tag will override an automatically evaluated tag.</p> <p>&lt;tag_no&gt;::= &lt;integer&gt;</p> <p>(0 &lt; TAG &lt;= 999)</p> <p>A tag number need not be unique within the panel. E.g. several stiffeners in line with each other may have the same tag.</p>
QUAL	<p>Defines the material quality of the stiffener.</p>

$$\langle \text{quality} \rangle ::= \left\{ \begin{array}{l} \langle \text{quality\_code} \rangle \\ \langle \text{quality\_string} \rangle \end{array} \right\}$$

<quality\_code>::= <integer>

<quality\_string>::= <string>

If left out entirely, the default quality according to customer definition is used.

Qualities may also be given as strings. However, then the quality must be selected as one of the strings, defined by the user.

Setup and Customisation Customer Set-up of Material Qualities

<destination>	<p>defines the workshop station where to assembly the stiffener.</p> <p>&lt;destination&gt;::= &lt;name&gt;</p>
---------------	---

The value to be assigned must be selected among the destination strings defined by the customer.

Setup and Customisation Destination Definition

<surface\_treatment> defines the surface treatment of the stiffener before the production phase.  
 <surface\_treatment>::= <name>

The value to be assigned must be selected among the surface treatment strings defined by the customer.

Setup and Customisation Surface Treatment Set-up

WELD <throat\_thickn> defines the thickness of the welding.  
 <throat\_thickn>::= <number>

INC Normally, the stiffeners are perpendicular to the plate surface. INC can be used to control the inclination of the profile.

<inclination>::= <number>

The inclination angle is measured between the mould line side of the stiffener and the surface of the panel as indicated in the figure below.

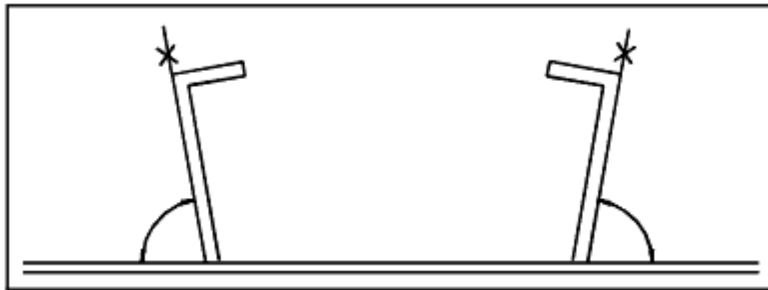


Figure 14:1. Inclination angle of stiffener

The angle is always positive.

Defaulting value is 90 degrees.

An inclination angle equal to 1, 2 or 3 is interpreted as though the x-, y- or z-axes, respectively, are in the web of the stiffener. The inclination angle will then be calculated automatically.

When the stiffener is connected to longitudinals etc., the inclination angle will normally be calculated automatically. Then a value assigned to INC will override the automatically calculated value. To make certain that the stiffener is perpendicular to the panel in such a case, set INC=90.

INC can be used in a little extended way in the control of knuckled stiffeners, see below.

<knuckle\_data> The input required for user control of knuckled stiffeners.

NO Normally, stiffeners will be numbered automatically and get the first free stiffener number (1, 2, ... ). However, the stiffener numbers can be controlled via input.

**Two stiffeners may never be given the same number.**

(see TEMP below and the SSTART statement.

Reference to stiffeners via stiffener numbers should be avoided since they are normally not stable during changes.

`<stiff_no> ::= <integer>`

NOM[ARK]

Normally the stiffener traces will be marked with marking lines on plate parts in splitmark. NOMARK will prevent these marking lines.

TEMP

This means that the generated stiffener shall be temporary and that it will be deleted automatically before the panel is stored. Such stiffeners are auxiliary and will get the numbers 901, 902, ..., unless otherwise stated.

UNSYM

If an unsymmetrical flange is generated as a stiffener, UNSYM is the height of the part of the profile on the "other side" (compared to the side defined by SIDE) of the mould plane of the panel. See the figure.

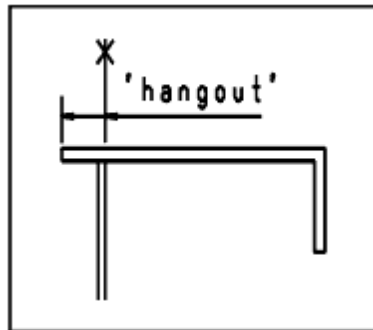


Figure 14:2. Definition of "hang-out" of stiffener placed along edge.

The height is always measured from the mould plane of the panel.

`<id's>`

correspond to the items assigned to the keywords LIS, AS1-AS4 in the panel statement (cf that statement).

---

```

<id's> ::= LIS=<parts_list>,
          AS1=<name>
          AS2=<name>
          AS3=<name>
          AS4=<name>

```

---

`<parts_list> ::= <name>`

The names, given in the stiffener statement will override the corresponding name given on panel level.

To cancel a name set on panel level without replacing it with another name, the corresponding keyword should be given stand alone (i.e. without any assigned value) or be assigned an empty string (e.g. AS3='').

`<assembly>`

Cf-Panel Statement. If the stiffener belongs to different assembly than the panel in general, that assembly can be specified here.

<excess 1> Defines the excess material (overlength) of the profile  
 <excess 2> related to any of the profile.  
 <excess 1>::= <excess 2>::= EXC = <number>

When the clause occurs before the slash (= <excess 1>), it is valid for end 1, after the slash for end 2.

<bevel 1> Defines the bevelling at the ends of the profile.  
 <bevel 2> <bevel1>::= <bevel 2>::= BEV=<bev\_web>[, <bev\_fla>]

<bev\_web> is the bevelling in the web of the profile, <bev\_fla> is the bevelling in the flange of the profile.  
 <bev\_web>::=<bev\_fla>::=<number>.

If the profile is bevelled only in the flange, <bev\_web> must be given as 0.

When the clause occurs before the slash (= <bevel 1>), it is valid for end point 1, after the slash (= <bevel 2>) for end 2.

The assigned values may be bevel code or bevel angle, depending on the implementation.

<end cut 1> Defines the end cutting of the stiffener.  
 <end cut 2>

---

<end cut 1>::=<end cut 2>::=  
     CUT = <cut\_type>  
     [, <cut\_param> (0 ... 6)]

---

<cut\_type> is the end cut type according to the Design Standards.

<cut\_type>::= <integer> <cut\_param> are the controllable parameters of the end cut according to the Design Standards.

<cut\_param>::= <number>

In case of connection, angles of the end cut may be calculated and added automatically and need not be given in the input.

Manually given values will always override the automatically calculated ones.

<p>Example:          CUT= 1100[, 87]</p>
--

When the clause occurs before the slash (= <end cut 1>) it is valid for end 1 of the stiffener, after the slash for end 2.

End cut data are irrelevant for swedging.

TBE Defines the bevelling along the trace of the profile.

COLOUR Colour of all stiffeners defined in the statement.

All of POS, QUAL, WELD, TEMP, UNSYM, EXC, BEV, TBE and CUT are irrelevant for swedging.



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### 14.1.1 型线

型线可由一个线直接定义，或平行于板架边界。

`<mould_line_first> ::= <mould_line> <end_point_1> / <end_point_2>`

以下处理型线定义，然后如何定义端点。一旦型线知道

#### A、型线定义

型线的定义，既可以一个给定的线或平行于边界或所给的子线。

`<mould_line> ::= <line_direct> | <line_parallel>`

`<line_direct>` 直接给出线

`<line_direct> ::= , <line> (1 ... 25) [, REV]`

`<line_parallel>` 用于定义一个或几个扶强材与边界或线平行

---

```

<line_parallel> ::=
  <parallel_line>
  <parallel_limit> |
  , M1= <dist>
  [, M2= <partition>]
  [, NUMB= <no_of_sti>]

```

---

<code>&lt;parallel_line&gt;</code>	用于定义一个或几个扶强材与边界或线平行 <code>&lt;parallel_line&gt; ::= &lt;line&gt;</code>
<code>&lt;parallel_limit&gt;</code>	defines, as an alternative, the limit to which the stiffener should be set parallel. <code>&lt;parallel_limit&gt; ::= LIM=</code> <code>&lt;limit_no&gt;[, &lt;line&gt;]</code>
LIM	平行的边界 <code>&lt;limit_no&gt; ::= &lt;integer&gt;</code>  <div style="display: flex; justify-content: space-between;"> <span><code>&gt; 0</code></span> <span>为相同方向</span> </div> <div style="display: flex; justify-content: space-between;"> <span><code>&lt; 0</code></span> <span>相反方向</span> </div>

This makes sense only if any of the end points end against the outer contour.

By adding an extra line, intersecting the limit, the stiffener will be set parallel to the tangent in the intersection point.

Otherwise, the stiffener will be set parallel to the longest straight segment of the limit.

M1 从所给极限至线的距离.  
`<dist> ::= <number>`

M2 第一与第二; 第二、第三个扶强材之间的距离  
When left out, M1 will be used.  
`<partition> ::= <number>`

NUMB 扶强材数的设定。缺省为1  
`<no_of_sti> ::= <integer>`

To summarize: The mould line can be defined in one of the following ways:

1. Along a given line.

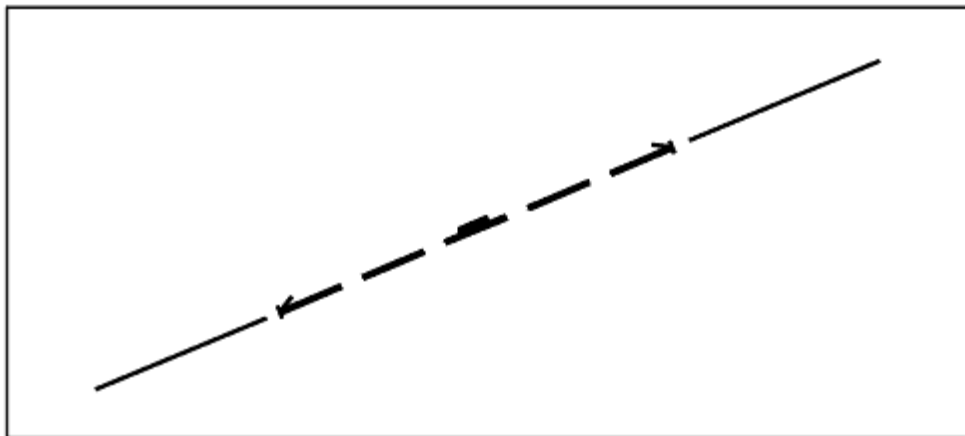


Figure 14:3. Stiffener along a given line.

2. Parallel with and at given distances from a line.



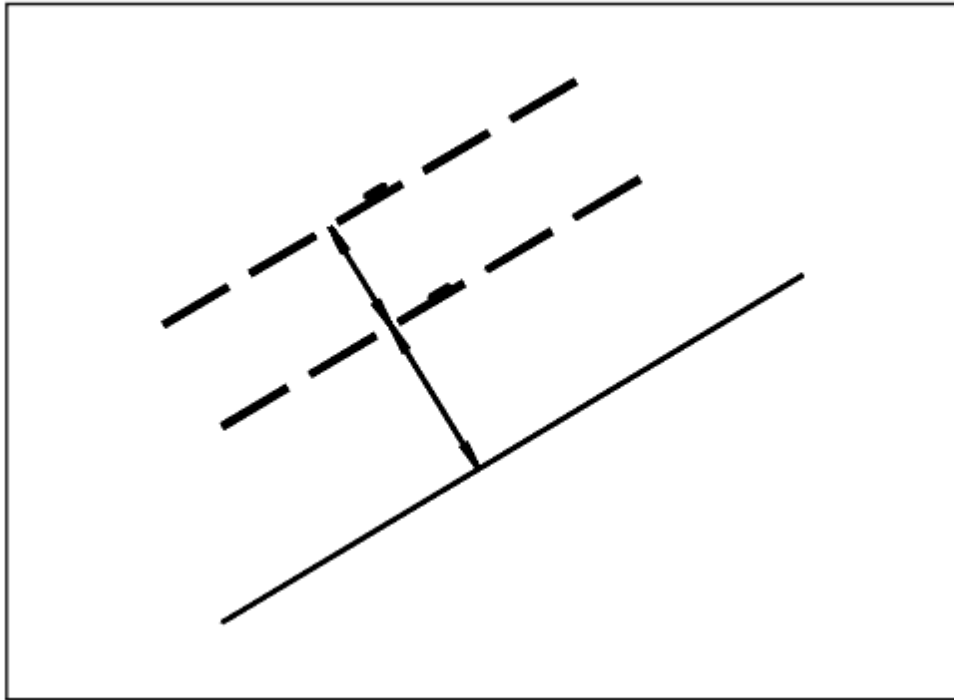


Figure 14:4. Stiffeners parallel to line at a distance.

3. Parallel with and at given distances from (the longest straight part of) a limit.

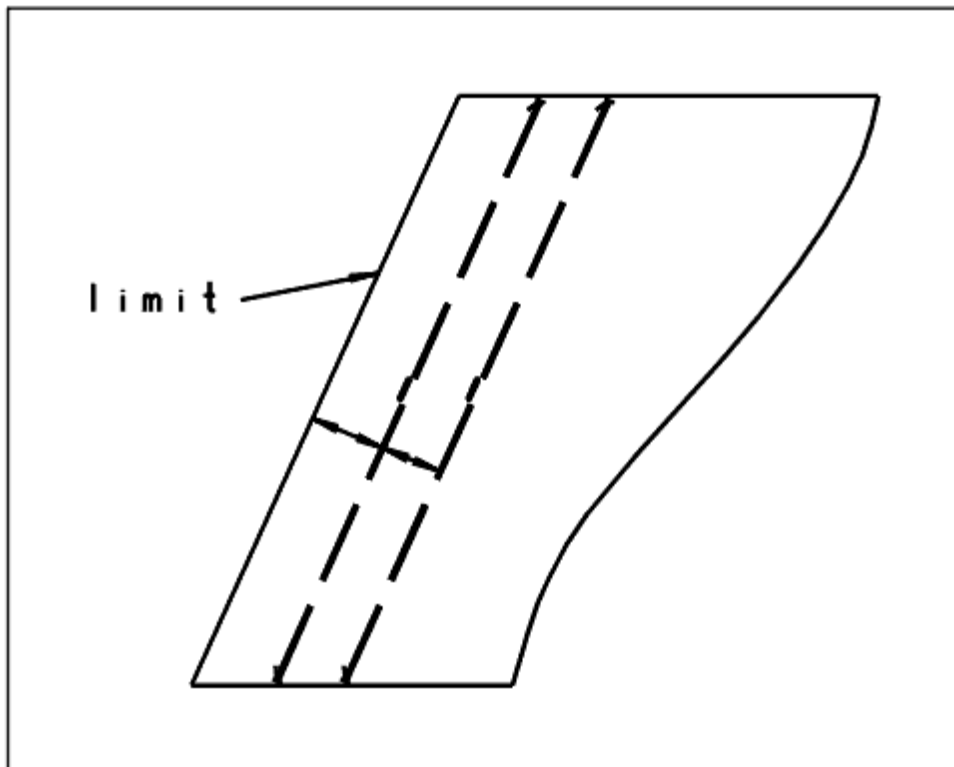


Figure 14:5. Stiffeners parallel to limit.

4. Parallel with and at given distances from the tangent to a given limit in the intersection point with a given line.

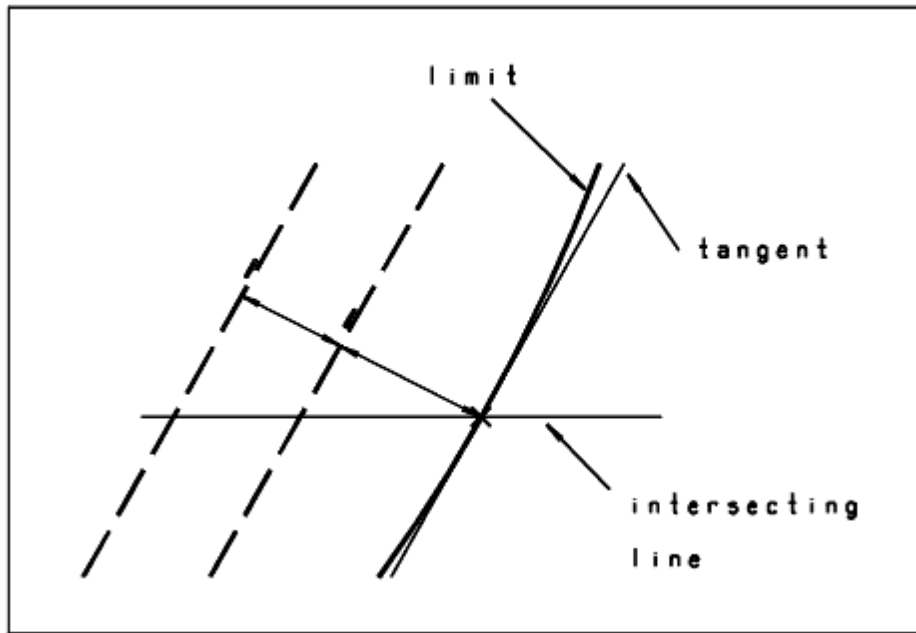


Figure 14.6. Stiffeners parallel to tangent of limit in given point.

## B. 定义端点

一旦定义型材，端点能相互独立定义，以不同方法定义。

- 与板架上的扶强材/面板
- 与所给线相交
- 在型线与外形的相交
- 所给相交板架的表面连接
- 在相同板架内与肘板表面连接
- 由相同板架内的缝的连接。
- 相交板架名或按REF对称。

`<end_point_1> ::= CON = <con_code>`

**Example:**  
`[, <int_prof_ref> |  
 <line_1> |  
 <name> [, REFL] |  
 <bracket_ref> |  
 <hole_ref> |  
 <seam_ref> ]`

CON is the connection code according to the Design Standards.  
`<con_code> ::= <integer>`

`<name>` Name of an intersecting panel, to the surface of which the stiffener should be attached. It may be mirrored in the CL plane by adding the keyword REF.

`<int_prof_ref>` See General Layout of a Statement.

`<line_1>`

`<bracket_ref>`

`<hole_ref>`

如不对型材定义, 假定有外形上终边。根据连接类型, 它可沿外切的切线连接扶强材。

作为一个替代, 扶强材可连接周围板架的表面, 它的外形由型线的相交或与周围板架的端与端连接。

后者的条件:

- 使用表面连接的代码, 船体曲线可用于不相关的边界。  
或
- 端对端的连接代码, 一个板架作为相应边界。  
 $\langle \text{end\_point\_2} \rangle := \langle \text{end\_point\_1} \rangle$   
 However, in  $\langle \text{end\_point\_2} \rangle$ ,  $\langle \text{line\_1} \rangle$  is replaced by  $\langle \text{line\_2} \rangle$ .

以上正常名称表示任何端点可由以下来定义。

1. 与其它扶强材折边连接, 使用适当的连接代码。

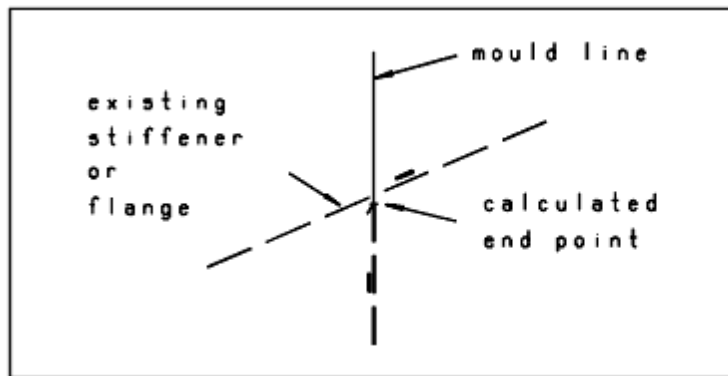


Figure 14:7. Connection of stiffener to another profile on the same panel.

2. 用给出的线相当的线, 可接受连接代码不影响结果。

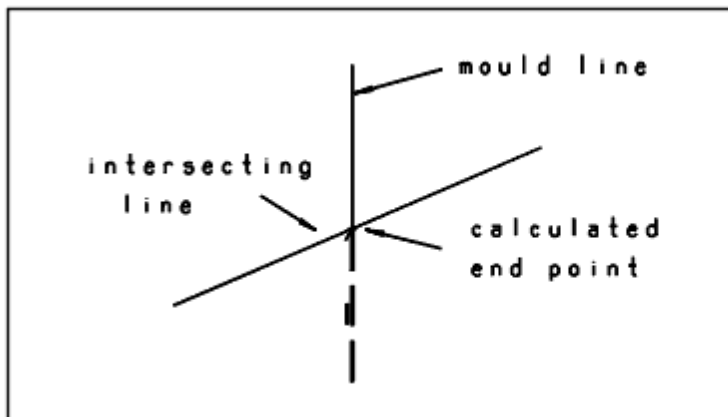


Figure 14:8. "Connection" of stiffener to a given line.

3. 与沿外形切线的虚拟扶强材的连接, 必须提供连接代码。

根据连接型式, 切线可由边界, 如船体表面的切平面来代替。在以前的情况, 端切角一般为 $90^0$ , 将沿型值计算间隙。在后者, 腹板角度有任意值, 间隙应与表面垂直。如端点按这个选项生成, 型值的方向必须是那个扶强材, 在其它情况, 方向是无关, 将自动选择正确的方向。

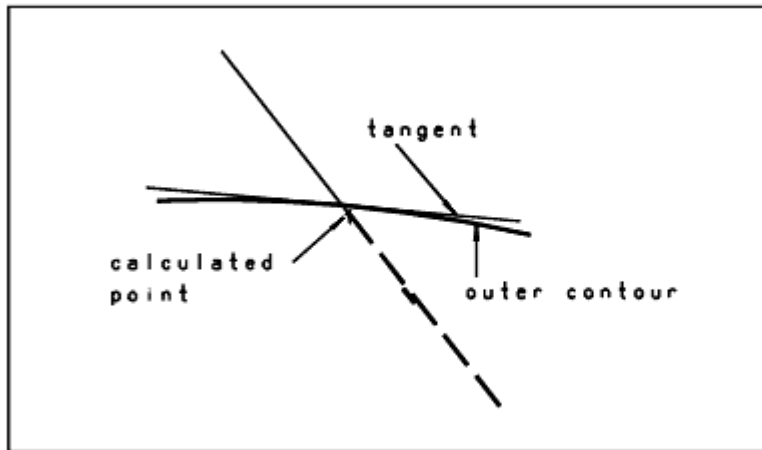


Figure 14:9. "Connection" of stiffener to a limit.

4. 与所给板架的表面的扶强材, 连接被做至一个板架上的虚拟扁钢。
5. 连接板架上的肘板的表面, 按4进行连接。
6. 连至板架上的孔, 连接应以相同的方法, 以便面板焊于孔边缘。

以下, 大量的例子按 (mould—line first) 定义, 以下例子, 端切数据为空线的方向, 必须与最终型线一致或相反, 因为两端是直接定义的。

Example 1 ('line direct'):

Example:

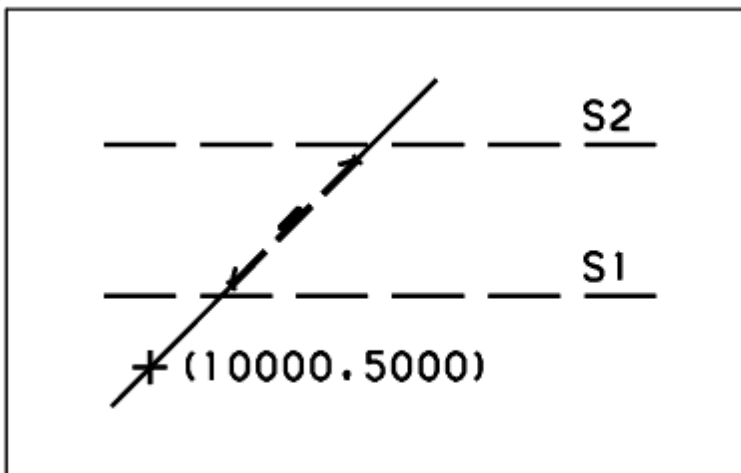


Figure 14:10. Stiffener between two other stiffeners.

STI[FFENER], ... U = 10000, V = 5000, T = 45,

S1, CUT = 1302, 15, CON = 14/

S2, CUT = 1302, 15, CON = 14;

Example 2 ('line direct'):

Example:

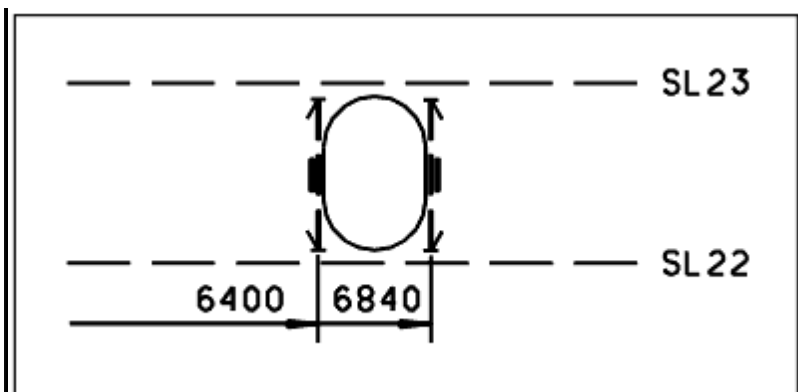


Figure 14:11. Carling stiffeners around hole.

STI, ... Y = 6400, 6840,  
 SL22-23, CUT = 1302, 15, CON = 14/  
 SL23-22, CUT = 1302, 15, CON = 14;

Example 3 ('line direct'):

Example:

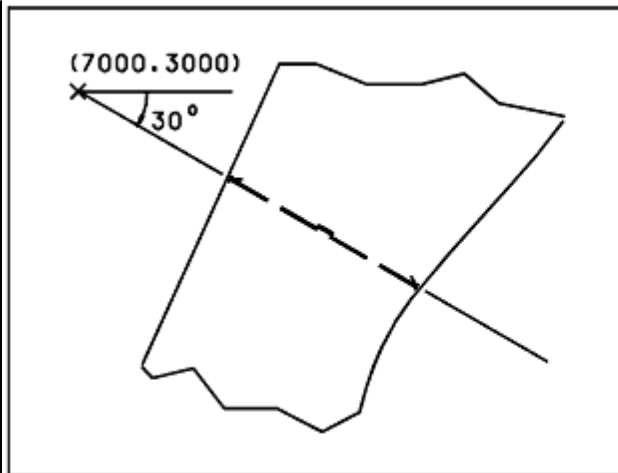
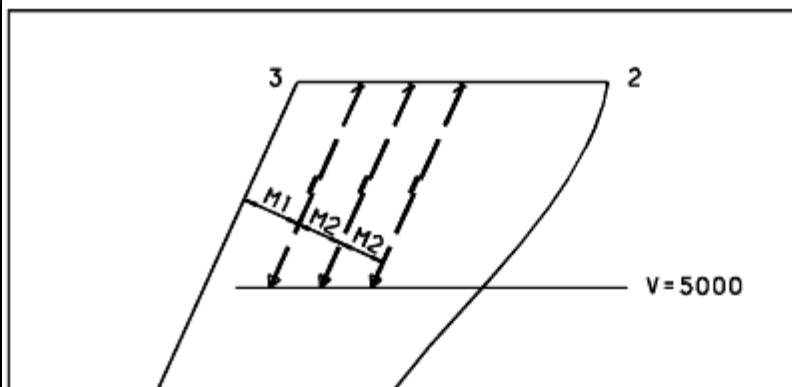


Figure 14:12. Stiffener across panel along given line.

STI, SID = AFT, PRO = 10, ... ,  
 U = 7000, V = 3000, T = -30,  
 CUT = 1302, 15, CON = 14/  
 CUT = 1302, 15, CON = 14;

Example 4 ('parallel to limit'):

Example:



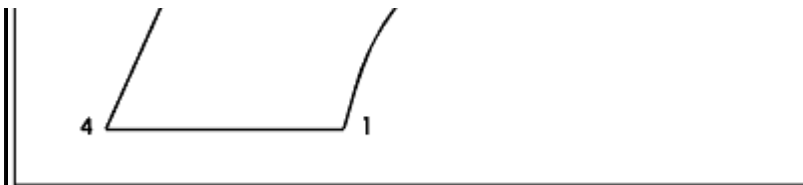


Figure 14:13. Stiffeners parallel to limit, end 1 by line.

STI, SID = AFT, LIM = -3,  
 PRO = 10, 200, 12,  
 NUMB = 3, M1 = 900, M2 = 750,  
 V1 = 5000/CON = 14;

In this example, the direction of the mould line is essential because in one end point the stiffener is "attached" to the outer contour.

Example 5 (cf Ex 4 - Note: LIM > 0):

Example:

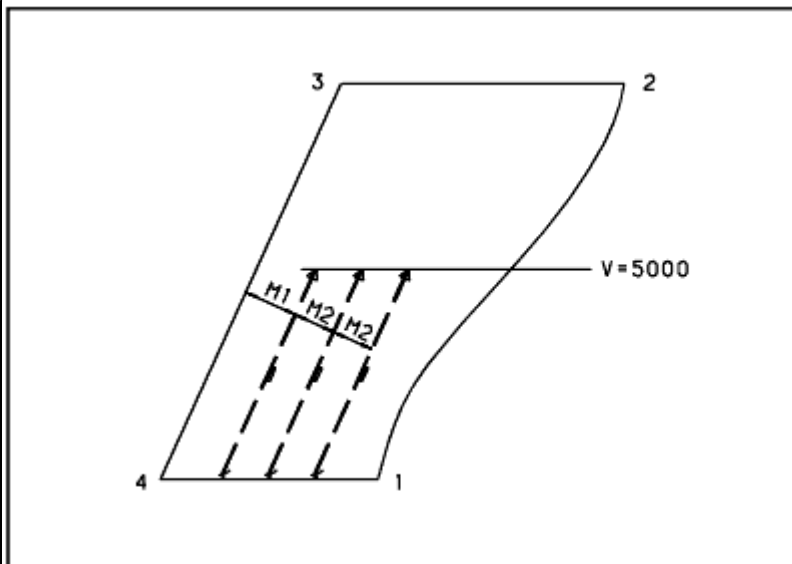
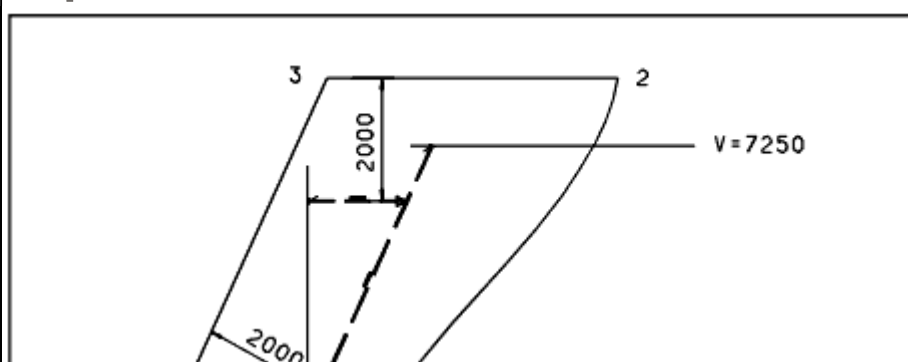


Figure 14:14. Stiffeners parallel to limit, opposite direction, end 1 by line.

STI, SID = AFT, LIM = 3,  
 PRO = 10, 200, 11.5,  
 NUMB = 3, M1 = 900, M2 = 750,  
 V1 = 5000/CON = 14;

Example 6 ('parallel to limit'):

Example:



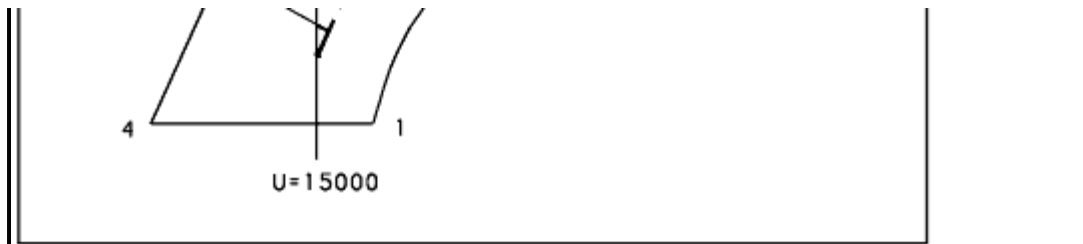


Figure 14:15. Stiffener parallel to limit, both ends by lines.  
 STI, SID = AFT, LIM = 3,  
 PRO = 10, 200, 11.5,  
 M1 = 2000,  
 $U1 = 15000/V2 = 7250$ ;

Example 7 ('parallel to limit' - see figure above):

Example:

STI, SID = AFT, LIM = 2,  
 PRO = 10, 200, 12, WELD = 4,  
 M1 = 2000,  $U1 = 15000/S1$ , CON = 14;

Example 8 ('parallel to limit'):

Example:

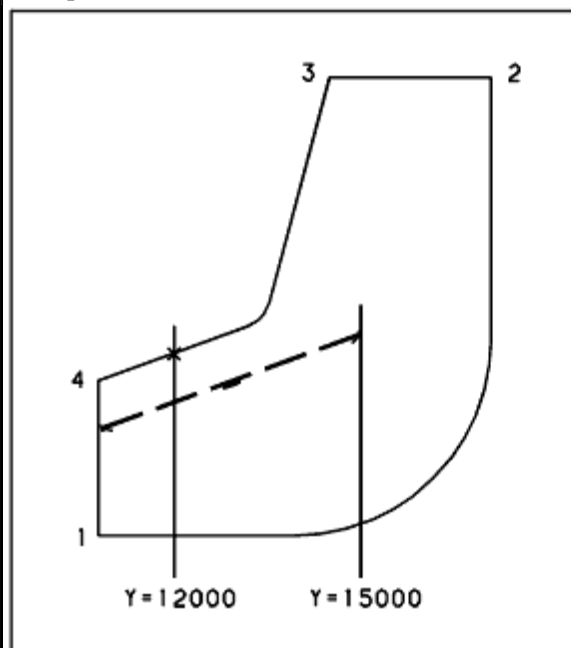


Figure 14:16. Stiffener parallel to indicated part of limit.  
 (Select the part of the limit where to set the stiffener by giving a line.)

STI, SID = AFT, LIM = 3, Y = 12000,  
 PRO = ... ,  $Y1 = 15000/$   
 CON = 14;

Example 9 ('parallel to line'):

Example:

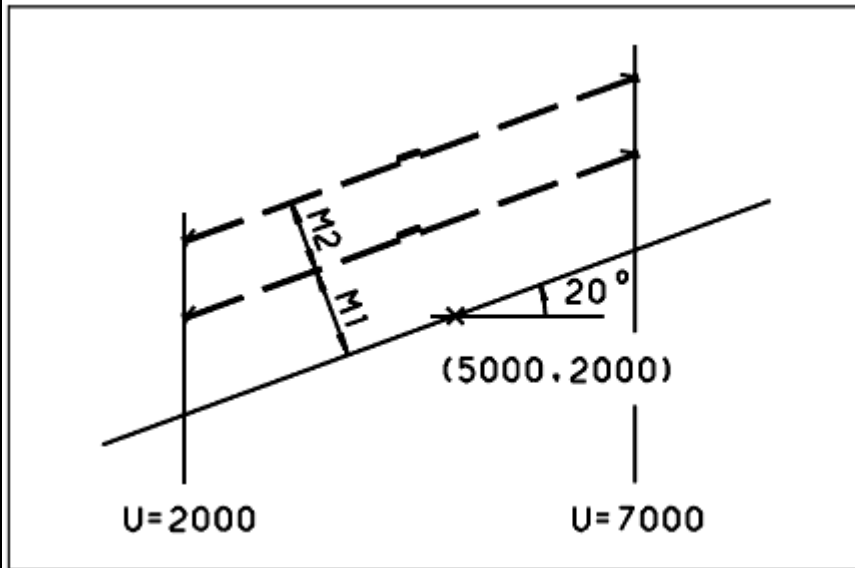


Figure 14:17. Stiffeners parallel to line, restricted by lines.

