中 国 般 级 社

CHINA CLASSIFICATION SOCIETY

浮船坞入级与建造规范

RULES AND REGULATIONS FOR THE CONSTRUCTION AND CLASSIFICATION OF FLOATING DOCKS

1992

中 国 船 级 社

浮船坞入级与建造规范

1992

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北　京

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第一章　　一般规定

第一节　通　　则

1.1.1　**适用范围**

1.1.1.1　**本规范适用于在港区内固定作业的钢质浮船坞。对于其他特殊情况，需经本社特殊考虑。**

1.1.1.2　**凡拟取得或保持本社船级的浮船坞，除应符合本规范要求外，在本规范未涉及的部分还应符合本社《钢质海船入级与建造规范》（以下简称《钢规》）的适用要求。**

1.1.2　**定义**

1.1.2.1　**设计升举能力** F_L**：指在正常状态下，所设计的浮船坞其预定升举起最重船舶的空载排水量，**t**；**

1.1.2.2　**坞长** L_D**：指浮船坞底部浮箱的最远两端壁之间的距离，**m**；**

1.1.2.3　**型宽** B_D**：指浮船坞宽度的型值，**m**；**

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1.1.2.7　**浮箱甲板：指浮箱顶部一层用于抬船和坞修作业的甲板；**

1.1.2.8　**残余水：指舱内无法泵出的水；**

1.1.2.9　**调节压载水：指压载水舱内扣除残余部分的水。**

第二节　入级符号和图纸资料

1.2.1　**入级符号和附加标志**

1.2.1.1　**凡满足本规范要求，经本社批准入级的浮船坞，将分别授于下列入级符号和附加标志：**

（1）在本社监督下建造的浮船坞；

★ZCA　Floating　Dock

（2）在本社承认的船级社监督下建造，但经本社检验和审查后，认为符合本社的入级要求的浮船坞；

★ZCA　Floating　Dock

1.2.1.2　**如浮船坞的建造港和使用港不在同一地，且所有设备尚未全部安装就绪，本社将在浮船坞到达使用港后，进行一次全面检查并认为合格时，才授予入级符号和附加标志。**

1.2.2　**特殊标志**

1.2.2.1　**当浮船坞或其机械设备采用新颖设计或新型结构获本社批准后，将加注一适当的特殊标志并记入船舶录。**

1.2.3　**图纸和资料**

1.2.3.1　**浮船坞建造前应将** 1.2.3.2 **至** 1.2.3.6 **所列项目图纸资料一式四份送本社审查。**

1.2.3.2　**船体图纸资料**

*（1）**总布置图；**

*（2）**主要横剖面图；**

*（3）**基本结构图，包括底部浮箱、坞墙、顶甲板、安全甲板等结构图。对分离型浮船坞，还包括沿浮箱缝隙穿过坞墙底部板的结构图；**

（4）结构规范计算书（包括纵强度、横强度和局部强度）；

*（5）**稳性、干舷计算书及吃水标志图；**

＊（6）锚及系泊设备布置图及其计算书；
（7）焊接方式和规格；
＊（8）挠度仪的类型及布置的详细说明；
（9）起重机基座及其支撑结构图；
（10）拖带设备布置图（如有时）；
（11）供备查的图纸资料：
① 静水力曲线图；
② 淡水舱和油舱布置图（包括舱容图）；
③ 甲板室和控制室结构图；
④ 外板展开图。

1.2.3.3 轮机图纸和资料
（1）轮机说明书和机械设备明细表（备查）；
＊（2）机舱布置图；
＊（3）浮箱进排水管系原理图；
＊（4）舱底水管系图；
＊（5）空气管、测量管和溢流管路图；
＊（6）辅机燃油系统图；
（7）辅机滑油系流；
（8）辅机冷却水管系图；
（9）疏排水管路和附件布置图；
（10）辅机排气管系图；
（11）机舱通风系统图；
（12）液压管系原理图；
＊（13）压缩空气管系图。

1.2.3.4 电气设备图和外视图；
（1）电力负荷估算书；
（2）配电板原理图和外视图；
＊（3）电力系流图；

（4）电力设备布置图；

（5）照明系统图和布置图；

（6）浮船坞内通信系统图和布置图；

（7）供备查的图纸资料：

① 电气设备说明书；

② 电气设备明细表。

1.2.3.5 消防图纸和资料

＊（1）结构防火的方式以及有关材料特性的说明；

＊（2）防火舱壁、甲板及有关材料特性的说明；

＊（3）通风系统而置及防火风闸控制图；

＊（4）固定式来火系统而置图及来火剂量计算；

＊（5）水灭火系统而置图；

＊（6）固定式控火及失火报警系统而置图；

＊（7）防火控制图；

＊（8）灭火设备及肖防用品清单。

1.2.3.6 本社认为必要的其他图纸和资料。

1.2.3.7 对不在本社监督下制造的浮船坞的入级，可按1.2.2.2～1.2.3.5 中打*号的图纸资料范围，一式四份送本社审查。

第三节 检 验

1.3.1 入级检验

1.3.1.1 浮船坞的入级检验，除符合本章规定外，还应遵照本社《钢规》第一篇第一章的适用规定。

1.3.2 保持船级的定期检验

1.3.2.1 保持浮船坞船级的定期检验，除符合本章规定外，还应遵守本社《钢规》第一篇第二章的适用规定。

1.3.3 **年度检验——船体**

1.3.3.1 **船体及设备检验范围：**

（1）轻载水线以上的结构（如露天内坞墙板、外板、浮箱甲板等）；

（2）安全甲板和顶甲板；

（3）龙骨墩及基座；

（4）露天舱棚、天窗等；

（5）升降口、梯道、舱口和人孔及其关闭与系固装置；

（6）空气管、舷外泄排水孔；

（7）绞接的天桥通道；

（8）锚泊设备，系泊设备；

（9）起重机导轨、支座；

（10）分离型浮船坞的浮箱联结处。

1.3.4 **水下检验**

1.3.4.1 **浮船坞的坞内检验可由水下检验代替**

1.3.4.2 **船龄为 10 年以下的浮船坞的水下检验，5 年不少于一次；船龄为 10 年及以上的浮船坞的水下检验，5 年不少于两次，最大间隔期不应超过 3 年。水下检验应结合期间检验和特别检验进行。**

1.3.4.3 **水下检验所采用的方法，应取得本社同意。**

1.3.4.4 **本社将根据浮箱甲板和轻载水线附近板的腐蚀情况，以及作业水域条件，在一定年限内免除水下检验的要求。**

1.3.5 **特别检验——船体**

1.3.5.1 **船体及设备的检验范围。**

（1）本节 1.3.3 和 1.3.4 规定的检验内容；

（2）安全甲板和顶甲板之间处所应予清洁和进行检查（如需要），舱壁护条、衬板、管子罩壳应予拆除（如需要）以便检查；

（3）验船师可要求对有明显损耗迹象的结构进行测厚检查，发现由于任何损坏或腐蚀而使构件尺寸严重减小的结构，则应进修复，并使验船师满意；

（4）当浮箱底板的内表面涂有水泥、沥青或其他涂层时，如经敲、铲检查证明涂层粘结良好，可以免予铲除涂层；

（5）浮箱及边坞墙液舱应予清洁和进行内部检查，并重新按最大工作压头进行水压试验；

（6）木甲板或覆盖层应予检查。如发现木甲板或覆盖层有磨损或腐烂者，应予更换。换查木甲板、覆盖层或其他甲板敷料下贴面的情况，如发现木甲板、覆盖层或其他甲板敷料损坏或不贴合甲甲板时，则应拆开检查和修复；

（7）检查从机器处所、船员处所和船员工处所的逃生措施的有效性；

（8）检查控制室与机器处所的通信联络措施的有效性。

1.3.5.2　对于船龄超过 15 年的浮船坞，还应对燃油舱进行内部检查。

1.3.5.3　对于般龄已达 20 年的浮船坞的第一次特别检验，及此后的每隔一次特别检验，除应满足 1.3.5.1 和 1.3.5.2 的要求外，还应对局部腐蚀处的坞墙及浮箱进行测厚，测厚范围为在坞中部 0.5L 范围内的每舷每列板不少于两处。测厚处的油漆及锈蚀应清除。验船师应编制详细测厚记录报告。当测厚的板需要换时，与此板同列的相邻板的厚度亦应记入报告。

第二章　结构与强度

第一节　通　　则

2.1.1　**一般要求**

2.1.1.1　**本章规定适用于下列类型焊接构造的钢质浮船坞。**

（1）整体型：底部浮箱与两舷坞墙均为连续，且不可分离的浮船坞；

（2）分离型：坞墙为连续而底部浮箱是非连续的浮船坞。浮箱可以是与坞墙固定连接的，也可以是可分离的。

对于其他类型的浮船坞，本社将给予特殊考虑。

2.1.1.2　**浮船坞除应满足本章规定外，本章未涉及部分还应满足《钢规》的适用要求。**

2.1.1.3　**应设置一套挠度仪来监测浮船坞的变形，其读数应能在中央控制室中清楚地显示。当升举能力超过** 2000t**，且采用不均匀压载方式作业时，则应设置两套完全独立的挠度仪。如采用其他方法替代挠度仪来监测浮船坞的变形，则应经本社审查同意。**

2.1.1.4　**应有监测和限制浮船坞作业变形的措施（如声、光报警系统，当浮船坞达到最大容许变形时自动停止泵水等）。**

2.1.1.5　**应在坞墙内设置一水密安全甲板，以保证当安全甲板下所有压载水舱全部浸水后，浮船坞仍能以不超过其顶甲板干舷的吃水而呈漂浮状态。**

2.1.1.6　**所有压载水舱都应设置空气管或溢流管，其直径应符合《钢规》的有关规定。所有压载水舱应在适当位置上开设足**

够数量的人孔，以便能顺利到达浮船坞内部结构的各部分和保证舱内的良好通风。

2.1.1.7　在食用淡水舱与油舱之间应设置隔离空舱。隔离空舱应有良好的通风。

2.1.1.8　应考虑系泊和锚泊设备对坞体结构的影响，并采取适当的结构加强。

2.1.2　拖航

2.1.2.1　如果浮船坞需从建造地拖至其他地方使用，则应进进拖航强度计算，并考虑拖带设备的布置和相应的结构加强，且应符合 2.2.3.3 的要求。

2.1.3　材料

2.1.3.1　浮船坞坞体结构所采用的一般强度钢或高强度钢应符合本社《钢规》的有关规定。如需采用其他材料，应予特殊考虑并经本社审查同意。

2.1.4　等效计算

2.1.4.1　如在本社入级的浮般坞拟采用直接计算法或其他通用的经验公式来决定各构件的尺寸，则应将有关的计算与计算假定及计算说明一并提交本社审查同意。

第二节　纵强度

2.2.1　一般要求

2.2.1.1　应按下述状态进行纵强度的校核：

进坞船坐于龙骨墩上，船长中点与坞长中点处于同一垂直线，干舷符合 3.2.1.1 的规定。

2.2.1.2　总纵强度计算中，如分离型浮船坞的浮箱构件未全部计入，则应核算浮箱连结处的剖面模数。

2.2.1.3　计入纵强度剖面模数的构件，应在浮船坞坞体中部 $0.4L_D$ 区域内保持相同截面，且应纵向连续。但起重机轨道不应

计入剖面模数中。

2.2.2 载荷条件

2.2.2.1 浮力可假定为沿坞长均匀分布。

2.2.2.2 应按设计中认为的最危险的作业载荷条件，校核浮船坞坞体的纵强度。一般可按空载排水量相当于浮船坞最大升举能力的船长最短船舶的重量分布进行校核。当载荷条件不明确时，可采用 2.2.2.3 的假定。

