By: MS **Date** 6th January 2016

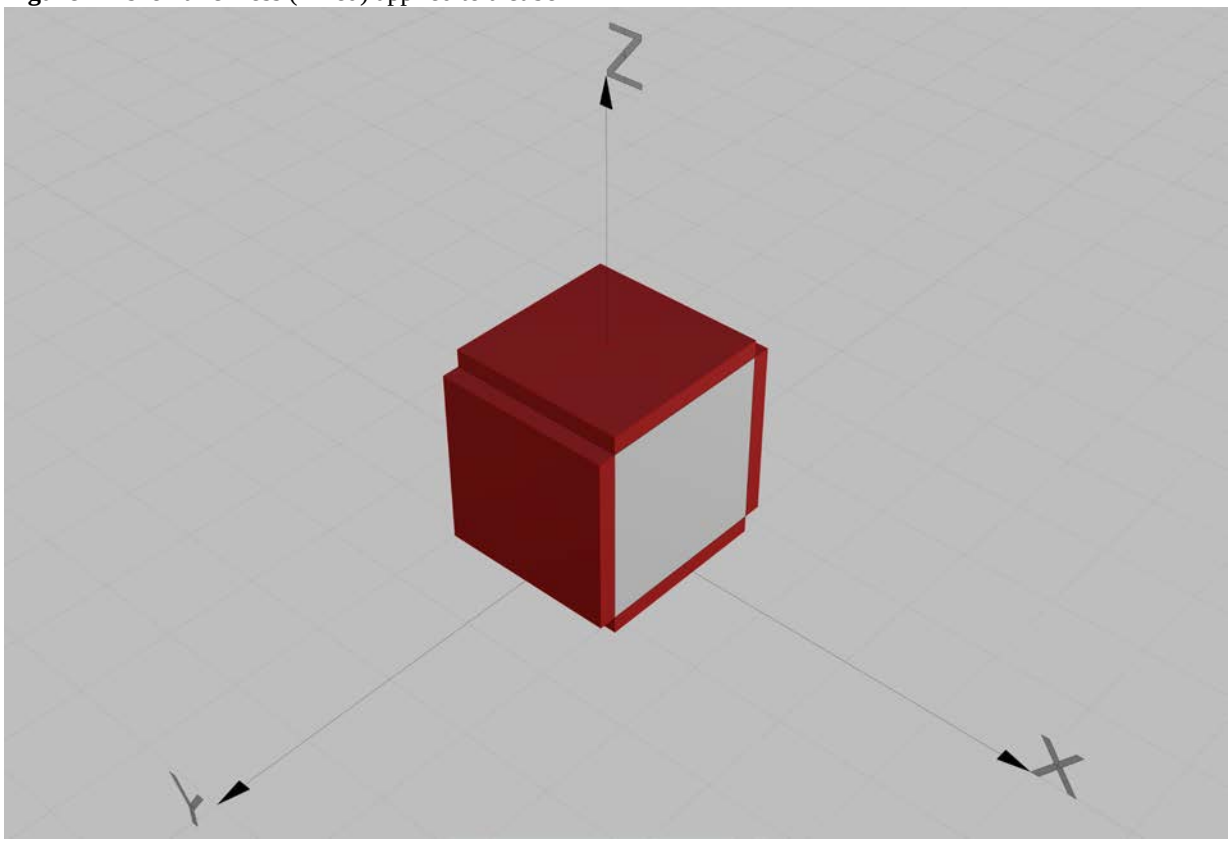
Subject: Shell thickness

Shell Thickness is defined as the average thickness of plating, used to calculate between moulded and full volumes Where a vessel is defined to the outside of shell it should be set to zero.

It is used by the hydrostatic calculation to calculate full displacement from Moulded Displacement, to calculate Wetted Surface Area, and for calculation of stability when the vessel's full displacement is entered rather than the moulded value. The shell thickness is defined in the Ship Properties Dialog.