STI, SID = -1, PRO = ... , U = 5000,  
V = 2000, T = 20,  
M1 = 1000, M2 = 750, NUMB = 2,  
U1 = 2000/U2 = 7000;

Example 10 (along line between bracket and hole):

Example:

STI, SID = ..., PRO = ..., Y = 13000  
CON = ..., CUT = ..., BR2/  
CON = ..., CUT =, HOL3;



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### 14.1.2 端点

初步定义扶强材的端点，型线合成按端点间的线，问题减少选择端点以正确的次序，这也有其它可能。

一个端点边定义型线的方向

一个端点被计算，边直接给出型线方向。

#### 1. 给出两点



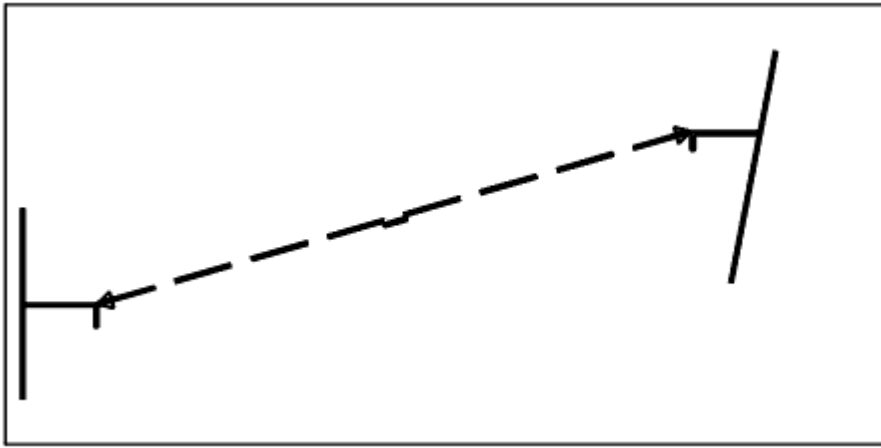


Figure 14:18. Both ends connected to profile sections.

2. 一点并定义方向

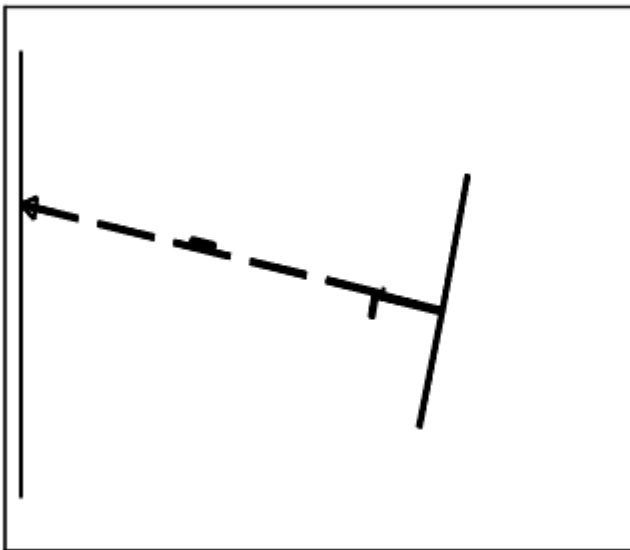


Figure 14:19. Profile section defining end 2 *and* direction.

3. 给出端点及型线或方向。

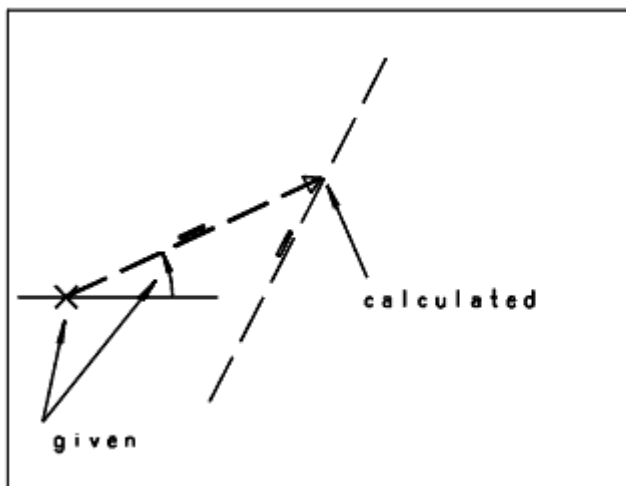


Figure 14:20. End 1 and direction explicitly given.

Syntax:

---

`<end_points_first>::=`

`[, T= <dir_angle> (1 ... 25)]`

`<end_point_1> /`

`<end_point_2`

---

方向角度一点给出也有控制，如当与板架上扶强材相同，一般为腹板方向，根据连接，也有给出方向。

`<dir_angle>::= <number>`

`<end_point_1>::=`

$$\left\{ \begin{array}{l} , <point\_1> [, CON= <con\_code>] \\ \\ , CON=<con\_code> \end{array} \left\{ \begin{array}{l} , <ext\_prof\_ref< (...25) \\ [, REF) \\ , <int\_prof\_ref< (...25) \\ , <name> [, REF] \\ , <bracket\_ref> \\ , <hole\_ref> \\ , <seam\_ref> \end{array} \right\} \right\}$$

CON

See Mould Line First above.

`<end cut>`

See Mould Line First above. Also see Recalculation of End Cut Parameters below.

`<point_1>`

`<ext_prof_ref>`

`<int_prof_ref>`

`<bracket_ref>`

`<hole_ref>`

See General Layout of a Statement in a previous chapter. **Note**, however, that the stiffeners cannot be attached to flanges.

`<name>`

Name of an intersecting panel to the surface of which the stiffener is attached. It may be mirrored in the CL-plane by adding the keyword REF.

`<end_point_2>` is identical to `<end_point_1>` if `<point_1>` is replaced by `<point_2>`.

如没有点及型材参考，扶强材结束在外形。

总结：下述可能性存在，如至少一个端点有固定位置，另一个端点设定。

- 直接给出坐标
- 与板架平面相交的型材相连，可在外板或相邻板架
- 与扶强材相连，肘板、孔或板架外形。（给出连接代码）
- 与相交线连接

In case of connection, an appropriate connection code must be given.

Example 1 (both end points explicitly given):

Example:

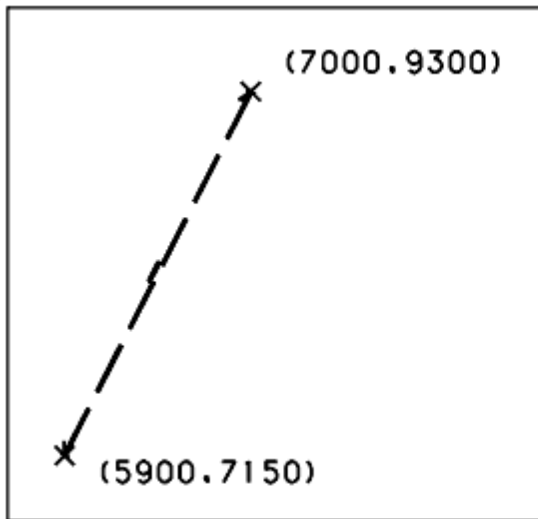


Figure 14:21. Both ends explicitly defined.

STI, SID=AFT, PRO=10, 200, 12, WELD=6,  
 U1=5900, V1=7150, CUT=1302, 15, CON=14/  
 U2=7000, V2=9300, CUT=1302, 15, CON=14;

Example 2 (both end points attached to intersecting profiles):

Example:

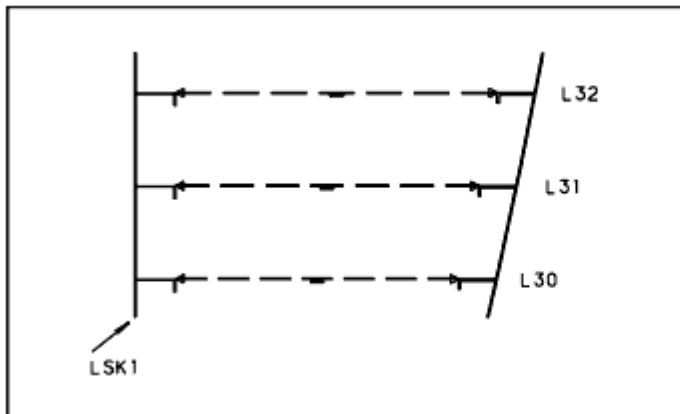


Figure 14:22. Both ends connected to profile sections.

STI, SID=AFT, L300-320, CUT=1100, CON=4/  
 'LSK1', SL30-32, CUT=1100, CON=4;

Example 3 (one point explicitly given, the other attached to an intersecting profile):

Example:

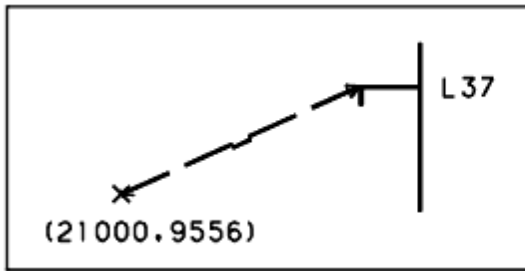


Figure 14:23. End 1 connected to profile section, end 2 explicitly given.  
STI, L370, CUT=1120, CON=4/ Y2=21000,  
Z2=9556, CUT=1302, 15, CON=4;

Example 4 (attachment to the longitudinal defines the starting points as well as the direction of the mould line):

Example:

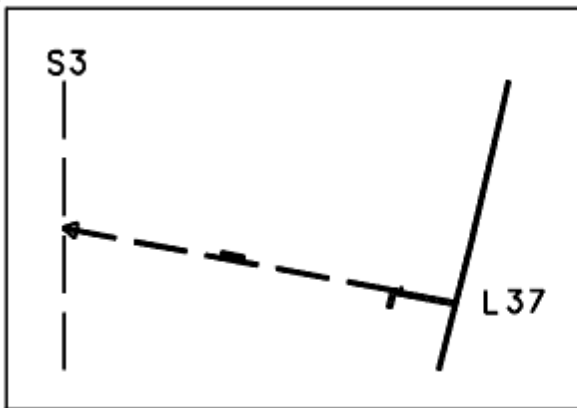


Figure 14:24. Stiffener between profile section and stiffener on the panel.

STI, ..., S3, CON=14, CUT=1302, 15/  
L370, CON=13, CUT=1130;

Example 5 (the explicitly given direction will override the direction fetched from the longitudinal):

Example:

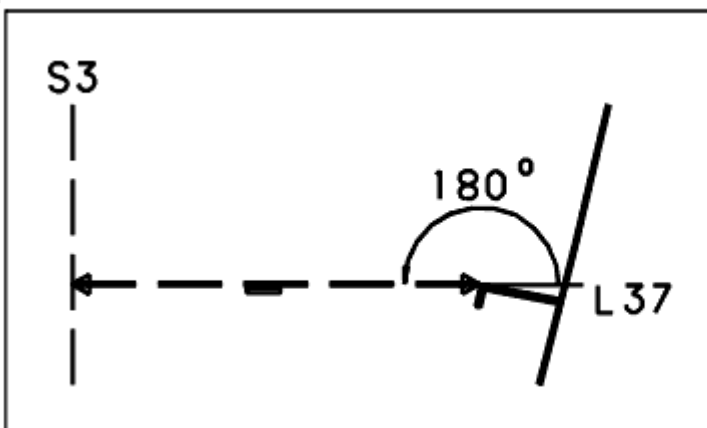


Figure 14:25. User control of stiffener direction.

STIFFENER, ...

L370, CUT=1130, CON=4/

S3, CUT=1302, 15, CON=14, T=180;

(Direction angle from the positive u-axis.)

Example 6 (like example 4 except that the stiffener on the panel has been replaced by a panel.)

STI, L370, CON=13, CUT=1130/'INT\_PANEL', CON=65 ....;

Example 7 (like example 4 except that the stiffener has been replaced by a line)

STI, ...L370, ... / Y2=18000, .... ;

Example 8 (ditto, but stiffener replaced by bracket)

STI, ..., L370, .../ BR3, CON ... ;

Example 9 (ditto, but stiffener replaced by hole)

STI, ..., L370, .../ HOL2, CON= ... ;



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### 14.1.3 折角扶强材的控制

当因为型材相互方向, 扶强材成为折角, Tribon全自动找出并评估。否则, 折角由下述子语句控制。

INC = <inc1>, <inc2>

[,KNH = <height>] [,KNL=<length>]

/ [,KNH = <height>] [,KNL=<length>]

INC 为扶强材与板的折角。折角部分的方向。

<inc2>= 1 | 2 | 3 is interpreted in the same way as there.

KNH 规定从目前点到折角线端点上的距离, 必须小于型材高度。

KNL 从型材上缘在端点上至折角线到达型材边缘的点。

The number of total occurrences of the keywords KNH and KNL (for both end points must not exceed two).

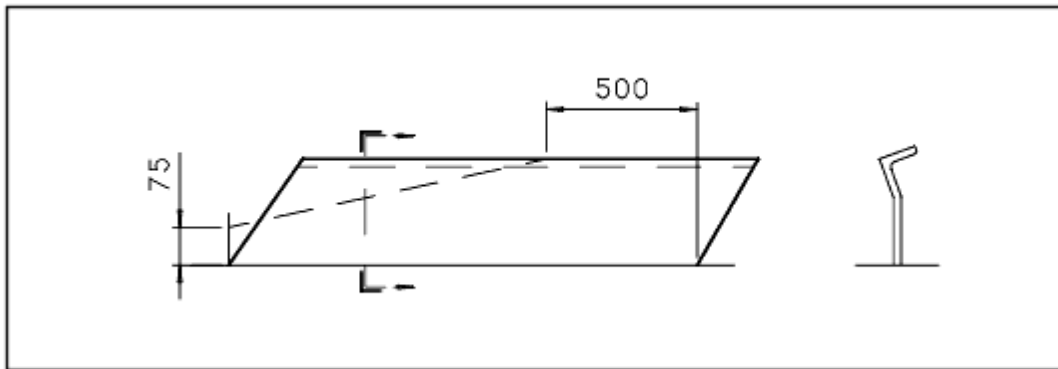


Figure 14:26. Knuckled stiffener, example.

Examples:

Knuckle input for the stiffener in the figure above may be as follows.

**Example:**

STI, ..., INC=90,75, KNH= 75, ... / ..., KNL=500, ... ;

当扶强材弯曲时，折角部分在所给平面内，可由下控制：

1. KNH=0
2. 第二个折角中倾角（但不是折角），即平行主轴，在弯曲部分平面

The **next example** illustrates the knuckling data require to generate the stiffener in the figure below.

**Example:**

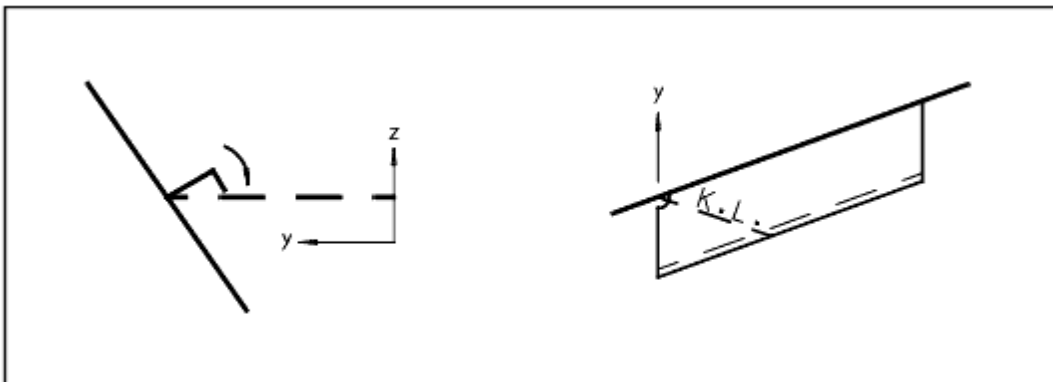


Figure 14:27. Knuckled stiffener, knuckled part in plane containing y-axis.

STI, ..., INC=90,2, KNH=0, ... / ... ;





#### 14.1.4 某个端切参数的重新计算

当一个扶强材与一个“外部型材”相连，两个特殊端切类型可更改见下图。

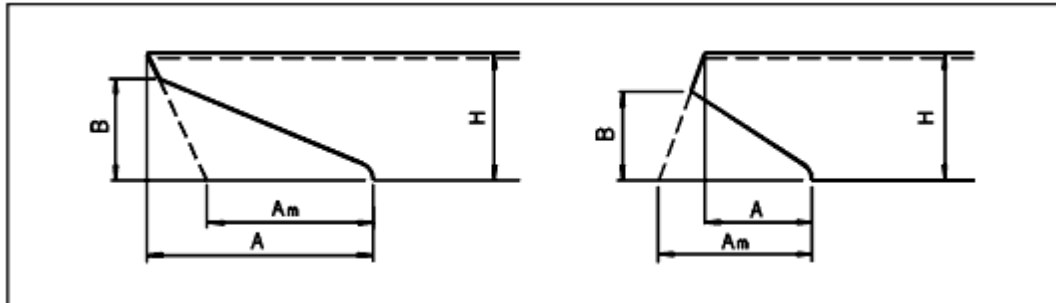


Figure 14:28. Recalculation of end cut parameters.

对于端切类型，在12或22开始按设计标准。A尺寸沿型材的型线给出（见 $A_m$ 图中），对这些端切类型，在一些情况方便定义尺寸A（见上图），给出肘板的搭接等，这发生在B超过H的一半。

因此，假定A被给出，变换至 $A_m$

相应地

$B > H/2$ ，用户应给出A

$B < H/2$ ，用户给出 $A_m$

注：这仅为端切类型，这最左边的数字是12或22。

如端切为90，A不变



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### 14.2 连接扶强材

能按以前的子语句，特殊语句非常简单，因为它涉及高度的自动化及参数的设定。

一种情况（类型4，如下），在一端搭接，另一端自由。

另一种情况, 自由端与其它扶强材面板相连。

Type=4

如 $V > 95$ 或 $V < 85$ , 角度将加至最一个端切。

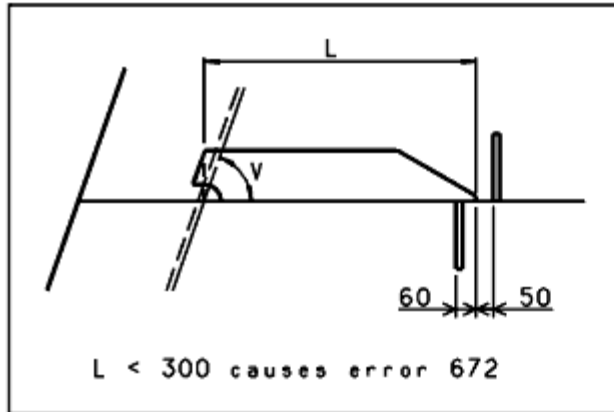


Figure 14:29. Connection stiffener, type 4.

Default values in this case:

PRO = 10, 150, 12

CUT = 1220, 100 / CUT = 1302, 15

If  $V > 95$  or  $V < 85$ , this angle will be added to the first end cut.

type = 5:

仅连于扶强材, 另一侧连接面板, 扶强材与型材相连

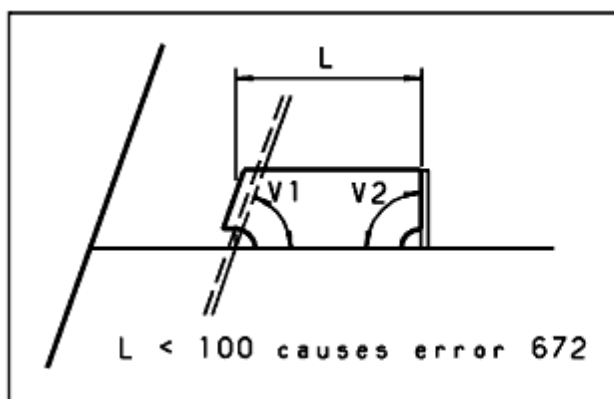


Figure 14:30. Connection stiffener, type 5.

缺省值

PRO = 10, 200, 12

CUT = 1220, 100 / CUT = 1120



如V1>95或V1<85/ V2>91或V2<89, 将以角度补充。

For both types, profile and end cut data can be changed via input.

#### Syntax:

---

STIFFENER, <type>

[, <symmetry>]

, SID= <direction>

[, POS= <pos\_no> (1 ... 25)]

[, QUAL= <quality\_code>]

[, <profile>]

[<id's>]

[<, assembly>

<ext\_prof\_ref> [, REF]

[<end cut>]

[/<end cut>]

[, COL[OUR]=<colour>]

;

---

<type> 定义扶强材的类型, 一端自由4; 连接为5

The remaining clauses have the same meaning as for ordinary stiffeners.

注:

- 系统自动选择正确的型线方向
- 如端切切由输入控制, 搭接端切数据应在斜 前给出, 另一端在斜

#### Example:

STI, 4, SID=AFT, L190-250;



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## 14.3 曲线扶强材

不直的扶强材生成为CURVED扶强材，曲线扶强材与板平面不为900，必须生成曲面扶强材。这有三个主要的选项定义扶强材的曲线。

- 1、扶强材与板架边界平行，以一定的距离
- 2、扶强材与孔平行
- 3、扶强材给所绘曲线，随意给出一个距离。

大部分与普通扶强材是一样的。

Syntax:

---

```
STI, <common_data>
    {
        <parallel_limit>
        <parallel_hole>
        <along_curve>
        ;
    }
```

---

<common data> 除位置及端切坐标条款外，其它与子章相同。

一般曲线扶强材以TAG型式给出，自动设定tag数，可能产生问题与相同标签的扶强材。

### - A. 平行于边界的曲面扶强材

When a curved stiffener is set parallel to a limit the following sub-syntax should be used.

<parallel\_limit>::= CURVED

```
,LIM = <limit_no>
,M1 = <dist>
,<end_1>
/<end_2>
```

```
<end_i>::= [CON = <con_code>, [<stiff_ref>] ][,<line_<I>>]
```

These clauses have the same sense as for straight stiffeners, parallel to a limit. The only difference is that CURVED indicates that the stiffeners should follow also a curved limit. For details, see 14.1 above.

注: 不可能连一个曲线扶强材至直接给出的板架或一个肘板

Example:

1.

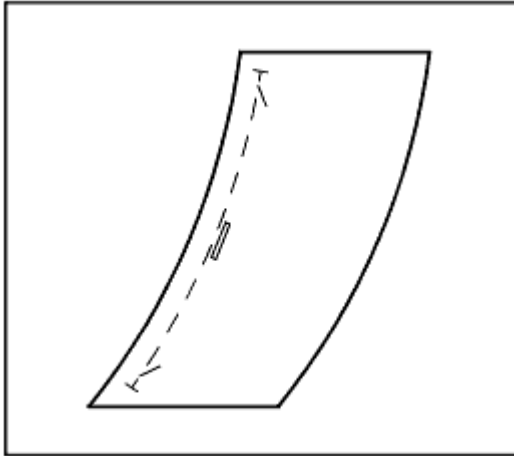


Figure 14:31. Curved stiffener along limit.

A stiffener along a curved limit with clearance against the surrounding limit of the panel.

STI, ...., CUR, LIM=3, M1=20, CON=14, /CON=14, ....;

2.

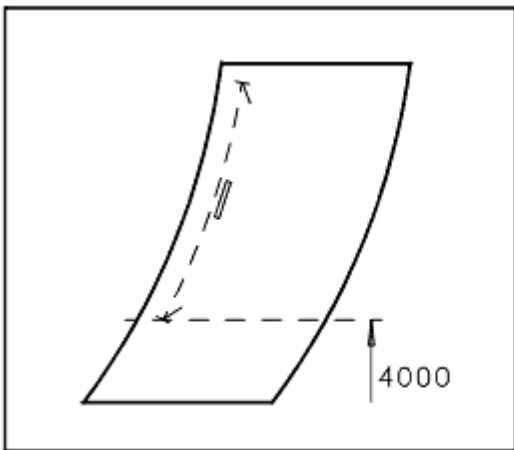


Figure 14:32. Curved stiffener along limit, end 2 restricted by line.

Compared with the previous example end no 2 is restricted by a line.

STI, ..... CUR, LIM=3, M1=20,  
CON=14, Z2=4000, ...../CON=14, .....;

#### - B. 与孔平行的扶强材

When a curved stiffener is set parallel to a hole the following sub-syntax should be used.

```

<parallel_hole>::=
                                CURVED,
                                ,CNO = <hole_no>
                                ,M1 = <dist>
                                ,<end_1>
                                /<end_2>

<end_i>::= [CON = <con_code>,[<stiff_ref>]][,<line<i>>]

```

### CNO扶强材平行的孔数

如没有端点被定义, 扶强材将接受整个孔的外形, 可限制为一部分由一根线或其它扶强材, 因为有多个交点, 第1个交点为端点, 扶强材顺时针按孔如CON>0, 即型线侧面向孔及面板, 为远离的方向, 如CON<0, 面板向孔内, 所给连接代码在计算时不可以用。

M1是孔至迹线的距离, M1>0为远离孔, 如M1<0, 移至孔。

Example:

1.

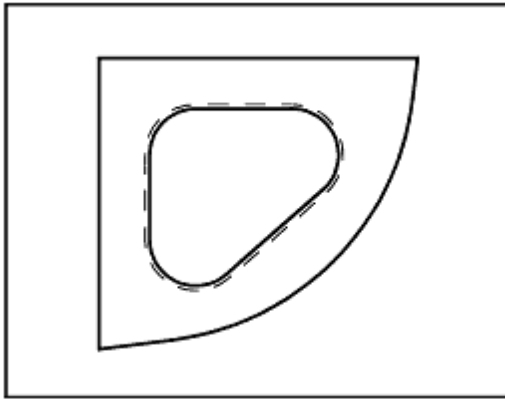


Figure 14:33. Curved stiffener parallel to hole.  
Stiffener following the complete contour of a hole.  
STI, ....., CUR, M1=20, CNO=5, CON=40, CUT=1100/CON=40, CUT=1100,

2.

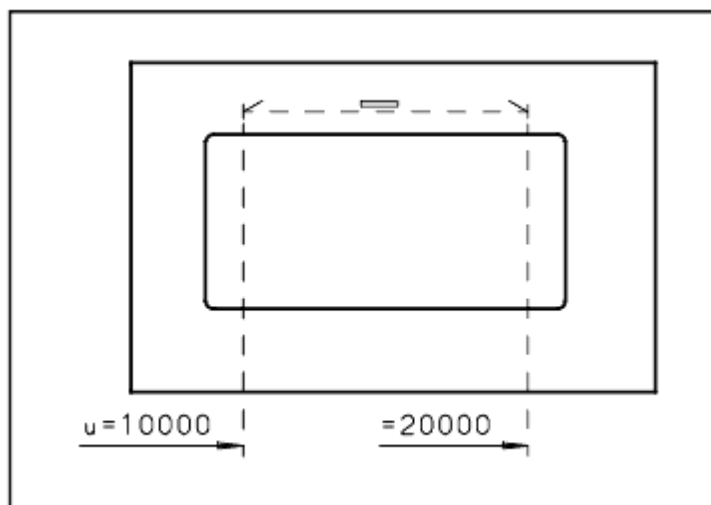


Figure 14:34. Stiffener along hole contour between two lines (short way).

Stiffener set between two restricting lines.

```
STI, ... , CUR, CN0=5, M1=20,
      U1=10000, T1=270, ... /
      U2=20000, T2=270, ... /
```

3.

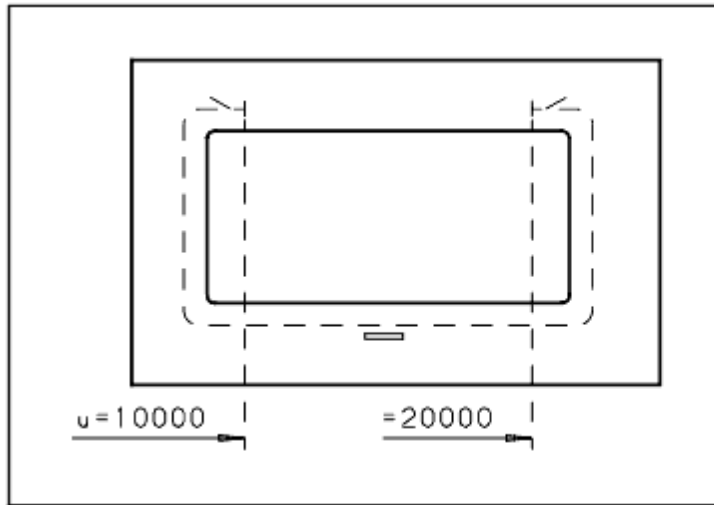


Figure 14:35. Stiffener along hole contour between two lines (long way).

Stiffener set between the same restricting lines but along the other part of the hole.

```
STI, ... , CUR, CN0=5, M1=20
      U1=20000, T1=270, ... /
      U2=10000, T2=270, ... /
```

### - C. 沿曲线的扶强材

When a stiffener is set along a curve the following sub-syntax should be used.

```
<along_curve> ::= CURVE = <curve_name>,

                [, M1 = <dist>]

                , <end_1>

                / <end_2>

<end_i> ::= [CON = <con_code>, [<stiff_ref>]]

                [, <line_i>]
```

4. CURVE: 规定曲线名; 一般认为在相同scheme创建

曲线可按M1>0 (右; <0左) 平行放置。如不给, 按曲线。

扶强材可以下述方法结束。

1、 给出线相交

- 2、 连至该板架的扶强材
- 3、 如不给线或扶强材，扶强材将在曲线与外形的相交处结束，只要连接代码正确。
- 4、 如都满足，结束有端点。

Example:

1.

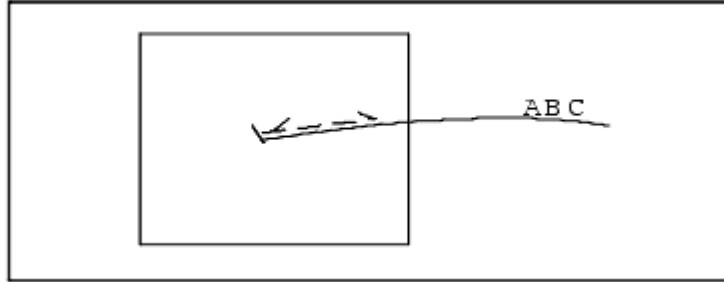


Figure 14:36. Stiffener along curve, restricted by boundary.  
In the figure the solid line is the curve, the dashed line the stiffener.

STI, ... , CUR='ABC',... /CON=15....;

2.

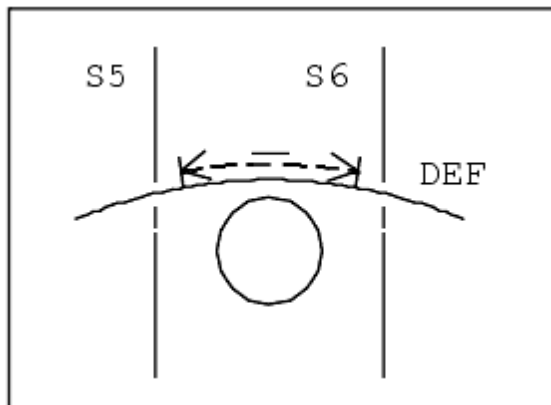


Figure 14:37. Stiffener along given curve between stiffeners.  
The stiffener follows the curve and is connected against two stiffeners.

STI, ... , CUR= 'DEF'  
S5, CON=14, ... /  
S6, CON=14, ... ;



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Stiffener

## 14.4 划线

在STIFFENER语句可插入画线，所有上述语句能用，一个虚拟扶强材可以给一个负位置号，位置号值定义的类型如下：

- 1实线
- 2虚线
- 3点划线
- 4比点划线
- 5“轨道线”

这些“扶强材”将被储存以数字701，702等，如不规定，虚拟扶强材可作为正常扶强材一样连接。



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## 15 Flange语句

规定不同的面板，可为折（弯）面板沿板件边缘。

面板可为焊于板缘的扁钢，面板可为直的或曲线，对称或不对称焊接或沿孔的外缘。如型材不是扁钢，但可作为面板，必须以不对称扶强材（见STIFFENER语句），面板不与板垂直，必须以扶强材生成。



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[Flange 1](#)

### 15.1 扁钢面板

The following syntax is used for the flange statement when the flange is a flat bar, welded to the plate edge.

Syntax:

---

**FLANGE**

```
[,<symmetry>]
,<profile>
[,CURVED]
,LIM= <limit_no> [, <at_line>]
{
    ,CNO= <hole_no>
    [,QUAL= <quality>]
    [,DEST=<destination>]
    [,SURF=<surface_treatment>]
    [,POS= <pos_no> (1 ... 25)]
    [,WELD= <throat_thickn>]
    [,UNSYM= <hangout>]
    [,NO= <flange_no> (1 ... 25)]
    [,COL[OUR]= <colour>]
    [<id' s>]
    [<assembly>]
    <end_point_1>/<end_point_2> ;
```

---

Profile data, symmetry, excess, position number, quality assembly, destination, surface treatment, welding and the flange number are handled in the same way as for stiffeners

**Description.**

CURVED means that the flange is to be placed along a curved contour. (A flange along a contour with a very small curvature can be handled as a straight flange.)

缺省为直的

The contour along which the flange is set can either be a limit (LIM) of the panel or a hole with a given number (CNO).

LIM defines the limit.  
           <limit\_no>::= <integer>

A **straight** flange will be set along the longest part of the limit, unless another straight part is selected via an intersecting line (<at\_line>).

If a straight flange is set along a curved limit, <at line> is used to indicate the point at which the flange should be set parallel to the tangent.

<at\_line>::= U|V|X|Y|Z::= <coord>

Unless the end points of the flange both are explicitly given, the flange will be opposite the direction of the limit if LIM > 0, and have the same direction if LIM < 0.

CNO is the number of a hole in which the flange will be set.  
           <hole\_no>::= <unsigned\_integer>

**Flanges in holes may be straight or curved.**

They are always in the opposite direction compared to the direction of the hole.



UNSYM

Normally, a flange is welded symmetrically to the plate edge. If the flange shall be placed unsymmetrically, UNSYM is the distance from the edge in the negative direction of the w-axis to the mould plane, cf the figure:

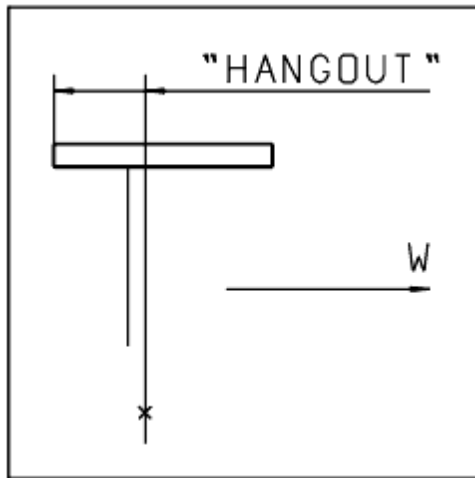


Figure 15:1. Control of asymmetrically welded flange.

`<hangout> ::= <number>`

COLOUR

Colour of all flanges defined in the statement.

`<end_point_1>`

defines the end point. The syntax differs somewhat in different cases:

`<end_point_1> ::=`

$$\left\{ \begin{array}{l} \text{<end\_straight\_1>} \\ \text{<end\_curved\_1>} \\ \text{<end\_in\_hole\_1>} \end{array} \right\}$$

`, <excess>`

`, <bevel>`

`, <endcut>`

`<excess>`, `<bevel>` and `<endcut>`, see the STIFFENER statement

`<end_straight_1>` defines the possibilities for a straight flange.

$$\left\{ \begin{array}{l} \text{<end\_straight\_1> ::=} \\ \\ \text{(<one\_coord\_line\_1>} \\ \text{[, CON= <con\_code>])} \\ \\ \text{< (, <ext\_prof\_ref> (1...25) [, REF]} \\ \text{>} \\ \text{, CON= <con\_code>)} \end{array} \right\}$$

```

      , CON= <con_code>
    )

```

CON, see the STIFFENER statement.