2.2.2.3 进坞船的重量分布曲线，可以假定为一等于船长的矩形上叠加一等长的抛物线，且抛物线部分面积为矩形面积的一半，该重量分布曲线长度可取为坞长的 0.8 倍。

2.2.3 许用应力

2.2.3.1 相应于 2.2.2 规定的载荷条件下的弯曲许用应力为 137N/mm^2，剪切许用应力为 95N/mm^2。

2.2.3.2 如果作业工况是依靠调整压载降低截面最大弯矩时，除应满足 2.2.3.1 的要求外，还应假定该压载水作合理分布，且应满足弯曲许用应力为 215N/mm^2，剪切许用应力为 120Nmm^2。

2.2.3.3 当浮船坞处于拖航状态时，在考虑了波浪弯矩的作用后，弯曲许多用应力为 175N/mm^2。

2.2.4 弯矩

2.2.4.1 当采用 2.2.2.3 的假定后，且压载水呈均匀分布时，坞体最大纵向弯矩 M 可按下式计算：

$$M = 0.327F_L \times L_D \qquad \text{kN—m}$$

式中：F_L—浮船坞设计升举能力，t；

L_D—浮船坞长，m.

2.2.5 屈曲

2.2.5.1 应保证纵向强力构件具有足够的抵抗屈曲破坏的能力。

第三节　横强度

2.3.1　**一般要求**

2.3.1.1　**应沿整个坞长进行横强度校核。**

2.3.1.2　**应按下述状态进行横强度的校核：**

（1）2.2.1.1 **所规定的状态；**

（2）进坞船长中点与坞长中点处于同一垂直线，浮船坞的吃水与中龙骨墩高度正好平齐时。

2.3.1.3　**通常按进坞船全部重量由中龙骨墩支持的工况校核。如作业工况是由中、边龙骨墩共同支持进坞船，则尚应校核全部重量由中、边龙骨墩共同支持的工况。**

2.3.2　**载荷条件**

2.3.2.1　**应采用与** 2.2.2 **相同的载荷条件。**

2.3.2.2　**横强度校核时，应考虑下述载荷的作用：**

（1）浮船坞的自重(包括龙骨墩)；

（2）进坞船的最大重量；

（3）特定吃水下的外部静水压力；

（4）相应于（3）规定的吃水，且浮船坞举起进坞船舶最大重量时，均布压载水的内部静水压力；

（5）为达到校核部位的重力与浮力的平衡，所需加在坞墙处的力，这些力在内外坞墙处可取等值。

2.3.3　**许用应力**

2.3.3.1　**弯曲许用应力为** $170N/mm^2$**，剪切许用应力为** $95N/mm^2$**，任何点合成应力的许用应力均取为** $180N/mm^2$**。**

2.3.4　**屈曲**

2.3.4.1　**应保证横向强力构件具有足够的抵抗屈曲破坏的能力。**

第四节　局部强度

2.4.1　**一般要求**

2.4.1.1　**板与骨材的尺寸应能满足纵、横强度要求，且应不得小于本节的有关规定。**

2.4.1.2　**本节对骨材所规定的最小剖面模数，均指包括附连带板后的剖面模数。带板宽度按《钢规》的有关规定确定。**

2.4.1.3　**纵骨、横梁及肋骨等重要骨材应保持连续，如有间断，应用肘板过渡。肘板尺寸应符合《钢规》的有关规定。**

2.4.2　**液体舱舱壁板、浮箱甲板、浮箱底板及坞墙外板**

2.4.2.1　**所有承受横向载荷的液体舱舱壁板、浮箱甲板、浮箱底板及坞墙外板的板厚** t **应不小于按下式计算所得之值，且应不小于** 7.5mm**：**

$$t = 3.9s\sqrt{h} + 2.5 \qquad \text{mm}$$

式中：s**——扶强材间距，**m**；**

h**——取下述值，但不小于** 2.5m**；**

（1**）对液体舱取为由板下缘至液舱顶的垂直距离，或至溢流管顶垂直距离的一半，**m**；取大者；**

（2**）对压载水舱除满足（**1**）的要求外，还应不小于** 2.4.9 **所述的最大压差水头高，**m**；**

（3**）对空舱和隔离空舱取为板下缘至最大吃水线的垂直距离，**m**。**

2.4.3　**舱壁扶强材、纵骨、横梁、肋骨**

2.4.3.1　**承受横向载荷的舱壁扶强材、纵骨、横梁、肋骨的最小剖面模数** W **应不小于按下式计算所得之值：**

$$W = 6.28shl^2 \qquad \text{cm}^3$$

式中：s**——扶强材间距，**m**；**

l**——扶强材跨距，**m**；**

h——取不述值，但不小于 2.5m。

（1）对液舱取为由扶强材跨距中点量至液舱顶的垂直距离，或量至溢流管顶垂直距离的一半，m；取大者；

（2）对压载水舱除应满足的（1）要求外，还应不小于 2.4.9 所述的扶强材跨距中点最大压差水头高，m；

（3）对空舱和隔离空舱取为扶强材跨距中点至最大吃水线的垂直距离，m。

2.4.4 强肋骨、强横梁、桁材

2.4.4.1 承受横向载荷的强肋骨、强横梁及支持扶强材的桁材的最小剖面模数 W，应不小于按下式计算所得之值：

$$W = 6.28bhl^2 \qquad \text{cm}^3$$

式中：b—强肋骨、强横梁或桁材支持宽度，m；

l—强肋骨、强横梁或桁材跨距，m；

h—取下述值，但不小于 2.5m。

（1）对液舱取为由强肋骨、强横梁或桁材跨距中点量至液舱顶的垂直距离，或量至溢流管顶垂直距离的一半，m；取大者；

（2）对压载水舱除应满足（1）的要求外，尚应不小于 2.4.9 所述的强肋骨、强横梁或桁材跨距中点最大压差水头高，m；

（3）对空舱和隔离空舱取为强肋骨、强横梁或桁材跨距中点至最大吃水线的垂直距离，m。

2.4.5 顶甲板

2.4.5.1 浮船坞中部 $0.4L_D$ 区域内的顶甲板厚应按纵强度要求决定，但应不小于端部厚度，并逐渐向端部板厚过渡。离坞端

0.1L_D 区域内，板厚 t 应不小于按下式计算所得之值，且应不小于 6.5mm：

$$t = 7.8s+2.2 \quad \text{mm}$$

式中：s——纵骨间距，m。

2.4.5.2 顶甲板应设置纵骨。在浮船坞中部 0.4L_D 区域内，纵骨尺寸应由纵强度决定，但应不小于端部纵骨尺寸，并逐渐向端部尺寸过渡。离坞端 0.1L_D 区域内，纵骨剖面模数 W 应不小于按下式计算所得之值。

$$W = 6.62sl^2 \quad \text{cm}^3$$

式中：s——纵骨间距，m；

l——纵骨跨距，m；

2.4.5.3 支持纵骨的顶甲板横梁的剖面模数 W 应不小于按下式计算所得之值：

$$W = 7.2bl^2 \quad \text{cm}^3$$

式中： b——顶甲板横梁间距，m；

l——顶甲板横梁跨距，m。

2.4.6 安全甲板

2.4.6.1 安全甲板厚度 t 应不小于按下式计算所得之值，且应不小于 7.5mm：

$$t = 3.4s\sqrt{h} +2.5 \quad \text{mm}$$

式中：s——安全甲板纵骨或横梁间距，m；

h——安全甲板板上缘与顶甲下缘的垂直距离，m。

2.4.6.2 安全甲板的纵骨或横梁的剖面模数 W 应不小于按下式计算所得之值：

$$W=4.5shl^2 \quad \text{cm}^3$$

式中： s、h——同 2.4.6.1；

l——纵骨或横梁跨距，m。

2.4.6.3 **安全甲板强横梁或桁材的剖面模数** W **应不小于按下式计算所得之值：**

$$W = 4.5bhl^2$$

式中：h**——同** 2.4.6.1**；**

b**——强横梁或桁材间距，**m**；**

l**——强横梁或桁材跨距，**m**。**

2.4.7 **非水密支承舱壁与支柱**

2.4.7.1 **非水密支承舱壁板厚及扶强材尺寸，可参照《钢规》的有关规定确定。**

2.4.7.2 **支柱的剖面积、壁厚和端部加强，可按《钢规》的有关规定确定，但负荷** P **应取为支柱实际支持的负荷。**

2.4.8 **撑杆**

2.4.8.1 **撑杆的剖面积、壁厚和端部加强，可参照《钢规》对支柱的有关规定确定，但负荷** P **应取为：**

$$P = 9.8hsl \qquad \text{kN}$$

式中：h**——**2.4.9 **所述的撑杆处最大压差水头高**,m;

s**——撑杆间距，**m**；**

l**——撑杆支撑处上下方骨材跨距中点之间的垂直距离，**m**。**

2.4.9 **最大压差水头高**

最大压差水头高系指浮船坞在工作沉浮过程中，坞中结构某处所承受的坞内外最大水面差所形成的水头高。如在局部强度计算中使用了最大压差水头高，则应先计算出坞内调节压载水位与坞外吃水水面差值随浮船坞吃水的变化，从而确定最大压差水头高，并将该资料随同其他图纸资料一起提交本社审查同意。

第五节 制造与试验

2.5.1 **一般要求**

2.5.1.1 **浮船坞的建造和焊接应符合《钢规》的有关规定。**

2.5.1.2 **应按** 2.5.2 **和** 2.5.3 **的规定对相应舱室分别进行密性试验或水压试验(结构试验).**

2.5.2 **密性试验**

2.5.2.1 **每一调节压载水舱应进行密性试验，并应符合《钢规》的有关规定.**

2.5.3 **水压试验(结构试验)**

2.5.3.1 **当浮船坞建造完毕后,应选择部分调节压载水舱取设计工作压头进行水压试验。一般应至少沿坞长方向取不同位置的三个舱进行试验：一个位于左舷，一个位于中间，一个位于右舷。**