It is applied around the perimeter of all sections of all elements, causing therefore an increase in sectional area. It is not applied in the X direction of an element so, for example, it does not increase the Waterline Length of a vessel having an immersed transom. Figure 1 shows a cube modelled in HST's coordinate system, with a Shell Thickness applied.

Figure 1 – shell thickness (in red) applied to a cube



When a portion is subtracted from an element and a shell thickness is set, it will be applied around the perimeter of all sections as described above. This case is encountered when modelling cockpits, bow thrusters, moonpools and other hull recesses.

There are two methods for modelling a recess: it can be incorporated in the main element such that its sections go around the recess, or subtracted from it using an additional element with a Negative Contribution. Regardless of the method chosen, the effect of applying a shell thickness is the same. Figure 2 shows a 'carved' cube with no shell thickness applied, and Figure 6 shows the effect of setting a shell thickness. The individual faces' contributions are clarified in Figures 3 to 5. Figures 3 and 5 combined show that shell thickness is applied to both sides of a bulwark or coaming.

NOTE: the recess shown in the carved cube example may be modelled as an additional, coamings-only element sitting on a rectangular parallelepiped element. This should be avoided, as some hydrostatics results may be incorrect.

Figure 2 –carved cube: starboard face and forward face removed for clarity

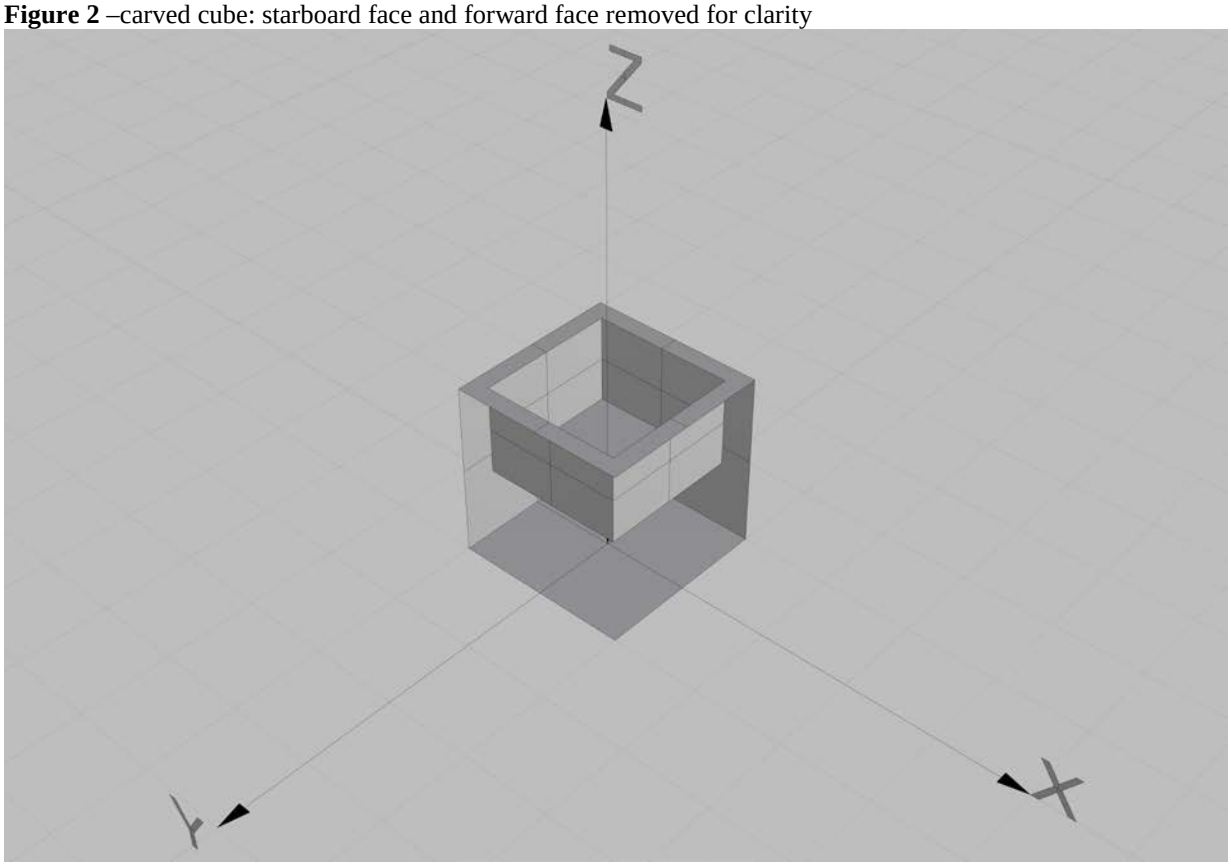


Figure 3 – shell thickness (in red) applied to carved cube: underside and topsides only