The alternatives are:

1. Let the end be defined by the intersection between a given one-coordinate line and the given limit.  
`<one_coord_line_1>::=`  
`U1|V1|X1|Y1|Z1::= <coord>`
2. Connect the flange to another profile.  
 (For `<ext_prof_ref>`, see General Layout of a Statement.)  
 In this case, end cut angles may be added automatically.
3. If no line and no profile is given, then start/end at the distance from one of the end points of the limit, as defined by the connection code.

`<end_curved_1>` is equal to `<end_straight_1>` with the exception that a curved flange cannot be connected to another profile.

`<end_in_hole_1>` defines the end of a flange in a hole.

`<end_in_hole_1>::= [ , <fl_line_1>]`

If nothing is specified about the end points, the flange is supposed to follow the hole contour completely.

Otherwise, the flange must be restricted by a line, intersecting the hole contour. Since there are always two intersection points between an infinitely long line and a closed contour, there is an additional rule:

"The first intersection point **in the direction of the line** is selected", cf the figure below.

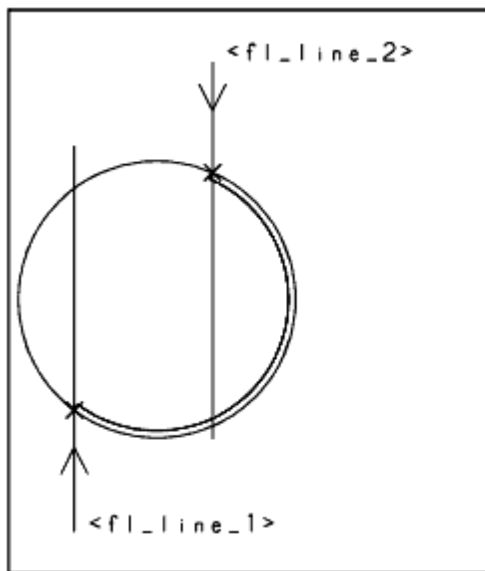


Figure 15:2. Curved flange in hole, restricted by lines.

`<fl_line_1>::= <line_uvt_1> |`  
`(X1|Y1|Z1= <coord>)`

Note: Since a line described in the xyz-system in this case cannot be given an arbitrary direction, it might be necessary to use a uv-line.

<end\_point\_2> Equal to <end\_point\_1> if all indices "1" are replaced by "2".

To sum up, the end points can be defined in one of the following ways.

1. By a line intersecting the limit (or the hole). In a hole, the direction of the line is significant for selection of an intersection point.
2. By connection to an intersecting profile. (only straight flanges)
3. By ending a certain distance from a corner as defined by a connection code (not for flanges in holes).
4. By setting a flange along a complete hole contour (only flanges in holes).

Remark:

If an end point of the flange is generated according to the alternatives 1) and 3) above, then adding an angle to the end cut means that the mould line of the flange will be changed accordingly. See the example below.

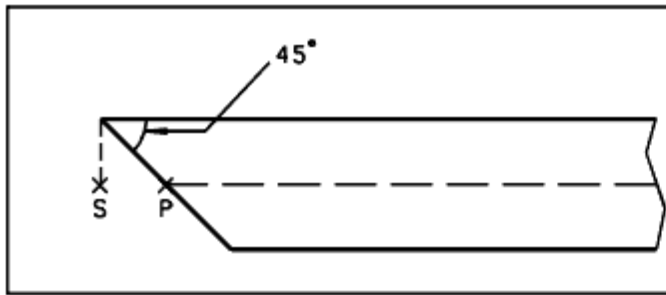


Figure 15:3. Recalculation of flange end point (from P to S)

... CON=15, CUT=1100, 45 ... moves the end point of the flange from P to S.

Example:

1. A flange on a bottom web is generated.

```
FLANGE, LIM=2, PRO=10, 400, 20, WELD=5,
L290, CON=3, CUT=1402, 50/
'LSK1', SL29, CON=3, CUT=1402, 50;
```

The three examples below are similar but different.

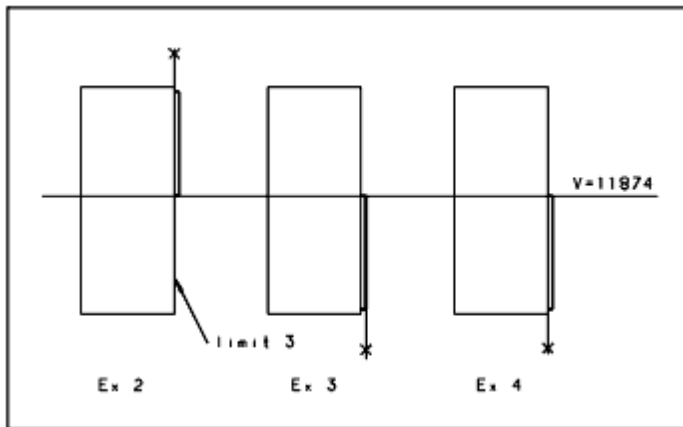


Figure 15:4. Illustration of examples 2, 3 and 4.

2. FLA, ..., LIM=3,  
CON=14/V2=11874;

3. FLA, ..., LIM=-3,  
CON=14/V2=11874;

4. FLA, ..., LIM=3,  
V1=11874/CON=14;

5. A curved flange is generated.

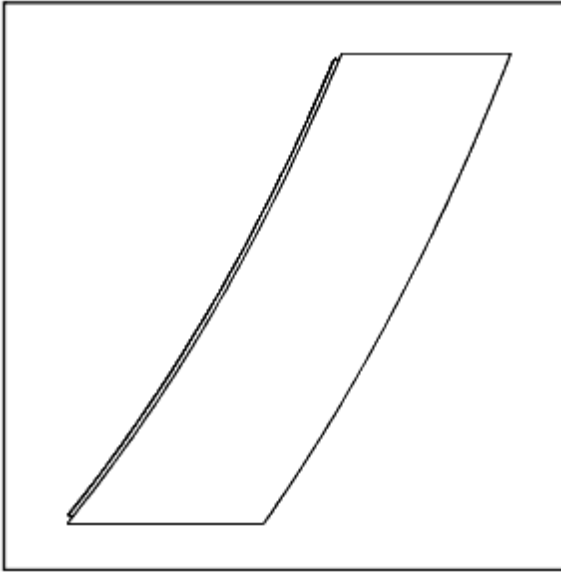


Figure 15:5. Curved flange along limit.

FLA, TYPE=5, LIM=3, ...,  
CON=14/CON=14;

6. A flange in hole number 5.

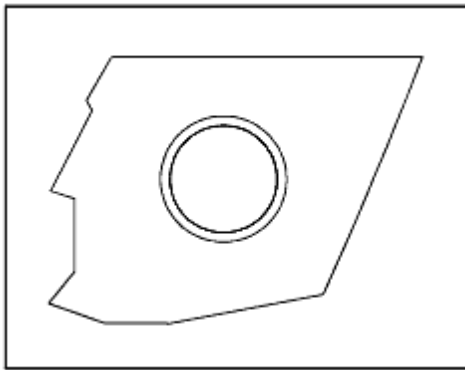


Figure 15:6. Curved flange in hole.

FLA, CUR, PRO=10, 100, 10, CNO=5,  
CUT=1100/CUT=1100;

7. A straight flange in a part of a hole number 2.

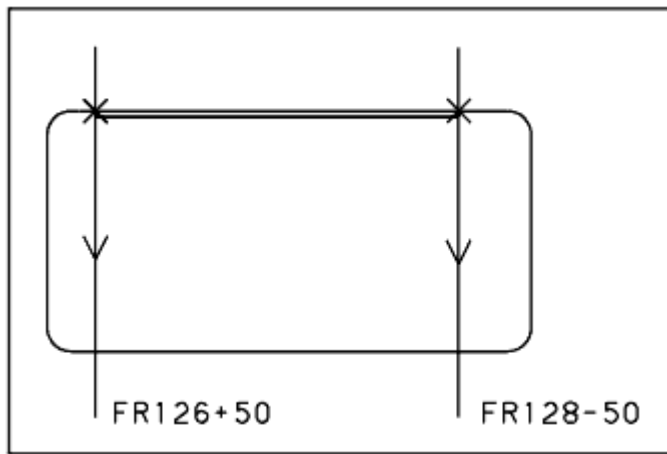


Figure 15:7. Straight flange in part of hole.

FLA, CNO=2, PRO=10, 200, 12,  
U1=FR128-50, T1=-90/ U2=FR126+50, T2=-90;



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## 15.2 折边面板

面板特征由用户定义，由逻辑变量

如不定义自己的面板标准，系统当用内置面板标准。

沿外形直线部分生成弯曲折边面板

折边面板的添加表示，将修改外形几何，为恢复它，BOUNDARY语句不必重新运行，在之前可删除法兰，同样，边界的再生表示 必须再生。

### Syntax:

```
FLANGE, SID= <direction>
,LIM= <limit_no> [, <at_line>]
[, TYPE= <flange_type>]
,H= <flange_width>
<end_point_1>/<end_point_2> ;
```

SID 见扶强材语句

LIM See Flat Bar Flanges above.

TYPE	<p>仅当新面板处理被激活, TYPE必须为用户定义的面板</p> <p>If then left out the user defined default flange type will be used. Otherwise TYPE must be assigned one of the user defined flange types.</p>
H	<p>The nominal height of the flange.</p> <p>The width of the added material for the built-in flange standard is described below.</p> <p>面板高度, 用心定义的标准, 每一个用户控制计算公式</p>
<end_point_1>	<p>定义法兰起点</p> <p>&lt;end_point_1&gt;::=</p> <p>[&lt;line_uvt_1&gt;  </p> <p>(X1 Y1 Z1= &lt;coord&gt;)]</p> <p>[, CUT=&lt;end type&gt;]</p> <p>[, M1= &lt;angle&gt;]</p> <p>如不给限制线, 面板将从边界直线部分点开始。</p>
	<p>CUT 选择其它法兰端切类型, 在定义文件中设定。</p> <p>&lt;end_type&gt;::=&lt;integer&gt;</p>
	<p>M1面板起点的角度</p> <p>&lt;angle&gt;::= &lt;number&gt;</p>

在用户控制面板定义, M1将覆盖面板, 定义文件的角度, 在缺省面板处理, 它将代替内置缺省值30度。

<end\_point\_2> is equal to <end\_point\_1> if, in all keywords, "1" is replaced by "2".

两个端点在外形周向应为一个接一个

备注: 折边面板的自由边长度必须超出所给值H, 否则, 给了解一个错误信息。



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### 15.2.1 评估面板，组合标准

- 当一个折边材被评估，外形部分应移至与其一定距离。
- 在用户定义的面板标准，计算由用户控制
- 在组合标准中，a为下述公式设定
- $a = H + k * R$   
Here, H是输入.  
k is a factor (= 0.6).  
R是弯曲半径（目前为25）  
因此 $a=H+15$

假定弯曲在面板加的起点。

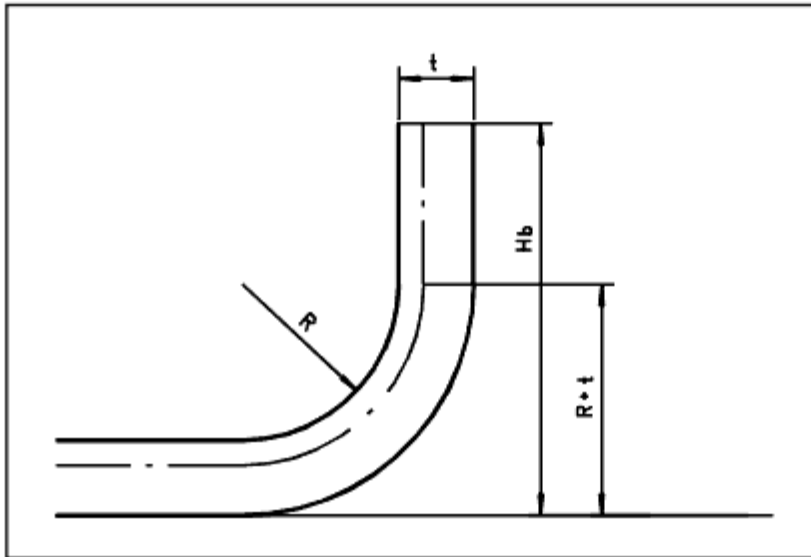


Figure 15:8. Evaluation of flange size (folded flange).

T为材料厚度

假定弯曲正确，面板将加R+T至板架延伸。

结果Hb，在弯曲后将如下，中和轴假定位于1/3材料厚度。

$$\begin{aligned}
 H_b &= H + k * R - \pi * (R + t/3) / 2 + R + t \\
 &= H + R * (1 + k - \pi/2) + t * (1 - \pi/6) \\
 &= (\text{appr.}) H + 6
 \end{aligned}$$

(supposing  $R = 25$ ,  $k = 0.6$ ,  $t = 12$ )

注：在标准中，H直接给出（见肘板语句）

Example:

1.

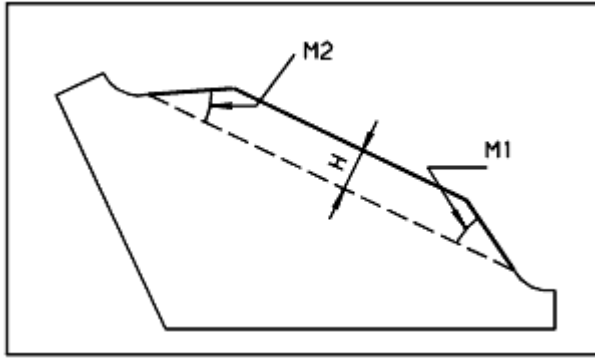


Figure 15:9. Folded flange along free side of (bracket) panel.  
FLA, SID=FOR, LIM=2, H=100;

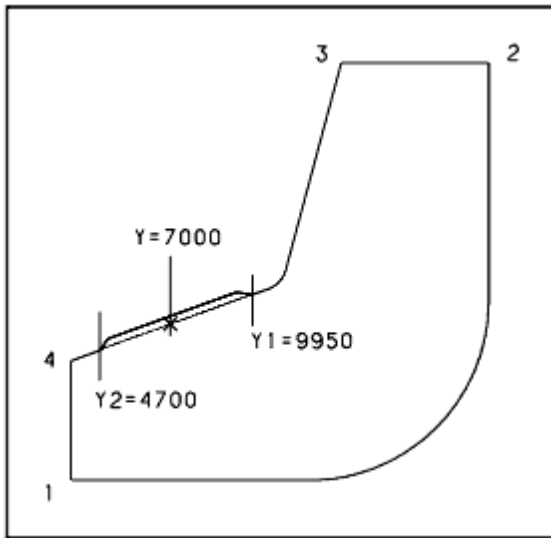


Figure 15:10. Folded flange along indicated part of limit.

2. FLA, SID=AFT, LIM=3, Y=7000, H=150, Y1=9950, Y2=4700;

The segment where the flange will be generated is chosen by the line defined by Y.

3. 一个面板在新面板处理时生成, 用缺省法兰端部类型在一端。(TYPE=7) 不是缺省文件。

FLA, SID=AFT, LIM=2, TYPE=7, H=120  
/CUT=191;

(面板及面板端部型式101, 需在面板定义中规定。)



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## 16 支柱语句

按设计标准的型材生成的支柱由此语句生成，总是属于目前板架。

“组合”支柱必须作为板架处理。

Syntax:

---

```
PILLAR, <profile>
      [, <symmetry>]
      [, POS= <pos_no> (1 ... 25)]
      [, QUA= <quality>]
      [, DEST=<destination>]
      [, SURF=<surface_treatment>]
      [, COL[OUR]= <colour>]
      [, <excess>]
      [, <bevel>]
      [, <id's>]
      [, <assembly>]
      [, <orientation>]
      [, <endcut>]
      [, <connection>]
      <position>
      ;
```

---



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[Pillar 1](#)

### 16.1 支柱通用数据

Symmetry, POS, QUA, DEST, SURF, COLOUR, <excess>, <bevel>, <id's> and <assembly> are used as for stiffeners (see [Stiffener Statement](#)).

对于型材数据有些是有效，不同的型材可作为支柱及扶强材。原则上，所有型材可用作设计标准的支柱，名称线的位置（即不定位点的位置）对称线，如下，描述一般用的支柱。

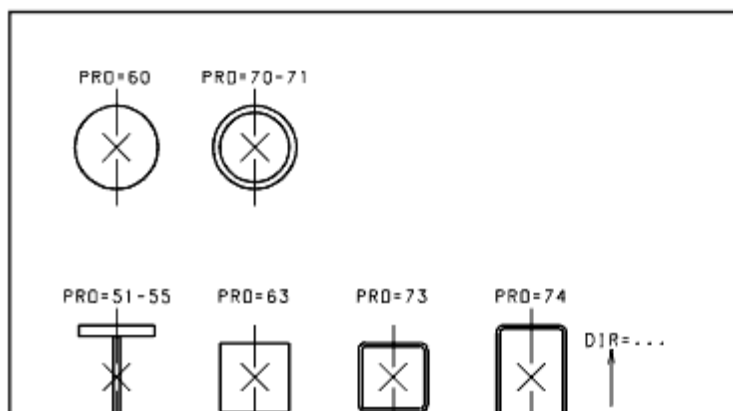




Figure 16:1. Location point of pillar profile types.

端切及连接代码与stiffener相同。

端切角度当支柱连接，对于某种型材类型，像管I—钢等，它们没有具体端切类型，若必须使用相似的端切类型为C钢或T—钢，如2100或3100（如支柱沿直线）

计算时不使用所给连接代码。



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[Pillar Stater](#)

## 16.2 支柱方向

### 16.1 支柱方向

支柱是自由的，可由用户直接至最大程序，对称平面处的方向（见上图）

除非支持有特殊方向的端切，它与圆钢及管子无关。、

三个方案存在：

- 对称线沿船主要的方向
- 在VV板架平面，对称线与U轴成一角度
- 对称线在位置点及额外点之间

`<orientation> ::=`

$$\left\{ \begin{array}{l} \text{<direction>} \\ \text{<inclination>} \\ \text{<additional\_point>} \end{array} \right\} \quad [ , \text{<fla\_dir>}]$$

`<direction> ::= DIR= AFT | FOR | SB | PS | TOP | BOT`

This alternative means that the symmetry line is pointing in the given direction. It can always be used when applicable.

`<inclination>::= T= <angle>`

`<angle>::= <number>`

通过VW点在W方向

`<additional_point>`

右对称线的正向析架平面上的点由XT, YT/XT, ZT或YT, ZT也可由XYZ或端点定义。

对不对称型材, 必须定义面板方向。

`<fla_dir>::= SID= AFT|FOR|SB|PS|TOP|BOT`

○



Toj

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Pillar State

## 16.3 支柱的定位

两种方法:

- 1、平行于坐标轴的线, 此线能限制它一定程序
- 2、简单定义端点, 这在不平行坐标轴也可以

`<position>::= <line_and_restrictions> | <end_points>`  
`<line_and_restrictions>::= <point> (1 ... 25)`  
`<end_1>/<end_2>`

`<point>`, see General Layout of a Statement.

点由两个坐标, 非限制线沿轴创建, 在点的创建定中不使用 (如UV系统已定义) 可沿W轴。

一旦沿主轴的支柱已生成, 可在两端限制。

- 1、 给出坐标平面
- 2、 给一个平面
- 3、 给一个板架或板架内面板

Clearance between the plane and the end point of the pillar can be defined, e.g. for a "doubling" plate.

$$\begin{array}{l} \langle \text{end\_1} \rangle ::= \\ \left[ \left\{ \begin{array}{l} \langle \text{one\_coord\_plane\_1} \rangle \ (1 \dots 25) \\ \langle \text{plane} \rangle \\ \langle \text{panel} \rangle \ [ , \ \langle \text{F-ref} \rangle ] \ [ , \ \text{REF} ] \end{array} \right\} \right] \\ \quad [ , \ M1 = \langle \text{gap} \rangle ] \end{array}$$

$\langle \text{one\_coord\_plane} \rangle$  is a plane defined by one coordinate in the main coordinate system of the ship.

$\langle \text{one\_coord\_plane\_1} \rangle ::= X1|Y1|Z1 = \langle \text{coord} \rangle$

$\langle \text{plane} \rangle$  is the name of a plane object in the data bank or created in a PLN statement.

$\langle \text{plane} \rangle ::= \langle \text{name} \rangle$

$\langle \text{panel} \rangle$  is the name of a panel. The description line is intersected either by the plane or the flange of the panel.

$\langle \text{panel} \rangle ::= \langle \text{name} \rangle$

If not defined according to any of these alternatives, the pillar is supposed to end at the plane of the current panel.

$M1$  is a gap, introduced between the restricting plane/panel and the end of the pillar.  
 $\langle \text{gap} \rangle ::= \langle \text{number} \rangle$

$\langle \text{end\_2} \rangle$  is equal to  $\langle \text{end\_1} \rangle$ , but "1" should be exchanged for "2" in all indexed keywords.

$\langle \text{end\_points} \rangle$  is used explicitly to define the end points of the pillar.

$\langle \text{end\_points} \rangle ::=$

$X1 = \langle \text{coord} \rangle$	$(1 \dots 25)$
$Y1 = \langle \text{coord} \rangle$	$(1 \dots 25)$
$Z1 = \langle \text{coord} \rangle$	$(1 \dots 25)$
$X2 = \langle \text{coord} \rangle$	$(1 \dots 25)$
$Y2 = \langle \text{coord} \rangle$	$(1 \dots 25)$
$Z2 = \langle \text{coord} \rangle$	$(1 \dots 25)$

Example 1:

Example:  
PILLAR, PRO=70, 150, 8, U=FR125, V=2350, CON=70,  
CUT=2100, M1=20/ Z2=11700, CON=70, CUT=2100;

This is a tube attached to the current panel at end 1 with a clearance of 20 mm and restricted at end 2 by a one coordinate plane.

Example 2:

```
Example:
PIL,      PRO=53, 200, X=FR175(3)187, Y=11000, DIR=FOR,
      'DECKA', CON=70, M1=15, CUT=3100/
      'GIRDER', F1, CON=70, CUT=3100;
```

This is an I-bar with the web parallel to the CL, placed between a deck and the flange of a girder.

Example 3:

```
Example:
PIL,      PRO=50, 160, DIR=FOR, SID=PS,
      X1=FR175, Y1=5300, Z1=9000, CUT=2100/
      X2=FR177, Y2=5300, Z2=11500, CUT=2100;
```

The pillar is a U-bar with its web parallel to the CL and the flanges towards portside. The pillar is inclined and the end points explicitly given. If the pillar shall be cut at an angle, the end cut angles must be given explicitly in input.



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## 17 肘板的生成



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### 17.1 概述

总原则见

有三种不同型式：标准肘板、板架肘板、任意封闭的外形并可转换成肘板



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## 17.2 标准肘板总述

由船厂创建，由tribon自动评估，强烈建议。由用户定义的肘板更换内置肘板。有一个设定文件重定义大量内置肘板，此文件可延伸至客户定义的标准，标准肘板有大量型式，（也有菜单功能）交互功能，结果将输入肘板语句。

标准肘板一般与周围的有拓朴连接，自动适合更改。



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## 17.3 板架肘板

创建非标肘板，方便的方法是以小板架生成，称作肘板板架，他能以所有特征生成且所有可用板架生成的机动性。一般适应于周围环境的更改。Tribon提示了生成板架肘板的方法。

- 他们先生成板架，然后连接所属板架。
- 更标准化TBhookCustBracket开发并由用户维护

它的界面在文件中描述，简单版本由用户提供，板架肘板的生成类似标准肘板。

板架肘板预生成及VITESSE激活可由交互肘板生成功能生成标准肘板，可经肘板语句连至主板架。



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## 17.4 封闭外形的肘板

可生成任意肘板, 任何一个封闭外形可为肘板, 只要位于空间, 有材料特性, 然而有下述限制:

- 他们没有拓朴, 不适应环境更乞讨
- 不能被加强
- 没有notch及切口 (除非封闭外形开始时就有)

不过, 它是比较方便创建零肘板, 尤其在生产阶段。

可用draft工具创建, 在符号视图中创建比较方便, 肘板为小件可由周围环境, 肘板位置可自动由视图选到, 确保目前视图为当前在肘板创建时

然而, 任何封闭外形可作为肘板, 如在局部坐标系, 但在空间必须激活。“外形肘板”与板架连接与其它肘板采用同样的交互肘板建模功能。

结果形成一个肘板, 肘板语句非常像板架肘板



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## 17.5 标准肘板的保存



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### 17.5.1 标准肘板

肘板作为一个单独板架上的肘板, 分离后为单独零件, 然而, 某些情况肘板可作为“标准肘板”处理, 这表示肘板一个拷贝, 所有进一步相同肘板出现, 参考此标准肘板。

标准肘板的处理目前没有为用户定义肘板激活。

- 1、 肘板必须是一个型式, 仅标准变量发生, 目前为B, BK, BA, BAK, BAA, BAB, BB, BBK, BBA, BR, BBR, KL, KLB, K, KP, KPA, L
- 2、 标准肘板必须在数据库内已创建

- 3、肘板臂的角度必须接近90度。
- 4、肘板臂长必须等于肘板表中的允许值设定。

标准肘板加      以识别名称，这将自动执行。



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## 17.5.2 “不同的肘板”

即使肘板不满是一个标准肘板的条件，可发生大量相同拷贝。

用户必须要求处理以纯标准肘板，用户分配此肘板一定的变量数，它必须检查肘板以相同的变量数及相同的臂长（两个以不同中心角的肘板可以取得相同的名称，如下）一个变化的肘板在被单独保存仅当用户需要时，目前用户定义肘板没有激活。

*The handling of variant brackets is currently not activated for customer defined brackets.*



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## 17.6 肘板名称

When a type standard bracket is generated and stored in the panel, the bracket will get a designation from which some details about the generated bracket can be figured out.

Syntax

The bracket designation is built up in the following way:

<bkt\_design>::= <bkt\_type><arm\_A>/<arm\_B>



Example:

B50/45

Description of syntax

<bkt\_type> is the bracket designation given as input.

<bkt\_type> ::= <string>

**Examples:** B, BK, A, C ...

<arm\_A> denotes the size of the bracket as the length of the bracket arms A

<arm\_B> and B, respectively, expressed in centimetres.

<arm\_A> ::= <arm\_B> ::= <unsigned\_integer>

For in-built brackets the bracket designation has a somewhat extended format:

<bkt\_design> ::= <bkt\_type>[S]<arm\_A>/<arm\_B>-<x><y>z>

S            标准肘板如上

<x>            表示notch布置输入号  
<x> ::= <digit>

<y>            表示加强/折边布置  
<y> ::= <digit>

= 0 无加强筋/折边  
= 1 折边正面上的折边/加强  
= 2 反面  
= 3 在自由边两侧, 保留正向加强  
= 4 如3, 但保留负侧加强

<z>            表示变量数  
<z> ::= <digit>

= 0 标准肘板  
= 9 一般单个肘板  
= 1~8 用户给出变量 (变化的肘板)

Examples (in-built brackets):

BS50/50-200 Standard bracket.

C150/60-511 Variant bracket that may be handled as a standard bracket.

EA80/75-209 Ordinary individual bracket.

注: 对两个臂间不同角度的相似肘板, 名称是一样的。



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## 18 Bracket 语句

BRACKET用于生成标准肘板并与其它板架肘板相连

在生成时, 一些参数来自周围结构, 也可简单定义参数生成

有下述主要的肘板生成语句:

- 1、 参考周围结构生成的标准肘板, 七丰不同的子句存在, 每一个与一种连接相关。
- 2、 标准肘板由直接给出参数生成
- 3、 板架肘板或零件连接为肘板
- 4、 已生成的肘板可从板架内或其它板架拷贝



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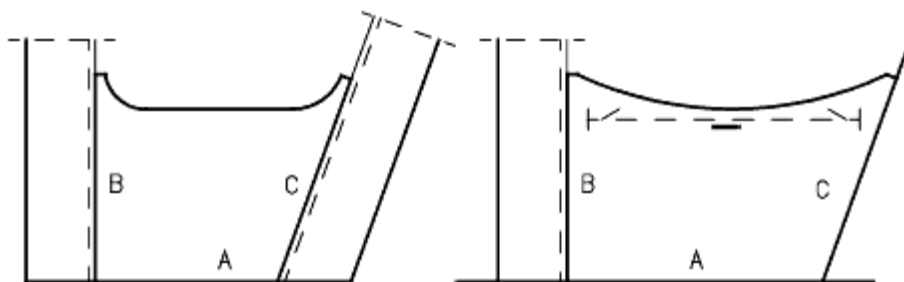


[Bracket](#)

### 18.1 标准肘板, 由结构生成

有七种:

- 1、 板架1型材连接, 一只臂终止于板架上相交型材, 在某些肘板上可为相交型材开切口。
- 2、 同型材/板架连接, 但臂完全自由, 也可生成三个边缘。



2. 

- 1、板架/板架由一与两面三刀板架相同平面的肘板连接。
- 2、型材/型材，当两根型材正似在相同肘板平面内
- 3、板架/型材（如2）但型材端搭接
- 4、型材/型材（如4），但至少一个是搭接端
- 5、许多不同的环境可能发生，但肘板平面由用户定义（2~3臂）

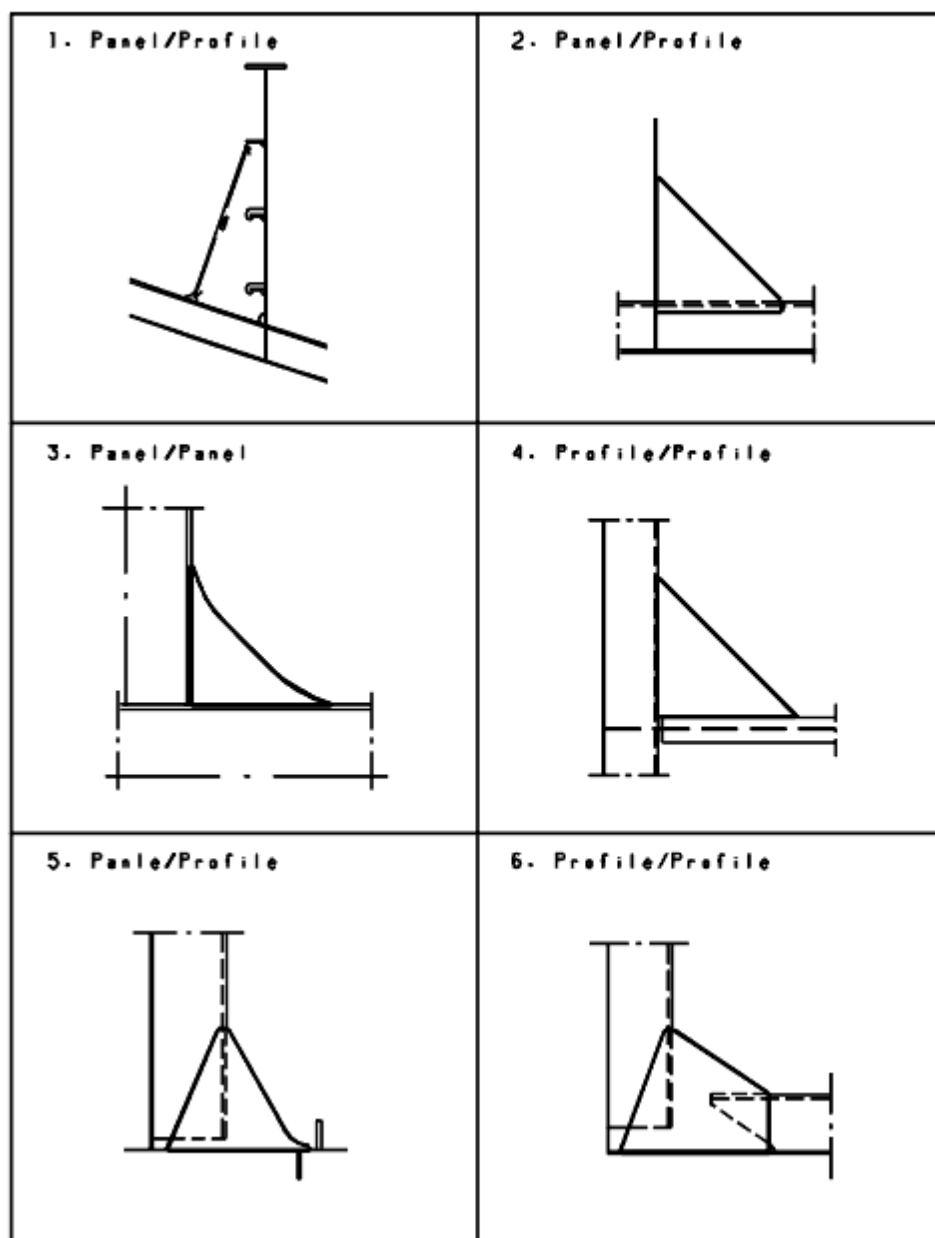


Figure 18:1. Typical arrangements in syntaxes 1-6.

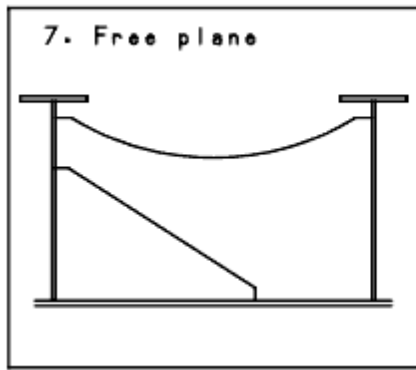


Figure 18:2. Typical bracket arrangements in syntax 7.

七个子句非常相似，共同部分先描述，之后，详细列出每个语句的特别之处

对于语句1~6有共同的规则，大多数情况，一个肘板与两个不同零件相连，涉及的元素参见语句，总先做参考（在斜杠前），其它零件之后，斜杠后是目前板架中的零件。

#### Common syntax

BRA, <bkt\_definition>

```
[, CNO = <bkt_number>( 1... 25)]
[, <symmetry>]
[, MAT = <plate_thickn>]
[, R = <radius> ]
[, RA = <radius> ]
[, RB = <radius> ]
[, TOLA = <toe_length> ]
[, TOLB = <toe_length> ]
[, <notch_def>]
[, SID = <side_info>]
[, PSID = <side_info>]
[, DOUBLE]
[, <profile_size>]
[, <flange_height>]
[, POS = <pos_no> (1 ... 25)]
[, QUA = <quality>]
[, DEST = <destination>]
[, SURF = <surface_treatment>]
[, WELD = <size> (1 ... 5)]
[, BEV = <bevel> (1 ... 5)]
[, VAR = <variant_no>]
[, SEP | BEL]
[, BRPAN = <current_panel>]
[, COL[OUR]= <colour>]
[, <id's>]
```

$$, \left\{ \begin{array}{l} \text{<syntax\_1>} \\ \text{<syntax\_2>} \\ \text{<syntax\_3>} \\ \text{<syntax\_4>} \\ \text{<syntax\_5>} \\ \text{<syntax\_6>} \\ \text{<syntax\_7>} \end{array} \right\};$$

---

## Description

`<bkt_definition>` defines the following items:

- the bracket type.
- the notch arrangement.  
(In the Extended Bracket Handling the notches should normally be controlled directly by the user via input, see `<notch_def>` below.)
- normal or reflected placing of the bracket.
- the bracket syntax.

`<bkt_definition>::=`

```
, <bkt_type>
, COR= <alt_no>]
[, MIRR]
[, SYN= <synt_no>]
```

Example:

BRA, B, COR=3, MIRR, SYN=3, ...

`<bkt_type>` is the designation according to the standards.

`<bkt_type>::= <string>`

Examples:

A, B, BK, ...

CNO Number of the bracket. Need normally not be given when the bracket is generated first time but should be given when a panel is regenerated after splitting in order to ensure constant naming of the bracket plate part(s) extracted from the panel

COR Defines the notch arrangement alternative according to the Design Standards.

