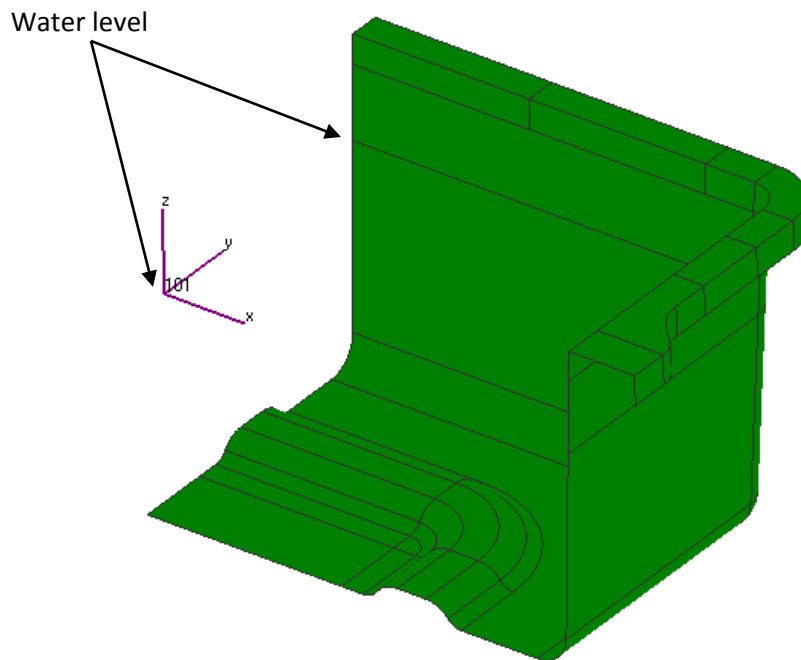


Femap Tip and Tricks: Equation Based Loading

To demonstrate the creation of equation based loading we'll use a water tank quarter model. Prior to load application a local coordinate system positioned at the expected water level has already been defined and the wall surfaces have been split at the corresponding level to allow a group of wetted surfaces to be created.



The hydrostatic pressure (P) is a function of the fluid density (ρ), acceleration due to gravity (g), and fluid depth (h).

$$P = \rho g h$$

For water, and using the mm/tonnes/s consistent set of units in this model, this simplifies to:

