

PHAST™

3D Explosions

Taking explosion modelling one step further

Major accidents involving vapour cloud explosions (VCEs) highlight the significant damage potential posed by this hazard on process facilities. Ensuring efficient management of this threat is of paramount importance.



Modelling VCEs on process facilities is a complex task

VCEs are complicated phenomena governed by many interacting factors. Research has shown that the degree of interaction between a dispersing flammable cloud and its environment, especially in terms of overlap with regions of confinement or congestion (obstructed regions), is a key factor for establishing the magnitude of overpressure. Often a wide range of scenarios, obstructed regions and targets need to be considered, further complicating matters.

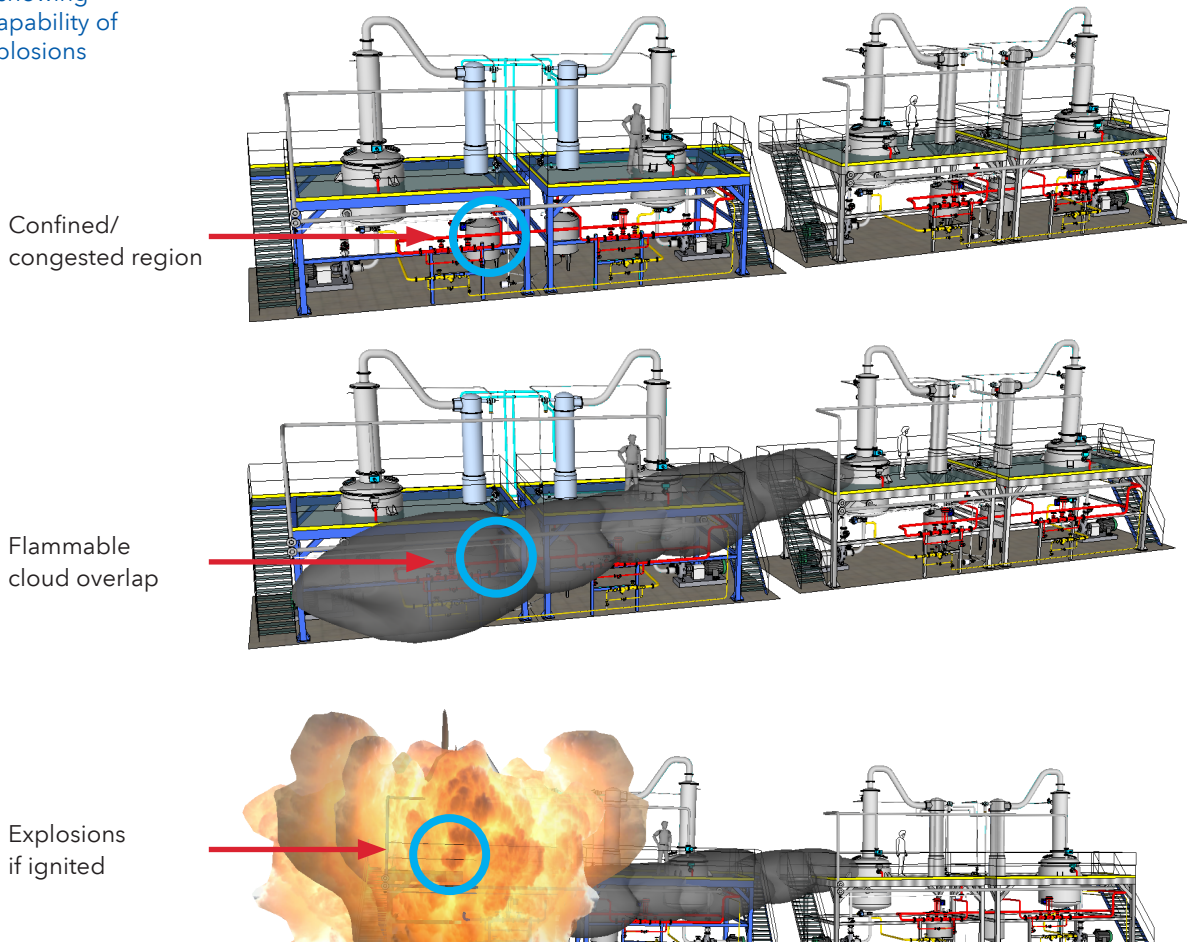
Models based on computational fluid dynamics (CFD-based models) are resource heavy and do not constitute a practical solution, particularly where large numbers of scenarios need to be assessed. The analyses can be more manageable through qualitative screening, modelling a limited set of scenarios or using simplified models, but the outcome is a less-than-realistic evaluation of the situation.

Phast 3D Explosions, the latest extension to the world's leading consequence analysis package, has been created to address these issues.

The Phast 3D Explosions extension adds advanced vapour cloud explosion modelling capability (incorporating both the Baker-Strehlow-Tang and Multi-Energy explosion models) that considers the interaction of a flammable cloud profile with congested regions of process plants in all three dimensions (length, width and height) according to wind conditions, to characterize explosion potential and derive blast loads (for example overpressure, impulse and pulse duration).

Directional effects are also accounted for, including particular emphasis on wind directions of interest. It also includes "multi-scenario hazard contouring" capability that allows for combined hazard contours to a defined threat level (e.g. 0.1 barg over-pressure) to be plotted for a group of scenarios. This output allows for ready visualization, communication and interrogation of the results associated with a range of hazards. The result is that a more detailed, robust and rigorous assessment of explosion hazards can be achieved.

Illustrations showing modelling capability of Phast 3D Explosions



The images are for visualisation purposes only. 3D visualization is not currently supported by Phast.

KEY BENEFITS:

Phast 3D Explosions:

- Advanced VCE modelling enables more detailed and realistic consideration of VCE hazards
- Multi-scenario hazard contouring
- Directional modelling

Phast:

- It enables a detailed analysis of a range of hazardous outcomes associated with a hazardous event taking into account various factors that impact on the development (e.g. variations in weather conditions).
- It utilizes linked models such that full analysis of an event and associated outcomes can be executed in a single integrated calculation run.
- It incorporates powerful visualization tools that allow the impact ranges to be imposed on location maps, thus allowing for clearer elucidation of the impact zones.
- The result outputs can be presented in various formats (graphs, tables, commentary).
- The embedded models are subject to continuous improvement processes and are constantly developed further and updated to reflect advances in both industry knowledge and technology in general