If no alternative is given, the alternative with the lowest number will be selected automatically.

`<alt_no>::= <integer>`

In the Extended Bracket Handling the notches are normally supposed to be explicitly given (see `<notch_def>` below). For compatibility reasons COR is still accepted for old brackets and will give the same result as before. Any explicit notch definition will supersede the one, asked for by COR.

Thus, COR cannot be used for brackets that are not in-built (or have been in-built

MIRR In many cases, there are two possible orientations of the bracket. It can be in normal position, i.e. the "A-side" of the bracket (= its u-axis) along the current panel. It can also be mirrored, i.e. the "B-side" along the current panel. Cf. the figures below.

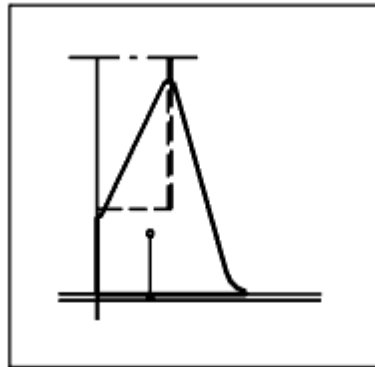


Figure 18:3. Normal position.

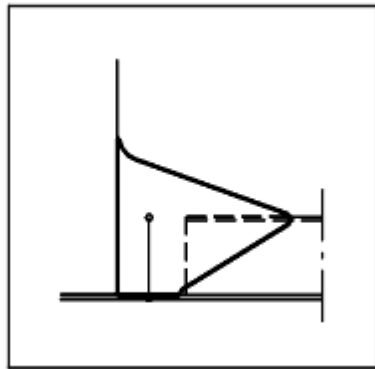


Figure 18:4. Mirrored position.

SYN defines the syntax according to which input is given. Each bracket type has a default syntax and if input is given for this syntax, it need not be defined.

<symmetry>

see STIFFENER statement

R

Used to control a radius of the free side of certain brackets. A negative value is interpreted as the amplitude of the arc.

RA, RB

Radius of toe A and B, respectively, for certain types of brackets/ bracket toes. Any values defined in the bracket setup will be overridden.

TOLA  
TOLB

Ditto lengths of toes at end of arm A and B, respectively.

MAT

defines the thickness of the bracket plate.

<plate\_thickn>::= <number>

<notch\_def> is relevant only for brackets according to the extended bracket handling. Explicit control of the notches thus may be performed.

```
<notch_def> ::= [, NOT=<notch_design>]
                [, NOA=<notch_design>]
                [, NOB=<notch_design>]
                [, NOC=<notch_design>]
```

The figures below illustrate in which corners the different corner notches may be used. The arrows indicate the default direction of asymmetrical notches. **Note** that there are somewhat different rules for 2- and 3-arm brackets.

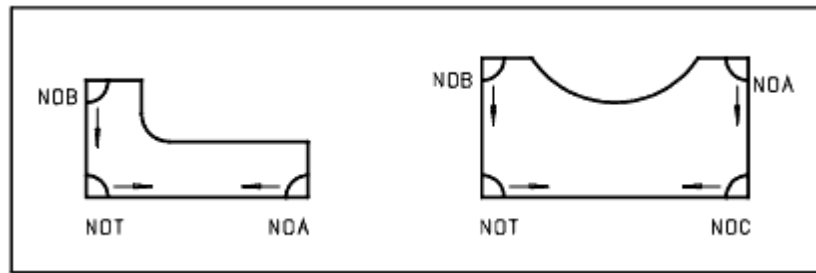


Figure 18:5. Keywords for notches at bracket corners.

<notch\_design> specifies the notch in the same way as in the notch statement. If set -1 means total suppression of the corresponding notch that would otherwise have been set, e.g. as a default in the bracket set-up.

If <notch\_design> is preceded by a minus sign, the notch will be mirrored in the bisector of the corner angle (i.e. its u-axis will fall along the other bracket arm).

Note: that symmetric notches always will be centred at the profile edge in case of overlapping brackets. Thus they may be transformed into unsymmetric notches when cut into the bracket geometry.

SID defines the position of the bracket relative to the plate of the current panel. Need not be given if the bracket is in the same plane as the panel.

```
<side_info> ::= AFT|FOR|SB|PS|TOP|BOT
```

PSID defines on which side of the bracket the flange/stiffener shall be located (if any). Need not be given for brackets without any stiffening and must not be given for bracket types which cannot have any profiles at all.

DOUBLE Certain big brackets may have stiffeners on both sides of the bracket, parallel to the free edge. Profiles on both sides are called for by DOUBLE.

<flange height> is relevant only for brackets with a folded flange. For them it may be used to control the nominal height of the flange.

<flange height>::= H= <number>

In most cases, there is a built in default flange size and then this clause need not be given even for flanged brackets.

<profile\_size> is used to control the dimension of the stiffeners that will occur on the bracket according to the bracket set-up.  
<profile\_size>::=

[, PRA= <p\_type> [, <param> (1..4)]]  
[, PRB= <p\_type> [, <param> (1..4)]]  
[, PRC= <p\_type> [, <param> (1..4)]]  
[, PRD= <p\_type> [, <param> (1..4)]]  
[, PRE= <p\_type> [, <param> (1..4)]]

Cf. the definition of profiles on stiffeners in the STIFFENER statement.

PRA is used for the first stiffener on the bracket (or the flange, if any).

PRB for the second stiffener (first stiffener if there is a flange), etc.

<p\_type>= -1 indicates that the corresponding stiffener should be deleted.

POS defines the positionpiece number of the bracket.  
Standard brackets and variant brackets are normally not supposed to have position numbers.  
<pos\_no>::= <integer>

QUAL defines the material quality of the bracket.  
<quality>::= <quality\_code>|<quality\_string>

<quality\_code>::= <integer>

<quality\_string>::= <string>

If left out entirely, the default quality according to customer set-up will be selected.

Setup and Customisation Customer Set-up of Material Qualities

DEST defines the workshop station where to assembly the bracket.  
<destination>::= <name>

The value to be assigned must be selected among the destination strings defined by the customer.

Setup and Customisation Destination Definition



SURF	<p>defines the surface treatment of the bracket before the production phase.</p> <p><code>&lt;surface_treatment&gt;::= &lt;name&gt;</code></p> <p>The value to be assigned must be selected among the surface treatment strings defined by the customer.</p> <p><u>Setup and Customisation Surface Treatment Set-up</u></p>
WELD	<p>defines the welding size along the connected edges of the bracket.</p> <p><code>&lt;throat_thickn&gt;::= &lt;number&gt;</code></p> <p>For 2-edge brackets at most four values may be given. They should be given in the following order: w_a, w_b, w_toea, w_toeb.</p> <p>For 3-edge brackets at most five values may be given in the following order: w_con, w_a, w_b, w_toea, w_toeb.</p> <p>(Here w_a is the weld along arm A, w_b along arm B, w_toea weld at (tight connected) toe of arm A, w_toeb ditto for toe of arm B. w_con is the weld along the extra edge connecting arm A and B)</p> <p>Any irrelevant weld must be indicated by 0 if a relevant weld follows. Trailing zeroes need not be given, e.g. WELD=5,5,0,5 and WELD=5,5.</p>
BEV	<p>defines the bevel along the connected edges of the bracket.</p> <p><code>BEV=&lt;bevel1&gt;, &lt;bevel2&gt;, ...</code></p> <p>Similar rules should be applied as described for WELD above</p>
VAR	<p>defines a variant number of the bracket. A given value should be in the interval 1-8.</p> <p><code>&lt;variant_no&gt;::= &lt;integer&gt;</code></p>
SEP	<p>Normally, individual brackets are stored along with the panel. Using SEP[ARATE] means that the bracket should be separately stored as a "variant bracket". SEP should not be used without defining a variant number simultaneously. Cf also BEL below.</p>
BEL	<p>As a default, standard brackets are stored separately (provided the standard bracket handling is in operation).</p> <p>BEL[ONGING] is used to make Hull Modelling treat a bracket as an individual bracket even if it fulfils all requirement of a standard bracket.</p>

BRPAN Normally, the bracket is generated directly on the current panel. In certain situations, it might be necessary or more convenient to give input as though another panel were current. This can be done by assigning the name of the panel to be considered as the current one to BRPAN (BRacket PANel).

<current\_panel>::= <name>

All input in the current statement shall be given as if the given panel had been the current one.

COLOUR Colour of all brackets defined in the statement.

<id's> correspond to the items assigned to the keywords LIS, AS1-AS4 in the panel statement (cf. that statement).

<id's>::= LIS=<parts\_list>,

AS1=<name>

AS2=<name>

AS3=<name>

AS4=<name>

<parts\_list>::= <name>

A name given in the bracket statement will override the corresponding name given on panel level.

To cancel a name set on panel level without replacing it with another name, the corresponding keyword should be given stand alone (i.e. without any assigned value) or be assigned an empty string (e.g. AS3='').

<assembly> Cf. Panel Statement. If the stiffener belongs to different assembly than the panel in general, that assembly can be specified here.



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### 18.1.1 语句1

注意: B总与“外部型材相连, SIDE在目前板架型材上结束。

下述内置肘板也可生成, 但语句必须直接给出。

The following built-in bracket types can be generated with syntax 1 as their default syntax:

A, C, CK, L, BC, BCK, BCA, BCB, BFK, BGK, BHK, BCW, KW

Consequently, the SYNTAX clause need never be given for them.

The following built-in brackets can also be generated but the syntax must be explicitly given:

B, BK, BA, BAK, BAA, BAAK, BAB, BEK, KL, KLK

For the dimension parameters of the bracket used below, see the Design Standards.

---

```

<syntax_1>::=[, A= <length_A>]

                [, B= <length_B>]

                [, C= <length_C>]

                [, M1= <gap>]

                [, OFF=<offset>]

                [, <bkt_dir>]

                , <ext_prof_ref> (1 ... 25) [, REF]

                [/ <S_ref> (1 ... 25)]

```

---

For <ext\_prof\_ref> and <S\_ref>, see General Layout of a Statement.

The references before the slash (if any) concern the adjoining panel and bars on it (or in the shell), references after the slash concerns bars on the current panel.

A      一般A尺寸, 自动计算搭接型材及相交型材的距离, 扩展肘板处理关于肘板与相交型材由客户设定控制。  
          对于内置肘板, 应使用相述规则  
          <length\_A>::= <number>

However, a clearance can be introduced between the bracket and the intersecting profile (see M1 below).

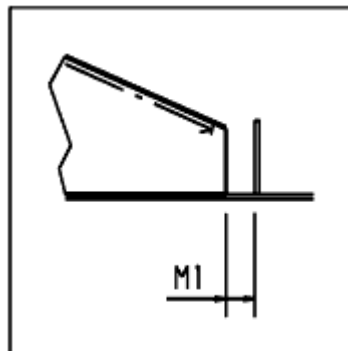


Figure 18:6. Gap controlled by M1.

In general, the rules for calculation described in the Design Standards will be used. Special notes on the calculation of A for different brackets are given below:

A, C, CK:

这里肘板在板架面板外停, 取非给出板架上的加强筋

穿过肘板的切口将自动产生, 对于C及AK, 搭接范围为50~150mm, 为A尺寸

L肘板在最近的扶强材外停, 而于哪侧无关, 如下所有其它肘板将至最近相交型材, 而是自动加的A

L:

This bracket stops against the closest intersecting stiffener irrespective of side. For details about the "connection", see below.

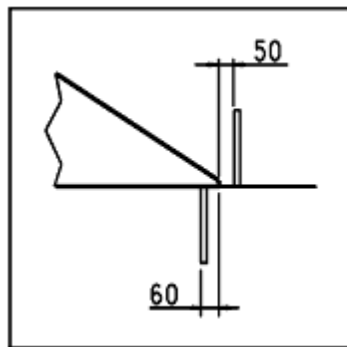


Figure 18:7. Default clearances/overlaps.

All other brackets will go against the closest intersecting profile and this is found automatically.

B

臂长

$\langle \text{length\_B} \rangle ::= \langle \text{number} \rangle$

C

对于内置肘板, 使用下述规则

- 1、除A、C、CK外, 缺省为  $(-) 0.4A$ , (如下) 其它部分给出
- 2、对于L, 所给值必须为  $(0.4A, 0.6A)$
- 3、当给出A、C、CK, 如为正或负, 尺寸不同, 肘板C总是自动计算, 按扩展肘板处理; 如给出, 必须小于自动计算值。

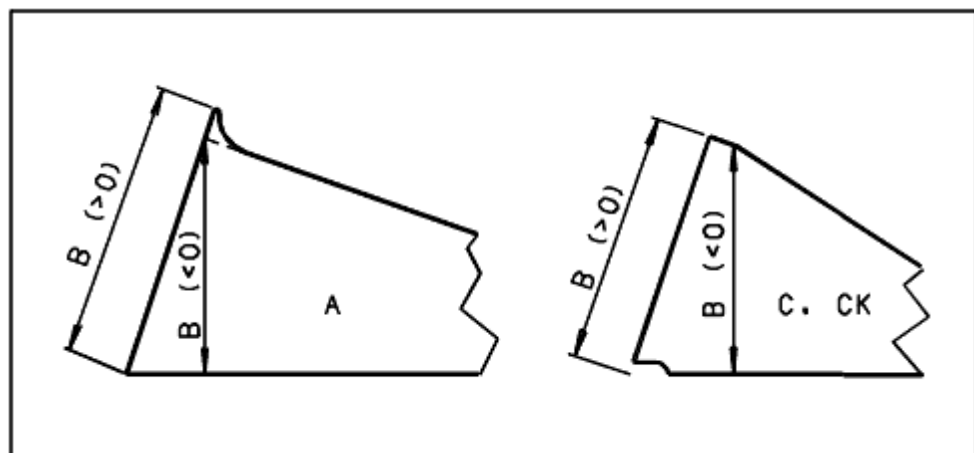


Figure 18:8. Interpretation of B for brackets A, C and CK.  
The bracket parameter C is always calculated automatically (when relevant) according to the Design Standards or as set-up by the customer in the Extended Bracket Handling.

$\langle \text{length\_C} \rangle ::= \langle \text{number} \rangle$

If given, C must be smaller than the automatically calculated value.

Remark:

对于肘板A、C、CK，自动切换肘板元素至R75切口，如C>180，（即

M1相交型材与肘板的间隙（如上）

M1 Clearance between the intersected profile and the bracket (cf. the comment on A above).

OFF Normally one of the faces of the bracket lies in the mould line plane of the profile. OFF can be used to displace the bracket a given distance from this plane. (Using the clause for overlapping brackets has no effect.)

$\langle \text{offset} \rangle ::= \langle \text{number} \rangle$

$\langle \text{bkt\_dir} \rangle$  Normally, the bracket is placed in line with the profile along the edge of which it is set.

$\langle \text{bkt\_dir} \rangle$  can be used to control the direction in an arbitrary way.

方向线能按一定的方向通过给出的点

$$\langle \text{bkt\_dir} \rangle ::= \left\{ \begin{array}{l} \langle \text{direction} \rangle \\ \langle \text{dir\_point} \rangle \end{array} \right\}$$

1. 给出一个方向

$$\langle \text{direction} \rangle ::= \left\{ \begin{array}{l} \langle \text{inclination} \rangle \\ \langle \text{vector} \rangle \\ \langle \text{in princ. plane} \rangle \end{array} \right\}$$

$\langle \text{inclination} \rangle ::= T = \langle \text{angle} \rangle$

角度从权架U轴测量

$$\langle \text{vector} \rangle ::= \left\{ \begin{array}{l} XT = \langle r \rangle, YT = \langle r \rangle \\ XT = \langle r \rangle, ZT = \langle r \rangle \\ YT = \langle r \rangle, ZT = \langle r \rangle \end{array} \right\}$$

The vector is defined as in the xyz-space by giving two coordinates of a point relative to the origin of the xyz-system of the ship, i.e. two components of a vector (in the plane of the panel).

$\langle \text{in princ. plane} \rangle$  specifies that the bracket is located in a principle plane of the xyz-system.

<in princ. plane>::= XT | YT | ZT |

Thus, the keywords should be given without any value.

2. 规定主平面, 给出一个点。

<dir\_point>::= <point\_1>

特殊的错误标记:

640A值不在搭接区in the interval [50, 150] (C, CK).

672A值不在间隙in the interval [600, 1200] (L).

673相交型材, 切口必须, 没有相同的尺寸 (A, C, CK).

674C<180时要求R75, C<100时, R50被要求 (A, C, CK).

Examples:

A-bracket:

Example:

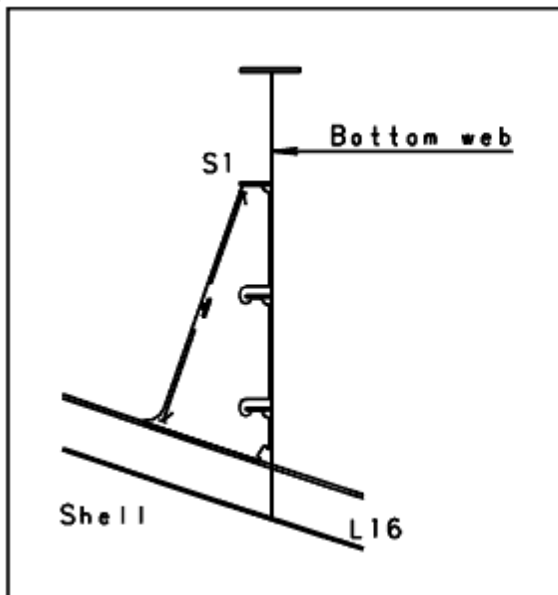
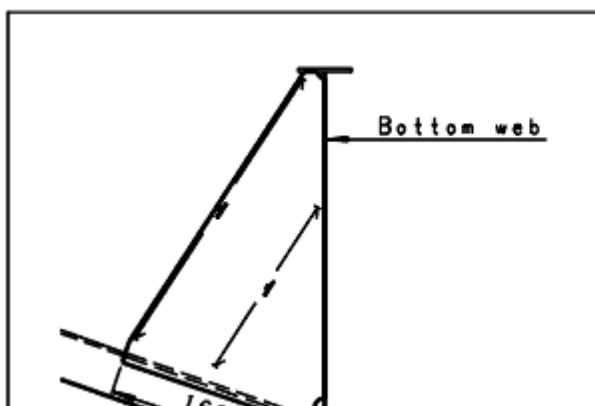


Figure 18:9. Bracket A in a typical syntax 1 connection (example 1).  
BRA, A, COR=5, SID=AFT, PSIDE=SB, MAT=12, L160/S1;

C-bracket:

Example:



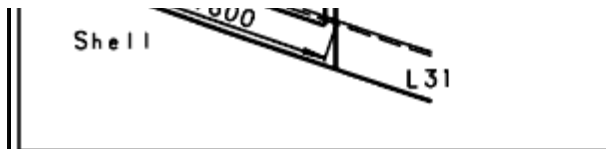


Figure 18:10. Bracket type C as in example 2.  
BRA, C, COR=5, SID=AFT, PSIDE=SB, B=1600, MAT=15, L310;

If not given, B is set  $(- )0.4 * \langle \text{length\_A} \rangle$ .

BCB-bracket:

Example:

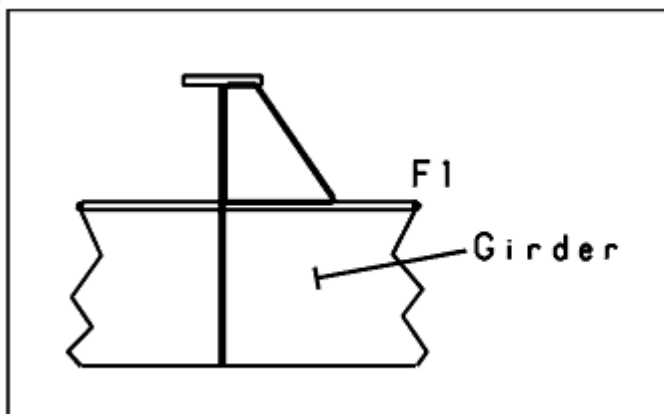


Figure 18:11. Bracket BCB as in example 3.  
BRA, BCB, SID=FOR, B=350, MAT=12, 'GIRDER', F1;



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## 18.1.2 语句2

在下述, C为外板型材, S为加强筋, F为面板

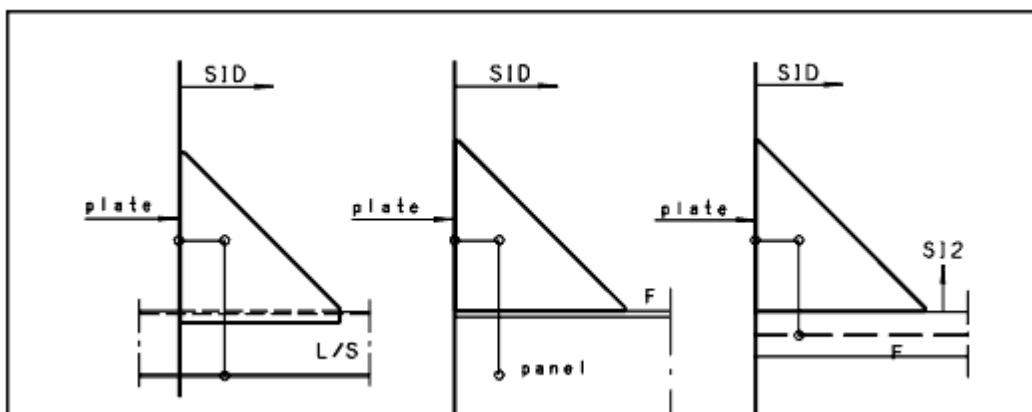




Figure 18:12. Typical bracket arrangements in syntax 2.

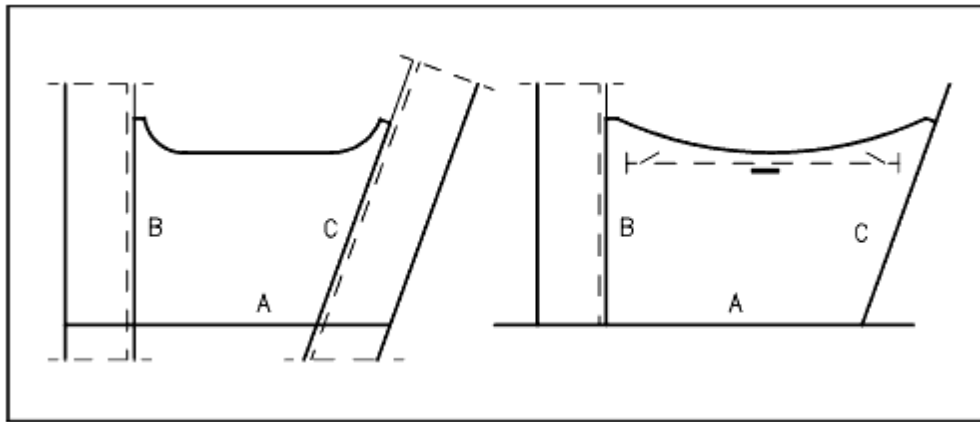


Figure 18:13. 3-edge bracket in syntax 2.

任一涉及的板架可为目前板架。

当为了边必须经A/B/C次序，目前板架可空（这些边缘必须由用户在扩展肘板外理中建立），下述内置型如下：

B, BK, BA, BAK, BAA, BAB, BEK, BR, K, KL, KLK, KP, KPA

语句2是肘板KPA的缺省语句，相应SYN=2无须对其它肘板类型给出

---

`<syntax_2> ::= , A = <length_A>`

```
[, B = <length_B>]
[, SI2 = <side_info>]
[, OFF = <offset>]
[, <bkt_dir>]
```

$$\left\{ \begin{array}{l} , <ext\_prof\_ref> (1 \dots 25) \\ \\ , <pan\_ref> \end{array} \right\} [, REF]$$

```
[/ <prof_ref> (1 ... 25), [REF]]
[/ <name>[<int_prof_ref> (1 ... 25), [REF]]
```

---

For <prof\_ref>, see General Layout of a Statement.



<pan\_ref> is used when the adjoining panel is the panel with the plate surface for 2-edge brackets.

<pan\_ref> ::= <name>

SID (cf. Common Syntax above) should always be given relative to the plate surface (i.e not necessarily relative to the current panel).

A 定义边A的长度

<length\_A> ::= <number>

B 边B长度不给为=A

<length\_B> ::= <number>

In the case of a 3-edge bracket A and B may be calculated from each other to ensure the same distance of the bracket toes from the intersecting plane, see the figure below.

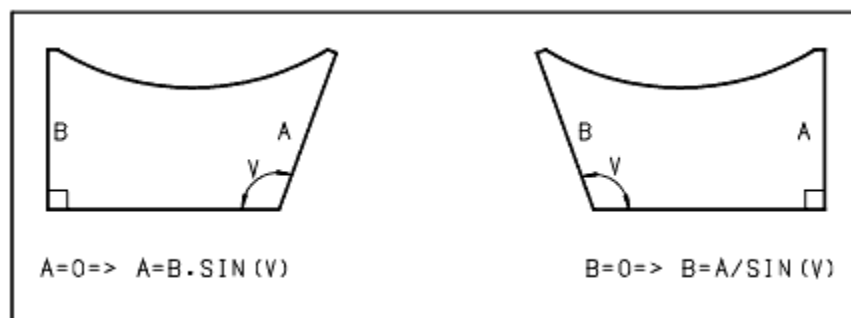


Figure 18:14. Default rules for A and B in 3-edge brackets.

SI2 If a bracket is set at the edge of a flange, it is necessary to select one of the possible edges (cf. the figures above).

The same is true if a stiffener is referred to by a tag reference and there are stiffeners on both sides of the panel.

<side\_info>, see SID, Common Syntax.

If SI2 is not given in a connection to a flange, the bracket will be connected to the flat side of the flange.

OFF See syntax 1.

<bkt\_dir> See syntax 1.

Examples:

AK-bracket connecting a bottom web to a longitudinal.

Example:

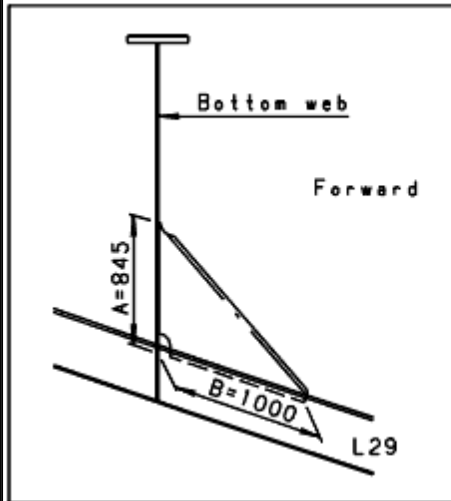


Figure 18:15. Bracket BAK as in example 1.

BRA, BAK, COR=3, SYN=2, MAT=12, SID=FOR,  
PSIDE=SB, A=845, B=1000, L290;

A B-bracket connecting a longitudinal bulkhead to the flange of a web, and belonging to the bulkhead.

Example:

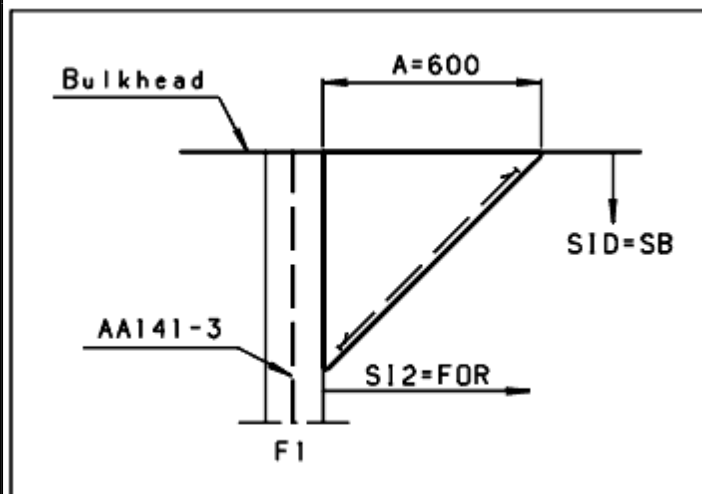


Figure 18:16. Bracket KL as in example 2.

BRA, KL, SYN=2, SID=SB, SI2=FOR, A=600,  
PSID=BOT, MAT=12, 'AA141-3', F1;

A user defined 3-edge bracket, connected to the plane of the current panel.

Example:

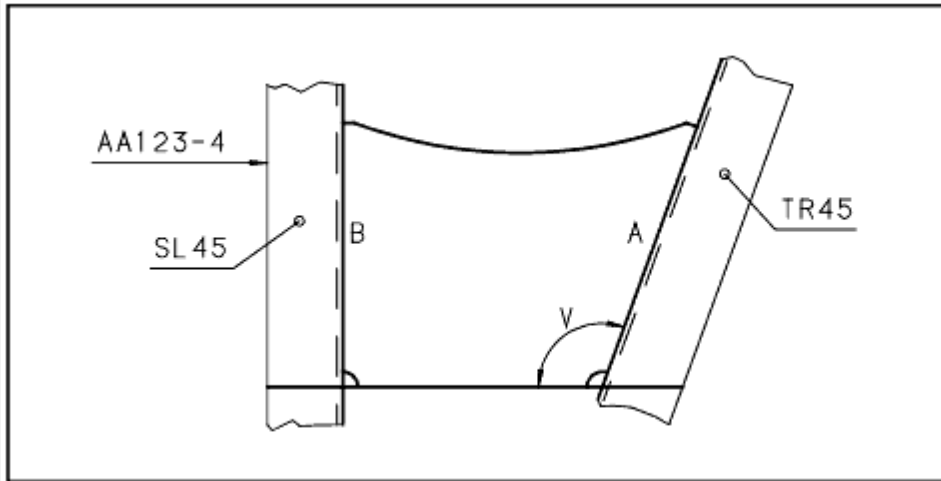


Figure 18:17. User defined 3-edge bracket ABC as in example 3.

```
BRA, ABC, NOT=R50, NOC=R50, MAT=10, B=500, SID=TOP
/' AA123-4', SL45,
/TR45;
```

Since A has been left out it will be set  $B/\sin(V)$ .



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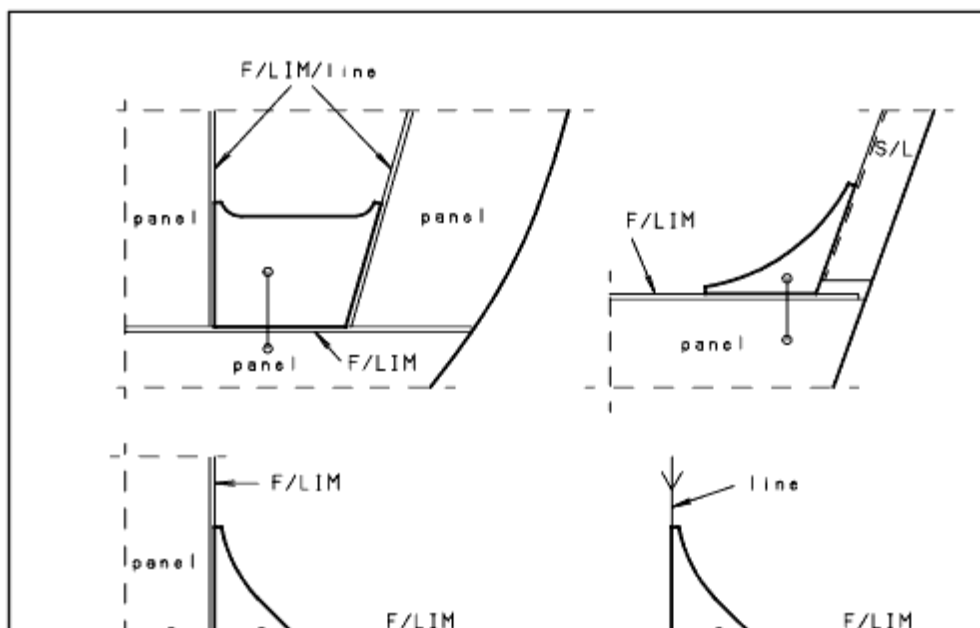
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### 18.1.3 语句3

下图说明不同的善, 图中, CM表示边界, F为面板, L是外板型材, S为相邻板架上扶强材



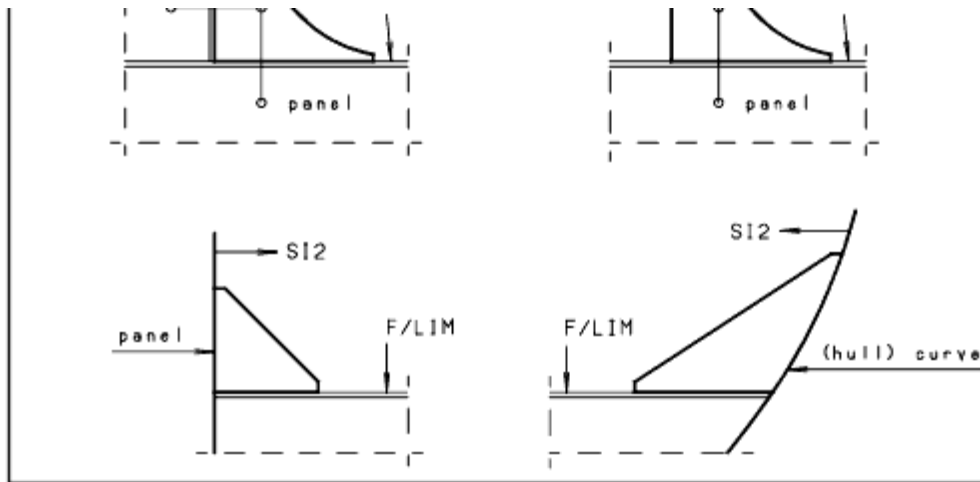


Figure 18:18. Typical Bracket Arrangements in Syntax 3.

除非与三臂肘板的连接，任一个涉及板架可为目前的一个

内嵌的有：

B(\*), BK(\*), BR, KL(\*), KLK(\*), K, KB, KC, KD, KBA, KCA, KP, KPV

所有肘板有\*的如缺省语句，SYN=3必须以带\*号肘板

<syntax\_3>::=

[,A= <length\_A>]  
[,B= <length\_B>]

, {  $\left\{ \begin{array}{l} \text{<ext_prof_ref> [,REF]} \\ \text{<panel>, LIM= <lim_no> [,REF]} \\ \left\{ \begin{array}{l} \text{<panel>[,REF]} \\ \text{<line> [,REV]} \\ \text{<line_1>} \\ \text{<curve> [,REF]} \end{array} \right\} \text{[,SI2 =<side_info>]} \end{array} \right\}$

/ {  $\left\{ \begin{array}{l} \text{<F_ref>} \\ \text{LIM= <lim_no>} \end{array} \right\}$

[/ {  $\left\{ \begin{array}{l} \text{<ext_prof_ref>} \\ \text{<panel> [,LIM=<lim_no>]} \\ \text{<line_2>} \\ \text{<curve>} \end{array} \right\} \text{[,REF]}$

A 臂A长度, 必须对两臂肘板

If  $A = \langle a \rangle$  ( $\langle 10 \rangle$ ) then  $A = \langle a \rangle * B$ .

对于三臂肘板臂位置的定义可由下述方法

B The length of arm B.

If  $B = \langle b \rangle$  ( $\langle 10 \rangle$ ) then  $B = \langle b \rangle * A$ .

If B is not given for a two-arm bracket it will be set equal to A.

If B is not given for a three-arm bracket it will be calculated from A as described in syntax 2 above.

肘板臂位置的定义可由下述方法。

- 1、沿目前板架的臂, 在斜杠之后经板架上的面板或一个边界。
- 2、臂B的位置既可沿相邻边界, 外部型材参考或边界或给一个线, 在斜杠前或参考一个板架或船体曲线, 如使用线, 必须有一个方向肘板公线的左边, 如STI不给
- 3、对于三臂肘板臂A的位置同臂B, 但在第二个斜杠之后。  
STI定义肘板的位置相对于斜杠之前的边界, 对于型材边界参考, 与三边肘板无关, 当与线一起给出时, 线的方向为不相关。见SIDE

SI2 Defines the position of the bracket relative to the limit before the first slash. Not relevant for profile and limit references and never for three-arm brackets.

