Keywords: LS-DYNA, drop test, discrete element method, DEM, granular materials, mining dump truck, dump truck body

Main Graphic:

Discrete Element Method: Rock Drop Test of Dump Truck Body

Case Study Section:

LS-DYNA Discrete Element Method Analysis for Load Analysis of Mining Dump Truck Body

Analysis Type: discrete element method, transient dynamic, drop test, impact, flexible body.

The discrete element method was used to simulate the load carrying capacity of a mining dump truck body. The LS-DYNA analysis investigated the stress response of the dump truck body during the shovel drop of a rock load. Figure 1 shows the basic setup of the model from initial loading of the shovel to final drop of the idealized rocks. The drop-test analysis work was used to bound a static stress analysis of the dump truck body. The finite element mesh was purposely made very coarse (see Figures 2 and 3) to provide rough estimates of the peak stresses during the loading operation.

The client used these results to further optimize the dump truck body and guide the overall design process.

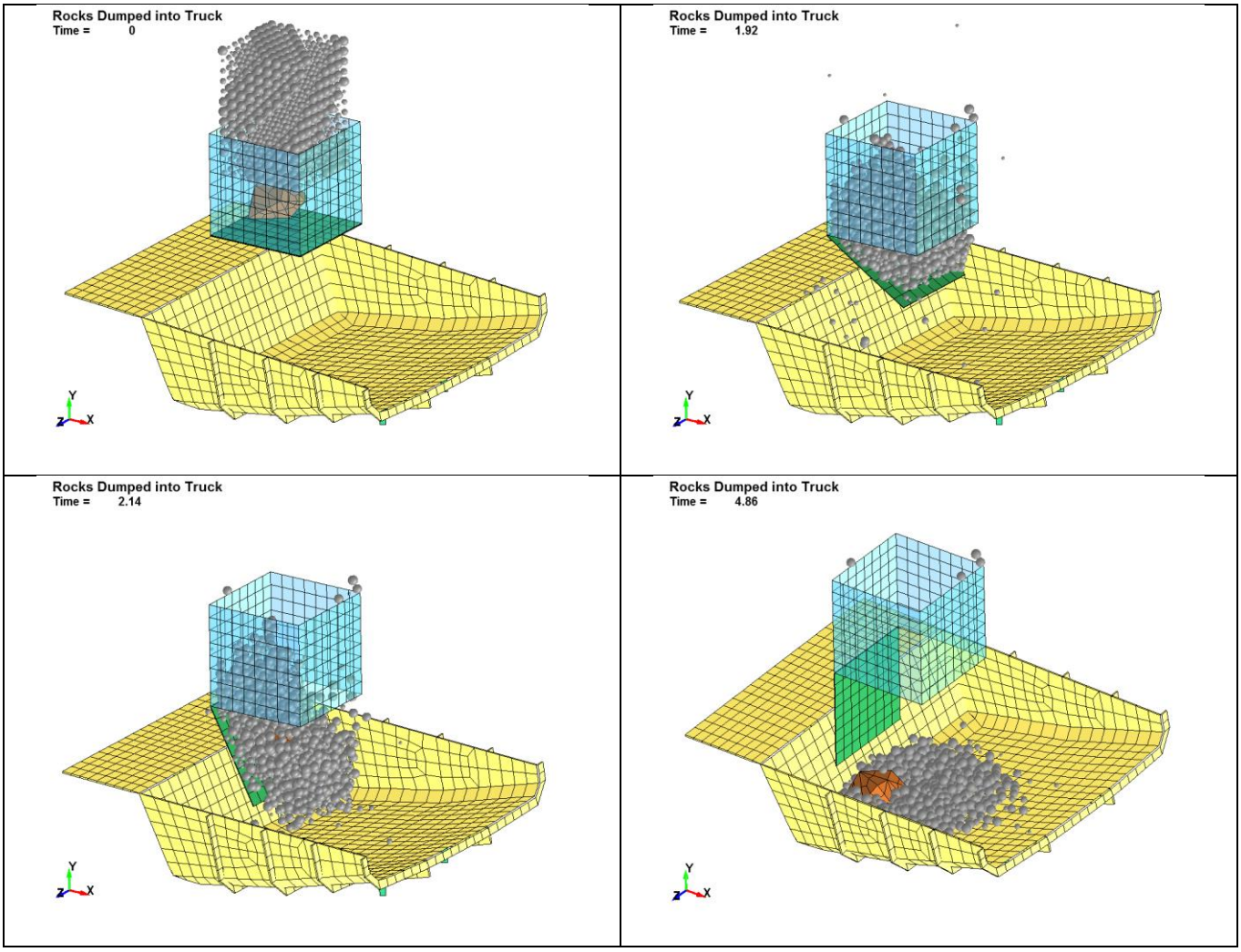

Figure 1: LS-DYNA simulation of shovel dropping rocks into mining dump truck bed.