2.5.3.2 **油舱、淡水舱和隔离空舱应单独以设计工作压头进行水压试验。**

2.5.4 **沉浮试验与倾斜试验**

2.5.4.1 **当浮船坞全部完工后，应在有本社验船师在场的情况下进行一次沉浮和倾斜试验，以验证：**

（1）浮船坞的最小顶甲板干舷；

（2）相应于浮箱甲板的最小干舷的吃水时，浮船坞实际最大升举能力；

（3）空载排水量；

（4）浮船坞的初始永久变形。其测量工况为：所有淡水舱及烯油舱全部充满，其余压载水舱仅留残余水，起重机置于合适的位置；

（5）通过调整压载后获得的接近实际装载情况下的挠度仪记录值；

（6）浮船坞空般重心位置。

第三章　稳性与干舷

第一节　稳　　性

3.1.1　**操作手册**

3.1.1.1　**浮船坞上应备有经本社认可的操作手册。该手册应能向浮船坞操作者提供在各种操作条件下，保持浮般坞有足够稳性和浮性的方法和措拖。浮船坞操作者在使用操作手册时，应考虑坞内液舱及进坞船舶液舱内自由液面的影响。**

3.1.2　**稳性**

3.1.2.1　**浮船坞在下列状态下的初稳性高度** GM **应不小于** 1.0m**；**

（1**）浮船坞处于最大沉浮；**

（2**）浮船坞下沉至坞吃水与龙骨墩顶端齐平状态，并假设进坞船舶的全部重量均由浮船坞支承；**

（3**）浮船坞在进坞船舶坐于其龙骨墩上时的正常工作状态。**

3.1.2.2　**应提交浮船坞处于** 3.1.2.1（3）**状态时的静稳性曲线。同时，该静稳性曲线与风压倾侧力矩曲线的交点所对应的横倾角在任何情况下，都不能超过浮箱甲板任一部位没入水中时，所对应的横倾角。**

3.1.2.3　**风压倾侧力矩** M_f **应取下式计算所得之值：**

$$M_f = 0.001PA_fZ \qquad \text{kN} \cdot \text{m}$$

式中：Z**——计算风力作用力臂，指受风面积中心距实际水线的垂直距离，**m**；**

A_f **——受风面积，指浮船坞实际水线以上部分的坞体和建筑物等，以及进坞船舶在纵中剖面上的侧投影面积总和，**m^2**；**

p——**计算风压，**Pa**；按计算风力作用力臂** *Z* **由表** 3.1.2.3 **查得。**

计算风力作用力臂 *Z*（m）	1.0	1.5	2.0	2.5	3.0	3.5	
计算风压 *p*(Pa)	228	248	268	284	301	314	
计算风力作用力臂 *Z*(m)	4.0	4.5	5.0	5.5	6.0	6.5	≥7.0
计算风压 *P*(Pa)	326	336	343	350	357	363	368

第二节　干　　舷

3.2.1　**浮箱甲板干舷**

3.2.1.1　**当浮船坞支承排水量等于其升举能力的船舶时，在浮船坞中心线处量至浮船坞箱甲板的干舷应不小于** 300mm**。当坞墙内壁处的浮箱甲板低于中心线处的浮箱甲板时，在坞墙内壁处量至浮箱甲板的干舷应不小于** 75mm**，且在中心线处的干舷应不小于** 300mm**。**

3.2.1.2　**上述规定系假定浮船坞上的移动式起重机处于不引起纵倾的位置。当移动式起重机移至浮船坞首端或尾端时，浮船坞的浮箱甲板不应没入水中。上述干舷值适用于遮蔽水域作业的浮船坞，如在其他水域，干舷值应适当增加。**

3.2.2　**顶甲板干舷**

3.2.2.1　**当安全甲板以下的调节压载舱灌满水，龙骨墩上无载荷时，顶甲板的干舷应不小于** 1.0m**。**

3.2.2　**顶甲板干舷**

3.2.2.1　**当安全甲板以下的调节压载舱灌满水，龙骨墩上无载荷时，顶甲板的干舷应不小于** 1.0m**。**

3.2.3　**开口的密性**

3.2.3.1 **浮船坞的通道、设备、电缆等的开口应配备有效的关闭装置以防止海水进入坞墙内的浮力空间。**

第四章　轮　　机

第一节　通　　则

4.1.1　**一般要求**

4.1.1.1　**本章要求适用于入级钢质浮船坞；此外，浮船坞轮机装置还应符合本社《钢规》第三篇中对其适用的关于货船的有关规定。**

4.1.2　**机械设备**

4.1.2.1　**浮船坞采用的重要机械设备（如锅炉、阀、动力机械、压缩机、泵等）的结构和而置应符合《钢规》的有关要求。**

4.1.3　**浮船坞的中央控制室**

4.1.3.1　**浮船坞的中央控制室应设置下列装置：**

（1）压载泵和吸排水附件的控制设备；

（2）浮船央横倾、纵倾和挠度的监测仪表；

（3）压载泵运转和吸排水附件开闭状态的指示装置；

（4）极限横倾、纵倾和挠度报警装置；

（5）调节压载舱水位指示器；

（6）必要的内部通信设备。

4.1.4　**防污染**

4.1.4.1　**浮船坞的污水和调节压载水的排放应符合主管机关的有关规定。**

第二节　管　　系

4.2.1　**动力管系**

4.2.1.1　**动力管系一般应符合《钢规》第三篇第四章的有关**

规定。

4.2.2 舱底水、调节压载水管系

4.2.2.1 应设有舱底水排除设备，其管路系统的布置应使舷外水不能浸入浮船坞内部，也不能由一水密分舱浸入另一水密分舱。

4.2.2.2 调节压载水管系布置，应满足每一浮箱至少有两台独立动力泵能有效排出调节压载水。

4.2.2.3 若调节压载水系统的附件是由动力操作的，则在安全甲板以上应设有舷侧排出附件的应急操作装置。

4.2.3 疏排水管

4.2.3.1 船内开口端在极限水线以下舱室内的排水管路，每个排出孔均应设置可强制关闭的止回阀，该阀应能从安全甲板以上易接近之予以关闭。

4.2.3.2 极限水线以上的舱室以及露天甲板的排水管和污水管，若舷外排水口低于极限水线，则应在外板上装设止回阀；若极限水线以下的管子壁厚不小于外板厚度（但不必超过 12mm、则止回阀可以免设）。

4.2.4 其他

4.2.4.1 调节压载水舱的测量管应引至坞墙顶甲板以上。

4.2.4.2 若在浮船坞上装设修船用的高压水系统时，其设计、制造和试验应符合《钢规》第三篇第二章的有关规定。

第五章　电气装置

第一节　通　　则

5.1.1　**一般要求**

5.1.1.1　**本章规定适用于钢质浮船坞的电气设备。本章未作规定的部分应符合本社《钢规》第四篇可适用的有关规定。**

5.1.2　**接地**

5.1.2.1　**每一进坞船应至少用两根截面积不小于** $70mm^2$ **的铜质软电缆跨接线从船体接到浮船坞的坞体上，而在浮船坞上，则应设置将跨接线接到坞体的装置。**

5.1.2.2　**浮船坞上应至少设有两根截面积不小于** $70mm^2$ **的铜质软电缆，用于将坞体与岸上接地装置相连接。**

若浮船坞采用阴极防蚀系统，且岸电网与浮船坞电网在电气上隔离时，则坞体可以不采用金属接地。

5.1.3　**电缆的敷设**

5.1.3.1　**经本社同意，允许电缆沿着直接焊到浮船坞外板上的桥形板敷设。**

5.1.4　**浮船坞的沉浮系统电力拖动**

5.1.4.1　**沉浮系统的闸阀电力拖动不应妨碍手动关闭和开启闸阀，在此情况下，应设有当闸阀转换到手控时使电力拖动系统不能工作的联锁装置。**

5.1.4.2　**闸阀电力拖动应在闸阀所在位置和集中操纵台等处设电动机运转指示器。**

5.1.4.3　**压载泵电动机的控制装置应设在电动机旁和控制室内。**

第二节　电源及配电

5.2.1　**主电源**

5.2.1.1　**可采用下列设备作为浮船坞的主电源：**

（1）发电机；

（2）岸电。

5.2.1.2　**在自给式浮船坞上，主电源应不少于两台发电机，必要时，岸电系统可作为备用电源。**

对于非自给式浮船坞，允许仅使用岸电系统。

5.2.1.3　**主电源的容量应足以保证浮船坞的下列工况：**

（1）下沉；

（2）船舶进坞；

（3）上浮；

（4）应急工况；

（5）与浮船坞用途相适应的其他工况。

5.2.1.4　**自给式浮船坞主发电机的台数和容量，应能在任一台发电机停止工作时，仍能保证浮船坞的下沉与上浮、船舶的进坞和出坞以及通讯、报警和照明的正常供电。**

5.2.1.5　**下列用电设备应以单独馈线从主配电板得到供电：**

（1）检测和操纵浮船坞沉浮过程的系统；

（2）与浮船坞安全工作有关的压载系统；

（3）焊接机组；

（4）进坞船配电板。

5.2.1.6　**当岸电系统对非自给式浮船坞以一路馈线供给高压电源时，则还应设置一路低压馈线，该低压馈线应在浮船坞锚泊而无修理工作时，对浮船坞长期提供所需的电能，并至少能对消防泵、闸阀的电力拖动以及主要舱室的照明长期供电。**

5.2.1.7　**当对非自给式浮船坞以两路单独馈线供给高压电**

源时，允许不设置低压电源馈线。

5.2.1.8 当从岸电系统供给低压电源时，应设置两路馈线和两个岸电箱，其中一路应保证对 5.2.1.5 所指的用电设备供电，另一路至少应对 5.2.1.6 所指的用电设备供电。