When given together with a line it makes the direction of the line irrelevant.

$\langle \text{side\_info} \rangle$ , see SIDE, Common Syntax

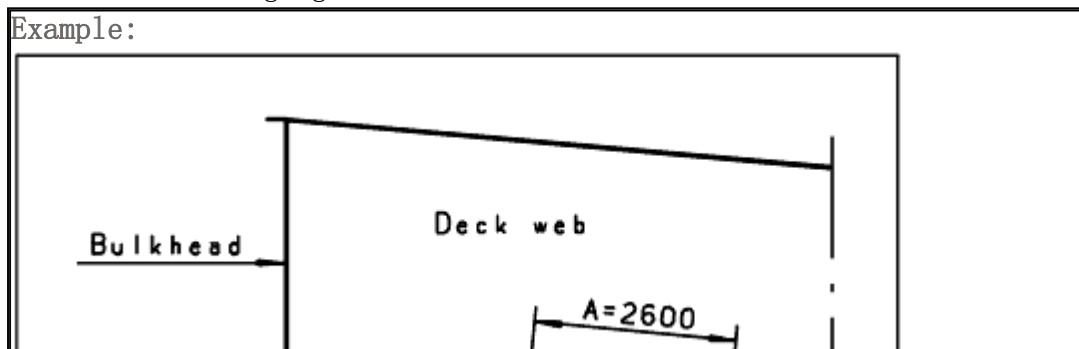
Regarding  $\langle \text{line} \rangle$ ,  $\langle \text{line}_1 \rangle$ ,  $\langle \text{line}_2 \rangle$ ,  $\langle \text{ext\_prof\_ref} \rangle$ ,  $\langle \text{F\_ref} \rangle$ , see General Layout of a Statement.

$\langle \text{panel} \rangle ::= \langle \text{curve} \rangle ::= \langle \text{name} \rangle$

$\langle \text{lim\_no} \rangle ::= \langle \text{integer} \rangle$

Examples:

Bracket KC belonging to a deck web.



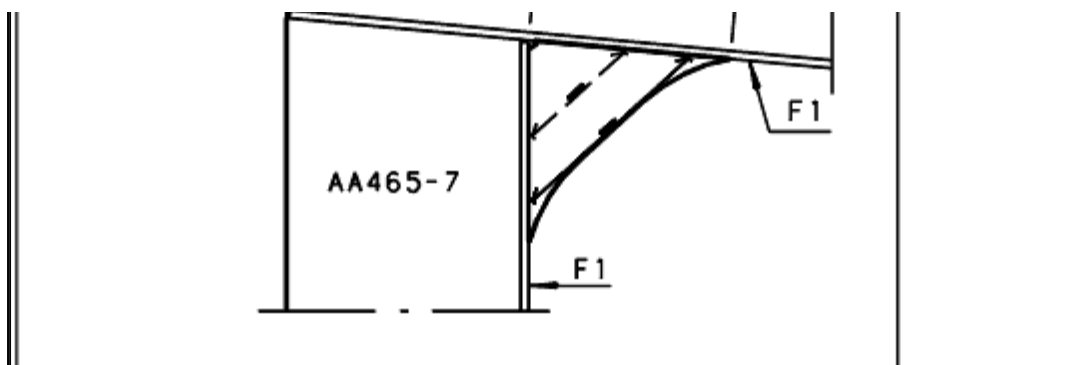
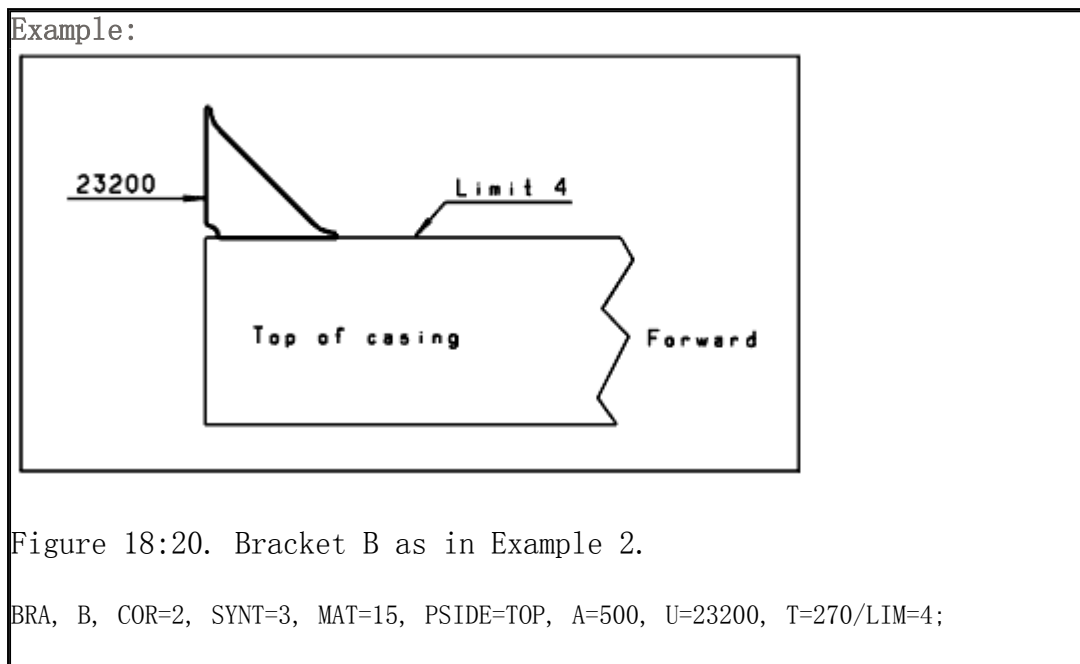


Figure 18:19. Bracket KC as in Example 1.

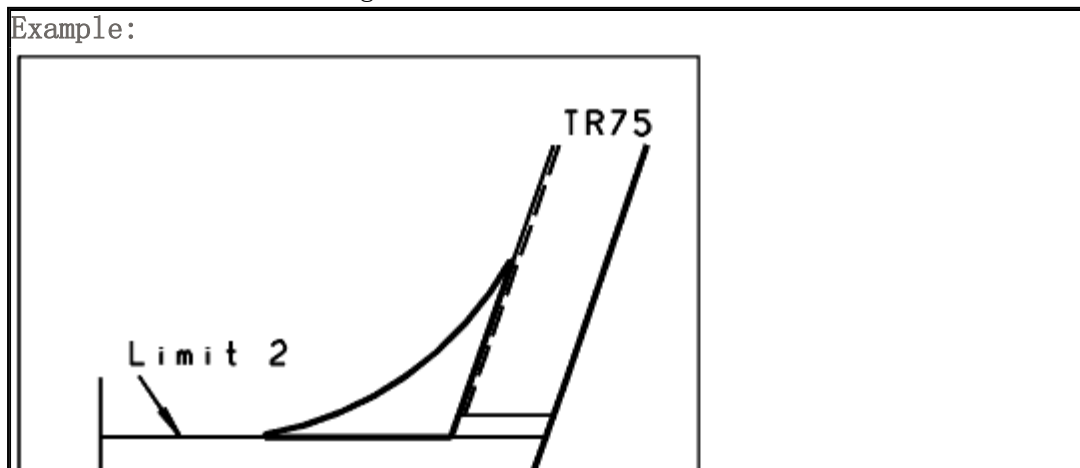
BRA, KC, COR=2, PSIDE=AFT, DOUBLE, A=2600, MAT=15, 'AA465-7', F1/F1;

Bracket B, one arm of which is defined by a line.

Note: 由线定义, 放于线的左边。



A bracket BR connecting a double floor bottom to a transversal.



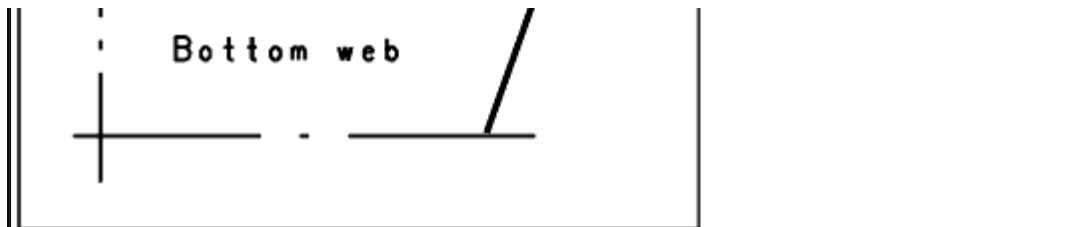
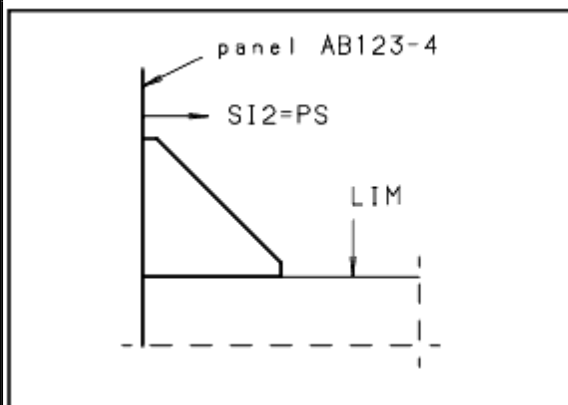


Figure 18:21. Bracket BR as in Example 3.

BRA, BR, MAT=12, A=500, TR75/LIM=2;

A bracket along a limit with arm B restricted by a panel surface.

Example:



BRA, KL, MAT=12, A=700, `AB123-4`, SI2=PS/ LIM=3, ... ;



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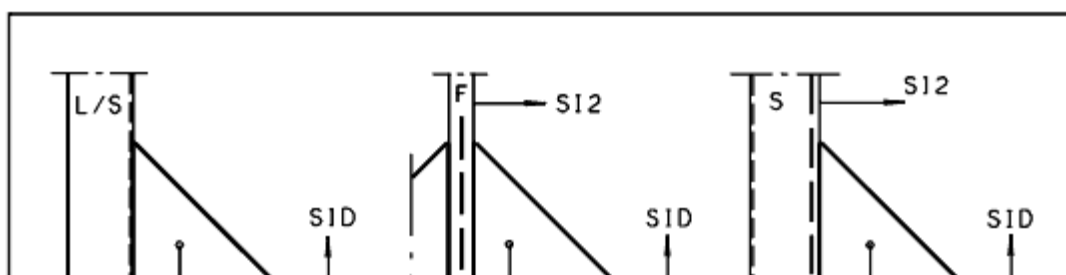


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### 18.1.4 语句4

The figures below show typical examples of connections in which brackets may occur in this syntax.

(In the figures, L denotes shell profiles, S stiffeners and F flanges.)



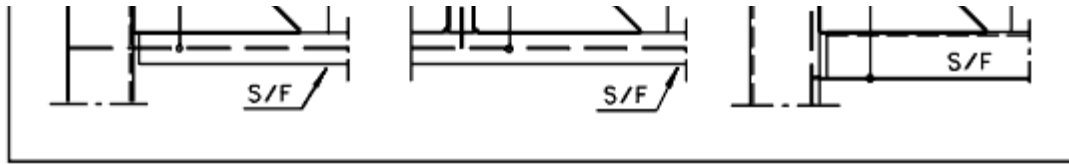


Figure 18:22. Typical bracket arrangements in syntax 4.

The following built-in bracket types can be generated:

B, BK, BA, BAK, BAA, BAB, BB, BBK, BBA, BBR, BDK, BEK, BR(\*), K(\*), KL, KLK, KP(\*)

All brackets have syntax 4 as their default syntax, except those followed by an asterisk. Consequently, SYN=4 must be given for the latter ones.

<syntax\_4> ::= ,A= <length\_A>

[,B= <length\_B>]

[,SI2= <side\_info>]

[,OFF=<offset>]

,<ext\_prof\_ref> (1 ... 25)

/<int\_prof\_ref> (1 ... 25)

<ext\_prof\_ref> and <int\_prof\_ref>, see [General Layout of a Statement](#).

A The length of the bracket arm A.

<length\_A> ::= <number>

B The length of the bracket arm B. If not given, B is supposed to be equal to A.

<length\_B> ::= <number>

SI2 See Syntax 2 and the figures above.

OFF Normally one of the faces of the brackets lies in the mould line plane of the profile. OFF can be used to displace the bracket a given distance from this plane. (The bracket must not overlap along any of its arms for this clause to come into effect.)

Examples

A BB-bracket connecting a flange on a deck web to a longitudinal.

Example:



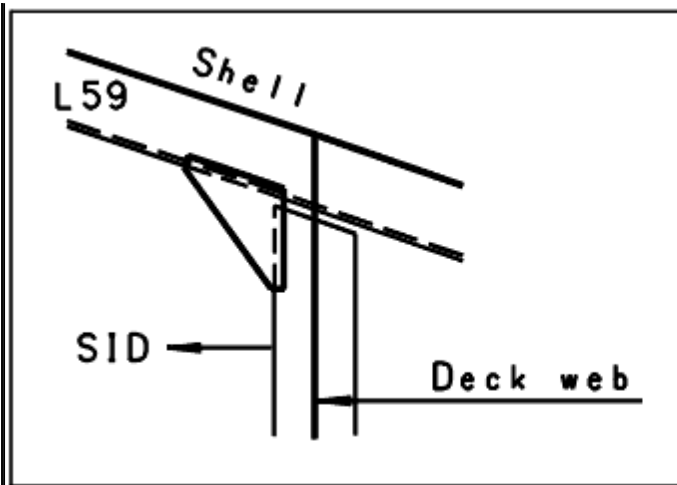


Figure 18:23. Bracket BB as in example 1.

BRA, BB, MAT=16, SID=AFT, A=500, L590/F1;

A BBK-bracket connecting two flanges and generated on a bottom web.

Example:

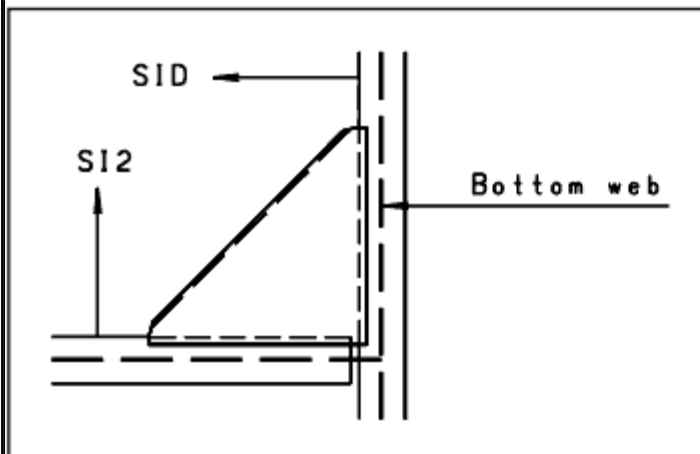


Figure 18:24. Bracket BBK as in example 2.

BRA, BBK, SID=AFT, MAT=20, SI2=PS, PSID=BOT, A=1400, 'AA161-3P', F1/F1;



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### 18.1.5 语句5

A、B、D肘板参数按标准，H是型材高度。如                      目前MIRR必须给

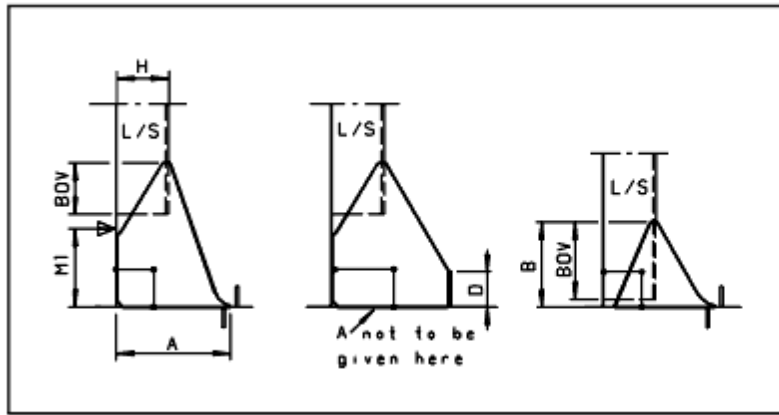


Figure 18:25. Typical bracket arrangements in syntax 5.

Any of the involved panels can be the current one. If the panel statement with L/S is current, then the keyword MIRR should be given to reflect the bracket.

The following brackets can be generated in this syntax:

EA, EAK, EC, ECK, EW, EWK, GA, GAA, GAK, GB(\*), GC, GCK, GE, GEK, GW, GWK, BVB

**Syntax 4** is the default syntax for all the bracket types except for GB. SYN=5, therefore, need be given only for this bracket type.

<syntax\_5>::= [,A= <length\_A>

[, (BOV= <overlap>) | (B= <length\_B>)]

[,D= <length\_D>]

[,M1= <dist>]

[, <ext\_prof\_ref> (1 ... 25) [,REF]]

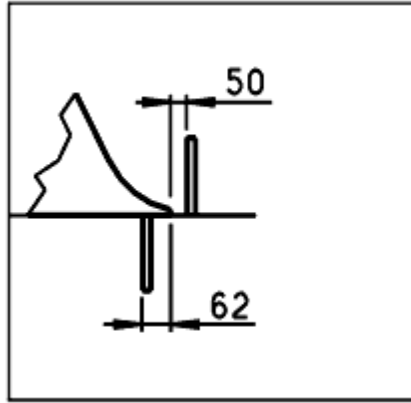
[/ <int\_prof\_ref> (1 ... 25)]

---

<ext\_prof\_ref> and <int\_prof\_ref>, see General Layout of a Statement. However, a bracket cannot overlap a flange.

In general, the bracket parameters will be generated according to the rules specified in the Design Standards. (The bracket BVB has a quite different way of deriving parameters compared to the others with a very high degree of automation.) Normally, quite a number of different alternatives exist and they will be described in detail below.

- A
- 1、肘板有D侧（见上图）尺寸由相交扶强材，面板定义。如不给，自动搜索。
  - 2、对于肘板趾端，尺寸能以相同方法定义，扶强材可在板的对侧，肘板与相交型材有间隙如下图。



2.

Figure 18:26. *Clearance/overlap at intersecting stiffener.*

- 1、如不给，A尺寸将以搭接型材端部间隙计算（ $1.5 \cdot H$ ）及板表面与自由边的角度（ $< 75^\circ$ ），见上详细节点。
- 2、对于带趾端肘板A可直接给出。

`<length_A>::= <number>`

- B A、B长度一般控制由BOU型材搭接

BOV the profile overlap.

The following possibilities exist:

- 1、如无BOU或B给出，假定 $1.5 \cdot H$ 搭接
- 2、BOU给出 $< 5$ ，为 $BOU \cdot H$ ， $B \geq 5$ 为实际搭接

- 3、最后对于G型，B尺寸由用户给出（B垂直于板）

因此，一个肘板不给出任意尺寸能生成，只要接受内置规则

- D The length of edge D is calculated automatically for those brackets where relevant.

However, the D-measure can be given explicitly, but the given length must be shorter than the automatically calculated value.

`<length_D>::= <number>`

- M1 For E-type brackets (brackets with lug):  
If not given, the lug will end 50 mm before the end of the profile  
(along the trace of it).

M1定义从板的缝的距离

$\langle \text{dist} \rangle ::= \langle \text{number} \rangle$

M1>0垂直距离, 耳板将在M1定义点前50mm结束

M1<0沿搭接型材迹线从端部至肘板耳板的距离

对于G型肘板:

从肘板原点及搭接型材迹线的距离, 距离从A臂方向测量。

Examples:

A GA-bracket connecting a sideweb to a longitudinal.

Example:

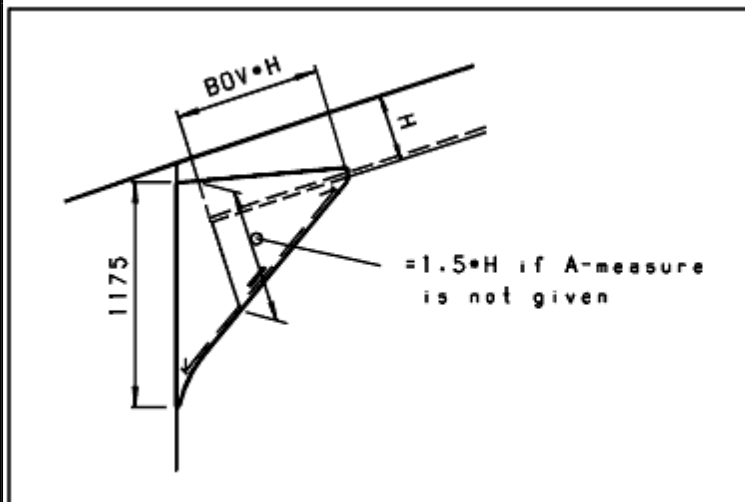


Figure 18:27. Bracket GA as in example 1.

BRA, GA, SID=FOR, BOV=2.7, A=1175, MAT=12.5, L450;

(BOV = 945 gives the same result.)

If the built-in rules are used:

BRA, GA, SID=FOR, MAT=12.5, L450;

An EC-bracket connecting a sideweb with an intersecting profile to a longitudinal.

Example:

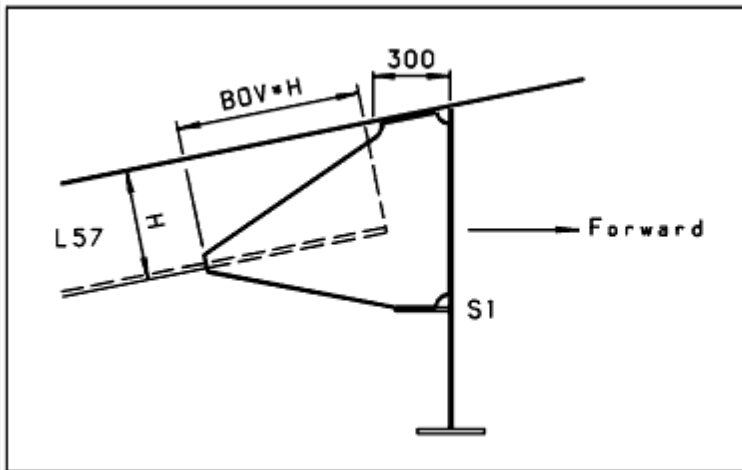


Figure 18:28. Bracket EC as in example 2.

BRA, EC, COR=4, SID=AFT, MAT=15, M1=300, BOV=1.7, L570/S1;



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### 18.1.6 语句6

The figures below illustrate the type of connections which the bracket may be part of in this syntax. (In the figures, L denotes shell profiles, S stiffeners and F flanges.)

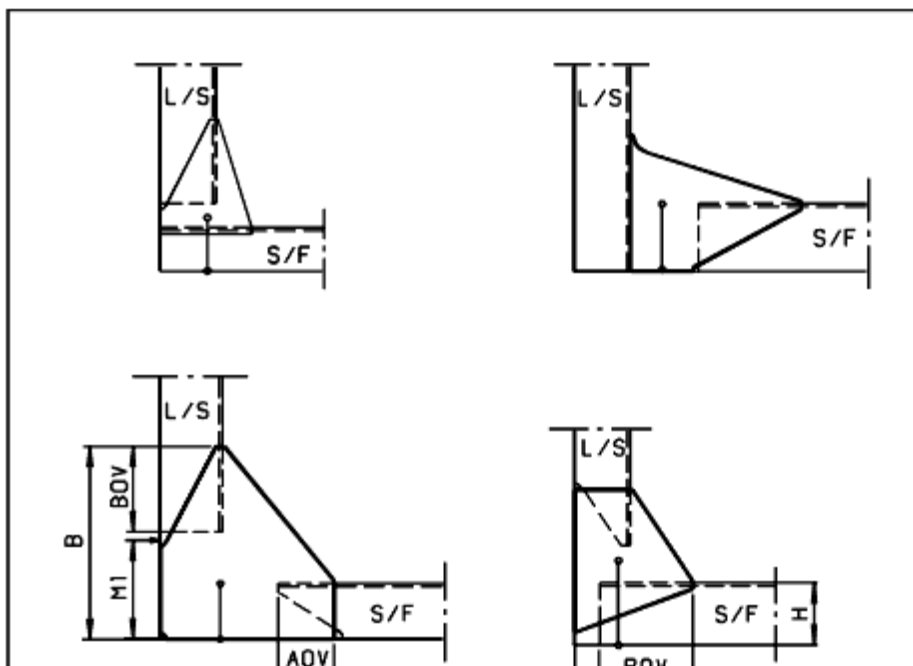




Figure 18:29. Typical bracket arrangements in syntax 6.

下述内置肘板能生成:

EA(\*), EAK(\*), EB, EBK, EC, ECK, EGK, GB, GC, GCK, GE, GEK, GG, G GK, GN, BVA, BVB(\*)

SYN=6 必须对EA, EAK及BVB给出, 所有其它肘板有缺省语句。

(Customer defined brackets can currently not be generated in this syntax).

---

```
<syntax_6> ::= [, (A= <length_A>) | (AOV= <overlap_A>)]
```

```
    [, (B= <length_B>) | (BOV= <overlap_B>)]
```

```
    [, M1= <seamdist>]
```

```
    , <ext_prof_ref> (1 ... 25) [, REF]
```

```
    / [<panel>,] <int_prof_ref> (1 ... 25)
```

---

板架及加强筋/面板不在目前板架内, 如EGLK肘板. For <ext\_prof\_ref> and <int\_prof\_ref>, see General Layout of a Statement. (<panel> is only given when an EGK bracket is generated. EGK生成时给出肘板, 此时, 位于其它两个板架内的型材见设计标准. However, the same technique can also be used for other types of brackets.)

```
<panel> ::= <name>
```

In general, the bracket parameters will be generated according to the rules specified in the Design Standards. (The brackets BVA and BVB are generated according to special rules with a high degree of automation. The following comments are not valid for these brackets.)

A 对于EA、EAK、EB、EBK, 尺寸可以两种方法定义o ways:

1. 如不给, A按5的规则计算; 直接给出

A侧搭接, H型材高度, 不给

```
<length_A> ::= <number>
```

AOV For those bracket types which overlap along the side A, the A-measure is defined by an overlap assigned to AOV.

```
<overlap_A> ::= <number>
```

Suppose that H is the height of the overlapped profile. If not given, AOV is supposed to be H.

AOV < 5 is interpreted as a factor giving an overlap AOV \* H.

$AOV \geq 5$  is interpreted as the actual overlap.

B Normally, the B-measure is controlled via the overlap. See syntax 5  
BOV which has the same possibilities.

M1 See syntax 5. Note that when  $> 0$ , M1 should include the height of the profile which the bracket is standing on, i.e. be measured from the plate surface.

Remark:

The rules above mean that a bracket can be generated quite automatically if the built-in design standard is accepted

Examples:

C bracket, connecting a bulkhead to a longitudinal:

Example:

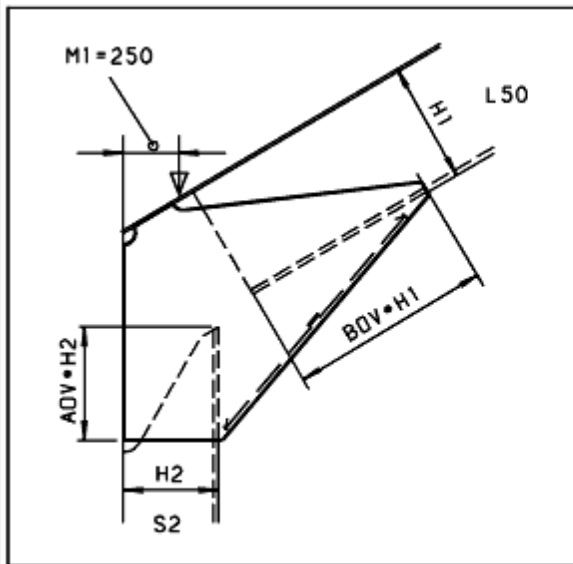
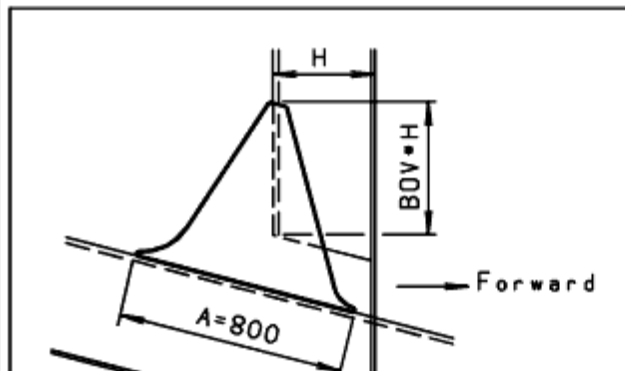


Figure 18:30. Bracket EC as in example 1.

BRA, EC, COR=2, SID=FOR, PSI=BOT, M1=250,  
BOV=1.7, AOV=1.2, MAT=15, L500/S2;  
or ... BOV=650, AOV=450 ... ;)

GB-bracket, connecting a bottom transverse to a longitudinal.

Example:



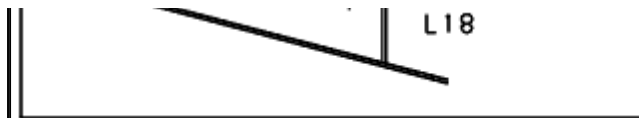


Figure 18:31. Bracket GB as in example 2.

BRA, GB, MIRR, PSIDE=SB, MAT=14, A=800,  
SID=AFT, BOV=1.35, L180/SL18;

If the built-in rules are accepted, A and BOV need not be given.



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### 18.1.7 语句 7

The figures below illustrate the type of connections which the brackets may be part of in this syntax.

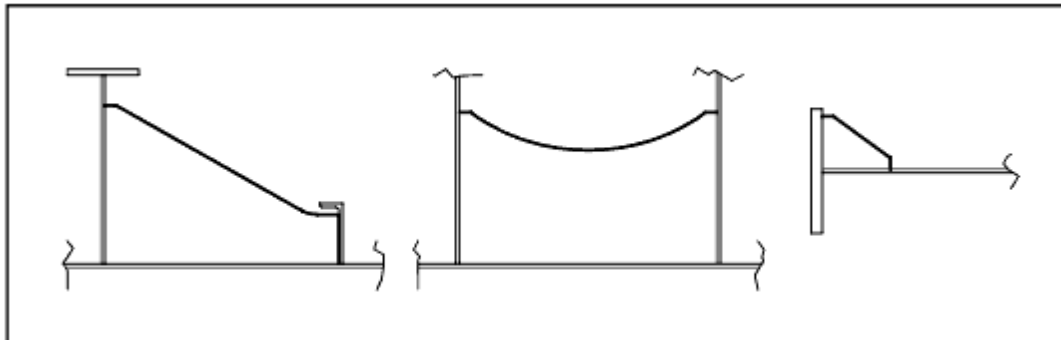


Figure 18:32. Typical bracket arrangements in syntax 7.

此语句的特征在肘板平面是“自由”即不由其它零件定义，肘板平面由用户定义必须由扩展肘板处理建立。即设后内嵌的肘板使用。除非重定义，并以语句、

SYN=7，给此语句肘板但也为其它单独肘板语句。

支持2和3臂，臂长（趾端自由时），由用户直接给出，下图B给出，A可由右侧型材给出。

定义肘板平面，除臂A沿外板曲线处强制的。



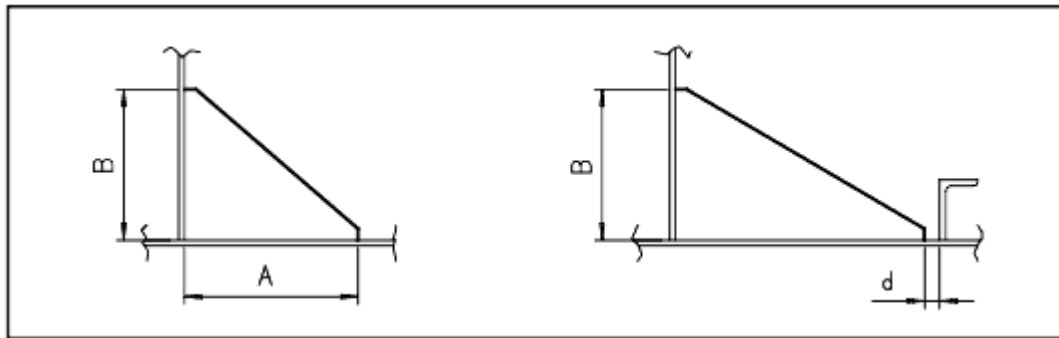


Figure 18:33. Explicitly given bracket size vs. automatically calculated.

In both cases B is supposed to be given by the user. In the left case A must also be given whereas A is calculated from the profile section in the right case.

`<syntax_7> ::= <plane_def>`

`,MSID=<side_info>`

`[,SID=<side_info>]`

`[,SI2=<side_info>]`

`[,A=<length_A>]`

`[,B=<length_B>]`

`[,C=<length_C>]`

`[,D=<length_D>]`

`[,R=<radius>]`

`[,<position_a>]`

`/<position_b>`

`[/<position_c>]`

`;`

---

`<plane_def>` defines the plane of the bracket. This information is compulsory except when the bracket arm A falls along a shell curve. In that case the bracket plane is supposed to be the same as that of the curve if not otherwise specified.

`<plane_def>:= <principal_plane> |`

`<normal+line> |`

`<three_points>`

<principal\_plane>::=X|Y|Z=<coord> (1...25)

<normal+line>::=<line>

In this case the bracket is supposed to be perpendicular to the uv-plane of the current panel along a given line in that plane.

<three points>::= ORI=<coord>, <coord>, <coord>

, UAX=<coord>, <coord>, <coord>

, VAX=<coord>, <coord>, <coord>

When the bracket is defined by this option arbitrary space points in the plane of the bracket can be selected, provided they are not co-linear.

When the bracket is defined by a curve or by three points only one bracket can be generated in one statement, otherwise up to 25.

Examples of plane definitions:

1. X=FR25()29, FR31()35
2. U=FR34, V=1345, T=45
3. X=FR34, Y=1345, XT=FR34+100, YT=1445
4. ORI=FR34, 1345, 1000, UAX=FR34+100, 1445, 1000,  
VAX=FR34, 1345, 2000

Examples 2), 3) and 4) are supposed to define the same plane. 2) and 4) suppose that the bracket is perpendicular to the current panel.

MSID	Defines the orientation of the material relative to the mould plan of the bracket.
SID	Defines the position of the bracket relative to the element given in <position_a> unless defined by any of the involved elements.
SI2	Defines the position of the bracket relative to the element given in <position_b> unless defined by any of the involved elements. Need never be given if <position_c> is given.
A	Defines the length of the bracket arm A it not otherwise specified. If given (=a) and a<10, A will be set to a*B (where B is the length of arm B, whether explicitly given or calculated).
B	Ditto bracket arm B. If given (=b) and b<10, B will be set to b*A (where A is the length of arm A, whether explicitly given or calculated).
C	Defines the height of the toe at the end of arm A. In case of connection to profile this height is normally set automatically.

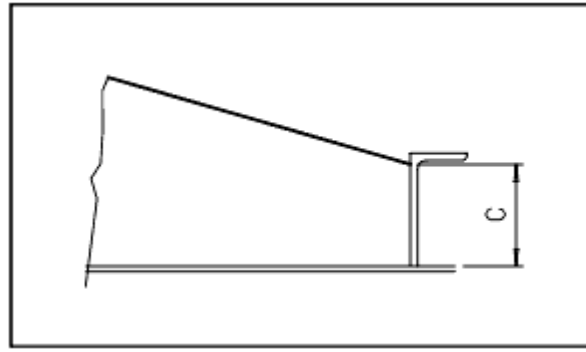


Figure 18:34. Definition of parameter C.

D

Ditto for toe at end of arm B.

R

In certain cases a major (fillet) radius of the free side of the bracket (associated with one of the toes) may be controlled by the user via R. In most cases this radius has a default value set up in the bracket definition.

