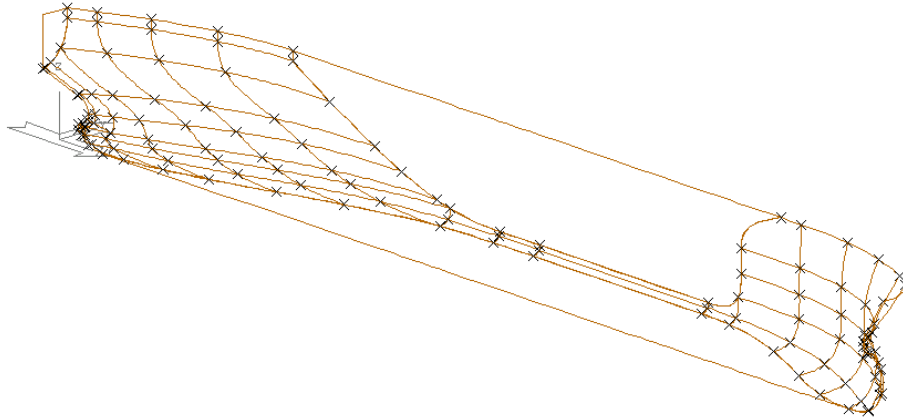# 10   Surface patches

In order for the hull steelwork and outfitting applications to access the hullform, it is necessary to fit a surface to the curves created in Lines. The surface is built up from a network of patches.


There are two approaches to creating surface patches in Lines, a manual approach and a semi-automatic approach. The surface patches defined by these two approaches are mutually incompatible and cannot be mixed when defining the surface.

This training course deals only with the semi-automatic approach, which is part of an extension to Lines referred to as PACE (**P**atch and **A**dvanced **C**urve **E**ditor).
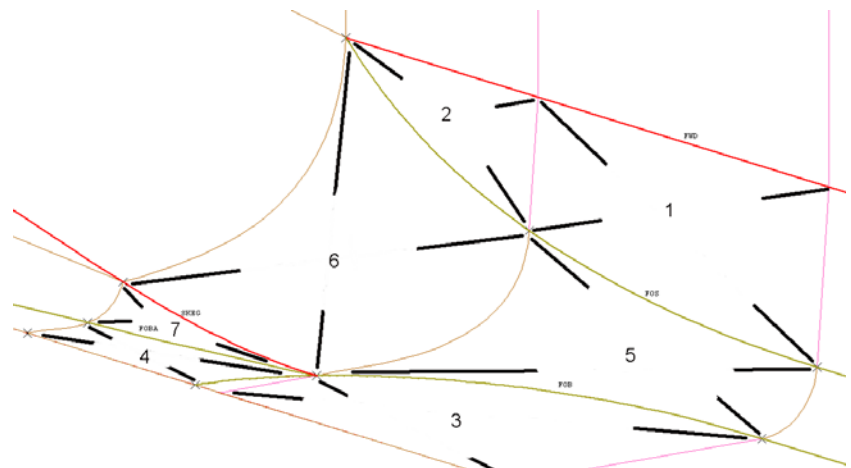
10.1   Patch generation rules and restrictions

In order to avoid any problems in downstream usage of the surface, there are certain rules and restrictions that must be followed when defining the patches.
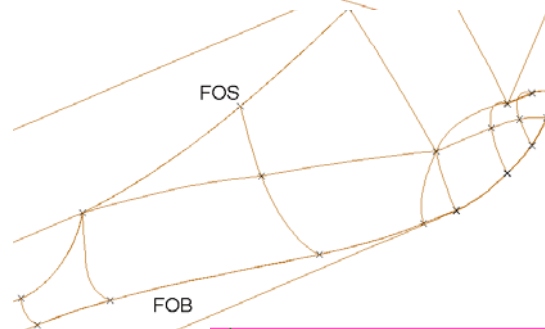
- Only 3 or 4 sided patches can be defined
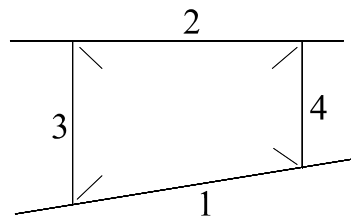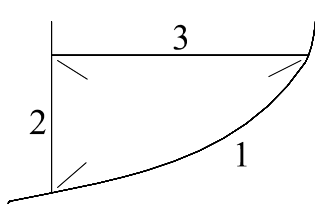
- All Boundary curves, e.g. FOS, FOB, Knuckle curves and Tangent curves must be used as patch boundaries