5.2.1.9 岸电供电电缆的布置和结构应保证：

（1）两路电缆敷设应尽量远离，以避免高压馈线和低压馈线同时发生故障；

（2）当浮坞下沉和上浮时在电缆内无机械应力；

（3）在电缆或导线连接的接线端上排除传递机械应力的可能性。

5.2.1.10 两个或多个岸电箱应尽可能布置在不同侧的坞墙上。

5.2.1.11 进坞船的电源应由浮船坞上的配电板供给。

5.2.2 应急电源

5.2.2.1 浮船坞应设有独立的应急电源。

5.2.2.2 应急电源应安装在浮船坞的安全甲板以上部位。

5.2.2.3 应急电源应具有足够的容量，能对下列设备至少供电 3h：

（1）主要舱室的照明；

（2）浮船坞沉浮系统的操纵和监测电路；

（3）浮船坞内部通信和报警系统。

5.2.3 配电

5.2.3.1 浮船坞上不应采用利用坞体作回路的单线系统，这样的系统仅适用于焊接网络以及绝缘电阴的监测装置。

5.2.3.2 浮船坞的供电电压一般不应超过 11000V。

5.2.3.3 浮船坞的高压装置应安装在专用舱室内，并应符合相应的国家标准和规范的要求。

第三节　照明与船内通信

5.3.1　**照明**

5.3.1.1　**除应满足《钢规》有关要求外，在浮坞甲板、坞墙、操作控制室的内部及其外走道等处均应设有主照明。**

5.3.1.2　**除《钢规》规定的处所外，可携式照明灯的插座应至少安装在下列处所：**

（1）在设有浮船坞下沉和上浮系统的装置的坞墙浮力舱内；

（2）在安装浮船坞下沉和上浮系统设备的安全甲板上的舱室内；

（3）在操纵浮船坞下沉和上浮的集中操纵台舱室内；

（4）在安装系泊机械电力拖动的舱室内。

5.3.2　**坞内通信**

5.3.2.1　**在无其他通信工具的情况下，安全控制室与下列处所之间应设置通话设备：**

（1）系缆绞盘处所；

（2）应急发电机室；

（3）主配电板舱；

（4）主发电机室；

（5）高压变压器舱；

（6）设有浮船坞沉浮系统的闸阀手动传动装置的舱室；

（7）消防站。

此外，中央控制室与主配电板舱之间需另设直通电话。

5.3.2.2　**浮船坞上应至少配备一台可与岸上电话网络相连接的电话。**

5.3.2.3　**浮船坞的通用报警装置应在中央控制室和值班室（如设有时）进行控制。**

第六章　　消　　防

第一节　　通　　则

6.1.1　**一般要求**

6.1.1.1　**本章要求适用于服务区域无灭火设施的浮船坞。如浮船坞的服务区域可提供灭火设施时，在本章所要求的同等条件下，本社可考虑这些设施的有效作用。**

6.1.1.2　**本章仅对浮船坞作出最低限度的消防要求，而不包括用于进坞船的灭火设备。**

6.1.1.3　**除本章要求外，对船舶登记国的有关法定要求也应予以满足。**

6.1.1.4　**凡用于浮船坞消防的主要材料、设备和装置等均应经本社认可。**

第二节　结构防火

6.2.1　**一般要求**

6.2.1.1　**上层建筑和甲板室应采用钢或与其等效的材料建造。**

6.2.1.2　**内部舱壁和天花板应采用不燃材料建造。走廊舱壁可采用“B”级分隔。**

6.2.1.3　**走廊和梯道环围的外露表面及陷蔽或不能到达处所内的表面应具有低播焰性。舱壁、天花板和衬板可以有厚度不超过** 2.0mm **的可燃镶片，但走廊、梯道环围和控制站内的镶片厚度不应超过** 1.5mm**。**

6.2.1.4　**用于内部外露表面的涂料、油漆等应具有不会造成过度失火危险的性质。**

6.2.1.5 **厨房、油漆间、灯间和贮藏有会引起类似火灾危险的材料的其他舱室，应采用钢材或与钢等效的材料建造。**

6.2.1.6 **居住舱室内的机舱顶甲板所用敷料，应为在高温时不易着火、不会产生毒性气体和爆炸性危险的认可材料。**

第三节 固定式灭火系统和控火系统

6.3.2 **通则**

6.3.1.1 **浮船坞的固定灭火系统应符合本节的规定。此外，还应符合本社《钢规》第六篇对其适用的要求。**

6.3.2 **水灭火系统**

6.3.2.1 **消防泵的排量可按与浮船坞的最大升举能力相当的货船水灭火系统所需的水量确定。**

6.3.2.2 **消防泵及其管路以及消防总管的设计，应能在通过规范规定尺寸的相邻的水枪排出** 6.3.2.1 **规定的水量时，维持足以产生** 12m **射程水柱的最低压力。上述规定的最低压力，应在浮船坞处于完全浮起状态下，在其顶部甲板上的消火栓处测得。**

6.3.2.3 **升举能力小于** 200t **的浮船坞，应至少设置一台固定式手动消防泵；升举能力等于或大于** 200t**，但小于** 1000t **的浮船坞，应设置一台固定式动力消防泵和一台手动消防泵。**

6.3.2.4 **升举能力等于或大于** 1000t **的浮船坞，应至少设置两台相互独立的固定式动力消防泵，最好每侧坞墙设一台。**

6.3.2.5 **升举能力等于或大于** 2000t **的浮船坞，若坞上任何舱失火可能导致全部消防泵都失去作用时，则应有供给消防水的替代措施，该措施可以是一台由柴油机驱动的固定式应急消防泵，也可以是其他认可的设施，应急消防泵应能提供两股射程各不小于** 12m **的水柱。应急消防泵的位置应保证当主消防泵所在舱室失火时仍能易于接近。应急消防泵应具有独立的**

海水箱。在主消防泵舱之外易于到达的适当位置应设置一个隔离阀，使主消防泵舱内的消防水管能与消防总管隔离。若岸上的消防设备可供浮船坞方便使用，则本社可考虑免设应急消防泵。

6.3.2.6 总功率不小于 735kW 的机器处所，应设有两个消火栓；小于 735kW 的机器处所允许只设一个消火栓；如果上述要求的消火栓设置在机器处所内确有困难时，经本社同意，可以设置在机器处所外面，并靠近出入口处。

6.3.2.7 每根消防水带应配有一支水枪和接头，所需消防水带数目应为每侧坞墙每 30m 长设一根，备用一根；对升举能力为 1000t 及以上者，水带总数应不少于 6 根（每坞墙 3 根），对升举能力小于 1000t 者，水带应不少于 4 根，这些数目不包括机舱或锅炉舱所需的消防水带。本社认为必要时，可要求增加消防水带数目。

6.3.3 其他固定灭火系统

6.3.3.1 在浮船坞上采用其他固定灭火系统时，应符合本社《钢规》第六篇第六章的有关规定。

6.3.4 固定式灭火系统的配备

6.3.4.1 所有浮船坞应设有符合本节和本社《钢规》第六篇有关对货船要求的水灭火系统。

6.3.4.2 升举能力大于 1000t 的浮船坞上，压力超过 0.35MPa 的燃油锅炉处所或燃油装置或燃油沉淀舱柜处所，应配备下列固定式灭火系统之一：

（1）压力水雾灭火系统；

（2）气体灭火系统；

（3）泡沫灭火系统，必要时，附加一套固定或移动的压力水雾或泡沫喷射系统，用于扑灭花钢板以上的火灾。对于升举能力 1000t 及以下的浮船坞将作特别考虑。所有装有闪点低于

60℃（闭杯试验）燃油的处所，均应装设上述（2）所述固定灭火系统。若机舱和锅炉舱有完全分隔开或燃油能从锅炉舱泄入机舱舱底时，则机舱和锅炉舱合起来作为一个舱室看待。

6.3.4.3 升举能力等于或大于 1000t 的浮船坞，其柴油机或燃气轮机的总功率等于或大于 735kW 的机器处所，应配备 6.3.4.2 所要求的固定式灭火系统之一。

6.3.5 探火系统

6.3.5.1 对功率大于 735kW 的机器处所拟采用集中遥控系统而实现机舱或锅炉舱的无人连续管理时，应设置探火系统。

6.3.5.2 浮船坞上装设的探火系统，应符合本社《钢规》第六篇第五章对其适用的要求。

6.3.5.3 报警系统应能在中央控制室发出声、光报警信号。如果机舱和/或炉舱不是连续有人值班时，报警系统应能在机器控制站发出声、光报警。

第四节 消防用品

6.4.1 一般要求

6.4.1.1 灭火器的型式、容量及布置应符合《钢规》第九篇第九章第一节的规定。

6.4.2 灭火器的配置

6.4.2.1 中央控制室、起居处所和服务处所等应配备足够数量的手提式灭火器。

6.4.2.2 厨房和使用生活锅炉的处所应配备适用于对油或电气炊具灭火的手提式灭火器。

6.4.2.3 每一锅炉舱的每一生火处所和部分燃油装置所在的每一处所至少应配置两具经认可的泡沫型手提灭火器或其他适于扑灭油火的设备。另外，若任何一个锅炉舱内附加灭火器或灭火

器的总容量不需超过 45*l* **进，每个燃烧器至少应配备一具容量为** 9*l* **的同类灭火器。**

6.4.2.4 **每一生火处所应有一个可装砂子、浸透苏打的锯屑或其他认可的干燥物的容器和一把铲子。上述设备亦可由一具经认可的手提式灭火器代替。**

6.4.2.5 **所有总功率不小于** 735kW **的柴油机或汽轮机的每一机器处所应配备一具容量至少为** 45*l* **的泡沫灭火器等效设备。此外，机器总功率在每** 735kW **或其零数时应配备一具认可的手提式泡沫枪；其总数不应少于** 2 **具，但也不必多于** 6 **具。**

CHINA CLASSIFICATION SOCIETY

RULES ANK REGULATLONS FOR THE CONSTRUCTION AND CLASS-IFICATION OF FLONTING DOCKS

CHINA CLASSIFICATION SOCIETY

RULES AND REGULATIONS FOR THE CONSTRUCTION AND CLASSIFICATION OF FLOATING DOCKS

Contents

已按英文勘误表修改

CHAPTER 1 GENERAL PROVISIONS

section 1 *General*

1.1.1 Application

1.1.1.1 The Rules apply to steel floating docks operating fixedly in port. Special consideration will be given by the Society to other floating docks for specific purposes.

1.1.1.2 A floating dock intended for classification with the Society or to maintain the class assigned，in addition to be in compliance with the requirements in the Rules，is to comply with the relevant requirements of the Society's Rules and Regulations for the Construction and Classification of Seagoing Steel Ships（hereinafter referred to as "the Rules for Ship-s"）.

1.1.2 Definitions

1.1.2.1 Lifting capacity F_L，in tons，is equal to the light displacement of the heaviest ship that the dock is designed to lift in normal service.

1.1.2.2 The length L_D，in metres，is the length of the bottom caisson or the distance from the aft end of the aftermost pontoon to the fore end of the forward pontoon.

1.1.2.3 The breadth B_D，in metres，is the molded breadth.

1.1.2.4 The depth D_D，in metres，is the vertical distance from the lowest point of the bottom framing to the lower surface of the uppermost deck plating；

1.1.2.5 The top deck is the deck extending over the length of the wing walls to form the top the wing walls.

1.1.2.6 The safety deck is a watertight deck extending over the length of the wing walls and located at least 1m below the top deck.

1.1.2.7 The pontoon deck is the deck of the pontoon structure on which the ship to be docked is lifted and repairing work is carried out.