The bracket position is defined in the following way:

1. The origin of the bracket is supposed to be in the intersection between the element given by <position\_a> and <position\_b>.
2. The position of bracket arm B is defined by <position\_b> and follows always after the first slash.
3. For brackets with two arms the bracket arm A is defined by <position\_a>. For brackets with three edges the arm A is defined by <position\_c>.
4. For brackets with three edges the position of the edge connecting arm A and arm B is defined by <position\_a>.

Examples:

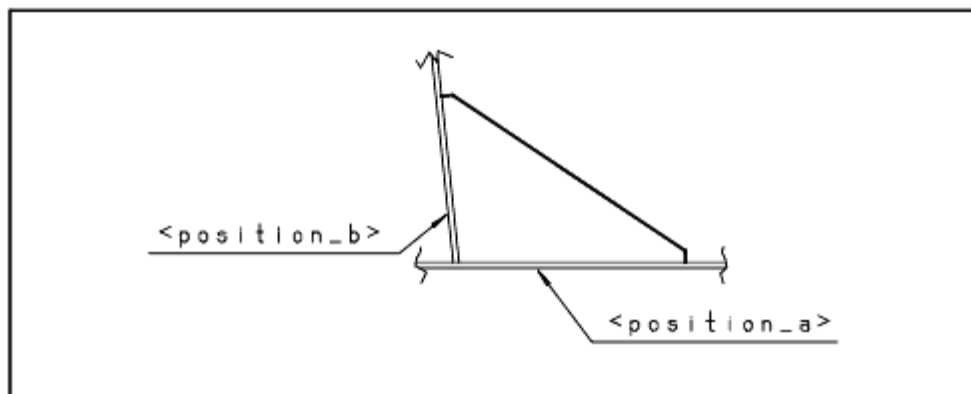


Figure 18:35. Positioning of bracket with two arms.

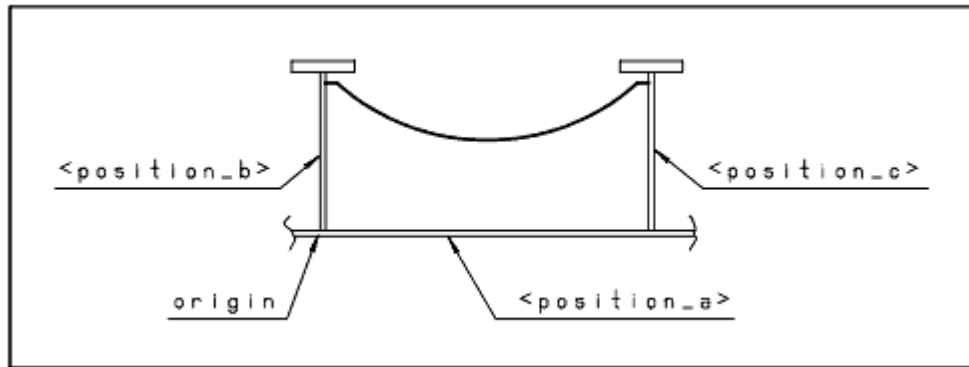


Figure 18:36. Positioning of bracket with three arms.

<position\_a>::=

```
{ [<panel>] [<int_prof_ref> (1... 25)] }
  <curve>
<panel>::=<curve>::= <name>
```

<position\_a> is used to define the position of arm A for brackets with two arms, to define the position of the connection edge for brackets with three edges (cf. above).

When the panel to be given is the current panel the panel name need not be given.

<position\_b> has the same layout as <position\_a> and is used to define the position of bracket arm B.

If bracket arm B has a toe with tight profile connection a profile reference must be included. The complete arm B may fall along a profile section, e.g. a flange in the current panel. In the latter case no panel name is required.

<position\_c> is similar to <position\_b>. It is used to define the position of bracket arm A for brackets with three edges but may also be used to define the connection /restriction of the bracket arm A for two-arm brackets (cf. above).

In case arm A of a two-arm bracket should be restricted by a profile section there are two possibilities provided arm A is located along a plane panel. Either the profile reference can be given in <position\_a> or in <position\_c> (cf. the example below). (If arm A is located along a shell curve and restricted by a shell profile section the latter option is the only alternative).

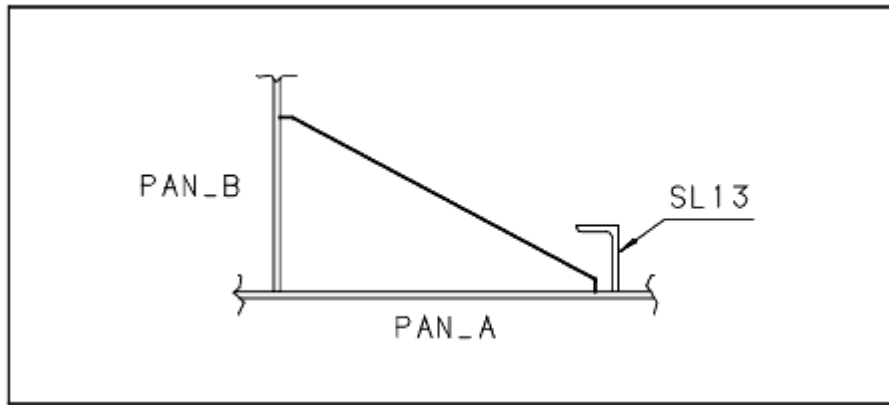


Figure 18:37. Bracket connection with optional alternatives for generation (see below).

Alternative 1:

```
BRA, ..., 'PAN_A', SL13/ 'PAN_B', ... ;
```

Alternative 2:

```
BRA, ..., 'PAN_A' / 'PAN_B' / 'PAN_A', SL13, ... ;
```

(If PAN\_A should happen to be the current panel, 'PAN\_A' can be left out completely in the statements above).

In the examples below, PAN\_A is supposed to be the current panel and thus left out wherever possible.

Example 1:

Example:

A free type of bracket is generated and the arms are not restricted by any intersecting member.

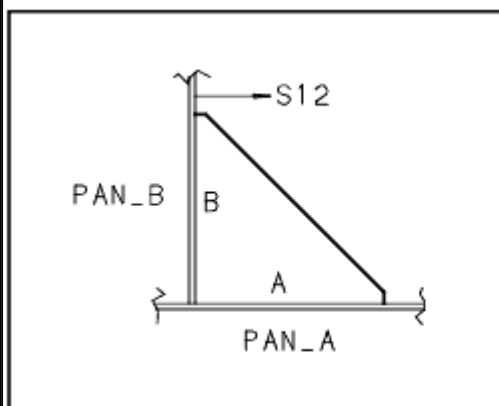


Figure 18:38. Bracket KL as in example 1.

```
BRA, KL, X=FR35, MAT=12, MSID=AFT, SI2=PS, ..
```

```
  / 'PAN_B', A=500, B=500;
```

Note: In this case the built-in KL bracket must have been re-defined in the Extended Bracket Handling (to be used in syntax 1).  
In this case it is not necessary to give SID since PAN\_B is only on one side of PAN\_A.

#### Example 2:

##### Example:

In the same situation the bracket arm A is restricted by a an intersecting stiffener.

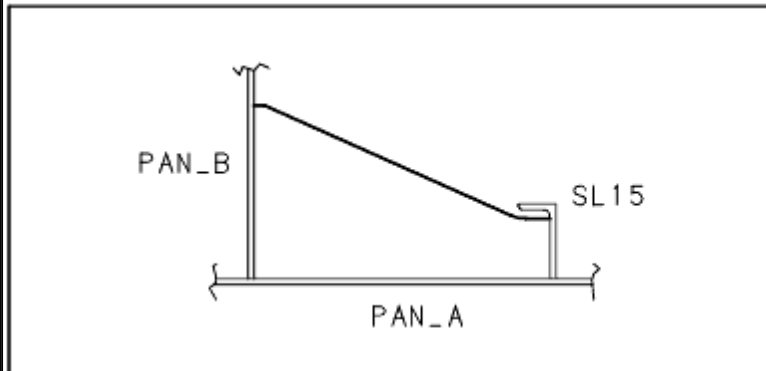


Figure 18:39. A user defined bracket BGM generated as in example 2.

```
BRA, BGM, ... , SL15/ 'PAN_B', B=500;
```

(or cf. above):

```
BRA, BGM, ... / 'PAN_B' / SL15, B=500; )
```

In this case A should not be given since the A-measure is defined by the intersecting stiffener. Note, in this case it is not necessary to give SI2 since this direction is defined by the intersecting profile SL15.

#### Example 3:

##### Example:

In this case arm B is restricted by a flange on PAN\_B and arm A is restricted by an intersecting panel.

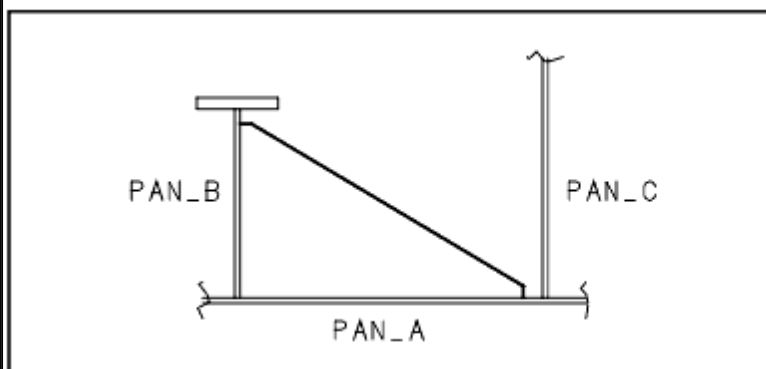


Figure 18:40. Bracket KL generated as in example 3.

```
BRA, KL, ... / 'PAN_B', F1/ 'PAN_C';
```

In this case neither A nor B should be given, nor are SID or SI2 required.

#### Example 4:

##### Example:

The bracket is here used as a tripping bracket between the current panel and a flange on it.

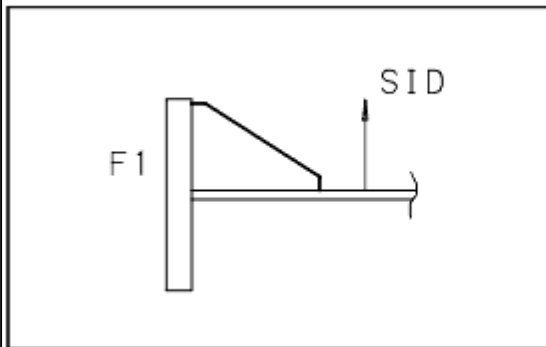


Figure 18:41. Bracket KL connecting flange and plate as in example 4.

```
BRA, KL, ... / F1, A=300, SID=TOP;
```

Note: In this case the arm A of the bracket must always fall along the panel, not along the profile. If not given B will be calculated from the flange height. SID is compulsory.

#### Example 5:

##### Example:

A tripping bracket is set perpendicularly to the current panel to support a bent flange. The bracket is positioned along a line in the current panel.

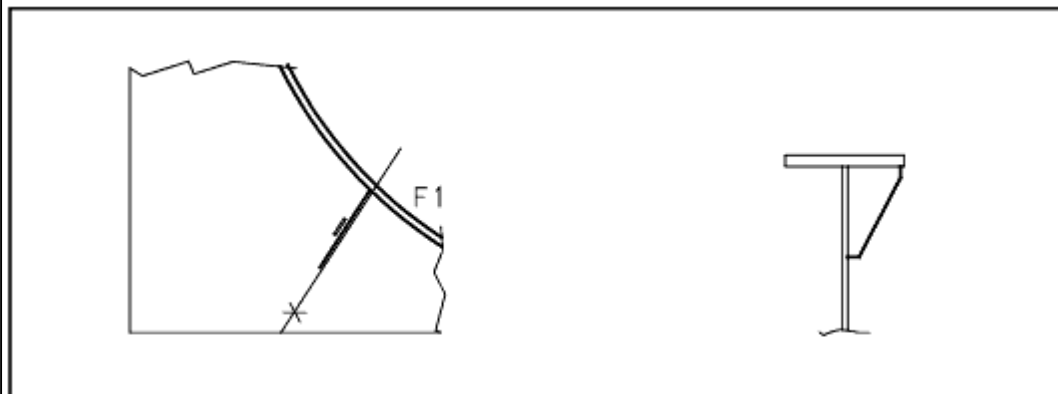


Figure 18:42. Bracket KL along given line, connecting flange and plate as in example 5.

```
BRA, KL, ... , U=15000, V=1000, T=60/ F1, A=600,
      SID=TOP;
```

Example 6:

**Example:**

The bracket is positioned by three arbitrary points in space. Otherwise equal example 1.

```
BRA, KL, ... / 'PAN_B', A=500, B=500, SI2=PS,
      ORI=FR35, 7000, 1000,
      UAX=FR35+1000, 8000, 1000,
      VAX=FR35+500, 7000, 2000;
```



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## 18.2标准肘板直接定义

This syntax is used explicitly to define all necessary information about the bracket, its geometry and its position.

**Syntax:**

---

```
BRA, <bkt_definition>
```

```
    [, <symmetry>]
```

```
    , MAT= <plate_thickn>
```

```
    , MSID= <side_info>
```

```
    , <bkt_param>
```

```
    [, PSID= <side_info>]
```

```
    [, DOUBLE]
```

```
    [, <profile_size>]
```

```
    , <position>
```

```
    [, POS= <pos_no>]
```

```
    [, QUA= <quality_code>]
```



```
[, WELD= <throat_thickn> (1 ... 3)]

[, VAR= <variant_no>]

[, SEP | BEL]

[, V1= <angle_1>]

[, V2= <angle_2>]

;
```

Most of the clauses are used in the same way as described above in the normal bracket syntax. Only the deviations will be described in detail below.

### Description

<bkt\_definition> MIRR和SYNTAX选肘板时不必使用。

MSID The orientation of the plate relative to the mould plane of the bracket must be defined.

<side\_info>::= AFT|FOR|SB|PS|TOP|BOT

<bkt\_param>::= (<param\_keyw>=<number>)

(...)

<param\_keyw>::= A|B|C|D|E|F|G|H|J|K

<position> The bracket is located in space by three points assigned to ORI, UAX and VAX in the same way as described in the PANEL statement.

The local uv-system of the bracket has its origin in the lower left corner of the bracket and the u-axis is along the edge A.

If the point assigned to VAX lies along the edge B of the bracket, the centre angle of the bracket will be calculated automatically (cf V1 below).

V1 defines the angle of the origin of the bracket. If not given, it will be calculated as the angle between the vectors from ORI to the points UAX and VAX, respectively (cf <position> above).  
<angle\_1>::= <number>

V2 Relevant only for brackets with another edge at the end of edge A. The angle at this corner is assigned to V2.  
<angle\_2>::= <number>

```
Example:
BRA, B, COR=2, MAT=12.5, A=500, B=500,

MSIDE=TOP, PSID=TOP,

ORI=FR75, 2000, 1000,

UAX=FR75, 3000, 1000,

VAX=FR76, 2000, 1000;
```



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## 18.3板架及肘板零件

用此将及板板件及肘板零件至目前板架

Syntax:

BRA, <obj\_name>

[, <symmetry>]

[, NAME= <designation>]

[, SEP]

[, MAT= <mat\_thickn>]

[, MSID= <side\_info>]

[, QUA= <quality\_code>]

[, POS= <pos\_no>]

[, WELD= <throat\_thickn> (1 ... 5)]

[, MIRR]

[, <position>|<translate>]

;

Those items which are equal to the other syntaxes will not be explained below.

Description

<obj_name>	Name of the object in which the bracket is stored. <obj_name>::= <name>
	If the object is a panel, it must have been generated as a bracket panel (see the PANEL statement).
NAME	The bracket will get a designation equal to <obj_name> unless otherwise stated. An arbitrary designation can be assigned to NAME <designation>::= <name>
SEP	A bracket panel or a part with holes will automatically be stored separately. SEP is relevant only for a part that otherwise would have been stored with the panel.
MAT MSID	The plate thickness and the orientation of the material must be controlled via input for a part and may optionally be changed for a bracket panel.
QUA	For bracket panels, the quality of the bracket panel will be used if not given here.
POS	Brackets generated in this syntax are normally supposed to be given position numbers automatically (e.g. in "autopos"). Giving POS = -1 means inhibiting of the automatic position number setting. In that case no position number will be set, e.g. because the bracket is a standard part.
MIRR	Means mirroring in the centre line of the bracket compared to where it has been generated.
<position>	Must be given if not defined by the part.

A given position overrides the existing position, if any.  
Defined as in the previous syntax, using ORI, UAX, VAX.

If a bracket panel should be reflected (MIRR) and given a new position simultaneously, then the unreflected position should be given.

<translate> is used to move one (or several) bracket(s) from the position where it has been generated.

```
<translate>::= MOVE
    [,X=<delta_x> (0...25)]
    [,Y=<delta_y> (0...25)]
    [,Z=<delta_z> (0...25)]
```

```
<delta_x>::=<delta_y>::=<delta_z>::=<number>
```

The numbers assigned to X, Y and Z respectively, define a vector along which the bracket will be moved relative to the position where it has been generated. A left-out keyword means that the corresponding vector component is 0.

In case of a mirrored bracket (cf. MIRR above) the vector should be given **before** the mirroring.

**Examples:****Example 1:**

A bracket generated as a separate panel and not to be position numbered.

```
BRA= 'BRACKET PANEL', POS = -1;
```

**Example 2:**

A part, the position of which is stored in it.

```
BRA= 'PART', NAME= 'AG112/75-209', MAT=15, MSIDE=TOP;
```

**Example 3:**

A panel bracket, occuring in 4 extra copies in addition to the position where it was generated.

```
BRA, 'BRA_PAN', MOVE, X=0(700)2800;
```


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## 18.4 拷贝已存在的肘板

By this syntax, an arbitrary bracket can be copied within a panel or from another panel.

**Syntax:**


---

```
BRACKET ,COPY [, <panel_from>]
```

```
,FCNO= <from_no> (1 ... 25)
```

```
[, <symmetry>
```

```
[, SEP]
```

```
[, MAT= <plate_thickn>]
```

```
[, MSID= <side_info>]
```

```
[, POS [, = <pos_no> (1 ... 25)]]
```

```
[, QUA= <quality_code>]
```

```
[, WELD= <throat_thickn> (1 ... 3)]
```

[, MIRR]

[, <position>|<translate>]

Most of the clauses are common to the previous syntax. Attributes which are not changed will retain their values from the bracket to be copied.

#### Description

**COPY** 如没有板架名, 肘板从目前板架拷贝, 否则, 从给定的肘板, 定义肘板数从拷贝肘板处。

<panel\_from>::= <name>

**FCNO** defines the bracket number(s) from where to copy the bracket(s).

<from\_no>::= <integer>

**QUAL** 如标准材料, 用于特定材持的肘板代码应设为-1

**MIRR** 按中心对称

#### Example:

##### Example 1:

```
BRA, COPY= 'AA171-7', FCNO=5;
```

##### Example 2:

An alternative way of achieving the same thing as in example 3 of the previous section (provided the first bracket is stored with number 1):

```
BRA, 'BRA_PAN';
BRA, COPY, FCNO=1, MOVE, X=700(700)2800;
```

##### Example 3:

```
BRA, 'BRA_PAN';
BRA, COPY, FCNO=1-4, MOVE, X=700;
```



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## 19 Doubling Plates 语句

"Doubling plate" is the name of plate parts that are used to reinforce openings in plane panel plates or as support for pillars. Doubling plates

are always attached to the surface of a panel plate. Such plates are generated via the DOUBLING statement.

### Syntax

---

```

/CN0=<cn0>\                               / CL0                               \
DOU < NOT=<no> >,M1=<dist>[,<                               >],MAT=<th>

    \CUR=' cur' /                               \ [M2=<dist1>]/

    [ POS=<posno>]

    [ SID=FOR | AFT | TOP | BOT | PS | SB ]

    [ { P | S} ]

    [ QUA=<quality> ]

    [ NOA=<notch>]

    [ NOB=<notch>,SEA=<no.>[, '<panel>'] ]

    [ BEV=<bev1> [,<bev2>]]

    [ AS1=<str> ]

    [ AS2=<str> ]

    [ AS3=<str> ]

    [ AS4=<str> ]

    [ AR=<ass> ]

    [ ARP=<ass> ]

    [ ARS=<ass> ]

    [,COL[OUR]= <colour>]
;

```

---

### Description

The position and geometry may be defined by one of these different alternatives:

1. By a hole with number CN0.
2. By a notch with number NOT.
3. By a curve CUR, defining the geometry of the doubling.

In case of 1 and 2 the geometry of the doubling plate is (at least partly) controlled by a parallel displacement of the component it is associated with.

The hole/notch may either be completely covered by the doubling plate or

the region around the component may be reinforced by a strip of plate parallel to the contour of the component

M1	Width of strip in case of a doubling strip. Otherwise, the size by which the doubling overlaps the plate
CL0	The doubling plate should cover the whole referenced component. Incompatible with M2.
M2	Distance from the inner curve of the strip to the component it is associated with. Incompatible with CL0.
MAT	Material thickness of the doubling plate
P   S	Symmetry of the doubling plate. P only valid portside, S only valid starboard (relevant only in otherwise symmetrical panels).
QUA	Quality of the material.
NOA	A notch should be placed in the corner of a doubling plate.
NOB	A notch should be placed for a seam (only valid when reference type is NOTCH). NOB is the notch designation for the seam SEA.
SEA	Referenced seam to make the notch NOB. <no> is the seam number. If <panel> is left out then the seam is supposed to be a shell surface seam, otherwise the seam number in panel <panel>.
BEV	Bevel codes to be used for panels of the doubling contour. (Only valid when reference type is NOTCH). <bev1> is bevel along the part of the contour following the part associated with M1. <bev2> is the bevel along the the part of the contour following the part associated with M2. <bev1> is beveling in the first bevelled interval in the circulation direction of the contour, <bev2> is the second.
	If the notch is for a seam and the doubling plate is open and <bev2> is left out then <bev2> = <bev1>.
COLOUR	Colour of all doubling plates defined in the statement.

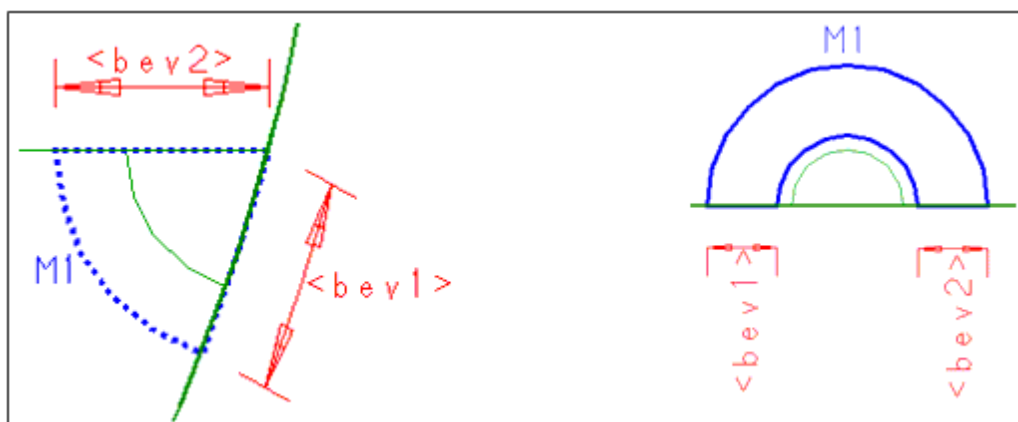


Figure 19:1. Doubling plate around notches, (Symbolic view and Model view.)

AS1General purpose strings  
 AS2  
 AS3  
 AS4  
 AR Assembly references  
 ARP  
 ARS

Example 1:

DOU, CN0=2, M1=250, M2=15, MAT=12, SID=AFT, POS=8;

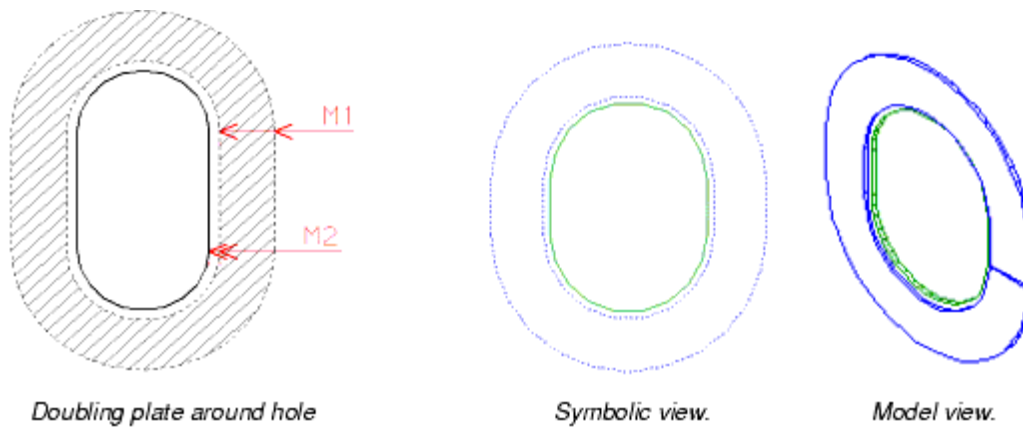


Figure 19:2. Doubling plate around hole, (symbolic view and model view).

Example 2:

DOU, NOT=3, M1=30, CLO, MAT=20, SID=FOR, POS=143, AS1='DNOT' ;

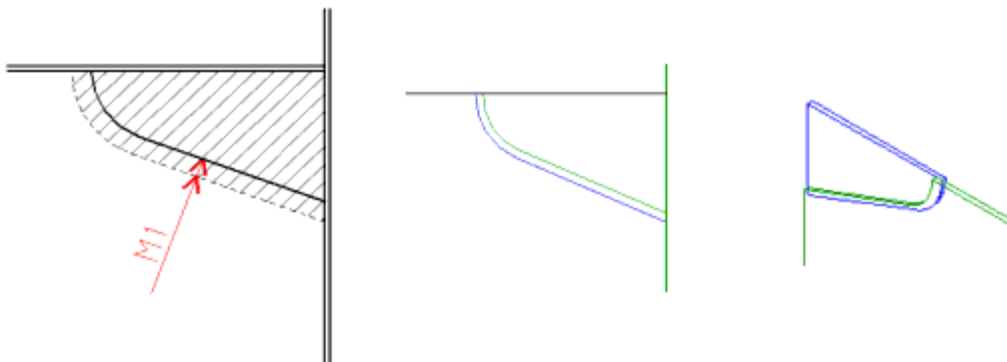


Figure 19:3. Doubling plate covering a notch.

Example 3:

DOU, NOT=3, M1=30, MAT=20, SID=FOR, POS=143, AS1='DNOT' ;



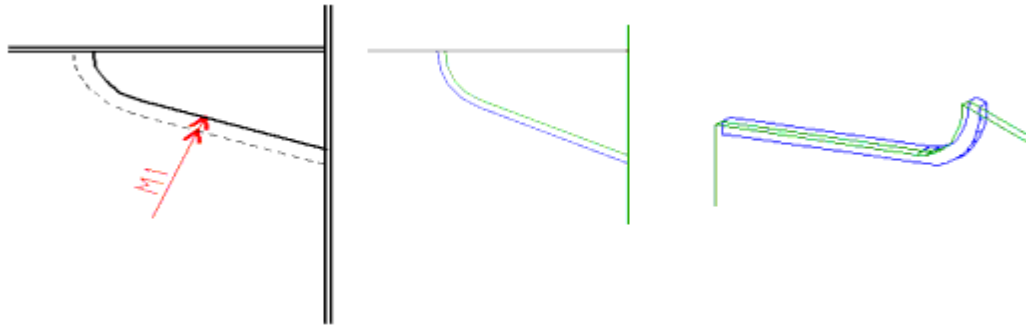


Figure 19:4. Doubling plate (strip) around a notch.

Example 4:

DOU, NOT=1, M1=125, M2=25, MAT=30, SID=FOR, POS=118, BEV=250;

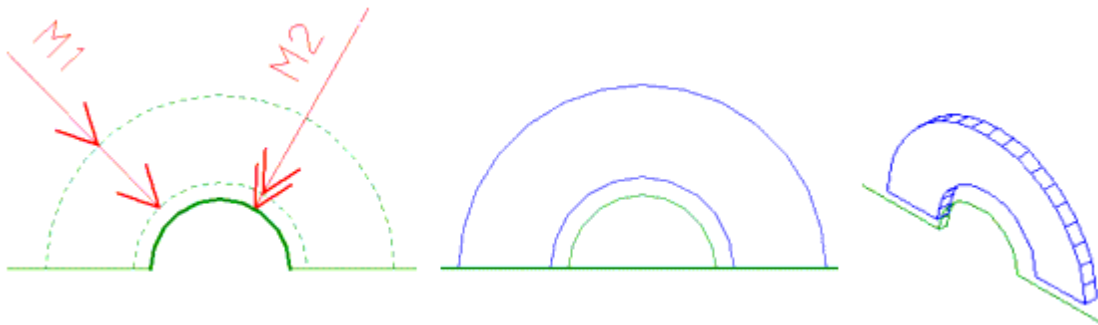


Figure 19:5. Doubling plate for a notch at a seam.

Ppanparts will mark the panel plates with the double plate edges and also handle the beveling including dotori.

In the automatic parts generation the edge contour of the doubling plates will be marked or the plate parts they are welded to. The doubling plates themselves will be equipped with bevel information, including dotori.



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## 20 Excess 语句

The EXCESS statement defines excess along one of the limits of the current panel. The geometry of the panel will be modified when the parts

are extracted.

### Syntax

---

```
EXC, LIM=<lim_no>, M1=<size>[, TYP={<ename>|<ename>}] [, <symmetry>] ;
```

---

### Description

- LIM** defines the limit along which to add excess.  
`<lim_no> ::= <integer>`
- M1** defines the amount of the excess.  
`<size> ::= <number>`
- TYP** Defines the excess type and must be one of the excess types given in the default file of Tribon Planar Hull Modelling.  
Setup and Customisation Excess and Excess Symbols
- <symmetry>** Normally excesses on a symmetric panel are supposed to be valid both portside and starboard.  
 However, it is possible to indicate that an excess should be used portside only or starboard only. This clause is relevant on a symmetric panel ("SBPS panel") only.  
`<symmetry> ::= P | S`
- P means portside only,  
 S means starboard only.

### Remarks:

1. For excess along inner seams, see the SEAM statement.
2. Excess may be added only to limits which fulfil the following condition:
  - Split the limits into separate contours and extend them at both ends along the tangents in the end points.
  - Make a parallel displacement of those limits which have excess. The contours, thus extended and moved, must now intersect, otherwise an error will occur in the splitting phase. This means that an excess can not be added in the case illustrated below. Limit 3 will not intersect limit 2 after the parallel displacement.

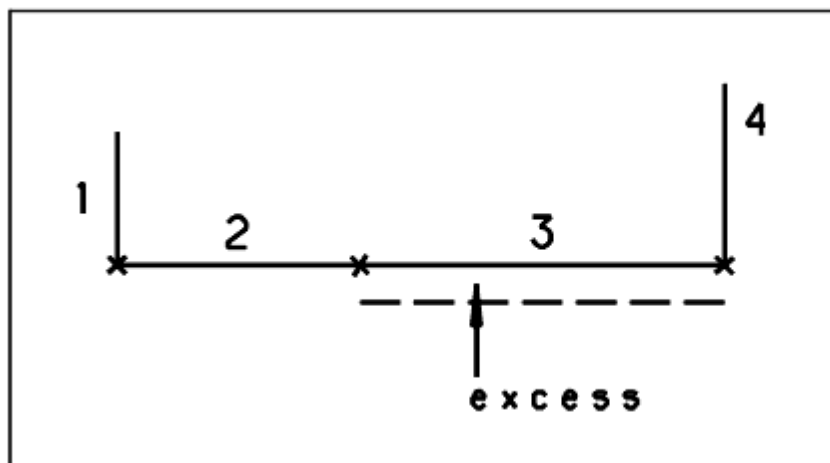


Figure 20:1. Excess, causing problem in Parts Extraction.

In such a case, the limits must be reorganized or the excess has to be included in the original contour.

Example:  
EXC, LIM=2, M1=50;



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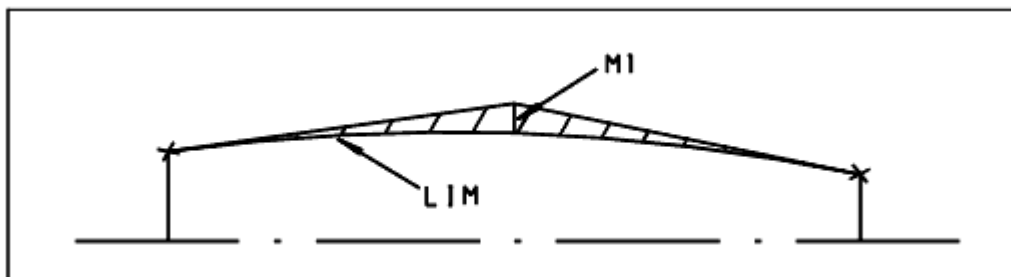
## 21 Compensation (CMP) 语句

This statement defines a wedge-shaped compensation along the outer contour. The compensation can be considered to be an unsymmetric excess.

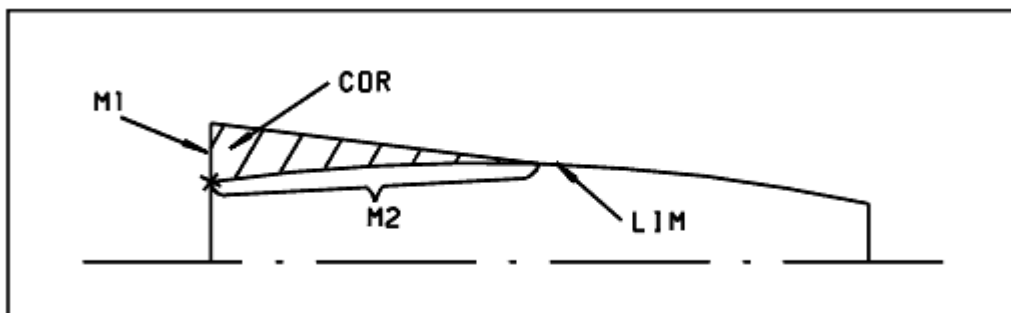
Like excess, the compensation is applied when the parts are extracted.

There are two different types of compensation as illustrated below:

Type 1: Symmetric compensation.



Type 2: Compensation at a corner.



Syntax:

---

```

CMP, TYPE= <type>
      ,LIM= <lim_no>
      ,M1= <size>
      [,M2= <length>
      ,COR= <corner_no>] ;

```

---

### Description

TYPE Type of compensation (see above).

<type>::= 1|2

LIM The limit along which the compensation will be added.

<lim\_no>::= <integer>

M1 The size of the compensation (see the figures above).

<size>::= <number>

M1 > 0 means expansion of the panel.

M1 < 0 means inwards compensation.

M2 and COR are relevant only for compensation of type 2 (see above).

M2 must be given.

M2 defines the length from the corner along which the compensation will be added.

If the given length is greater than the length of the limit, then the compensation will cover the whole limit.

<length>::= <number>

COR defines the corner of the given limit from which the compensation shall be added.

<corner\_no>::= <integer>

### Example:

```

CMP, TYPE=1, LIM=1, M1=25;
CMP, TYPE=2, LIM=2, COR=2, M1=30,
      M2=1500;

```



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## 22 Shrinkage 语句

When welding together plates or welding profiles to a plate surface, the plate will shrink due to the heating. Especially for thin plates the shrinkage is not neglectable but might have to be compensated for. The

Tribon system has functions to achieve this.

The SHRINKAGE statement is used to indicate that the shrinkage compensation shall be activated for a **panel**. The actual compensation will take place when the plate parts are created.

