BLAST ASSESSMENT

For Facility Siting Studies and API 752 Compliance

STRUCTURAL ADVISORIES FOR PROCESS SAFETY

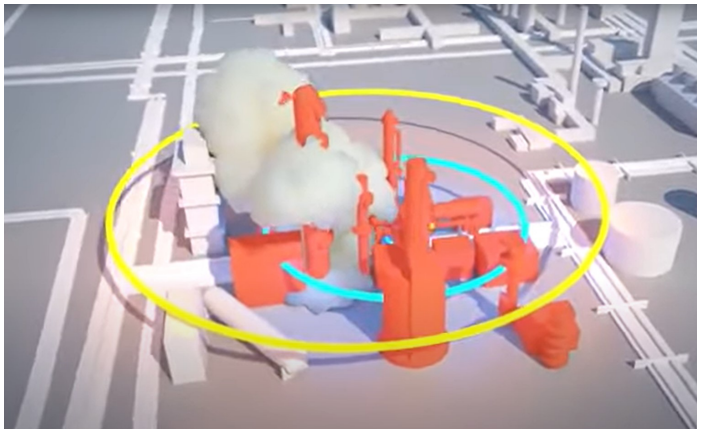
The American Petroleum Institute Recommended Practice 752 provides "guidance for managing the risk from explosions, fires and toxic material releases to onsite personnel located in new and existing buildings intended for occupancy". Part of the framework described in API RP 752 includes performing analytical studies for the evaluation of blast response of buildings.

To complement the Facility Siting Study or Quantitative Risk Analysis for a petrochemical or other industrial facility, MAC can help your team define structural vulnerability of occupied buildings, temporary buildings, control rooms and other electrical and instrumentation enclosures, and have a comprehensive understanding of the overall explosion risk for your facility and personnel.

MAC's blast assessment methodology is based on best recommended practices from CCPS, ASCE and extensive experience performing assessment and design of structures under blast loading utilizing building damage level (BDL) prediction.

MAC EXPERIENCE

MAC has been leading the development of industry best practices and the definition of blast assessment and design fundamentals for buildings and other structures typically found in industrial facilities. By leading task committee of ASCE Design of Blast Resistant Buildings in Petrochemical Facilities and being actively involved in the development of ASCE 59 - 22 Blast Protection of Buildings, MAC can provide its expert advisories for your specific project.



Overpressure contours form Facility Siting Study or Quantitative Risk Analysis

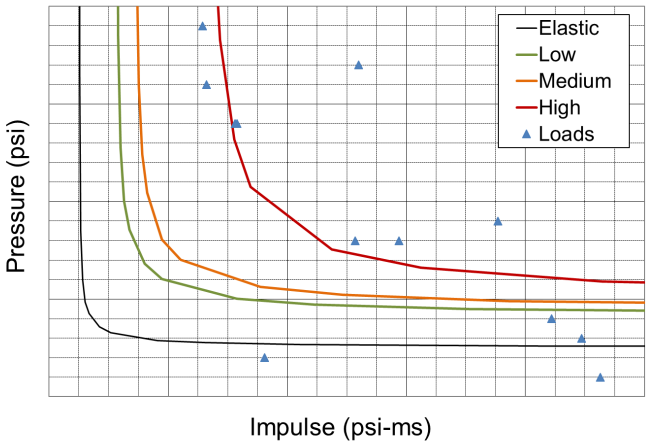
Graphical Representation of Building Damage Level 3

- **API 752**
- **Building Structural Response to Blast Loading**
- **Pressure-Impulse Diagrams**
- **Building Damage Levels**
- **New Building Design Assessment and Consulting**

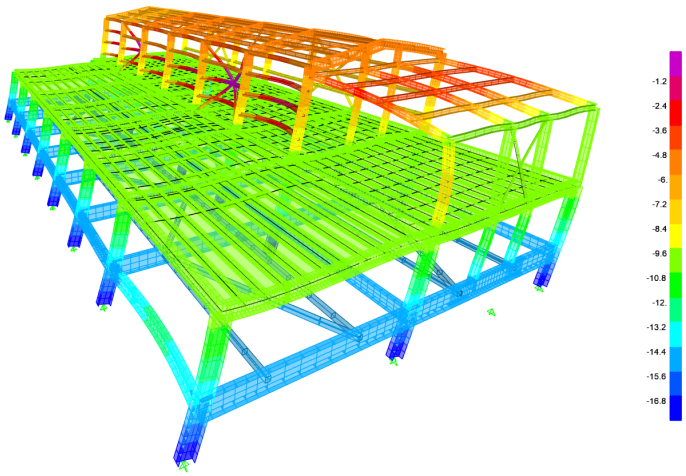
THE METHODOLOGY

The following are some steps that MAC can take to assess the response of a building in a petrochemical facility to a potential accidental vapor cloud explosion:

- Review of Structural Information: MAC can coordinate with the facility owner operator to collect available information on the structural design of occupied buildings on site. This can be accomplished by reviewing any available building drawings.
- Blast Load Calculations: Perform a blast analysis to determine the potential effects of the explosion on the building surfaces. This analysis can be done by using simplified equations and calculating the applied loading on each of the building walls and roof surfaces based on the free-field blast pressure and impulse contours at the building location.
- Structural Analysis: Conduct a structural analysis of the building to determine its capacity to withstand the potential effects of the explosion, including blast pressure and vibrations. This analysis should consider the building's design, construction materials, and location.
- Mitigation Measures: Identify and evaluate potential mitigation measures, such as blast-resistant design, barriers, or relocation of hazardous materials, that can be implemented to reduce the potential impact of the explosion on the building.



Pressure-Impulse Diagrams are used to estimate the response of a building in a variety of loading conditions.



Advanced FEA for Blast Design Optimization