1.1.2.8 The rest-water is the ballast water in the tanks which the pumps cannot discharge.

1.1.2.9 The ballast water is the water, other than the rest-water, used in ballast tanks.

Section 2 Characters of Classification and plans

1.2.1 Characters of Classification and Class Notations

1.2.1.1 The floating docks in compliance with the requirements in the Rules and classed with the Society, will be assigned either of the following Characters of classification and class notations as applicable:

(1) The floating docks have been constructed under the supervision of the Society:

★ZCA Floating Dock

(2) the floating docks have been constructed under the supervision of a classification society recognized by the society and that they have been found, after examination and survey, to be in compliance with the classification requirements of the society:

★ZCA Floating Dock

1.2.1.2 Where the port of construction is not the port of operation and the equipment is not fully installed, the class will not be assigned until the dock has received a General Examination following its arrival and installation at its port of operation.

1.2.2 Special notation

1.2.2.1 Where novel design or construction of a floating dock or its machinery has been approved by the Society ,an appropriate special notation will be affixed and entered in the Register Book.

1.2.3 Plans and documents

1.2.3.1 When it is intended to build a floating dock for classification with the Society, plans and documents as specified in 1.2.3.2 to 1.2.3.6 of this Section are to be submitted in quadruplicate to the Society for approval .

1.2.3.2 Hull：*（1）General arrangement；

*（2）Principal transverse sections；

*（3）Construction profile, including structural plan of bottom caisson or pontoons, wing walls, top deck , safety deck and, for pontoon type docks ,the plating across the base of the wing walls in way of the pontoon gaps；

（4） Scantlings and section modulus calculations according to the Rules including strength of longitudinal, transverse and local areas)；

*（5） Stability and freeboard calculations, and plan of draughts mark；

*（6） Arrangement of anchoring and mooring equipment with calculations ；

（7） Welding，including type and size of welds；

*（8） Full details of the type and proposed arrangement of deflection monitoring equipment；

（9） Pedestals and stanchion of the crane ；

（10） Arrangement of towed equipment （if any）；

（11） Plans and documents for information：

① Hydrostatic curves；

② Arrangement of oil and fresh water tanks (including their capacity plan)；

③ Structural plans of deck room and control house；

④ Shell expansion。

1.2.3.3 Machinery

（1） Specifications and list of machinery （for information）；

*（2） Arrangement of machinery spaces；

*（3） Schematic drawing of inlets and overboard discharge piping systems of pontoons；

*（4） Arrangement of bilge piping；

*（5） Arrangement of air pipes，sounding pipes and overflow pipes;

*（6） Oil fuel system for auxiliary engines；

（7） Lubricating oil piping system for auxiliary engines；

（8） Cooling water piping system for auxiliary engines；

（9） Arrangement of scuppers and overboard

discharge pipes and fittings；

（10）Arrangement of exhaust pipes for auxiliary engines；

（11）Arrangement of ventilation system for machinery spaces；

（12）Schematic drawing of hydraulic system；

*（13）Arrangement of compressed air piping。

1.2.3.4 Electrical installations

（1）Electric loading calculations；

（2）Schematic diagrams and arrangement of switch-boards：

*（3）Electric power distribution diagrams；

（4）Arrangement of electric power equipment；

（5）Schematic diagrams and arrangement of lighting；

（6）Schematic diagrams and arrangement of internal communication systems；

（7）Plans and documents for information：

① Specifications for electrical equipment：

② List of electrical equipment.

1.2.3.5 Fire protection，detection and extinction

*（1）A statement of the method of structural fire protection adopted and specifications of material employed；

*（2）Construction of fire protection bulkheads，decks and doors；

*（3）Ventilation systems including dampers and their control positions；

*（4）Arrangement of fixed fire-extinguishing

should be deleted systems with calculation for quantities of fire-extinguishing media used;

* (5) Arrangement of water fire-extinguishing system;

* (6) Arrangement of fixed fire detection and fire alarm systems;

* (7) Fire control plans;

* (8) List of fire fighting appliances.

1.2.3.6 Other plans and documents may be required if considered necessary by the Society.

1.2.3.7 Floating docks which have not been built under the supervision of the Society, but which are submitted for classification, plans and documents of the items marked with * as specified in 1.2.3.2 to 1.2.3.5,are to be submitted in quadruplicate to the Society for approval.

Section 3 Surveys

1.3.1 **Classification surveys**

1.3.1.1 The classification surveys of floating docks, in addition to the requirements in this Chapter relevant requirements of Chapter 1, PART ONE in the Rules for ships are to be complied with (if applicable).

1.3.2 **Periodical surveys for maintenance of class**

1.3.2.1 The periodical surveys of maintaining the class of floating docks, in addition to the requirements in this Chapter , relevant requirements of Chapter 2, PART Two in the Rules for Ships are to be complied with (if

applicable）。

1.3.3 **Annual surveys-Hull**

1.3.3.1 Scope of survey of hull and equipment

（1）Structures above the light waterline (such as exposed inner walls，shell plating，pontoon deck，etc.)；

（2）Safety and top decks；

（3）Supporting blocks and their foundations；

（4）Casings and skylights；

（5）Companionways and ladders，hatchways and man-holes with their closing and securing arrangements；

（6）Air pipes，overboard scuppers and discharges；

（7）Hinged gangways；

（8）Anchoring and mooring attachments；

（9）Guard rails and stanchions；

（10）Connections in way of gaps between two adjacent pontoons for pontoon type docks。

1.3.4 **In-water surveys**

1.3.4.1 Docking surveys of the floating dock may be replaced by in-water surveys。

1.3.4.2 For floating docks under 10 years of age，an in-water survey is to be carried out at least once in 5 years，for those of 10 years and over of age，an in-water survey is to be carried out on two occasions in any 5-years period with a longest interval not exceeding 3 years. In-water surveys are to be carried out on intermediate survey and special survey bases。

1.3.4.3 The methods for the in-water surveys are to be approved by the Society。

1.3.4.4 The Society may exempt a floating dock from the in-water surveys in a certain period, according to the corrosion conditions of the pontoon deck plating and the shell plating around the light draught of the dock ,and to the operating circumstances.

1.3.5 **Special surveys-Hull**

1.3.5.1 Scope of survey of hull and equipment

(1) The requirements as specified in 1.3.3 and 1.3.4 in this Section are to be complied with;

(2) The spaces between the safety and top working decks are to be cleared and cleaned as necessary and examined; battens, lining and pipe casings are to be removed as required;

(3) The Surveyor may require to ascertain the thickness of the materials in any portion of the structure where signs of wastage are evident or wastage is normally found. Any parts of the structure which are found defective or materially reduced in scantlings are to be made good to the Surveyor's satisfaction.

(4) Where the inner surface of the bottom plating is covered with cement ,asphalt or other composition, the removal of this covering may be dispensed with, provided it be inspected ,tested by beating or chipping, and found sound and adhering satisfactorily to the steel;

(5) Pontoon and side wall tanks are to be cleaned and examined internally and tested by a head sufficient to give the maximum pressure that can be experienced in service;

（6）Wood deck or its sheathing is to be examined，if decay or rot is found ，or the wood is excessively worn，it is to be renewed. Attention is to be given to the condition of the plating under the sheathing or other deck covering. If it is found that such coverings are broken or not adhering closely to the plating，sections are to be removed as necessary to ascertain the condition of the plating；

（7）The efficient condition of the means of escape from machinery spaces ,crew spaces and spaces in which crew are normally employed，are to be ascertained；

（8）The efficient condition of the means of communication between control position and machinery spaces，are to be ascertainers。

1.3.5.2 For floating docks over 15 years of age oil fuel tanks are to be examined internally。

1.3.5.3 For the first special survey of a floating dock of 20 years of age , and for the every other special survey thereafter，local wastage and outside plating of walls and pontoons are to be gauged ,in addition to complying with the requirements of 1.3.5.1and 1.3.5.2. At least two points of each strake of plating on each side within 0.5*L* of the midships are to be gauged. All paint or rust is to be entirely removed where it is to be gauged. The detailed report of gauging is to be made by the surveyor. Where gauged plates need to be renewed，the thickness of adjacent plates in the same strake are to be reported.

CHAPTER 2 HULL STRUCTURE AND STRENGTH

section 1 General

2.1.1 General requirements

2.1.1.1 The requirements in this Chapter apply to welded steel floating docks of the following types：

（1）Caisson type，in which the bottom caisson and both wing walls are continuous and inseparable；

（2）Pontoon type，in which the wing walls are continuous and the bottom is formed of non-continuous pontoons。The pontoons may be either permanently attached to the wing walls or may be detachable。

The Society will，however，give special consideration to other types of floating docks。

2.1.1.2 In addition to the requirements in this Chapter，the relevant requirements of the Rules for Ships are to be com-plied with (if applicable)。

2.1.1.3 A defection meter is to be fitted and be capable of outputting deflections over the length of the dock. The readings of the meter should be displayed on an indicator board in the control room of the dock. Where the lifting capacity of the dock is more than 2000t with differential ballasting，two completely independent deflection meters are to be fitted. It is to be approved by the Society if alternatives are adopted instead of deflection

meters to monitor the deflection of a dock.

2.1.1.4 The methods of monitoring and limiting the dock deflections in service are to be used (such as arrangements for visual and audible warning and, also for ballast pumps to be stopped automatically before the maximum allowable deflection is reached ,etc).

2.1.1.5 A watertight safety deck in the wing wall is to be fitted so as to ensure that the dock can remain afloat at a draught no greater than that corresponding to the freeboard to the top deck when all tanks below the safety deck are flooded.

2.1.1.6 All ballast tanks are to be fitted with air pipes or overflows, and the determination of their diameters is to com-ply with the relevant requirements of the Rules for Ships. Sufficient manholes are to be opened in the suitable positions of all tanks so as to make easy access to all parts of the internal structure and provide ventilation in the tanks.

2.1.1.7 Compartments carrying oil are to be separated by cofferdams from those carrying fresh or feed water. Cofferdams are to be suitably ventilated.

2.1.1.8 The effort of the anchoring and mooring attachments to the dock structure is to be considered, and the adequate reinforcement of the structure is to be taken.

2.1.2 **Ocean towage**

2.1.2.2 Where the floating dock is intended to be tow-ed from its port of construction to port of

operation, the towage strength calculation is to be taken, and the arrangements of the towing equipment and the relevant structure reinforcement should be considered, and in addition the requirement of 2.2.3.3 of this Chapter is to be complied with.

2.1.3 **Materials**

2.1.3.1 The mild steel or higher tensile steel used for the structural members of the dock are to comply with the relevant requirements of the Rules for Ships. Using other materials should be specially considered and is to be approved by the Society.

2.1.4 **Equivalents**

2.1.4.1 If scantlings of structural members are determined using direct calculations or other popular formulas, the assumptions made together with the calculations are to be submitted to the Society for approval.

Section 2 Longitudinal Strength

2.2.1 General requirements

2.2.1.1 The longitudinal strength is to be calculated as per the following condition:

The ship entering the dock is supported on the keel blocks, the center of the dock, and the freeboard is in compliance with the requirements of 3.2.1.1 of the Rules。

2.2.1.2 For the pontoon type dock, if all pontoon structural members are not included in the longitudinal strength calculation, the section modulus at the pontoon connection are to be calculated.