This means that the panel is always stored with its correct extensions, etc. The amount of the compensation can be controlled in different ways:

- o entirely under user control via the SHRINKAGE statement.
- o entirely automatic from a user specific external table and from the thickness of the plate.  
In this case, the main direction of the shrinkage is defined by the stiffeners. Stiffeners and seams along the main direction will add to the compensation as controlled by the shrinkage object.
- o partly manually, partly automatically.

For details, see below.

#### Syntax

---

```
SHR[INKAGE]      [, <line>]
                  [, M1= <p_sti_fact>]
                  [, M2= <p_sti_part>]
                  [, M3= <alfact>]
                  [, M4= <alpart>]
                  [, M5=<p_seam_fact>]
                  [, M6=<p_seam_part>]
```

---

#### Description

- <line> Defines a direction, perpendicular to which the main shrinkage takes place (normally parallel to the main stiffeners).  
If undefined, the system will search for that direction from the stiffeners.  
When the line is perpendicular to any of the axes, only the appropriate keyword need be given, e.g.  
SHR, U, M1= ... ;  
SHR, Y, M1= ... ;
- M1 Compensation factor for stiffeners to be applied perpendicularly to the main direction, i.e. normally perpendicularly to the main stiffeners.  
<p\_sti\_fact>::= <number>

- If M2 (below) is left out, then M1 is interpreted as a factor. Otherwise the actual factor is calculated as  $M1/M2$ . M2 Partition perpendicular to the main direction, that together with M1 is used to defined a compensation factor for stiffeners (see above).
- If M1 is left out, the factor will be calculated automatically from the plate thickness.
- M1 = 0 indicates no compensation for stiffeners perpendicular to the main direction.  $\langle p\_sti\_part \rangle ::= \langle number \rangle$

M3 Used as M1 and M2 but valid in a direction along the main direction

If M3 is left out, then the compensation is calculated automatically.

M3 = 0 indicates that no compensation should be made along the main direction.

M5 As M1 and M2 but to be used for shrinkage caused by seams parallel to the main direction.

M6

For the automatic calculation of the compensation, it is necessary that the corresponding information can be found in the shrinkage object.

The figure below illustrates the concepts above.

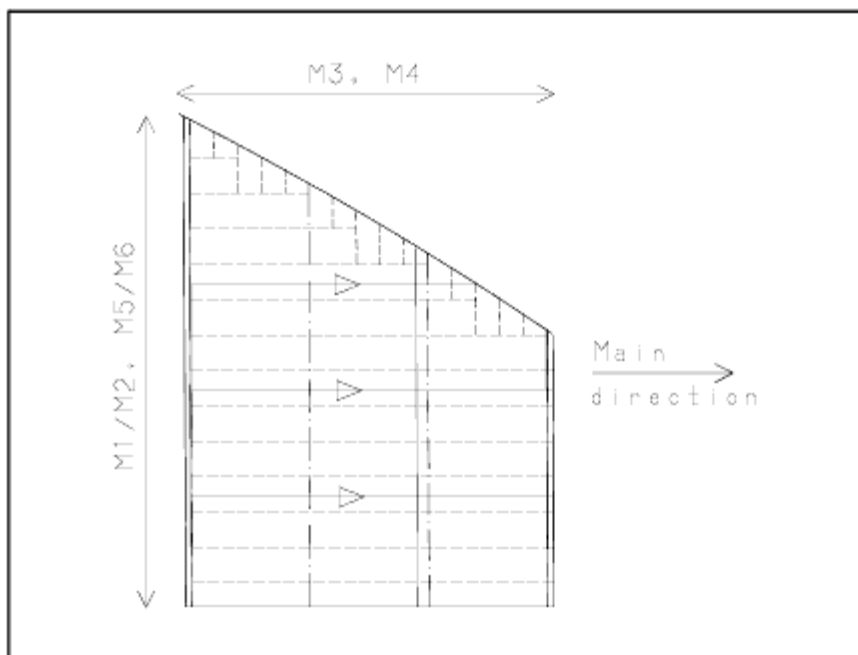


Figure 22:1. Shrinkage directions and parameters for shrinkage control.

The main direction is normally defined by the stiffeners but may be given on a line.

M1/M2 and M5/M6 are valid perpendicularly to the main direction. M2 is normally the position between the stiffeners, M6 the partition between seams.

M3 and M4 are applied parallel to the main direction.

Remark:

If stiffener arrangement is as in the figure below, the partition between the stiffeners will be incorrectly calculated ( $=d$ ). In such and similar cases, the partition should be set manually.

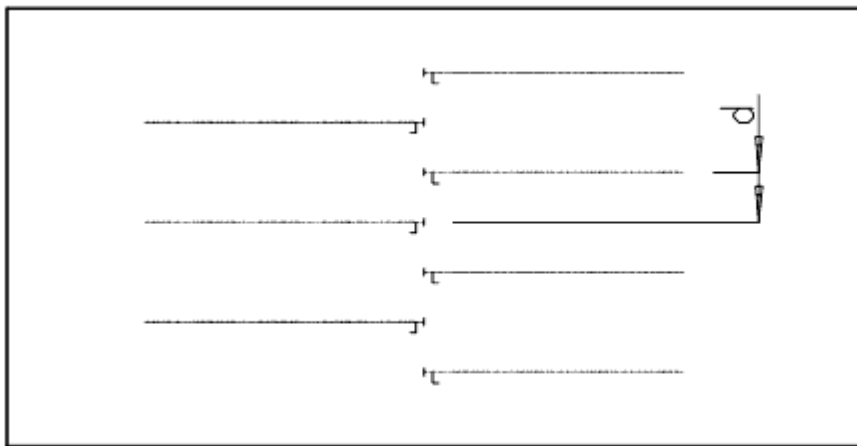


Figure 22:2. Unsuitable arrangement for automatic shrinkage evaluation.

Example:

1. SHR, ;

The compensation is calculated entirely automatically.

2. SHR, V, M1=0.5, M2=700, M3=0, M5=0;

SHR, V, M1=0.0007, M3=0, M5=0;

These two statements give the same result. The shrinkage is parallel to the u-axis. Compensation only perpendicularly to the main direction and for stiffeners only.

3. SHR, M2=800, M3=0, M6=2500;

In this case, there is compensation only perpendicularly to the main direction. This direction is calculated automatically and the compensation for each profile is defined by the shrinkage table and the plate thickness. Similarly, the compensation for each seam is fetched from the shrinkage object.


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## 23 Weld 语句

The WELD statement is used to define bevelling and welding along the limits of a plane panel. A limit may be broken down into several intervals. One WELD statement is required for each interval. Bevelling and welding can be set along limits defined by hull curves, panel intersections, profile sections (CROSS), profile edges (ALONG) if no overlap is given and by flanges on panels in the same plane.

Syntax:

---

```

WELD, [LIM=<limit>]

    [, <int_start> ]
    [, <int_end> ]
    [, SID = <def_side> ]
    [, WELD = <size> [ , <size> ] ]

    {
        ( BEV = <bevel_type>
          {
            [ , [VAR[YING]] ]
            [ , A= <ang_st> [ , <ang_end> ] ]
          } )
        ( AUT[0]
          {
            [ , [VAR[YING]] ]
            [ , A= <ang_st> [ , <ang_end> ] ]
            [ , SET = <set_no> ] )
          EQU[AL]
        )
    }

    [ , BVT = <string> ]
    [ , <kn_line> ]
;

```

---

Description

LIM	Defines the limit of the panel along which the interval is defined. If no limit is given explicitly, bevelling and welding is applied to all limits possible. <limit> ::= <integer>
-----	--



<int\_start> Defines the start of the interval along the limit.

Different options are available for the start of the interval:

- From the end of the previous interval along the limit. If no interval has been defined before, it is supposed to be the starting point of the limit.
- From the intersection between the limit and a given line.
- From the intersection between the limit and a given seam in the panel.
- By a distance from the start or end of the limit.

<int\_start> ::=

$$\left\{ \begin{array}{l} \text{<line1>} \\ \text{FROM} = \text{<seam\_no>} \\ \text{M1} = \text{<distance>} \end{array} \right\}$$

<line1>

See General about the Input Language of Hull Modelling.

FROM

Defines the seam from where the interval starts.

<seam\_no> ::= <integer>

M1

Defines the distance from an end point of the limit to the start of the interval. (M1=0 need not be given)  
> 0 : From starting point  
< 0 : From the ending point.

<int\_end> Defines the end of the interval along the limit.

Basically the same options are available as for the start of an interval:

- End at the end of the limit. This is chosen if no explicit end point is defined.
- End at the intersection between the limit and a given line.
- End at the intersection between the limit and a given seam in the panel.
- Define end as a distance from the start or end of the limit.

<line2>

See General about the Input Language of Hull Modelling.

T0	Defines the seam where the interval ends <seam_no>::= <integer>
M2	Defines the distance from an end point of the limit to the end of the interval. (M2=0 need not be given) > 0 : From starting point < 0 : From the ending point.
SID	Defines the positive side that is supposed when defining the weld and bevel type (cf. below). If not given, the positive side is supposed to be in the direction of the w-axis of the local coordinate system of the panel. <def_side>::= AFT FOR SB PS TOP BOT
WELD	The size of the (fillet) weld on "this" and "the other" side, respectively. If the weld is symmetric, only one value need be given.
BEV	Defines the type of bevel in the interval. In the case with a bevel to be derived automatically, the bevel type is normally derived from rules, set up in the bevel control file. <bevel_type>::= <number>
VAR	In combination with the keyword VARYING the bevel angle should be calculated automatically but the automatic selection of bevel type should be cancelled.
A	In combination with the keyword A the bevel angle is defined. Two values mean that the angle should vary continuously between these along the interval. A > 0 means a bevel "open" in the direction as defined by SIDE,  A < 0 in the opposite direction.  <ang_st>::= <ang_end>::= <number>

AUTO	Indicates that the bevel should be derived automatically. Can only be used for limits against the shell or against another, intersected panel. The use of AUTO implies also that the a continuously varying bevel angle (if any) should be calculated unless explicitly given.
VAR	Need not be given (default).
A	Cf. <i>BEV</i> above. If the bevel angle is manually set then the bevel type will be selected automatically but the automatic calculation of the angle will be inhibited.
SET	The bevel rule set from which the bevel should be selected. Need not be given if the default set should be used.
EQUAL	Should be used only in case of butt welding to the limit of another panel. Then the bevel type (and weld, if any) will be fetched from the adjoining limit of that panel.
BVT	An arbitrary string that will be written along the trace of the boundary in symbolic views.

`<kn_line> :: = KNA=<ang> | KNP=<panel>`

`<kn_line>` is used to define a knuckle angle against the adjoining panel along this boundary, either as an explicit angle or by giving the name of the adjoining panel.

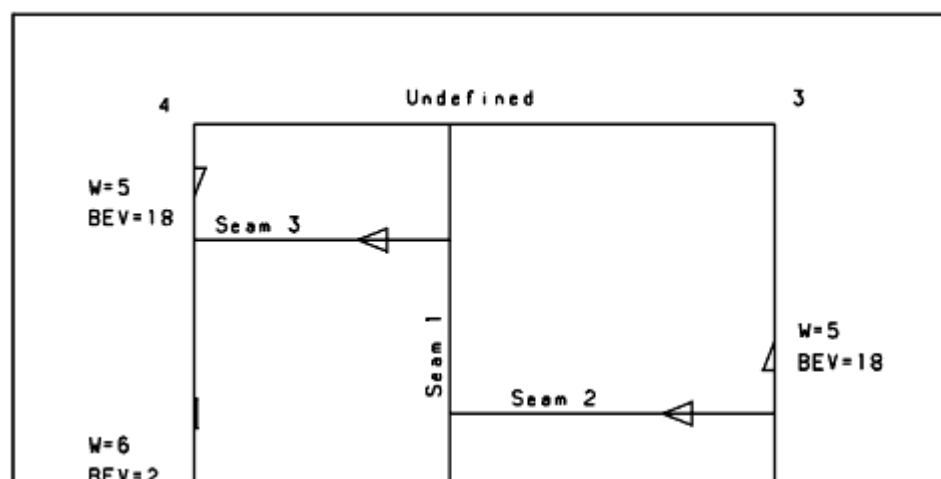
KNA Defines the knuckle angle along the boundary. If the angle, `<ang>`, is positive the knuckle is supposed to be concave, negative otherwise (when seen from the positive side of the panel).

KNP Reference to a panel, `<panel>`, that should be used to calculate the knuckled angle along the boundary.

If `<kn_line>` is left out, Hull Modelling will use the boundary references to automatically calculate the knuckled angle. Only panel references are handled.

A given `<kn_line>` overrides the automatic calculation.

`<kn_line>` is only valid for the basic bevel types 10, 20, 50 and 51.



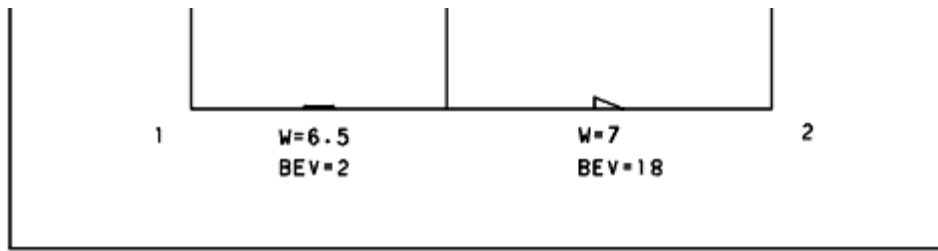


Figure 23:1. Bevel along outer contour according to example 1.

#### Example:

1. The bevel and weld information in the panel above will be described by the following statements.

```
WELD, LIM = 1, TO = 1, BEV = 2, WELD = 6.5;
WELD, LIM = 1, FROM = 1, BEV = 18, WELD = 7;
WELD, LIM = 2, BEV = 18, WELD = 5;
WELD, LIM = 4, TO = 3, BEV = 18, WELD = 5;
WELD, LIM = 4, FROM = 3, BEV = 2, WELD = 6;
```

This is relevant in case the panel is butt weld against another panel and the two panels are not located in exactly the same plane. The bevel angles may then have to be adjusted to become symmetrical with respect to the bisector of the angle between the two panels.

2. Bevel to be selected automatically against a shell curve limit.

```
WELD, LIM = 1, AUTO;
```



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## 24 Curve 语句

The CURVE statement is used to establish curves that can be referred to from other statements within the scheme. The curves exist only temporarily during the execution of the input scheme and will not be stored on any data bank. Curves may be closed contours.

There are three main layouts of the CURVE statement:

- The curve is established by explicitly giving the segments which it consists of.
- The curve is established as a spline curve through a set of given points.
- The curve is established by connecting curve parts by fillet radii. The curve parts may be arbitrary contours or straight lines.


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[Curve](#)

## 24.1 曲线, 由段定义

This type of statement is used when segments, i.e. lines and arcs, of the curve are known.

Syntax:

---

CURVE, <curve\_name> [, <system>], <point>

(/(<segment>) (1 ... 29);

<curve\_name>::= <name>

<system>::= UV|XY|XZ|YZ

<segment>::= R <radius>| <amplitude>, <point>

<radius>::= <amplitude>::= <number>

---

Remarks:

1. The statement can be given everywhere in the scheme. If xyz-coordinates are used, the statement must not occur until the position of the panel has been defined.
2. <system> defines the coordinate system, used to describe the curve. All points must be given using the same type of coordinates. If not given, uv-coordinates are supposed.
3. As everywhere else, FR-terms, LP-terms and topology point references may be used.
4. Radius and amplitude are positive if the circulation direction of an arc is positive, negative if the direction is negative. Zero indicates a line segment.  
When described in the xyz-system, the curve is supposed to be seen from FOR|TOP|SB when judging the circulation direction.
5. <point> may be a complete topology reference, i.e. one term only.

---

Example:

1. CURVE, 'ABC', 1000, 2000/0, 2000,  
1800/R2000, 3000, 2000;

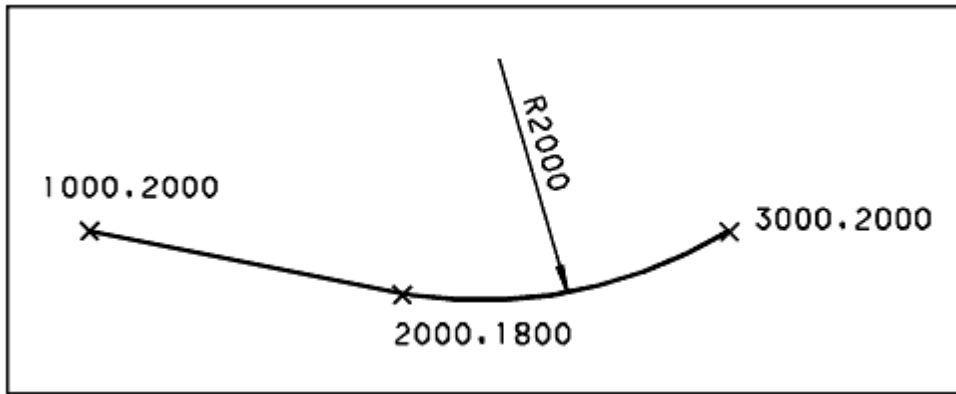


Figure 24:1. Curve defined explicitly as in example 1.

2. CURVE, 'AAA', P1/50, P2/0, P1+50, P2+100/0, 1000, 2000.



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## 24.2 样条曲线

This type of statement is used when the curve is supposed to pass through a number of known points. The curve is generated as a spline.

### Syntax

CURVE, <curve\_name>, SPL[INE] [, <system>], <point>

[, <vector>] (/ <point> (0 ... 28)) /<point>

[, <vector>];

### Description

<curve\_name> is the name of the curve.

<curve\_name>::= <name>

<system> see above.

<vector> is a tangent vector of the curve in the starting and/or ending points. It can also be a reference to a direction of a topology point. In that case the direction vector is calculated from the direction angle. It can be given at any end independently of the other. If left out, the spline has a free direction in the end points. The vector need not be normalized.

<vector>::= <number>, <number>|<top\_ref>

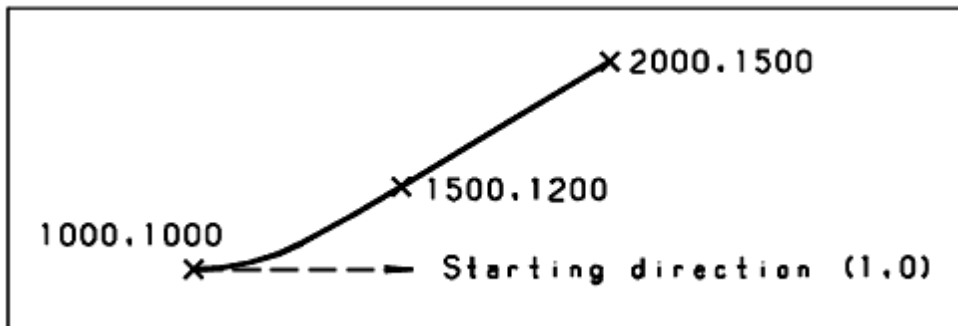
<top\_ref> is a topology direction reference.

The general remarks on the previous type of curve statement are valid also here.

Example:

1. CURVE, 'DEF', SPLINE, 1000, 1000, 1, 0,

/1500, 1200/2000, 1500;



2. CUR, 'BBB', SPL, P1, P1, TA1 /P2/1000, P3/ 3000, 500/



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## 24.3 圆角曲线

This type of statement is used when a curve shall be formed by connecting curve parts to each other via fillet radii. The curve parts can be lines, existing curves, limits of the current panel and boundary curves from intersected panels and profiles. All curves can be displaced parallel to themselves.

Syntax

---

CURVE, <name> [, CLO[SED] [, R= <radius>]], <curve\_part>

([/, R= <radius>], <curve\_part>) (0 ... 9);

---

### Description

CLOSED indicates that the curve shall be closed.

This means that the last curve part will be intersected with the first one.

R is the radius of the fillet arc, connecting the current curve part to the previous one. It should be given without sign. If left out, a knuckle will normally be introduced in the intersection point between the involved curve parts.

A single topological point can also define the radius. The radius is then created in such a way that the arc goes through the point. The point must lie in the sector where the arc would have been created when given with a number. However, the point can lie exactly on one of the curve parts and would in that case coincide with the tangent point of the radius.

If the curve is not closed, the radius of the first curve part is irrelevant. The radius is always supposed to be given in the plane of the resulting curve.

<radius>::=<number>

<curve\_part>::=

```
<line>  [ , <REV>] [ ,M1=<dist>]
        [ , <side>]
```

```
<line_two_uv-points>  [ ,M1=<dist>]
                      [ ,<side>]
```

```
<limit>
        [ , <line>] [ ,M1=<dist>]
```

```
<curve> [ , <CNO=<no>] [ ,REFL] [ ,<line>]
        [ , M1=<dist>] [ ,<side>]
        [ , <direction>]
```

```
<surface> [ ,REFL]
          [ ,M1= <dist>] [ ,<side>]
          [ ,<direction>]
```

```
<panel> [ , REFL] [ , M1=<dist>],<side>,
        <direction>
```

```
<prof_ref> [ , REFL] [ , M1=<dist>],<side>,
          <direction>
```

<curve>::= <panel>::= <name>

<surface>::= SURF = (<surf\_no> | <surf\_name>) [<limits>]



```

<limits>::= [XMIN = <coord>]

               [, XMAX = <coord>]

               [, YMIN = <coord>]

               [, YMAX = <coord>]

               [, ZMIN = <coord>]

               [, ZMAX = <coord>]

```

```

<surf_no>::= <integer>

```

```

<surf_name>::= <name>

```

The surface may either be selected via its number or via its name.

The number is 1 for the main hull and -1 for the default deck surface if any. For additional surfaces the numbers are the ones used when defining supplementary surfaces during initiation of CGDB.

The names are the surface object names like "SURF='AAHULL'".

Limits can be given along the principal axes to trim the curve resulting from the surface reference. This is necessary e.g. when the curve consists of multiple contours as a curve part curve should have only one contour.

If none of the limit keywords above are given "YMIN=0" is assumed. When referring the reflected surface the keywords above should be given relative to the original position.

<prof\_ref> see General Layout of a Statement. However shell profiles are not handled. Also no repetition can be used here.

<side> is used to indicate the direction of the parallel displacement. In the case with a curve part, resulting from an intersected panel, it also selects the side of the panel that shall be used.

```

<side> ::= SID= AFT|FOR|PS|SB|TOP|BOT

```

<direction> is used to indicate the positive circulation direction of the curve part.

```

<direction>::= DIR= AFT|FOR|PS|SB|TOP|BOT

```

M1 is the displacement of the curve. If <side> is not given, M1 > 0 means displacement to the right, < 0 to the left. However, if the curve part is derived from a limit, the displacement is always to the left, i.e. towards the interior of the panel.

`<dist>::= <number>`

`<limit>::= LIM= <limit_no>`

`<limit_no>::= <integer>`

REFL means that the curve, panel, etc. shall be reflected in the CL-plane before the curve part is calculated.

This also means that SID and DIR, if given, will be applied after the curve has been reflected.

As described in the syntax, each curve part can be described independently of the others in one of the following ways:

1. As a line, restricted or unrestricted. The line may be displaced.
2. As a limit of the current panel. If combined with a line, the limit is replaced by its tangent in the intersection points with the line. The limit can be displaced. A positive limit number means that the curve part retains the direction of the limit, a negative that it is reversed.
3. As an arbitrary curve, read from the data bank or established in another CURVE statement in the same scheme. The curve itself can be replaced by its tangent in the intersection points with a given line. If the curve is reflected and displaced, SID and DIR should always be given to make certain that the curve part is correctly located and oriented. By default, contour zero will be used for the curve part. Other contours can be selected via CNO=<no>.  
`<no>::= <integer>`
4. As a curve, resulting from the intersection between the plane of the current panel and a given surface. This curve may be restricted by a box, otherwise it is handled as an existing curve.
5. As an intersection curve with a given panel that can be reflected in the CL-plane.  
Differences in the plate thicknesses are not taken into consideration.
6. As a stiffener trace line. The non-mould side can be chosen by defining a proper value for side (SIDE=...). If the stiffener is given by tag, an additional line can be defined to select a single instance. If no line is given the first stiffener with the given tag is chosen.
7. As a flange line. For welded flanges the side welded to the outer contour is used unless the other side is chosen. The resulting curve part is the intersection between the flange and the panel plane.
8. As a pillar description line. This is the default. As for stiffeners the side keyword is used to select either one of the web sides or the flange side(s) depending on the orientation of the pillar relative to the curve plane. The pillar web is supposed to be either perpendicular to, or lie in the curve plane.
9. As an elliptical pillar cross section. A special case is when a pillar made from a tube or a round bar is intersecting the curve plane. Then the cross section curve of the pillar is used. This will be the case if the angle between the curve plane and the pillar description line is more than 30 degrees. The resulting elliptical

curve will have a deviation less than 0.5 mm also for inclined intersections. If the side keyword is given for the cross section this means that the curve part will have a gap on the opposite side.

Remarks:

1. In the following cases, the position of the panel in space must already have been defined before executing the CURVE statement:
  - when xis-coordinates are used.
  - when SID or DIR are used.
  - when a curve part is derived by intersecting a panel or a surface.Likewise, of course the boundary of the current panel must exist if a limit is referred to.
2. The curve parts must be given the same direction as the final curve.
3. The fillets may interfere, but the result will then normally be that a knuckle is introduced in the breakpoint between the involved fillets.  
One of them will have a radius that differ somewhat from the given value.
4. Note the possibility to generate one curve, consisting of several others that are connected.
5. Also a curve that has been established in a curve statement can be reflected in the CL-plane.

**Example 1:**

This statement generates a simple rectangular hole with different radii at all corners.

```
CURVE, 'HOLE', CLOY, V=1000, R50
```

```
/U=2000, R=75
```

```
/V=2000, REV, R=100
```

```
/U=500, REV, R=125;
```

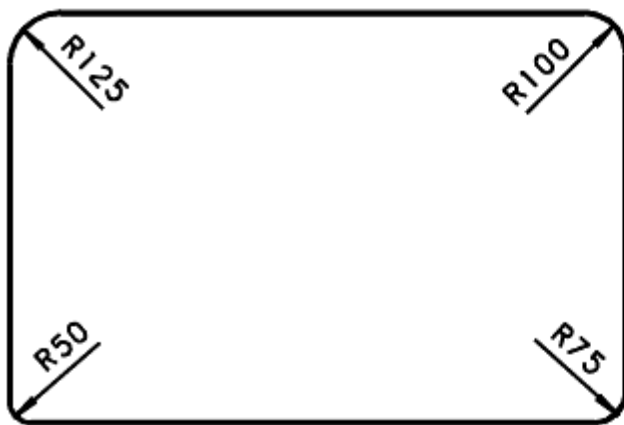


Figure 24:2. Closed Fillet Curve as in Example 1.

**Example 2:**

This statement generates a curve parallel to the limits of the current panel, The curve can be used e.g. As a hole.

```
CURVE, 'HOLE2', CLOY, LIM=1, M1=600, R=500
```

```
/LIM=2, M1=500, R=500
```

```
/LIM=3, M1=400, R=400
```

```
/LIM=4, M1=700, R=700;
```

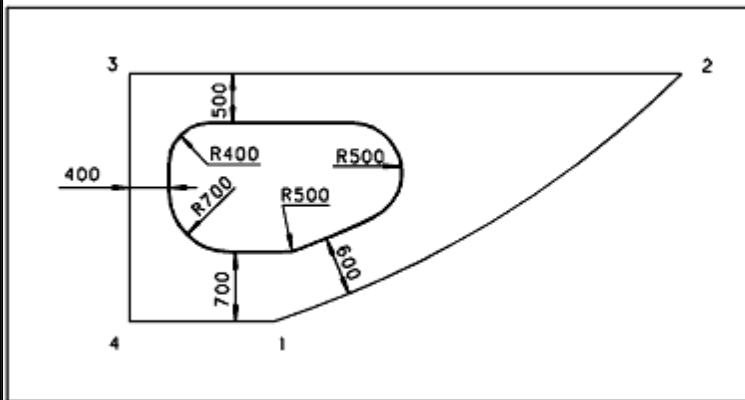


Figure 24:3. Closed Fillet Curve as in Example 2.

**Example 3:**

This statement generates a curve that is supposed to be used as a free boundary of a side web. (PITFALL and DECK are panel names).

```
CURVE, 'LIMIT', 'PLATF', SID=TOP, DIR=PS, M1=500
```

```
/ 'SBX106', M1=-800, R=700
```

```
/ 'DECK', SID=BOT, DIR=SB, M1=400, R=400;
```

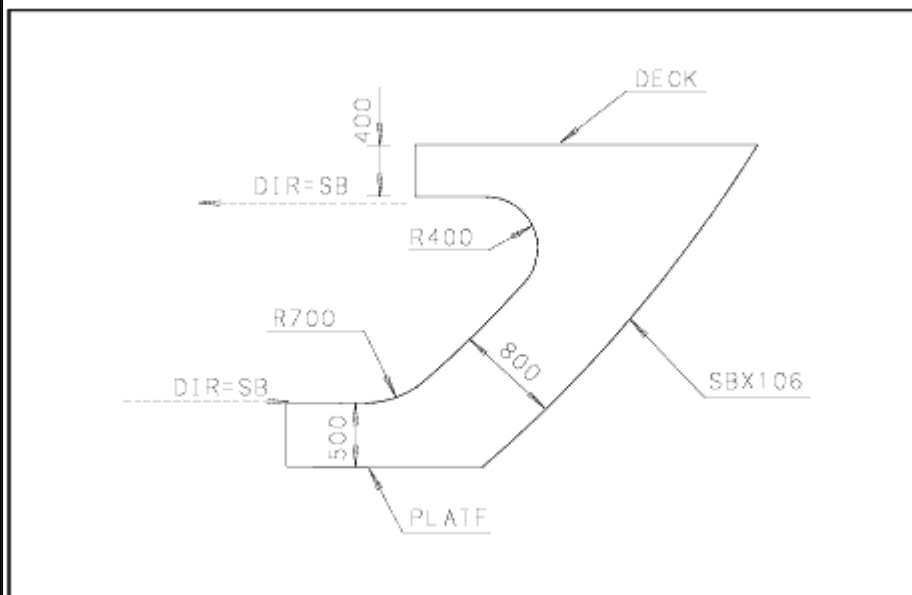


Figure 24:4. Fillet Curve as in Example 3 (used as free edge).

#### Example 4:

This statement generates a fillet curve where the radius of the fillet arc is calculated from the condition that it should pass through a given topology point.

```
CUR, `NAME', Y=P1
```

```
  / U= P1, V=P1, T=15
```

```
  / R=P1, 'ESX45', M1=700, SID=SB
```

```
  / ---
```

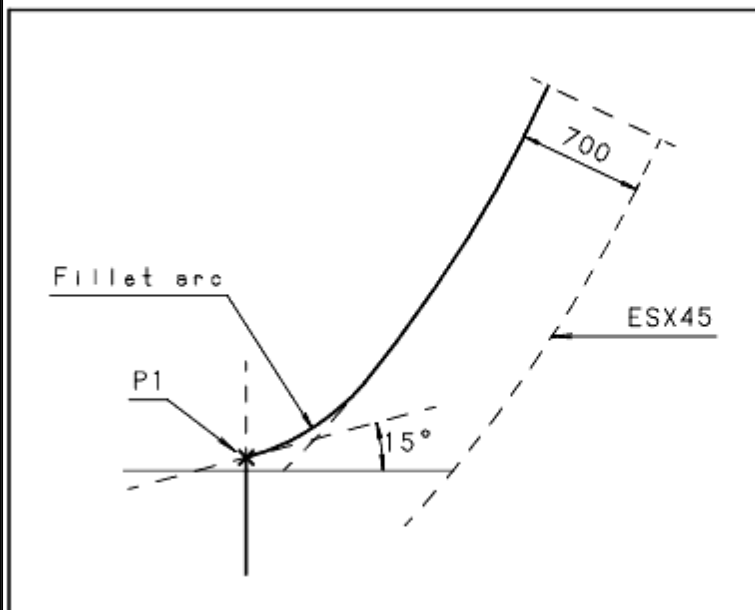


Figure 24:5. Fillet Curve as in Example 4.



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## 25 拓扑点



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## 25.1 背景

When creating the hull model in Hull Modelling there is a general ambition to use topological references to as large an extent as possible. This ensures that changes in one object will more or less automatically propagate also to the dependent objects. Another way of expressing this is that the use of explicitly given coordinates and positions should be minimized.

One means of enhancing the level of topological references in the modelling work is to use the so called **topology points** that are available in the design language of Hull Modelling. The concept topology point and its intended use in Tribon Planar Hull Modelling are outlined in this chapter.



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## 25.2 拓扑点是什么?

The definition of a topology point given here is supposed to be primarily valid within the modelling of internal/plane structures.

Hull Modelling supports the use of many kinds of topology references, e.g. by connecting a stiffener to the cross section of a longitudinal, by connecting stiffeners to each other, by using penetrating structures as the boundaries of panels and parts, etc.

A topology point is a point stored in the current panel whose position, etc. normally is calculated by reference to parts of the model. Components in the panel may then be generated by reference to topology points. The topology points can be said to form a kind of "topology links" between components and the model in those cases where no direct topological references of the type mentioned above are available.

A topology point is characterized by

1. The information stored along with the point,
2. The way it can be generated,
3. The way it can be used.

This will be further discussed below.



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## 25.3 拓扑点的储存

The topology points are currently restricted to be used within one plane panel only. On the other hand they may of course be generated by references to other panels and to other items in the model.

Topology points are numbered in the range 1 to 999. The numbers of the points are used when they are referred to and may be user defined.

Topology points may be restricted to the plane of the current panel, either the mould plane or a selected side of the plating of the panel. Such points are called 2D topology points.

However, topology points may also be space points, located in an arbitrary way in the coordinate system of the current panel. Such points are called 3D points.

Topology points are stored as attributes in the panel. In addition to the position of the point, 2D points also have associated with them two directions in the uv plane of the current panel, one primary direction and one secondary direction. The sense of these directions depends on the way the topology point has been generated.

References to topology points may concern their position or directions or both combined in one reference.



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## 25.4 拓扑点的生成

The idea behind the topology points is that they should be able to be generated in a very general way by referring to a large variety of items in the model, including other topology points. If new needs should occur the point generation module can easily be extended.

The design language of Tribon has a special statement type for topology points, the POINT statement. The syntax of this statement is described in detail in the next chapter.

The main alternatives for definition of a topology point are as follows:

- Explicitly given point,
- Corner of the current or another panel,
- Cross section of an intersecting profile (one of several characteristic points in a profile section),
- Intersection between two "curves" to be arbitrarily combined:
  - A line
  - A panel limit
  - An arbitrary curve
  - A curve from a panel section
- Interpolation between points

Each point definition is supposed to be combined with a possibility for offsets along the axes of the coordinate system (either in uvw or xyz) or for displacements given distances along the directions associated with the point (or along the curves involved in the point definition).

Existing topology points may be used in the definition of new ones.



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### • 拓扑点的显示

When generated the topology points are displayed in the current view in the following way:

- By a point symbol in the position of the point,
- By a small circle surrounding the point symbol,
- By a solid line and an arrow in the primary direction associated with the point,
- By a dashed line and an arrow in the secondary direction,
- By the number of the point, displayed close to the point symbol.