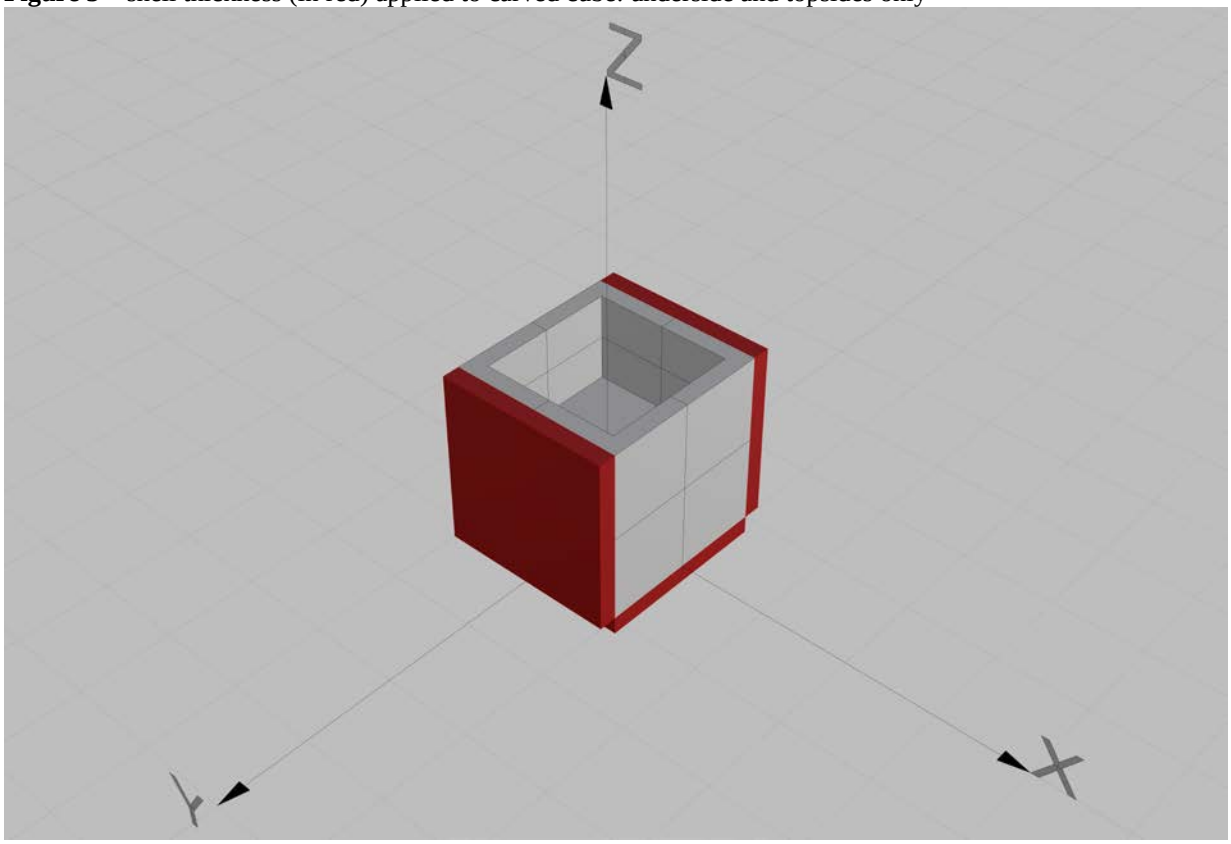


Figure 4 – shell thickness (in red) applied to carved cube: top face only