2.2.1.3 The structural members to be included in the calculation of the section modulus is to have same section within $0.4L_D$ amidships, and is to be longitudinally continuous. In no case should the crane rail be included in section modulus calculation.

2.2.2 **Loading conditions**

2.2.2.1 Dock buoyancy distribution may be assumed rectangular over the length of the dock.

2.2.2.2 The longitudinal strength is to be determined according to the most severe loading condition that may appear in the service. Generally, it is to be investigated for the condition corresponding to the shortest vessel intended to be lifted and supported at the maximum lifting capacity of the dock .If the condition is not easily determined, the assumption of 2.2.2.3 may be adopted。

2.2.2.3 The weight curve of the ship can be taken as a rectangle with a superimposed parabola of half the area of the rectangle, the length of each area being 0.8 times the dock length.

2.2.3 **Permissible stresses**

2.2.3.1 For the loading conditions defined in 2.2.2, the

longitudinal bending stresses are not to exceed 137N/mm^2,and the shear stresses are not to exceed 95N/mm^2.

2.2.3.2 Where provision is made for the normal operation of the dock to be complemented by the differential emptying of the ballast compartments，in addition to complying with the requirement of 2.2.3.1,the longitudinal bending stresses are not to exceed 120N/mm^2 and the shear stresses are not to exceed 120N/mm^2 with ballast water evenly distributed over the dock length .

2.2.3.3 Where floating dock involves ocean towage，after considering the effort of the wave bending moment，the maximum stress en route is not to exceed 170N/mm^2.

2.2.4 **Bending moment**

2.2.4.1 When the assumption of 2.2.2.3 is adopted and ballast water is evenly distributed ,the maximum bending moment M at midship section of the dock can be taken as follows：

$$M=0.327F_L \cdot L_D \quad \text{KN-m}$$

Where：F_L-Design lifting capacity of the floating dock，t；

L_D—Dock length，m.

2.2.5 **Buckling**

2.2.5.1 The longitudinal structural members are to be adequately stiffened to prevent buckling.

Section 3 Transverse Strength

2.3.1 **General requirements**

2.3.1.1 The transverse strength is to be calculated throughout the whole length of the dock.

2.3.1.2 The transverse strength is to be calculated according to following conditions：

（1）The condition specified on 2.2.1.1 of this Chapter；

（2）The center of the ship's length is over the midlength of the dock，and the dock draught is equal to the depth to the top of the keel blocks.

2.3.1.3 It is generally assumed that the ship to be docked is supported only by the keel blocks .Where it is the operating condition that the ship to be docked is supported by both the keel and side blocks，consideration is to be given to the condition.

2.3.2 Loading conditions

2.3.2.1 The loading conditions are same as specified in 2.2.2.

2.3.2.2 The transverse strength members of the dock should be suitable for the sum of the following loading components：

（1）Self-weight of the dock including supporting blocks；

（2）Maximum ship weight to be docked；

（3）External hydrostatic pressure due to given draught；

（4）Internal hydrostatic pressure due to the level of

evenly distributed ballast associated with the draught as in (3) when lifting at maximum capacity;

(5) Wing wall reactions required to give equilibrium on the section under consideration. These reactions at inner and outer wing walls may be taken as equal.

2.3.3 **Permissible stresses**

2.3.3.1 The bending stresses are not to exceed 170N/mm^2. The shear stresses are not to exceed 95N/mm^2 and the combined stress at any point is not to exceed 180 N/mm^2.

2.3.4 **Buckling**

2.3.4.1 The transverse structural members are to be adequately stiffened to prevent buckling.

Section 4 Local Strength

2.4.1 **General requirements**

2.4.1.1 Scantlings of plating and supporting stiffeners are to be adequate to meet the requirements for longitudinal and transverse strength, and not to be less than the relevant specification in this section.

2.4.1.2 The minimum section modulus for the stiffeners specified in this section is that with attached plating. The breadth of the attached plating is to be determined complying with the relevant requirements in the Rules for

Ships.

2.4.1.3 Primary structural members, such as longitudinals, beams and side frames, are to keep continuous. If discontinuing in a position, they are to be bracketed. The scantlings of bracket are to comply with relevant requirements of the Rules for Ships.

2.4.2 **Tank plating, pontoon deck and bottom plating and shell plating**

2.4.2.1 For all tank plating, pontoon deck and bottom plating and shell plating subjected to lateral pressure, the thickness t is not to be less than that obtained from the following equation or 7.5mm, whichever is the greater:

$$t = 3.9s\sqrt{h} + 2.5 \quad \text{mm}$$

where s—stiffener spacing, in m,

h—obtained from the followings or 2.5m, whichever is the greater:

(1) for tanks, vertical distance measured from the lower edge of the plate in a strake to the top of tank or half the distance to the top of overflow, in meters, whichever is the greater;

(2) for ballast tanks, besides the above (1), is not to be less than the maximum differential head defined in 2.4.9, in meters;

(3) for cofferdams and void spaces ,vertical distance measured from the lower edge of the plate in a strake to the

maximum immersion water line, in meters.

2.4.3 **Tank stiffeners, longitudinals, beams and side frames**

2.4.3.1 For all tank stiffeners, longitudinals, beams and side frames subjected to lateral pressure, the minimum section modulus W is not to be less than that obtained from the following equation:

$$w=6.28shl^2 \quad \text{cm}^3$$

Where s—stiffener spacing, in m,

l—the span in m between effective supporting members,

h—obtained from the followings or 2.5m, whichever is the greater:

(1) for tanks, vertical distance measured from the mid-point of l to the top of tank or half the distance to the top of overflow, in meters, whichever is the greater;

(2) for ballast tanks, besides the above (1), is not to be less than the maximum differential head defined in2.4.9 at the mid-point of l, in meters;

(3) for cofferdams and void spaces, vertical distance measured from the mid-point of l to the maximum immersion water line, in meters.

2.4.4 **Webs, transverses, stringers, and girders**

2.4.4.1 For all webs, transverses, stringers and girders subjected to lateral pressure, the minimum section modulus W is not to be less than that obtained from the

following equation：

$$W=6.28bhl^2 \qquad cm^3$$

Where *b*—spacing of webs，transverses，stringers，or girders，in m；

l—the span in m between effective supporting members；

h—obtained from the followings or 2.5m，whichever is the greater：

（1）for tanks，vertical distance measured from the midpoint of *l* to the top of tank or half the distance to the top of overflow，in meters，whichever is the greater；

（2）for ballast tanks，besides the above（1），is not to be less than the maximum differential head defined in 2.4.9 at the mid-point of *l*，in meters；

（3）for cofferdams and void spaces，vertical distance measured from the mid-point of *l* to the maximum immersion water line，in meters.

2.4.5 **Top deck**

2.4.5.1 The thickness of top deck plating over the $0.4L_D$ mid-length of the dock is to be determined as required For longitudinal strength .For outside the $0.4L_D$ mid-length the plate thickness may be gradually reduced until for 0.1 L_D from each end of the dock, and the thickness is not to be less than the following equation or 6.5mm,whichever is the greater：

$$t=7.8s+2.2 \quad \text{mm}$$

where s—spacing of longitudinal in m.

2.4.5.2 The top deck is to be framed longitudinally. The scantlings of the longitudinals over the $0.4L_D$ mid-length of the dock is to be determined as required for longitudinal strength. For outside the $0.4L_D$ mid-length, the scantlings of the longitudinals may be gradually reduced until for $0.1L_D$ from each end of the dock, and the section modulus W of the longitudinal is not to be less than the following equation:

$$W=6.62sl^2 \quad \text{cm}^3$$

Where s—spacing of longitudinals in m;

l—the span in m between effective supporting g members.

2.4.5.3 The section modulus W of each top deck member supporting longitudinals is not o be less than the following equation;

$$W=7.2bl^2 \quad \text{cm}^3$$

Where b—spacing of deck transverses in m

l—the span in m between effective supporting members.

2.4.6 **Safety deck**

2.4.6.1 The thickness t of safety deck plating, is to be obtained from the following equation or 7.5mm, whichever is the greater:

$$t = 3.4s\sqrt{s} + 2.5 \quad \text{mm}$$

where *s*—spacing of the deck longitudinals or beams, in m;

h—the height from the top of the safety deck to the underside of the top deck plating, in m.

2.4.6.2 The section modulus *W* of each safety deck longitudinal or beam id not be less than the following equation:

$$W=4.5shl^2 \quad \text{cm}^3$$

Where *s*, *h*—same as defined in 2.4.6.1,

l—the span in m between effective supporting members.

2.4.6.3 The section modulus *W* of each safety deck transverse beam or girder is not to be less than the following equation:

$$W=4.5bhl^2 \quad \text{cm}^3$$

Where *h*—same as defined in 2.4.6.1;

b—spacing of deck transverses or girders in m

l—the span in m between effective supporting members.

2.4.7 **Non-watertight pillar bulkheads and pillars**

2.4.7.1 The scantlings of non-watertight pillar bulkhead plating and stiffeners may be determined according to the relevant requirements of the Rules for Ships.

2.4.7.2 The sectional area, scantlings and end reinforcement of pillars may be determined according to the

relevant requirements in the Rules for Ships to the loading *p* taken as actual loads supported by the pillars.

2.4.8 **Cross ties**

2.4.8.1 The sectional area, scantlings and end reinforcement of cross ties may be determined referring to the pillar defined in the Rules for Ships with the loading p taken as follows:

$$p = 9.8hsl \quad \text{kN}$$

where *h*—maximum differential head, in m, as defined in 2.4.9;

s—spacing of cross ties in m;

l—vertical distance between the mid-point of the spans of two members immediately over and under the cross ties in m.

2.4.9 **Maximum differential head**

Maximum differential head is the maximum vertical difference in meters between the ballast water level and the dock draught acting on a structural member during the working sinkage. If the head is used in the local strength calculations, the differences between ballast water levels and water levels out-side the dock varying with the dock draughts are to be calculated for determining the head. The

calculating data are to be submitted to the Society with other plans and documents for approval.

Section 5 Manufacture and Testing

2.5.1 **General requirements**

2.5.1.1 The manufacture and weld of the floating dock are to comply with the relevant requirements of the Rules for Ships.

2.5.1.2 Leak tests or structural tests are to be carried out for each compartment as specified in 2.5.2 and 2.5.3.

2.5.2 **Leak tests**

2.5.2.1 Each ballast tank is to be tested for leaks, and the test is to comply with the relevant requirements in the Rules for Ships.

2.5.3 **Structural tests**

2.5.3.1 On completion of the dock, selected ballast tanks are to be hydraulically tested by filling with water to a depth equal to the maximum designed operational head. Three tanks are to be tested, one port, one starboard, and one middle tank, each at a different point along the length of the dock.