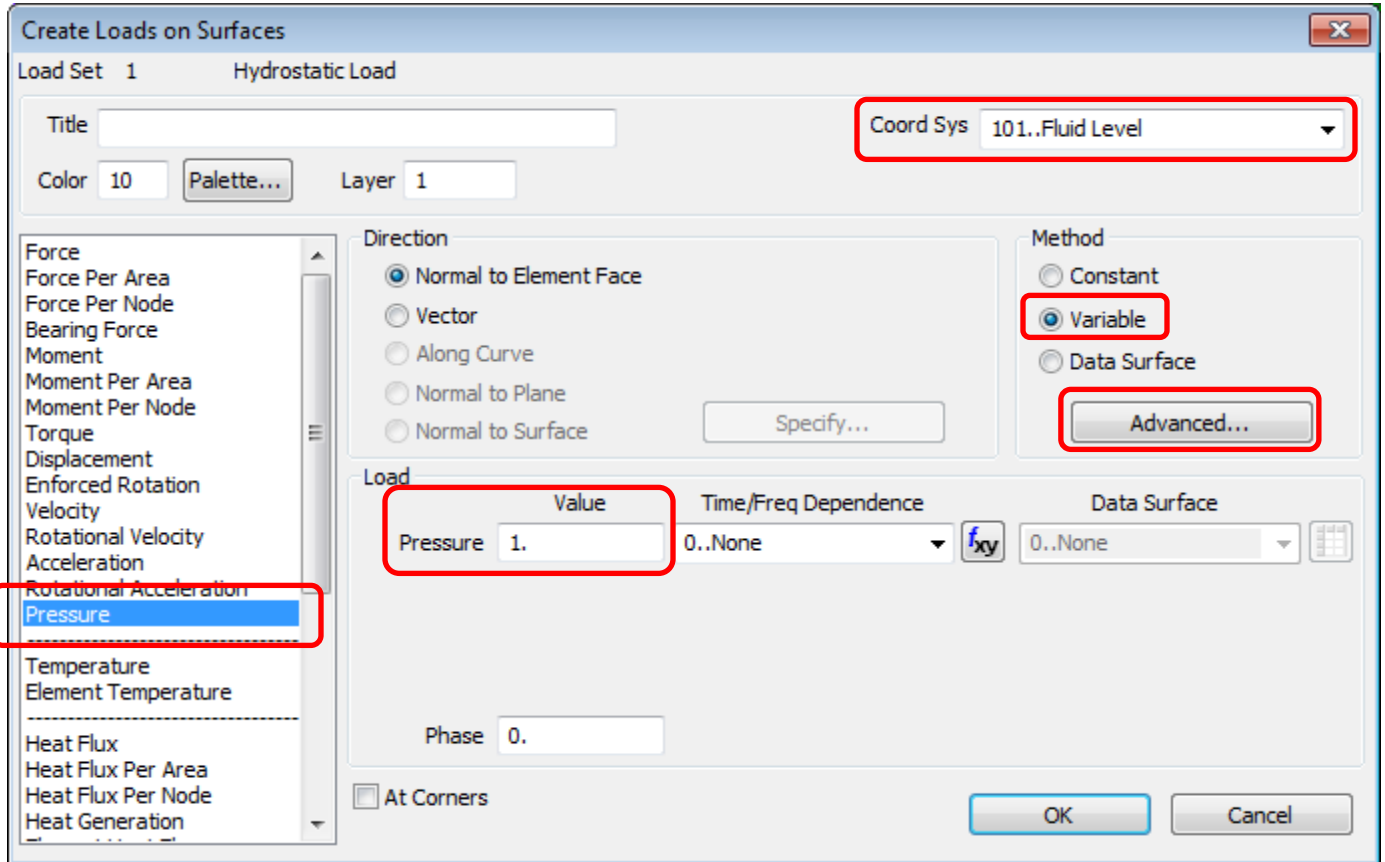
$$P = 9.79e^{-6} !z$$

Note that “!z” is the Femap variable that represents the depth of water in the equation.

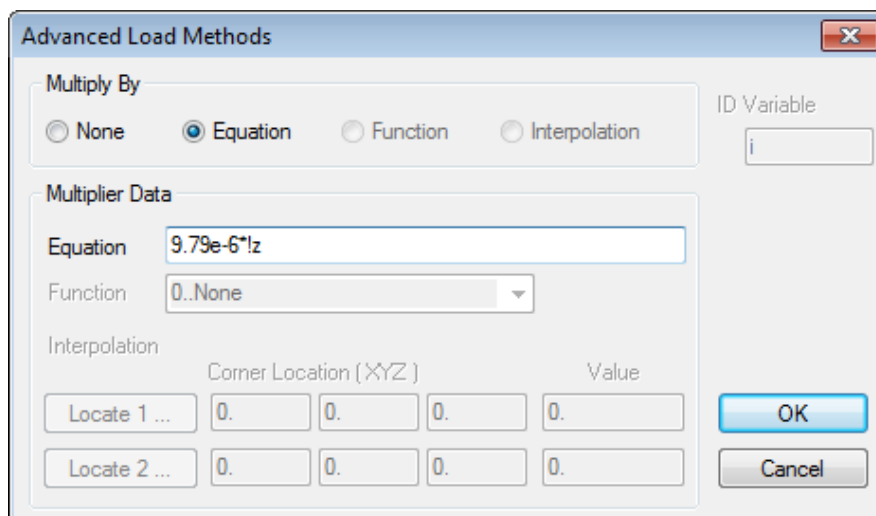
Create a new load definition by opening the **Model** section in the *Model Info* tree and right clicking **Loads**. Select **New** and enter a **Title** in the *New Load Set* dialog, then click **OK**.

Expand the **Loads** section of the *Model Info* tree and right click **Load Definitions** and select **On Surface**. You should now select the surfaces that represent the wetted area of the model in the *Entity Selection* dialog.

In the *Create Loads on Surfaces* dialog, select **Pressure** as the load type. In the *Load* section of the form, enter **1.** as the *Pressure*. In the *Coord Sys* box, select the local coordinate system that is positioned at the water level (this needs to have been defined previously). In the *Method* section of the form, select **Variable**, then click the **Advanced** button.

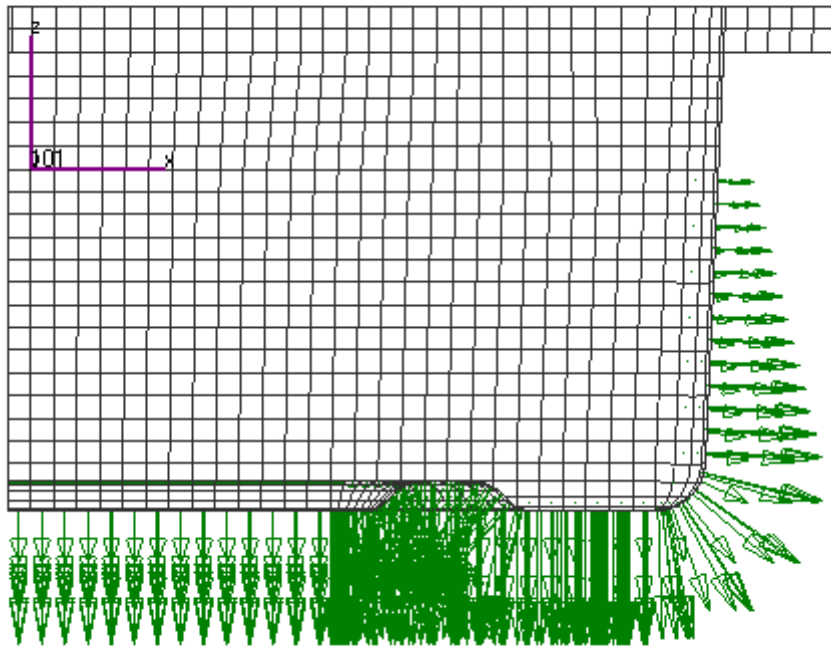


In the *Advanced Load Methods* dialog select **Equation** and enter the equation **9.79e-6*z** in the *Equation* box. Click **OK** and **OK** again.



The surface load markers are now visible, but to see the actual element loads that have been created select **Model | Load | Expand** in the menu.

In the *Expand Geometry Loads* dialog, click the **Convert to Node/Elem** checkbox and click **OK**, then **Yes** in the confirmation dialog. The elemental loads are then displayed.



Watch the video of this Femap tip on [YouTube](#).