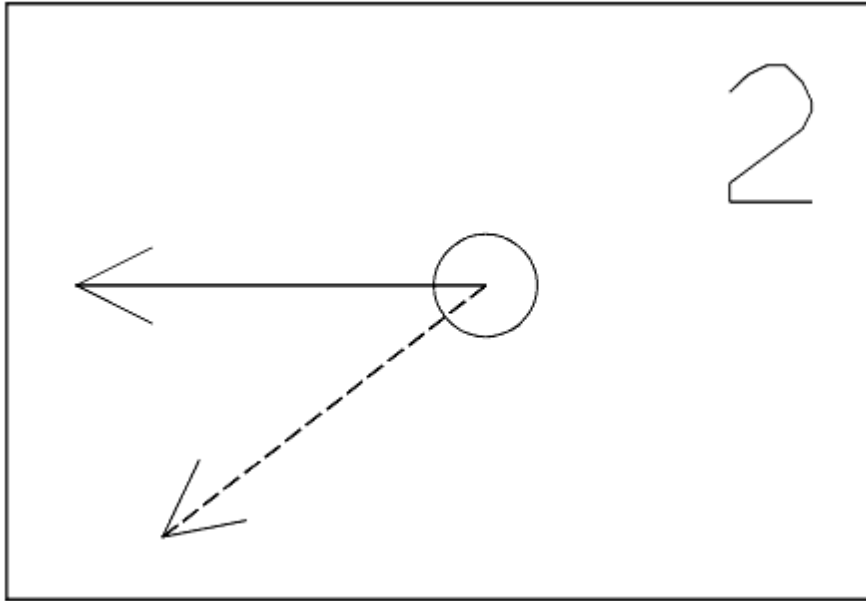


Figure 25:1. Display of topology point.

In the case with a 3D point the direction arrows are not displayed. To minimize irrelevant information in the view it is recommended to generate the points as R3 points except when the directions are of interest.

The display of the points in the drawing is temporary during the generation only. When a scheme is terminated the view will automatically be cleansed for the points.



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拓扑

## 25.5 拓扑点的使用

The general principle for the use of topology points is that **references to topology points should be supported everywhere in plane hull modelling where explicit coordinates and directions can be given in input**. This means e.g. in assignments to keywords like U, V, X, Y, Z, T, etc. but also in curve statements without any keywords and in the keywords for space points (ORIGIN, UAXIS and VAXIS).

Exception to the general rule is that topology references are not supported in the PANEL and plane (PLN) statements.

Reference may take place for individual coordinates and directions but also for/to a point as a whole.

This is described in detail in General Layout of a Statement.



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## 26 Point 语句

The POINT statement is used to generate topology points in a plane panel. A POINT statement may occur everywhere in an input scheme after the PANEL statement.

There are a few alternatives available for the generation of topology points, each corresponded by variants of the general syntax.

These alternatives are currently:

1. Explicitly given point.
2. Point at corner of panel.
3. Cross section of profile.
4. Intersection between "curves".
5. Interpolation between points.
6. Section of pipe.



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Point

### 26.1 共同特征

The general layout of the point statement is as follows.

Syntax

---

POINT     [, NO = <point\_No> (1 ... 25)]

[, R3]

[, MSIDE = <dir>]

[ <deltas>]

$$\left\{ \begin{array}{l} \text{<given>} \\ \text{<at corner>} \\ \text{<profile section>} \\ \text{<intersection>} \\ \text{<interpolation>} \end{array} \right\}$$

;

---

### Description

NO        Points are normally numbered automatically and will get the first free number in the range 1-999.

When given by the user the number must be in this interval and a point with that number must not exist before.

<point\_No>::= <integer>

R3        Indicates a 3D point. If not given, the resulting point will be projected onto the surface or mould plane of the current panel.

For space points the directions associated with the points are irrelevant (they are set to 0).

MSIDE    If not given (and R3 missing) the point will be projected onto the mould plane of the panel.

If given, the point will be moved to the plate surface of the panel in the calculated point in the indicated direction.

<dir>::=AFT|FOR|SB|PS|TOP|BOT

<deltas> Used to move the calculated point parallel to the axes of the selected coordinate system.

<deltas>::=

$$\left\{ \begin{array}{l} \left( \begin{array}{l} [, DU=<delta\_u> (1 \dots 25)] \\ [, DV=<delta\_v> (1 \dots 25)] \end{array} \right) \\ [, DX=<delta\_x> (1 \dots 25)] \\ \left( \begin{array}{l} [, DY=<delta\_y> (1 \dots 25)] \\ [, DZ=<delta\_z> (1 \dots 25)] \end{array} \right) \end{array} \right\}$$

<delta\_<>>::=<number>

For 2D points the deltas in the xyz system will be projected onto the uv-plane of the panel before being applied.

The deltas and the offsets along directions (cf. below) form two independent and complementary ways of adjusting the position of the point.


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## 26.2 点假定

This subsyntax may be used to define a topology point by giving points and an associated direction explicitly (including references to already existing points).

### Syntax

```
<given>::=<point> [ <direction> [ ,M1=<offset> ] ]
```

### Description

<point> Cf. the general definition of this item in the design language.

However, for a 3D point all the three coordinates X/Y/Z may be given.

<direction>::= <point def. by XT/YT/ZT>

```
{
```

```
,T=<angle>
```

The primary direction (DIR1) is defined. The secondary direction is automatically set to DIR1 +90.

If not given, DIR1 will be set to 0.

Note: that the point and the direction may be given independently of each other, e.g. the direction may be given by T and the point by X/Y/Z.

This clause is irrelevant for 3D points.

M1 Defines a move along <direction> from the given point.

**Example:**

1. POI, U=1000, V=500, T=30, M1=500, DY=100;
2. POI, X=FR75, Y=P3+25, T=45, M1=-100;
3. POI, XYZ=P1()2, DY=725;



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## 26.3 边角处的角

This subsyntax may be used to define a topology point by reference to the corners of the current panel or any other given panel.

### Syntax

`<at_corner> ::= ,COR = <corner_No> ( 1 ... 25)`

`[ , <panel> [ , REFL ] [ ,SID=<dir> ] ]`

`M1=<forw_move>`

`[ , { } ]`

`M2=<backw_move>`

`<corner_No> ::= <integer>`

`<forw_move> ::= <backw_move> ::= <number>`

`<panel> ::= <name>`

### Description

**COR** The number of the corner.

**<panel>** Name of the panel the corner(s) of which should be used.

If left out the corners of the current panel will be used.

**REFL** The corner point will be reflected in the centre line plane of the ship.

**SID** If the corner is on another panel which is intersected by the current one, SID indicates from which side of the "other" panel the corner point should be fetched. If left out it is supposed to be in the mould plane.

`<dir> ::= AFT|FOR|PS|SB|TOP|BOT`

- M1 Defines a move in the forward direction of the outer contour from the given corner. The move will be along the contour of the panel in which the corner is indicated.
- M2 Defines a move in the backwards direction.

The primary direction will be calculated as the direction of the tangent after the corner, the secondary as that of the tangent before the corner in the negative direction of the contour.

In case of a move the corresponding direction will be calculated in the position of the resulting point.

The picture below illustrates the meaning of the parameters in this case.

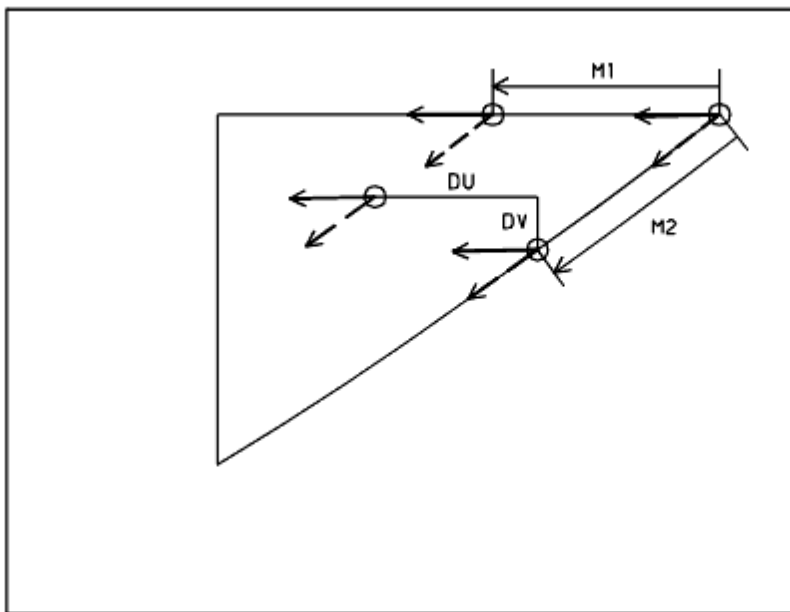


Figure 26:1. Topology points at panel corner.

Example:

1. POI, COR=1-2;
2. POI, 'OTHER\_PANEL', COR=3, M1=250, DZ=-100;



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Point

## 26.4 在型材截面的点

This subsyntax may be used to define a topology point by reference to a profile cross section. The section may be either with the plane of the

current panel or with principal planes in the local coordinate system of the panel or in the ship coordinate system.

### Syntax

---

```

<profile_section> ::= ,CRO

                    ,<ext_prof_ref> [,REF],

{
                    } (1 ... 25)

, <int_prof_ref>

[ <plane> ]

TOP | FLA

[ , {
                    } ]

DIR = <direction> [,FLA]

DIS[PLACED]

[ , {
                    } ]

SID = <direction>

[ ,M1 = <offs_dir1> ]

[ ,M2 = <offs_dir2> ]

[ ,PER[PENDICULAR] ]

<direction> ::= AFT|FOR|PS|SB|TOP|BOT

```

---

### Description

CRO Indicates profile section.

<ext\_prof\_ref>

See [General Layout of a Statement](#).

<int\_prof\_ref>

**Note** that references to pillars are supported.

<plane>

Normally the profile is supposed to be intersected by the plane of the current panel (on the side indicated by MSIDE, cf. above). This clause allows the profile to be intersected by a plane perpendicular to an axis of the global or local coordinate system.

<plane> ::= U|V|X|Y|Z = <coord>

Normally, the intersection point with the plane is calculated as the intersection with the mould line (trace) of the profile. However, there are different possibilities to get another intersection point.

TOP Moves the point to the top of the profile section.

FLA Moves the point to the side of the flange against the web.

DIR Moves the point to the flange in the indicated direction (should be used primarily for pillars which normally have flanges in two directions). If combined with FLA the point will be on the "inwards" side of the flange.

DIS Moves the point to the non-mould line side of the web of the profile. Should be used only for profile types where the mould line is one side of the web.

SID Moves the point to the edge of the flange in the given direction.

In this case TOP is not required.

The result will be as though the flange was a profile (flat bar) of its own.

M1 Defines an offset in the primary direction.

M2 Defines an offset in the secondary direction.

PER Means that the measure will be measured perpendicularly to the profile trace, e.g. to give a correct overlap of a bracket.

The picture below shows the keywords used to reach certain node points of a T-bar (without any offsets and deltas and without the use of SIDE). 'Basic point' is the result when no other keywords than CROSS are given. The resulting directions are also indicated.

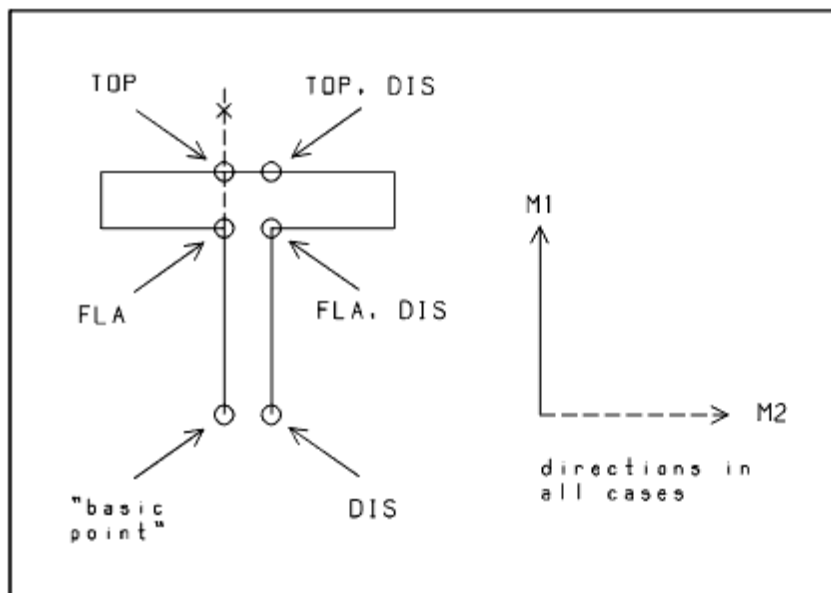


Figure 26:2. Parameters for control of topology points in profile section.

The next picture shows the points (and directions) at the edge of the flange that are reached with the aid of the keyword SIDE. **Note** that the directions have changed compared to the previous picture.



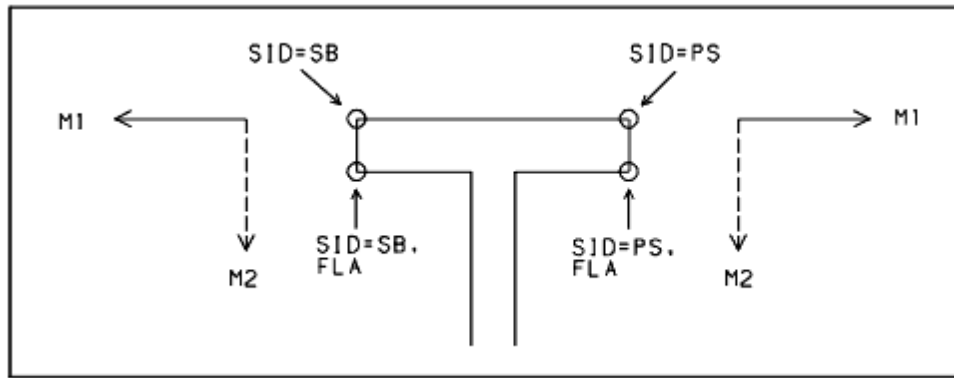


Figure 26:3. Parameters for control of topology points in a profile section in combination with use of SIDE.

Similar principles are also valid for the profile types normally used for pillars. However, DIR should be given in all cases except when a point is wanted in the description line.

Welded flanges can be considered as T-bars. However, if none of TOP, FLA and SID is given the point will be delivered on the free face of the flange. Also, if TOP or FLA are not given when SID is used the point will be delivered on the mould line side of the flange.

The resulting directions will be as follows.

If SID is not given then the primary direction (DIR1) will be in the direction of the web and the secondary direction (DIR2) along flange towards web. Cf. the figure below which also illustrates the positions that can be reached without the keyword SIDE.

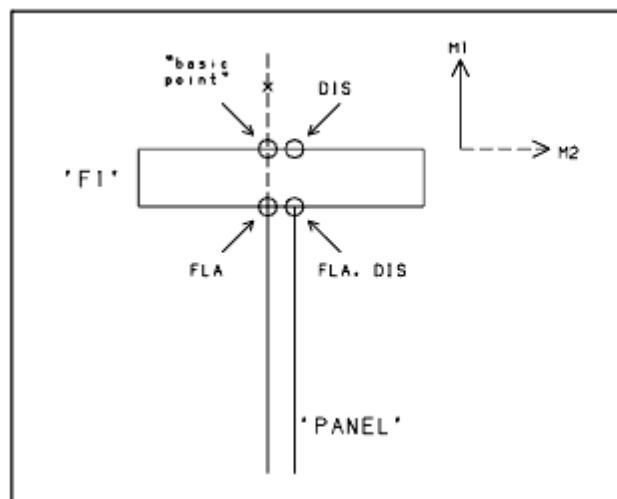


Figure 26:4. Control of topology points in flange section without use of SIDE.

If SID is given, DIR1 will be along the flange in the direction indicated by SID. DIR2 will be along the web of the profile inwards the flange. This is illustrated in the next picture.

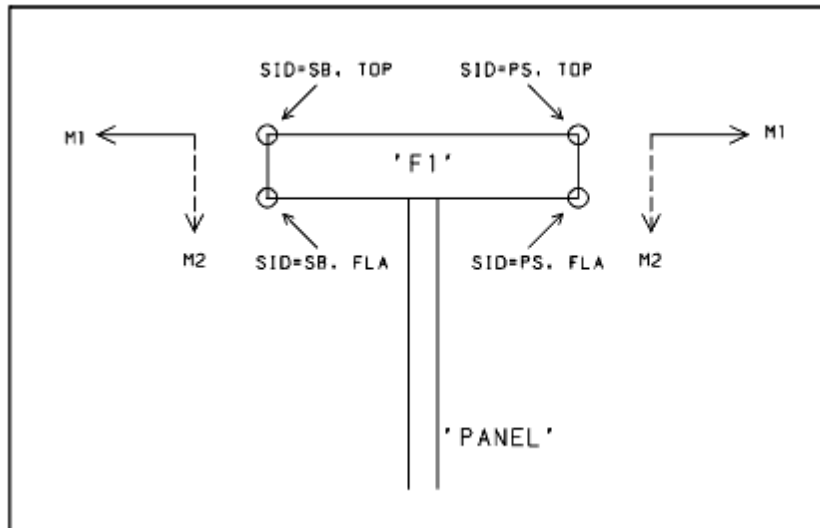


Figure 26:5. Control of topology points in flange section with use of SIDE.

**Example:**

1. POI, CRO, L240;
2. POI, 'WEB', F1, SID=AFT, FLA, M1=-20;
3. POI, CRO, 'DECK', SL13, TOP, M1= -50;
4. POI, CRO, U=1000, MSI=AFT, ST5;
5. POI, CRO, R3, X=FR75, L200, M1=-50, PER;
6. POI, CRO, Z=7000, PI3, DIR=PS;



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Point

## 26.5 交点

This subsyntax may be used to define a topology point as the intersection between two "curves". Each of the two curves may be derived in a number of ways independently of each other. They will always be projected into the UV-plane of the current panel before being intersected.

Syntax

```

<intersection>::= ,INT
<curve_1>
[ ,M1 = <dist_along1> ]
/
<curve_2>
[ ,M2 = <dist_along2> ]
[ ,PER[PENDICULAR] ]

```

## Description

INT	Indicates point by intersection.
M1	Move along <curve_1> from the intersection point.  >0 in the positive direction of <curve_1>  <0 in the negative direction.
M2	Ditto along the second curve.
PER	The distances M1 and M2 should be measured perpendicularly to <curve_2> and <curve_1>, respectively. <b>(In this case only one of M1 and M2 may be given.)</b>
curve_1>::=	

$$\left\{ \begin{array}{l} \text{<line> } (1 \dots 25) \\ \\ ([, \text{<lim\_pan> } [, \text{REF}]] , \text{LIM} = \text{<lim\_No>} \\ \hspace{15em} (1 \dots 25) ) \\ \\ \text{<int\_pan> } [ , \text{REF}], \text{SID} = \text{<direction>} \\ \\ \text{<curve> } [ , \text{CNO} = \text{<cont\_No> } ] \end{array} \right\}$$

$$\langle \text{lim pan} \rangle ::= \langle \text{int pan} \rangle ::= \langle \text{curve} \rangle ::= \langle \text{name} \rangle$$
$$\langle \text{direction} \rangle ::= \text{AFT} \mid \text{FOR} \mid \text{PS} \mid \text{SB} \mid \text{TOP} \mid \text{BOT}$$
$$\langle \text{lim No} \rangle ::= \langle \text{cont No} \rangle ::= \langle \text{integer} \rangle$$

<line> See specification in General Layout of a Statement.

LIM            Limit number within the current panel if the panel name (<lim\_pan>) is left out, otherwise limit of the given panel. If another panel is given then the limit may be reflected in the Centre Line plane.

SID In the case with an intersected panel (<int\_pan>) one must indicate which of the two possible intersection curves that should be used. SID should be assigned the direction of the preferred face.

The direction of the curve in this case is selected so that the largest component of its direction vector (U or V) will be positive.

CNO The contour number within the curve. If left out contour 0 is supposed.

<curve\_2>::=

$$\left\{ \begin{array}{l} \text{<line\_2> } (1 \dots 25) \\ \text{([,<lim\_pan> [,REF]] ,LIM=<lim\_No>} \\ \text{ } (1 \dots 25) \text{ )} \\ \text{<int\_pan> [ ,REF], SI2=<direction>} \\ \text{<curve> [ ,FCN = <cont\_No> ]} \end{array} \right\}$$

The interpretation is similar to <curve\_1> with some keyword exchanged (the definition keywords for lines, SI2 replacing SID and FCN replacing CNO).

The directions associated with the point will be those of the positive tangents in the intersection point (primary direction along <curve\_1>, secondary along <curve\_2>). If the point is moved along any of the curves the direction will be calculated in the new position along that curve.

The result of the intersection may be multiple intersection points. They will all be delivered. If the user has controlled the point number via input it will be increased by one for each of the resulting points.

The figure below illustrates a point calculated in the intersection between a frame curve and a deck. The position is defined by the condition that its perpendicular distance from the frame should be 1000 mm (cf. example 3 below).

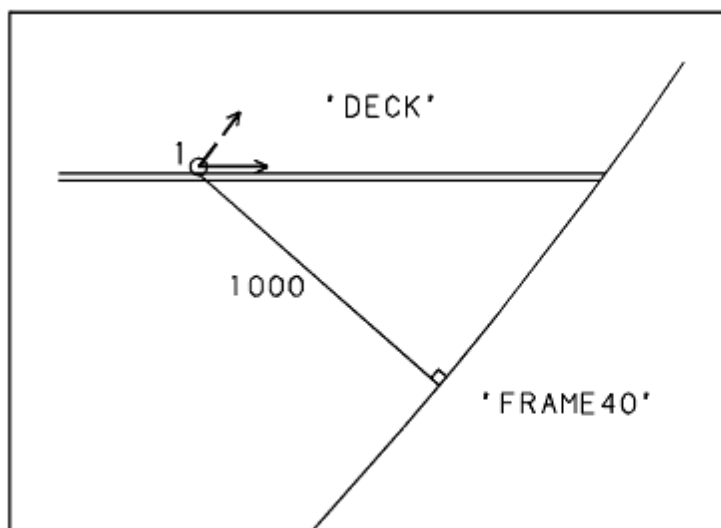




Figure 26:6. Topology point by intersection as in example 3 below.

**Example:**

1. POI, INT, Y=LP3()7, M1=500, PER/ LIM=1;

This example creates the same positions as the centres of the holes in the following statement. **Note** the slash that is required in the POINT statement.

HOL, D400, Y=LP3()7, M1=500, LIM=1;

2. POI, INT, Y=LP3()7, M1=500 / LIM=1;

In this case the distance is measured along the lines corresponding to a slight modification of the HOLE statement.

HOL, D400, Y=LP3()7, M1=500, LIM=1, ALO;

3. POI, INT, 'DECK', SID=TOP, M1=-1000, PER /'FRAME40', DZ=15;

4. POI, INT, U=1000, V=1000, T=30/ U2=500, V2=0, T2=100;

Two lines are intersected. **Note** that the first point is defined by unindexed keywords, the second by keywords with index 2 (however an inclined line in XYZ by X1,Y1,Z1/ X2,Y2,Z2).



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## 26.6 插入的点

This subsyntax may be used to define a topology point by interpolation between two other points (any of which may be a topology point).

### Syntax

<interpolation>::=

, F = <factor>

, <point>

, <point\_2>

[ ,M1 = <offset\_along> ]

[ ,M2 = <offset\_perp> ]

<offset\_along>::=<offset\_perp>::= <number>

#### Description

F Interpolation factor between the two points. It may have any value. F=0.5 means calculating the midpoint between the two points.

<point> See specification in General Layout of a Statement.  
<point\_2>

M1 Specifies a displacement along the connection line between the two given points from the calculated point.

M2 Displacement perpendicular to and to the left of the previous direction.

#### Example:

1. The following statements generate a number of holes at longitudinal positions 2-4 at an equal distance from the frame curve and a platform (assuming that the frame curve is limit 1 and the platform limit 2 of the current panel).

```
POI, INT, Y=LP2()4/ LIM=1;
```

```
POI, INT, Y=LP2()4/ LIM=2;
```

```
POI, F=0.5, UV=P1()3, U2V=P4()6;
```

```
HOL, D300, UV=P7()9;
```

2. POI, F=1, U=1000, V=500, U2=2000, V2=1500, M2=200;

In this case a point is generated 200 mm from the second point in the direction perpendicular to the line from the first point to the second.



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## 26.7 管截面的点

This sub-syntax may be used to calculate the topology point as the intersection between the centre line of a pipe and the plane of the current panel (or another defined plane).

Syntax

---

<pipe\_section>::=

PIPE = <pipe\_name> [, REF]

[ <plane> ]

[ , M1 = <offs\_dir1> ]

[ , M2 = <offs\_dir2> ]

---

### Description

PIPE Name of the pipe to be intersected. The reference may be reflected in the centre line plane.

<plane> Normally the pipe is intersected by the plane of the current panel (on the side indicated by MSIDE, see above). This clause allows the pipe to be intersected by a plane perpendicular to an axis of the global or local coordinate system

<plane>::= U|V|X|Y|Z

M1 Defines an offset in the primary direction. In case the pipe is normal to the intersecting plane the primary direction will be along the u-axis and the secondary direction along the v-axis.

In case of an inclined intersection the section contour of the pipe will be an ellipse. The primary direction is in this case the along the major axis of this ellipse. The secondary direction is perpendicular to the primary one.

M2 Offset in the secondary direction.

If the pipe has many intersection points with the given plane, i.e. passes it more then once, one topology point will be generated for each intersection.

#### Example:

(showing how a hole may be located for a penetrating pipe)

POI, PIPE=' AB123/4-5', NO=5;

HOL, D433, UV=P5;



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## 27 Plane (PLN) 语句

The PLN statement is used to create a plane to be referred to later in the input scheme. The plane will not be stored in the data bank.

The plane can be defined as a plane perpendicular to a principal coordinate axis by one coordinate. It can also be given as three points in the xyz-space.

### Syntax

```
PLN, <pln_name>,

      X|Y|Z= <coord>

{                                     } ;

      <point>/<point>/<point>
```

### Description

<point>::= <coord>, <coord>, <coord>

<pln\_name> is the name of the plane.

<pln\_name>::= <name>

### Remarks:

1. If three points are used to define the plane, they must not be co-linear.
2. FR- and LP-terms can be used when giving the coordinates.

### Example:

```
PLN, 'X-PLANE', X=FR175+100;

PLN, 'GENERAL PLANE', 100, 110, 120/200,

      210, 220/FR10, 0, 0;
```



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## 28 Comment 语句



The purpose of this statement is to introduce comments in the input scheme.

A COMMENT statement may occur anywhere after the identifier statement in an input scheme.

Syntax:

COMMENT, <char> (0 ...);

<char> ::= <letter> | <digit> | <special\_character> | =, | /

Example:

COM, THIS IS A COMMENT;



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## 29 Marking 语句

The marking statement is used to define special marking of three different types:

1. Explicitly positioned marking triangles GSD:s). for details about the GSD option.  
[Setup and Customisation Marks for Assembly \(GSD\)](#)
2. Marking lines resulting from intersections between selected reference planes and the current panel. For details about reference planes.  
[Setup and Customisation Marks for Assembly \(GSD\)](#)
3. Arbitrary marking lines by arbitrarily given end points.

The syntax of the MARKING statement is different in these cases and the different cases are described in individual sections below.



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[Marking](#)

## 29.1 GSD

As there may be a need for additional reference marks along the boundary of a panel, the interactive modelling function has been supplied with a facility for manual setting of GSD:s.

Syntax::

MAR, LIM= <lim\_no>;

Description

LIM Defines the limit along which reference marks should be added  
<lim\_no>::=<integer>

The GSD:s are placed along panel limits and are oriented towards one of the three principal axes.

The spacing between GSD:s in the direction of the y- and z- axes is defined by the Tribon environment variable SBH\_GSD\_INTERVAL and evaluated from the centre line and the base line, respectively. Reference marks in the direction of the x-axis are placed at frame locations.

The evaluated GSD:s are displayed during modelling but will not be part of the drawing.



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Marking

## 29.2 参考平面

Reference planes, previously defined, can be selected to be marked on a panel.

Syntax:

MAR, PLA=<name\_of\_reference\_plane>;

Description

PLA Defines the plane whose intersection with the current panel should be marked.

The reference plane is marked as the line of intersection between the plane and the panel.

The evaluated intersection line is displayed during modelling but will

not be part of the drawing.

When creating this statement interactively, all reference planes intersecting the current panel will be displayed on the panel, allowing the user to pick the one he wants to use.



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Marking

## 29.3 任意线

An arbitrary restricted line can be added for use as a marking line. A typical example is to use such a line to align two plate parts in a slender panel, e.g. a curved side web.

### Syntax:

---

```
MAR, U1=<coord>,
      V1=<coord>,
      U2=<coord>,
      V2=<coordinate>;
```

### Description

U1, V1 defines the starting point of the line.

U2, V2 defines the ending point of the line.

When creating this statement interactively the user points at the starting and ending point of the line.

By the default parameters MARK\_LINE\_TYPE and MARK\_LINE\_COLOUR in the default file of Tribon Hull Modelling the line type and the colour of the marking lines can be controlled.



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## 30 特殊的 GRP 补充

General information about the GRP (Glass Fibre Reinforced Plastics) option of Tribon Hull can be found in the guide Tribon M2 Set-up and Customising. To support modelling of vessels in the GRP technique certain extensions have been made to some of the input statement of the design language of Hull Planar Modelling. Moreover, quite a new statement type has been introduced for the modelling of beads along panel boundaries. These extensions are described below. The special features are also supported in interactive modelling of a GRP vessel.

At the same time certain clauses of input statements have become obsolete for GRP vessels. However, these are not specified in this documentation and they are normally available for use/definition. However, they will in most cases have no effect if used.



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[增加特殊的](#)

### 30.1 Hole 语句

It is possible (but not compulsory) to laminate holes. This means that the additions to the hole statement specified below may be missing.

Syntax:

---

HOLE, ...

[, LAMINATE = <lam>]

[, D = <width>]

, ...

;

---

Description

LAM Specifies the laminate code for the lamination around the hole.

D Defines width of the laminate zone around the hole.

Example:

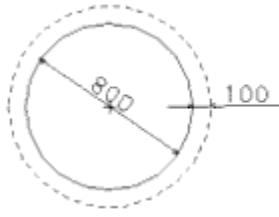


Figure 30:1. Laminated hole.

```

Example:
HOLE      ,D800
          , ...
          ,LAM =16
          ,D = 100
          ;

```



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## 30.2 Plate 语句

A new keyword, LAMINATE, has been added to the plate statement. It defines the laminate code ((implies thickness, designation and density of the laminate).

---

PLATE, ...

```

    [,LAMINATE = <lam1>[,<lam2> ]
    , ...
    ;

```

---

<lam1> Indicates the laminate code on the side of the plate pointing at the side of the positive w-axis (or as indicated by MSIDE).

<lam2> Laminate for the opposite side. If <lam2> is omitted, then <lam2>=<lam1>.

Example (see the figure below):

```

Example:
PLATE, ...

      ,MAT=60

      ,LAM=8,6

      ,QUA=600

      ;

```

(In a GRP project QUA is used to specify the density of the core material (in kg/m3)).

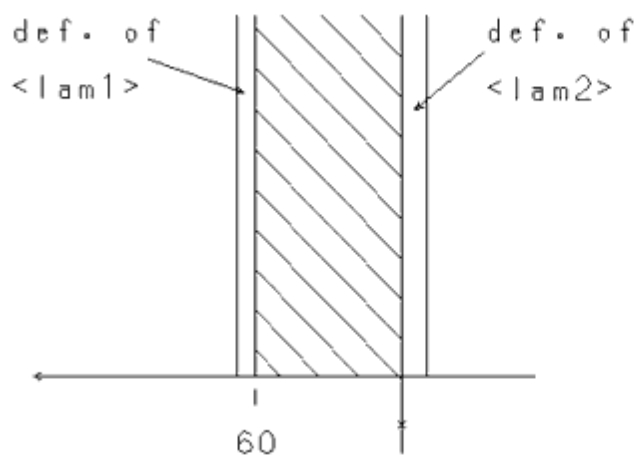


Figure 30:2. Defining of plate thickness in a GRP project.



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增加特殊的

### 30.3 Stiffener 语句

Only two profile types are available for use for stiffeners, the normal flat bar (type 10, with or without supporting beads) and a special profile type with a cross-section in the shape of a trapezoid. The latter has been assigned the profile type 99. Use of any other profile type will result in an error message.

Syntax:

---

STIFFENER, ...

```
,LAMINATE = <lam side>[,<lam top>]

[,BED = <width>]

[,BPO = <bead_posno>]

, ...

;
```

---

<lam\_side> Defines the laminate code on the side of the profile.

<lam\_top> Defines the laminate code on the side of the profile.  
A missing <lam\_top> means that <lam\_top> will be set 2\* <lam\_side>.

BEAD Defines the leg length of the bead along the profile. If given, the profile must be of type 10.

BPO Defines a position number of the beads.

Example (of profile type 10 ("flat bar"), see figure below):

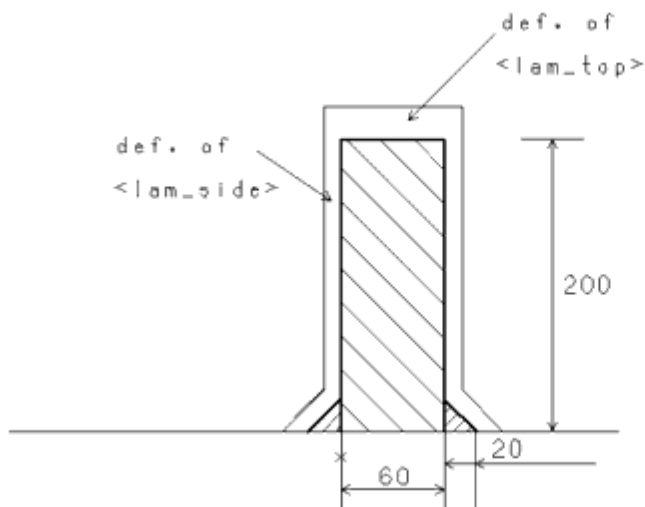


Figure 30:3. Laminated "flat bar" with beads.

Example:

STI, ...

```
,PRO = 10, 200, 60
```

```
,LAM = 11, 12
```

```
,QUA = 200
```

```
,BEAD = 20
```

```
,BPO = 4
```

```

, ...;

```

Example (of profile type 99, see figure below):

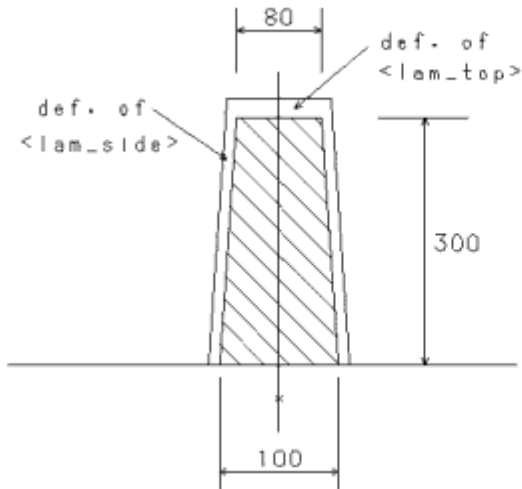


Figure 30:4. Example of profile type 99 with laminate.

```

Example:
STI, ...

,PRO = 99, 300, 100, 80

,LAM = 12

,QUA = 300

, ...

;

```



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## 30.4 Bead 语句

In normal shipbuilding, welding is used to connect parts to each other. In the GRP technique, fillet connections are often supplied with additional beads before the connection is laminated. The BEAD statement makes it possible to define beads along the boundaries of the panel.



**Syntax:**

BEAD,

,LIMIT = &lt;limit\_no&gt;

[,SIDE = &lt;side&gt;]

,POS = &lt;pos\_no&gt;

,M1 = &lt;width&gt;

[,V = &lt;angle&gt;]

,LAMINATE = &lt;lam&gt;

,QUALITY = &lt;quality&gt;

;

---

**LIMIT** Indicates the number of the boundary for which the bead(s) will be defined.

**SIDE** Indicates the side of the panel where to position the bead.  
side>::= FOR|AFT|SB|PS|TOP|BOT

If SIDE is not given, beads will be defined for both sides of the panel.

**POS** Defines a position number of the bead(s).

**M1** The leg length of the section of the bead(s).

**V** The corner angle of the bead, i.e. the angle between the current panel and the adjacent panel to be connected to.

**LAMINATE** Indicates the laminate code for the lamination of the bead(s).

**QUAL** Defines the density of the core material of the bead(s).


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