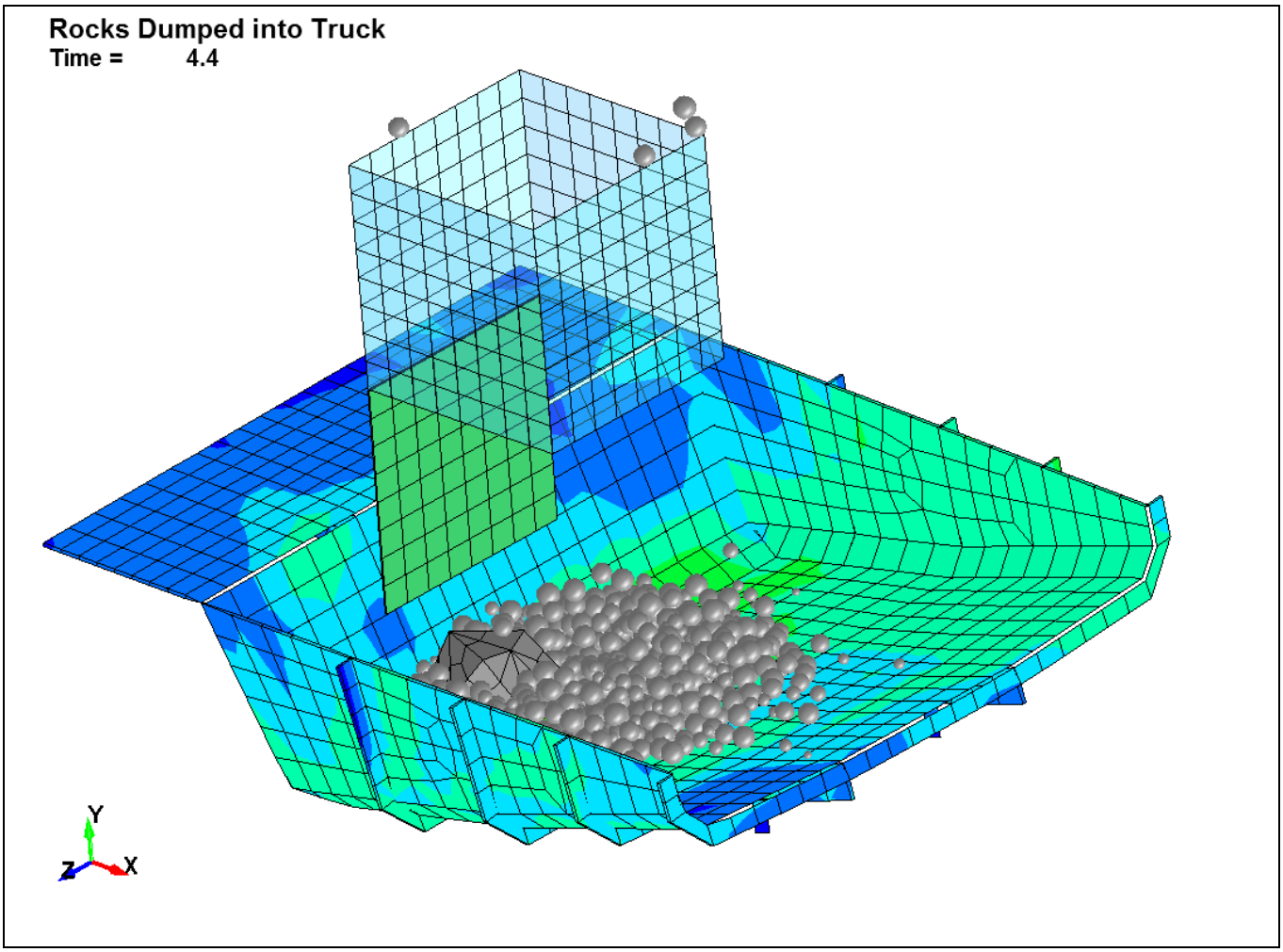

Figure 2: Transient stress analysis results from rocks hitting dump truck bed.