- In order to ensure continuity across patch boundaries, adjacent patches with a boundary in common (except for those in planar regions such as the FOS & FOB) must have common corners

- Where a curve used as a patch boundary contains straight line or arc segments, intersecting patch boundaries must be defined at the ends of these segments
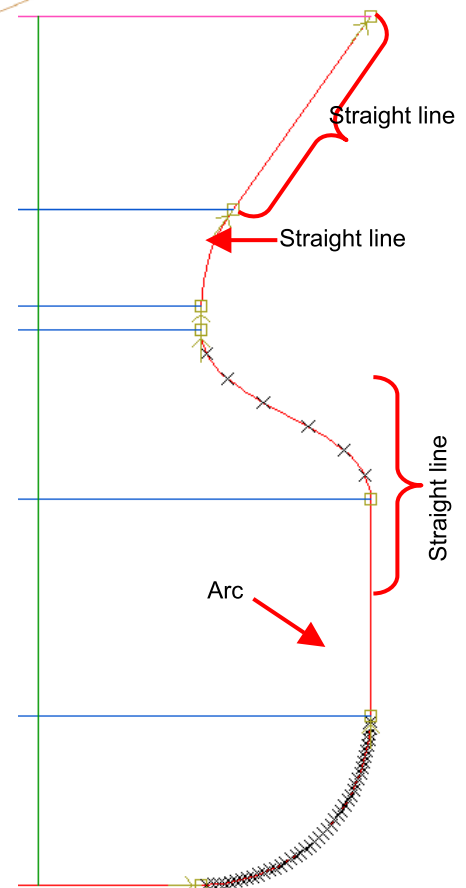
Provided these rules are followed there should be no gaps between adjacent patches therefore curves interpolated in Tribon Hull for example should not have any breaks.

10.2   Patch arrangement considerations

For any given hullform, there will always be several possible patch arrangements that will give comparable results for the quality of the surface.

The differencences in the possible patch arrangements may be global, e.g. one approach is to use sections and waterlines to form the patch boundaries,
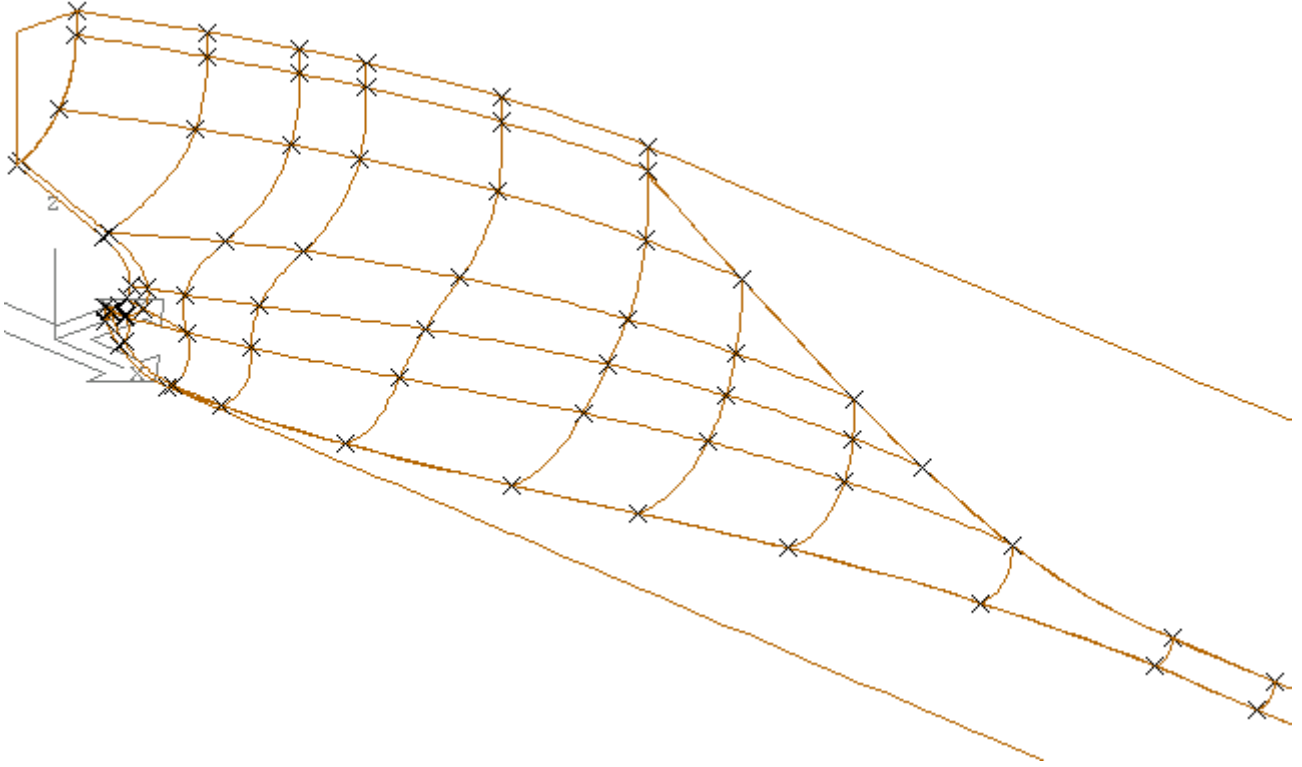

