**Appendix A: Load blast enhanced in LS-DYNA**

1. Open LS-PrePost
2. Create a mesh of 4-noded shell elements using the meshing tool
3. Specify material properties using the \*Mat tab (mat rigid is recommended unless an evaluation of plate deformation is required)
4. Specify shell section using the \*Section tab. Enter shell thickness
5. Assign shell elements to part 1 using the \*Part tab. Enter part title if desired
6. Assign a surface segment to apply the load to using the \*set\_segm option in the SetD tab. Specifiy SSID as 1.
7. Specify explosive mass and location using the blast\_enhanced option in the \*Load tab. If arrival time of the blast is known, this can be specified as a negative burn time (TBO) so that the blast wave arrives at the beginning of the analysis. Specify BID as 1.
8. Apply the previously defined load (BID=1) to the previously defined surface segment (with SSID=1) using the option blast\_segment\_set.
9. Define an analysis time using the termination option in the \*Control tab
10. Specify output time intervals for binary\_d3plot. This effectively controls how often animation files are written and can be large if animation is not needed
11. Specify output time intervals for binary\_blstfor. This controls how often information about the blast load is written. Intervals of 1E-6 s should be adequate.
12. If plate deformations are required, create boundary node sets using the \*set\_node option in the SetD tab.
13. Apply single point constraints to these node sets using the Spc tab. Ensure each Spc set corresponds to the correct boundary node set (NSID).
14. Save keyword file and run analysis
15. Re-open LS-PrePost. Click File>open>LS-DYNA Binary Plot and open the blstfor file written by the analysis
16. Attributes of the blast are stored as Interface Pressure within the Segment option of the History tab.
17. Select a representative element, plot the Interface Pressure and integrate to get specific impulse (using the Oper tab within the plotting window).
18. The specific impulse should be multiplied by the plate area (or representative area) to give the total impulse. This can be done multiple times to evaluate the spread of impulse, or the element located closest to the centre of the blast can be selected as a worst case scenario. This will be very over-conservative for larger plates.