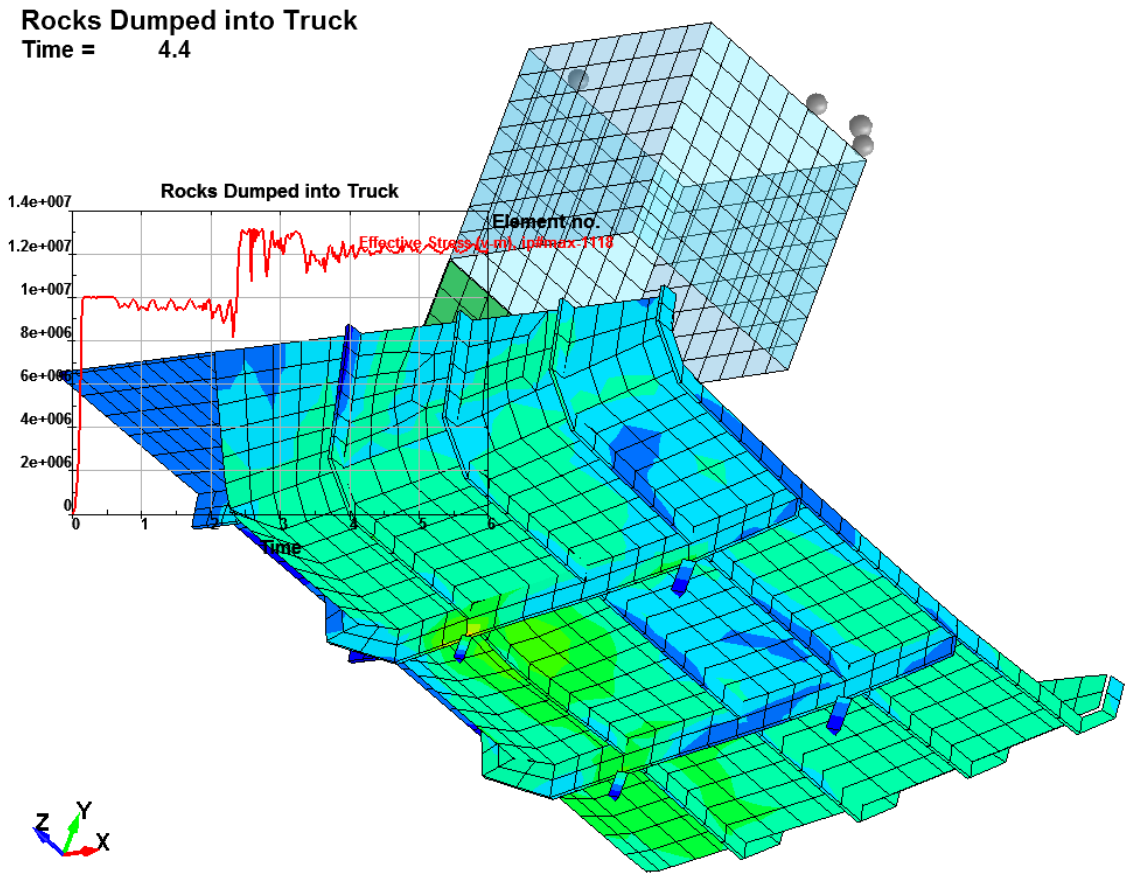

Figure 3: Transient stress results at an element within the body of the dump truck.