Another approach is to use buttocks and waterlines as the patch boundaries.
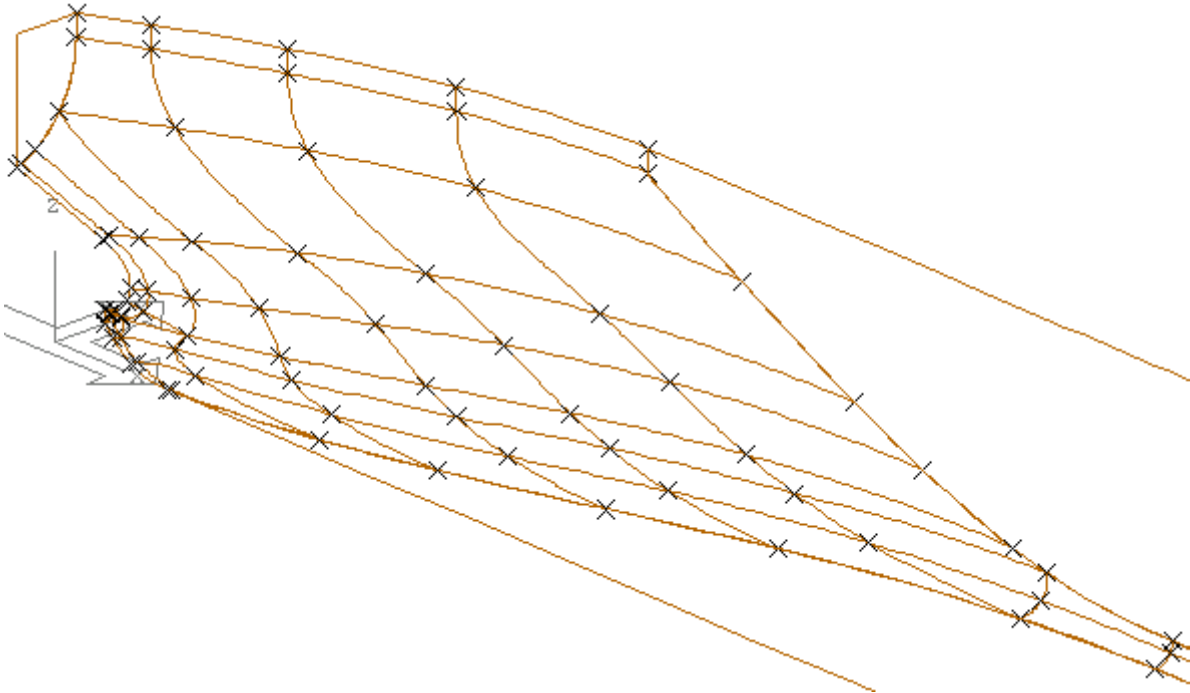
Alternatively, the global patch arrangement may be the same, with only some local differences at the stern or stem, e.g, as in these alternative patch arrangements for the stern of the training example.
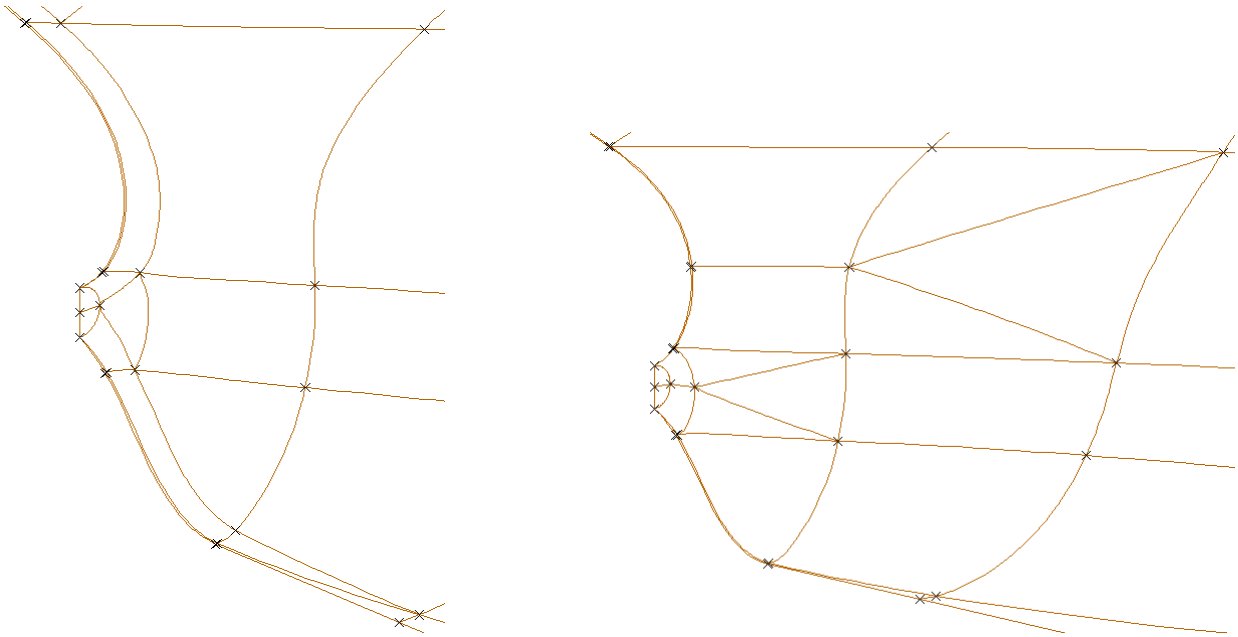
The application of the rule concerning the location of patch boundaries at the ends of straight line and arc segments, can sometimes lead to situations that result in