TECHNICALLY SUPERIOR RISK MANAGEMENT

Occupied Building Risk Assessment

THE PROBLEM

The location of temporary and permanently occupied buildings at petrochemical, chemical and oil & gas facilities is important because accidents in these industries have the potential to cause significant damage. If occupied buildings are exposed to such incidents, significant numbers of people may be present, resulting in a large number of serious or fatal injuries. Fortunately, these accidents are rare, however when they do occur, the results can be tragic.

BP Texas City Refinery Explosion, 23 March 2005
A series of explosions occurred at the BP Texas City refinery during the restarting of a process unit as a result of large flammable liquid release. Fifteen workers were killed and 180 others were injured. Many of the victims were located in or around temporary on-site buildings.

THE APPROACH

R4Risk can provide guidance on the location and design of temporary and permanently occupied buildings on these sites, where hazardous materials may present a fire, explosion or toxic hazard to building occupants.

R4Risk utilises risk-based approaches documented in various industry sources and publications including US American Petroleum Institute (API), UK Chemical Industries Association and the Center for Chemical and Process Safety (CCPS).

Our methodology for conducting occupied buildings risk assessment includes the following steps:

- Hazard Identification
- Consequence Assessment
- Frequency Assessment
- Risk Assessment
- Identification of Risk Reduction Measures

METHODOLOGY

Hazard Identification

Hazards to building occupants that could result in serious injuries or fatalities are identified from the chemical processes conducted at the site. These hazards typically include vapour cloud explosions, jet fires, pool fires, toxic gas releases and pressure burst explosions.

Consequence Assessment

The impact of the hazards are assessed against building vulnerability data.

Frequency Assessment

The likelihood of the hazards are estimated from industry sources and client-specific data.

Risk Assessment

The risk is assessed by combining the consequence and frequency assessments and comparing the assessment with applicable client, government or industry risk criteria.

Risk Reduction Measures

Based on the risk assessment, risk reduction measures can be identified and prioritised. These may include:

- Mitigation measures, such as strengthening the building, providing toxic gas refuges
- Providing safer exits points outside the building
- Relocating personnel to buildings in safer locations
- Relocating temporary buildings to safer locations.

THE OUTCOME

The results of the analysis ensures that the risks to building occupants are acceptable by assessing safe building locations, appropriate mitigation measures and safe evacuation paths. The resulting models can be used continually in the assessment of appropriate positioning of temporary buildings during periods of high on-site activities, such as plant shutdowns and turnarounds.

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