2.5.3.2 Oil tanks，fresh water tanks and coffer-dams are to be separately tested by filling with water to the designed operational head.

2.5.4 Sinkage trials and inclining tests

2.5.4.1 On completion of the dock，sinkage trial and inclining test are to be carried out in the presence of the Society’s Surveyor as to ascertain：

（1）The minimum freeboard to the top deck；

（2）The actual lifting capacity of the dock corresponding to the minimum freeboard to the pontoon deck；

（3）The light displacement；

（4）Any built-in permanent deflection in initial condition. The condition is to be that，fresh water tanks and the dock’s fuel tanks are to be full ,all ballast water is to be emptied so far as possible，only rest-water remaining，and the traveling cranes are to be positioned appropriately；

（5）The deflection meter readings are to be recorded，by simulating the most severe intended loading condition；

（6）The position of the centre of gravity of the dock.

CHAPTER 3 STABILITY AND FREEBOARD

Section 1 Stability

3.1.1 **Operating manual**

3.1.1.1 Each floating dock is to be provided with operating manual approved by the Society. The Operating Manual is to contain information sufficient to give such guidelines so as to enable the dock master to ensure adequate stability and floatability in all operating modes of the dock. It is assumed that the dock master will take into consideration the effect of free surface of liquids in the tanks of the dock as well as in the ship to be docked.

3.1.2 **Stability**

3.1.2.1 The initial metacentric height（*GM*）of the dock under the following conditions is not to be less than 1.0 m：

（1）full dock submergence;

（2）the submergence draught to the top of keel block assuming full weight of the docked ship supported on blocks;

（3）the normal working condition with a typical ship on the blocks.

3.1.2.2 The statical stability curves under the condition (3) as specified in 3.1.2.1 are to be submitted. The point of intersection of the statical stability curve and wind heeling moment curve is under no circumstance to exceed the angle where any part of the pontoon deck submerges.

3.1.2.3 The wind heeling moment M_f may be calculated from the following formula:

$$M_f = 0.001PA_fZ \qquad \text{kN} \cdot \text{m}$$

Where: Z——calculated wind pressure lever, in m, it is the vertical distance between the center of the windage area and the actual waterline;

A_f——dock and docked ship's windage area, in m^2, it is the projected lateral area of all parts on the centerline plane above the actual waterline;

P——calculated wind pressure, in Pa, it is to be determined by Table 3.1.2.3, depending upon the calculated wind pressure lever Z.

Table 3.1.2.3

Calculated wind pressure Z (m)	1.0	1.5	2.0	2.5	3.0	3.5	
Calculated wind pressure P (Pa)	228	248	268	284	.01	314	
Calculated wind pressure lever Z (m)	4.0	4.5	5.0	5.5	6.0	6.5	≥7.0

Calculated wind pressure lever P (Pa)	326	336	343	350	357	363	368

Section 2 Freeboard

3.2.1 **Freeboard to the pontoon deck**

3.2.1.1 The freeboard to the pontoon deck at the centerline of the dock, when supporting a ship having a displacement equal to the lifting capacity, is not to be less than 300mm.When the pontoon deck at the inner side walls is lower than that at the center, the freeboard to the pontoon deck at the inner side walls is not to be less than 75mm, and the freeboard at the center line is not to be less than 300mm.

3.2.1.2 The above limits however , assume the traveling crane (s)are positioned so as to give no trim. When crane (s) are moved to the forward end or after end of the dock, the pontoon deck is mot to be submerged. The above freeboard limits apply to the docks operating in sheltered water area. In other areas they should be suitably increased.

3.2.3 **Freeboard to the top deck**

3.2.2.1 When all compartments below the safety deck are flooded, but with no load in the dock on blocks, the free-board to the top deck is, generally not to be less than1.0 m。

3.2.3 **Closing of openings**

3.2.3.1 Opening for access, equipment, cables etc. are to be fitted with effective means of closing to prevent seawater from passing into buoyant spaces in the dock wings.

CHAPTER 4 MACHINERY INSTALLATLONS

Section 1 General

4.1.1 **General requirements**

4.1.1.1 This Chapter applies to steel floating docks for classification; additionally, the machinery installations are to comply with (as appropriate) the relevant requirements for cargo ships as specified on PART THREE of the Rules for Ships.

4.1.2 **Machinery and equipment**

4.1.2.1 The construction and arrangements of the essential machinery and equipment (such as boilers, valves, power machines, compressors and pumps, etc.) of floating docks are to comply with the relevant requirements as specified in the Rules for Ships.

4.1.3 **Central control rooms of floating docks**

4.1.3.1 The central control rooms of floating docks are to comprise the following installations:

(1) the control devices of ballast pumps, including the suction and overboard discharge fittings of ballast system;

(2) Monitoring instruments for heeling, trim and deflection control of the dock;

(3) equipment indicating the operation of pumps and the position (open/closed) of the suction and discharge valves of ballast system;

(4) Alarm devices on limit values of heel, trim and deflection;

(5) Level indicators of ballast water compartments;

(6) Necessary inter-communication facilities.

4.1.4 **Prevention of pollution**

4.1.4.1 Discharge of bilge and ballast water of floating docks is to comply with the relevant provisions by the Administration.

Section 2 Piping Systems

4.2.1 **Machinery piping systems**

4.2.1.1 Generally, machinery piping systems are to com-ply with the relevant requirements as specified in Chapter 4, PART THREE of the Rules for Ships.

4.2.2 **Bilge and ballast systems**

4.2.2.1 The bilge discharge equipment is to be arranged. The bilge pumping system is to be so arranged as to prevent the possibility of water passing from the sea the floating dock, or from one watertight compartment into another.

4.2.2.2 The arrangements for the ballast piping system are to be such that at least two independent motor pumps are available for each buoyancy compartment to effectively

discharge the ballast water.

4.2.2.3 If the fittings of the ballast system are controlled from a power source, then the discharge valves at side are to have emergency operative devices above the safety deck.

4.2.3 **Drainage and discharge systems**

4.2.3.1 Each overboard discharge pipe leading from the spaces below the margin line, which have inboard ends in these spaces ,is to be fitted with a non-return valve with positive means of closing from a readily accessible place situated above the safety deck.

4.2.3.2 The scuppers and discharge pipes from spaces located above the margin line, as well as from open decks, which are led overboard below the margin line ,are to be fitted with non-return valves installed at the shell. The valves may be dispensed with provided the thickness of pipes fitted below the margin line is not less than that of the shell plating (how-ever, it need not to exceed 12 mm).

4.2.4 **Miscellaneous**

4.2.4.1 The sounding pipes of ballast compartments are to be led to above the top deck.

4.2.4.2 If the high-pressure water systems used for docked ships are arranged in floating docks, the designs, manufacture and tests of the systems are to comply with the relevant requirements as specified in Chapter 2, PART

THREE of the Rules for Ships.

CHAPTER 5 ELECTRICAL INSTALLATIONS

Section 1 General

5.1.1 **General requirements**

5.1.1.1 This Chapter applies to the electrical equipment of steel floating docks. In addition to the requirements detailed in this Chapter ,the relevant requirements in PART FOUR of Rules for Ships are to be complied with, where applicable.

5.1.2 **Earthing**

5.1.2.1 Every docked ship is to be earthed to the floating dock hull through at least two flexible copper cables, having a cross-sectional area of not less than 70mm^2 each, and every floating dock is to be provided with devices for connecting these cables.

5.1.2.2 To connect the dock hull to the shore earthing system, at least two flexible copper cables having a cross-sectional area of not less than 70mm^2 each, are to be provided on the floating dock.

Where cathodic protection from corrosion is employed for the floating dock and the circuits of the floating dock are electrically separated from the shore circuits, the earthing of the floating dock may be dispensed with.

5.1.3 **Installation of cables**

5.1.3.1 Cables may be installed on rtay plates welded directly to the dock plating subject to the an-reement with the Society.

5.1.4 **Electrical drives of the submersion and emersion system of the floating dock.**

5.1.4.1 Electrical drives for sluice valves of the submersion and emersion system are not to hinder manual opening and closing of sluice valves. An inter-locking device is also to be provided to prevent the electrical drive from operation in case of the sluice valve change-over to manual control.

5.1.4.2 For electrical drives of sluice valves，indicators showing operation of motors are to be provided at a position where the sluice valves are located and at the central control console.

5.1.4.3 Control devices for ballast pump motors are to be provided by the side of the motors and in the control station.

Section 2 Electrical Power Sources and Distribution

5.2.1 Main electrical power source

5.2.1.1 The following systems may be employed as main electrical power sources of floating docks:

（1）generating sets；

（2）a shore electrical power system.

5.2.1.2 At least two generating sets are to be

provided as a main electrical power of an autonomous floating dock, and, if necessary, shore electrical power system may be employed as a stand-by power source.

For a non-autonomous floating dock, it is allowed that a shore electrical power system may be employed as the only main electrical power source.

5.2.1.3 The capacity of a main electrical power source is to be sufficient to ensure the following operation conditions of a floating dock:

(1) submersion;

(2) docking of the ship;

(3) emersion;

(4) emergency condition;

(5) other conditions in accordance with the docking purpose.

5.2.1.4 The power of main generating sets of an autonomous floating dock is to be such that in case of failure of any one of generating sets, the rest of the generating set (s) can ensure the safe submersion and emersion of the floating dock, docking and undocking of a ship or ships and normal power supply for communication, alarming and lighting.

5.2.1.5 The following consumers are to be supplied by separate feeders from the main switchboard bus-bars:

(1) the system of monitoring and controlling the dock submersion and emersion;

(2) the ballasting system essential to the safety of the

dock;

(3) Welding equipment;

(4) Switchboards for supply of the docked ships.

5.2.1.6 Where the high-voltage electrical power is supplied to a non-autonomous floating dock from the shore electrical power system by one high-voltage feeder, a low-voltage supply feeder is to be additionally provided. In this case, the low-voltage supply feeder is to continue its power supply to the floating dock when the dock is mooring and no repairs are carried out, and at least such supply for fire pumps, sluice valve drives and lighting in main spaces is to be maintained.

5.2.1.7 Where the high-voltage electrical power is supplied to a non-autonomous floating dock from the shore by two independent feeders, a low-voltage supply feeder need not be provided.

5.2.1.8 When the floating dock is supplied from the shore low-voltage electrical power system, two feeders and two shore power connection boxes are to be provided; one of them is to supply the consumers specified in 5.2.1.2 and the other to supply at least the consumers specified in 5.2.1.6.

5.2.1.9 The arrangement and construction of the shore power supply cables are to be such as to ensure:

(1) the two cables are to be so installed that they are as far distant from each other as practicable to prevent simultaneous damage of high-voltage and low-voltage

feeders;

(2) absence of mechanical stresses in cables during submersion and emersion of the floating dock;

(3) prevention of transmission of mechanical stresses to terminals intended for connection of cables or wires.