a number of long thin patches. These types of patches should be avoided if possible, this can be achieved by using cranked plines.
Long thin patches resulting from a short straight line segment in the stem profile
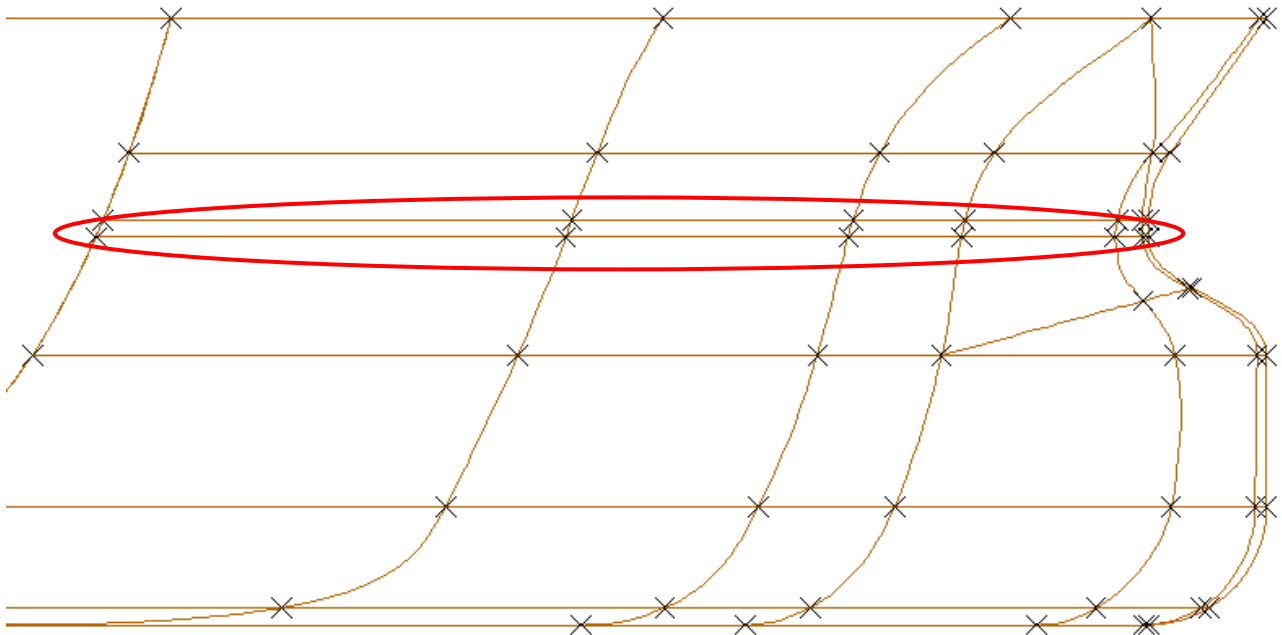
Cranked pline used to remove the need for long thin patches
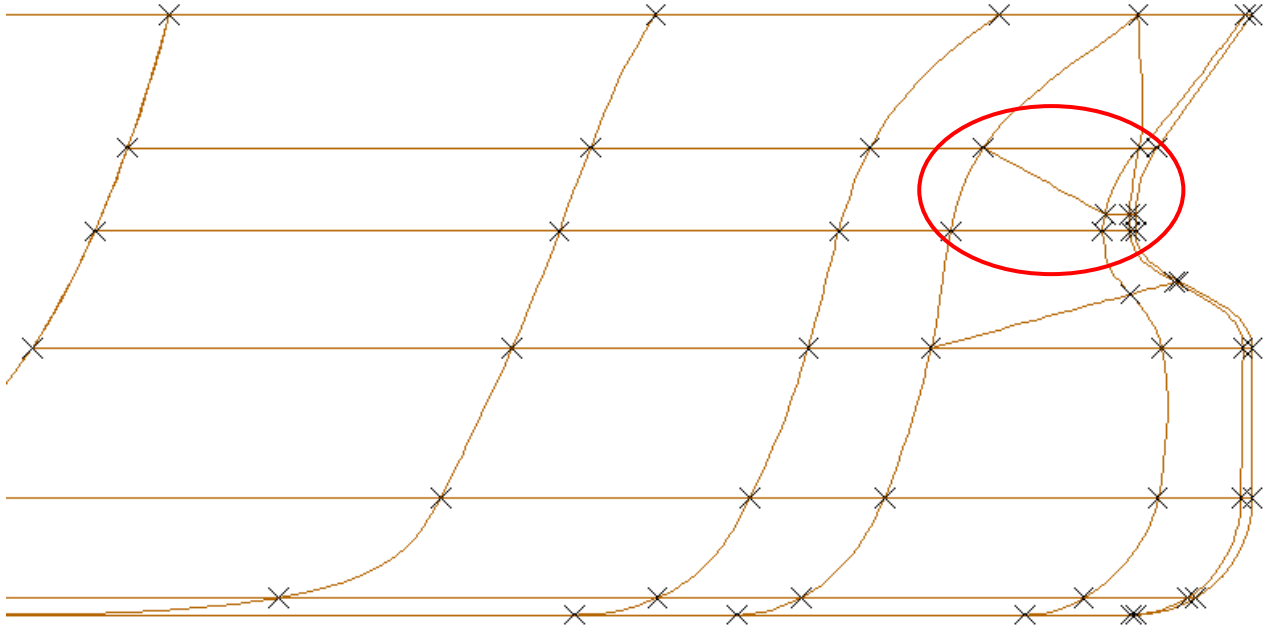
Which particular patch arrangement is eventually used for a particular hullform is generally a matter of trial and error. It is usually necessary to generate various versions and then compare the isophote displays and the deviation of the surface from the curves.

In general, the idea is to minimise the number of patches used to define the surface, while maintaining the quality.

The use of buttocks and waterlines as patch boundaries, as opposed to sections and waterlines will remove the need for three sided patches at the flat of side but may introduce three sided patches at the stem tangent line. It is of course possible to combine the use of both buttocks and sections as patch boundaries.