

CHARGE-DISASSEMBLY CALCULATIONS FOR THE DIRECT COURSE HIGH EXPLOSIVE TEST EVENT

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In order to define close-in conditions for the 600 T ammonium nitrate fuel oil test event DIRECT COURSE, and to provide a credible source for free field air blast and structure loading calculations, a carefully configured 2D charge detonation and disassembly calculation was performed. The HULL finite difference hydro-code was used. This calculation included simulations of the fiberglass shell containing the charge, the perforated fiberglass structural core, and certain features of the fill mechanism and the support tower. Because the support tower was square in horizontal cross-section, it was necessary to make certain adjustments in order to represent it in cylindrical symmetry. In doing this, care was taken to preserve total tower mass, periodicity of tower elements with height, and area blocking of the flow.

The charge was computationally detonated at its center. The calculation was continued until the charge was fully detonated and the resulting shock wave had broken out the shell and traveled about 1/3 of the way down the tower. The motion of detonation products and fiberglass casing materials was monitored. Results show a more or less symmetrical expanding shock, which is slightly flattened at its lower edge and has a channeled jet running upward in the fill tube. These features compare favorably with observations from DIRECT COURSE photographic coverage.