5.2.1.10 Two or more than two shore power connection boxes are to be located on different wing walls of the floating dock, where practicable.

5.2.1.11 The docked ships are to be fed from the stationary switchboards installed in the floating dock.

5.2.2 **Emergency sources of electrical power**

5.2.2.1 Every floating dock is to be provided with an independent emergency source of electrical power. The emergency source of electrical power is to be installed on the level above the safety deck of the floating dock.

5.2.2.2 The emergency source of electrical power is to be sufficient and at least to en-sure supply of the following consumers for three hours:

(1) lighting in main spaces;

(2) controlling and monitoring circuits for the submersion and emersion system of the floating dock;

(3) internal communication and alarming system of the floating dock.

5.2.3 **Power distribution**

5.2.3.1 One-wire system with dock's hull return is not to be employed on a floating dock except for welding circuits and devices for monitoring and measuring insulation resistance.

5.2.3.2 The supply voltage for a floating dock is generally not to exceed 11,000V.

5.2.3.3 High-voltage electrical installation of a floating dock is to be located in special spaces and should comply with the requirements of relevant national standards and rules.

Section 3 Lighting and Internal Communication

5.3.1 **Lighting**

5.3.1.1 In addition to complying with the relevant requirements of the Rules for Ships, main lighting for decks, wing walls, control stations and outside passageways are to be provided.

5.3.1.2 In addition to the spaces specified in the Rules for Ships, sockets for portable lighting fixtures are to be installed at least:

(1) in dry compartments of wing walls where equipment for the submersion and emersion system of the floating dock is located;

(2) in spaces on the safety deck where the equipment for the submersion and emersion system of the floating dock is located;

(3) in the spaces where the central control console for the submersion and emersion of the floating dock is located;

(4) in the area where the mooring machinery electrical drives are located.

5.3.2 Internal Communication

5.3.2.1 Where other types of communication are not employed, telephones between the central control station and the spaces where the following equipment is located are to be provided:

(1) mooring winches;

(2) emergency generating sets;

(3) main switchboards;

(4) main generating sets;

(5) high-voltage transformers;

(6) manual control for sluice valves of the submersion and emersion system of the floating dock;

(7) fire-extinguishing station.

In addition, a direct telephone set is to be provided between the central control station and the space where the main switchboards are located.

5.3.2.2 At least one telephone set which can be connected with the shore telephone system is to be provided on the floating dock.

5.3.2.3 General alarm system is to be actuated from the main control station and the space (if provided) intended for the personnel on duty.

CHAPTER 6 FIRE PROTECTION, DETECTION AND EXTINCTION

Section 1 *General*

6.1.1 **General requirements**

6.1.1.1 This Chapter applies to floating docks operating at those locations where there is no available, professional fire service. However, where such fire service can be provided in the operating area, consideration may be given by the Society to effectiveness of the fire service under the equivalent conditions as required in this Chapter.

6.1.1.2 This Chapter applies to the minimum fire protection, detection and extinction for floating docks, excluding the equipment for fire fighting that may occur on docked ships.

6.1.1.3 Attention is to be given to be given to any relevant statutory requirements of the National Authority of the country in which the floating dock is registered, in addition to the requirements in this Chapter.

6.1.14 The principal materials, equipment and installations end for the fire protection, detection and extinction of docks are all be approved by the

Society.

Section 2 *Structural Fire Protection*

6.2.1 General requirements

6.2.1.1 The superstructures and deckhouses are to be of steel or other materials which has structural and fire integrity properties equivalent to steel.

6.2.1.2 All internal bulkheads and ceilings are to be constructed of non-combustible materials. Corridor bulkheads may be constructed to 'B' Class divisions.

6.2.1.3 All exposed surfaces in corridors and stairway enclosures and surfaces in concealed or inaccessible spaces are to have low flame-spread characteristics. Bulkheads, ceilings and linings may have combustible veneer, provided that such veneer should not exceed 2.0 mm in thickness within any such space except corridors, stairway enclosures and control stations, where it should not excess 1.5 mm.

6.2.1.4 Paints, varnishes and other finishes used on exposed interior surfaces are not to be of a nature to offer an undue fire hazard.

6.2.1.5 Bulkheads of galley, paint stores, lamp rooms and other compartments containing materials which would constitute a similar fire hazard are to be constructed of steel or other equivalent materials.

6.2.1.6 Deck coverings within accommodation spaces on the decks forming the crown of machinery spaces are to

be of approved materials which will not readily ignite, or give rise to toxic or explosive hazards at elevated temperatures.

Section 3 Fixed Fire-Extinguishing and Fire Detection Systems

6.3.1 **General**

6.3.1.1 The fixed fire-extinguishing systems of floating docks are to comply with the requirements of this Section. Additionally, they are to comply with the applicable requirements in PART SIX of the Rules for Ships.

6.3.2 **Water fire-extinguishing systems**

6.3.2.1 The capacity of fire pumps is to be determined in accordance with the quantity of water required for the operation of the water fire-extinguishing system of the cargo ship whose displacement corresponds to the largest lifting capacity of the floating dock.

6.3.2.2 The fire pumps and associated piping and fire main are to be so designed that a minimum pressure can be maintained sufficient to produce a water jet throw of 12m through nozzles specified in the Rules with the quantity of water specified in 6.3.2.1 through any adjacent hydrants. The minimum pressure required is to be obtained from fire hydrants at the top deck when the floating dock is in its fully risen position.

6.3.2.3 For floating docks less than 200 tonnes

lift, at least one fixed hand operated pump is to be provided; floating docks of 200 tonnes lift and over, but less than 1000 tonnes lift ,are to be provided with one fixed power pump and one hand operated pump.

6.3.2.4 For floating docks of 2000 tonnes lift and over, at least two independently driven fixed power pumps are to be provided, preferably one pump being placed in each wing.

6.3.2.5 In floating docks of 2000 tonnes lift and over, if a fire in any one compartment could put all the pumps out of action, there is to be an alternative means of providing water for fire-fighting. This alternative means is to be a fixed emergency pump independently driven by a diesel engine, or other approved means. This emergency pump is to be capable of supplying two jets of water of not less than 12m. The pump is to be located in a readily accessible position which is not likely to be rendered in accessible position which is not likely to be rendered inaccessible by a fire in the compartment containing the main fire pumps. The pump is to be provided with its own sea suction. A valve is to be provided for isolating the main fire pumps. This isolating valve is to be situated in a readily accessible position outside that compartment. However, if shore based firefighting appliances are readily available, consideration may be given to dispensing with the emergency pump at the discretion of the Society.

6.3.2.6 In the machinery spaces containing a total

power of 735kW and over, two hydrants are to be provided, and in the machinery spaces where the total power is less than 735kW, one hydrant will be accepted. If it is difficult to arrange those hydrants in the machinery spaces, such hydrants may be arranged near the accesses outside the machinery spaces with the consent of the Society.

6.3.2.7 The number of fire-hoses to be provided, each completed with couplings and nozzles, is to be one for each 32m in length of each wing of the dock and one spare, but in no case less than a total of six (three on each wing) for floating docks of 1000 tonnes. lift and over, and not less than a total of four for floating docks less than 1000 tonnes. These numbers do not include any hoses required in any engine or boiler room. If necessary, the number of hoses is required to be increased by the Society.

6.3.3 **Other fixed fire-extinguishing systems**

6.3.3.1 If other fixed fire-extinguishing systems are arranged in floating docks, they are to comply with the relevant requirements as specified in Chapter 6, PART SIX of the Rules for Ships.

6.3.4 **Disposition of the fixed fire-extinguishing systems**

6.3.4.1 All floating docks are to be arranged with water fire-extinguishing systems, which are to comply with this Section and the relevant requirements for cargo ships as

specified in PART SIX of the Rules for Ships.

6.3.4.2 In spaces where oil boilers with steam pressure exceeding 0.35MPa are situated, or in spaces contain oil fuel units or settling tanks in floating docks exceeding 1000 tonnes lift, any one of the following types of fixed fire-extinguishing systems is to be provided:

(1) a pressurized water-spraying system;

(2) a fire-smothering gas system;

(3) a foam system supplemented, if necessary, by a fixed or mobile pressurized water of foam spraying system to fight fires above floor plates.

Floating docks of 1000 tonnes and under will be specially considered. The fixed fire-extinguishing systems of the above type (2) are to be installed in all spaces where the flash point of the oil fuel is less than 60℃ (closed cup test). If the engine and boiler rooms are not entirely separate, or if fuel oil can drain from the boiler room into the engine room into the engine room bilges, the combined engine and boiler rooms are to be considered as one compartment.

6.3.4.3 For the machinery spaces containing diesel engines or gas turbines with a total power of 735 kW and over in floating docks up to1000 tonnes lift and over, one of the fixed fire-extinguishing systems as required in 6.4.4.2 is to be provided.

6.3.5 **Fire detection systems**

6.3.5.1 Where it is proposed to apply a remote

centralized control system for the essential machinery of 735kW and over, and it is intended that the engine and/or boiler rooms will not be continuously manned, an approved fire detection system is to be provided in these spaces.

6.3.5.2 Fire detection systems arranged in floating docks, are to comply with the requirements as specified in Chapter 5, PART SIX of the Rules for Ships.

The alarm system is to initiate audible and visible alarm signals at the central control room. Where it is intended that the engine and/or boiler rooms will not be continuously manned, the alarm system is to initiate audible and visible signals at the station from which the machinery is controlled.

Section 4 Fire Fighting Appliances

6.4.1 **General requirements**

6.4.1.1 The types, capacity and locations of the fire fighting appliances provided on docks are to be in accordance with the requirements in Section 1 of chapter 9 .PART NINE of the Rules for ships.

6.4.2 **The extinguishers**

6.4.2.1 The control room, accommodation and service spaces are to be provided with a sufficient number of portable fire-extinguishers.

6.4.2.2 For galleys , and for spaces containing domestic boilers, one portable fire-extinguisher suitable for

dealing with oil fires in electric cooking equipment is to be provided.

6.4.2.3 There are to be at least two approved portable foam fire extinguishers, or other approved medium suitable for extinguishing oil fires, in each firing space of each boiler room and each space in which a part of the oil fuel installation is situated. In addition, there is to be at least one extinguisher of the same description with a capacity of 9 litres for each burner, provided that the total capacity 0 additional extinguishers need not exceed 45 litres of any one boiler room.

6.4.2.4 In each firing space there is to be a receptacle containing sand, sawdust impregnated with soda, or other approved dry material and a scoop. Alternatively, an approved portable extinguisher may be substituted therefore.

6.4.2.5 For all machinery spaces containing diesel engines or gas turbines with a total power of not less than 735kW ,a foam extinguisher with at least 45 litres capacity or the equivalent is to be provided in every engine space. In addition, one approved portable foam extinguisher for each 735kW of the engine power output or part thereof is to be provided. The total number of portable extinguishers so supplied is not to be less than two and need not exceed six.