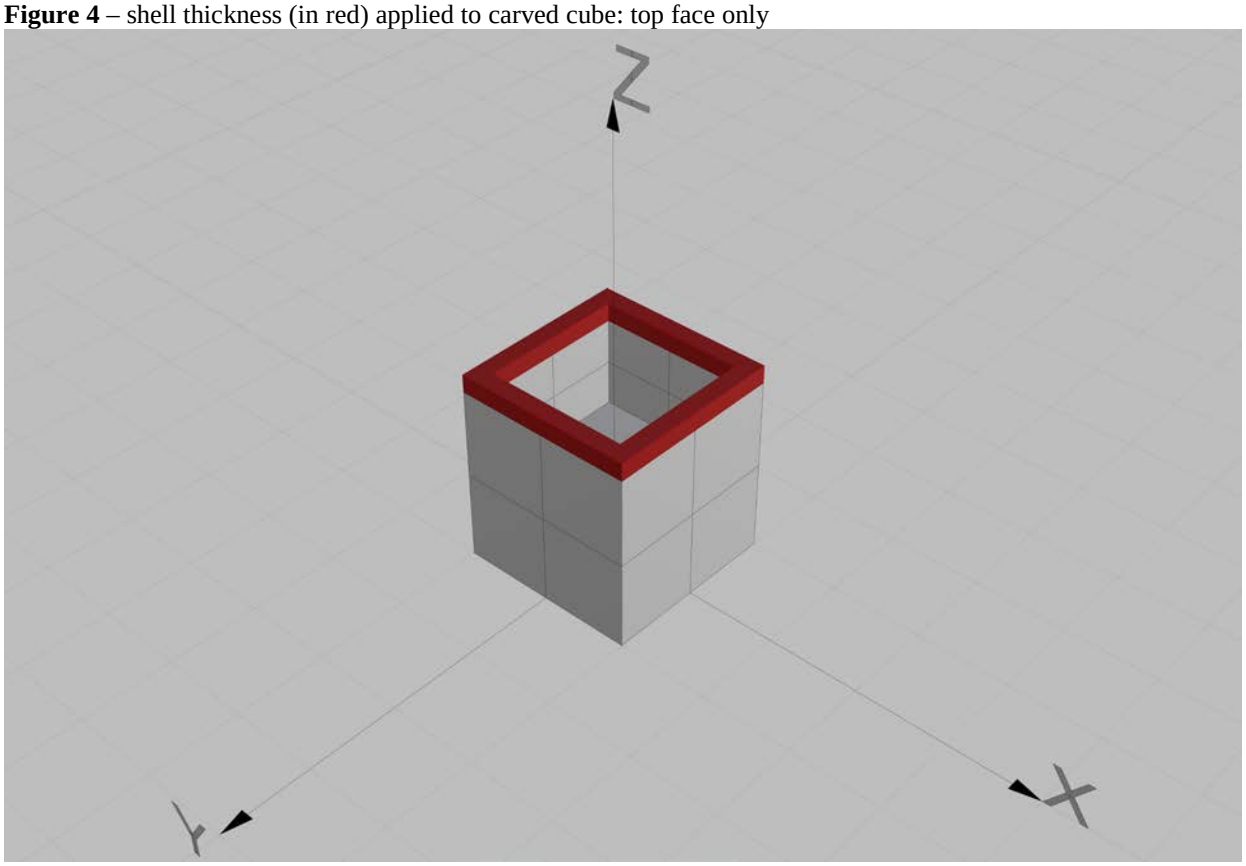


Figure 5 – shell thickness (in red) applied to carved cube: inner faces only

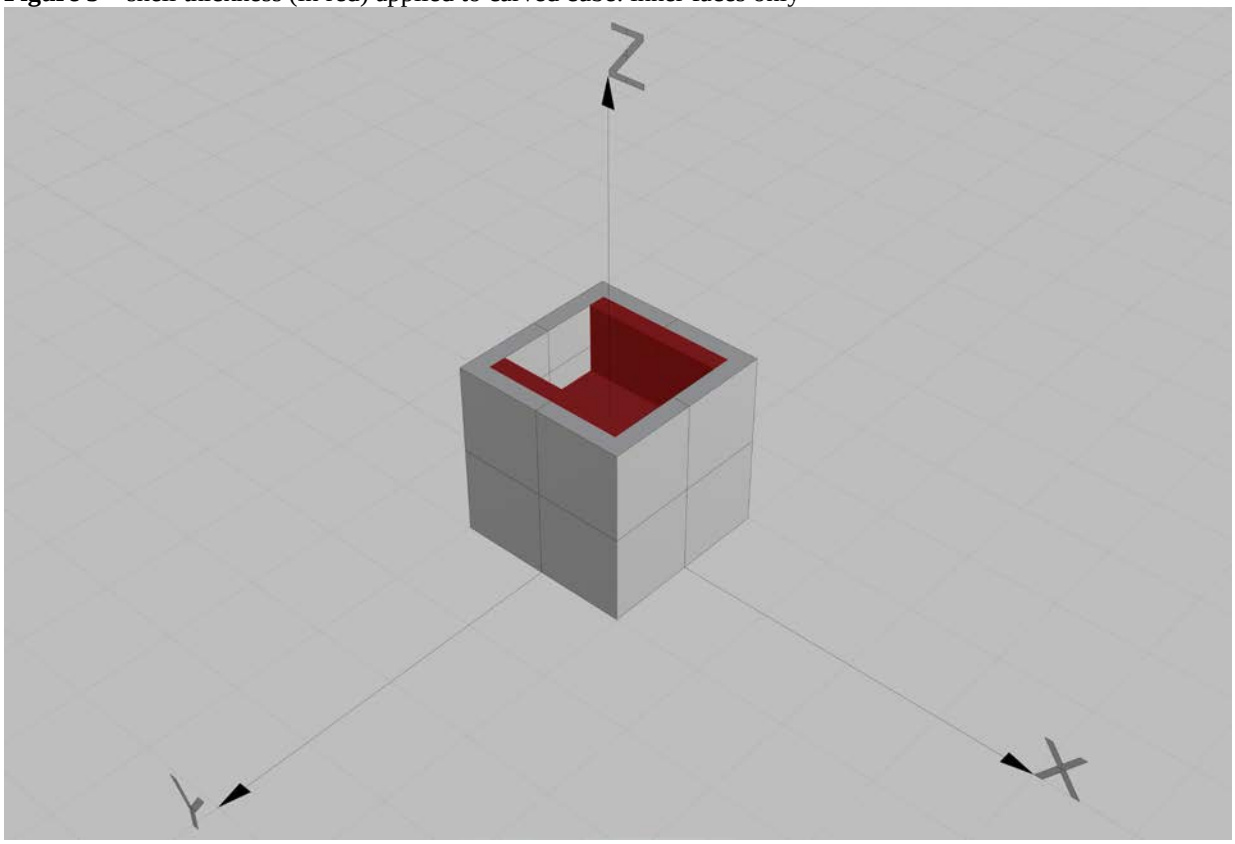


Figure 6 – shell thickness (in red) applied to whole carved cube