Phast

The most comprehensive hazard analysis and QRA software for safety professionals

DNV Software

MANAGING RISK

Offering a complete solution

The most widely used and comprehensively validated software meeting all your risk management analysis needs
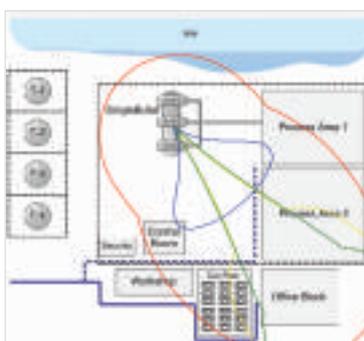
Process Industry Challenges

In today's competitive environment, the management of hazardous facilities to ensure safe and cost effective operation is high on the corporate agenda. The market demands consistent performance in demonstrating safe and efficient operation whilst complying with regulation and legislation. As safety professionals we recognise that "good safety means good business". Demonstrating this to key stakeholders is not straightforward and you need the best tools to help.

Our Innovation

Phast is the most comprehensive software available for performing Process Hazard Analysis (PHA), Quantitative Risk Assessment (QRA) and Financial Risk Analysis (FRA). Our extensively validated software for consequence and risk analysis is used by governments and industry helping them to comply with local safety regulation and their own corporate best practice. Phast contains all the discharge, dispersion, effects and risk models you will need to accurately assess all your major hazards and associated risks.

User Friendly Environment

All configurations of Phast share the same Graphical User Interface and standard Windows look and feel. The user friendly Phast environment has many benefits:

- Compatible with popular office applications
- Excel import and export facility
- Extensive on-line electronic help
- Provides traceability and consistency in calculations
- Detailed technical documentation for models with validation
- Dedicated helpdesk
- Easy to read results in a graphical or report format
- Facility to overlay results on Geographical Information System, maps, aerial photographs and CAD images using Intergraph's GeoMedia GIS
- Comprehensive database of material properties
- Highly configurable parameter sets

Configured to meet your Needs

Phast is available in a number of modes, from consequence analysis only to full risk analysis. Phast also comes with a number of extensions which increase the functionality available within each mode.

Phast Consequence

Phast Consequence provides you with comprehensive hazard analysis facilities to examine the progress of a potential incident from the initial release to its far-field effects.

Following identification of your major process plant hazards, Phast allows you to predict all possible complex consequences from possible releases of hazardous material.

Toxic and flammable impact

Phast Consequence is the world leading consequence analysis tool which can be used for all stages of design and operation across a wide range of process industries
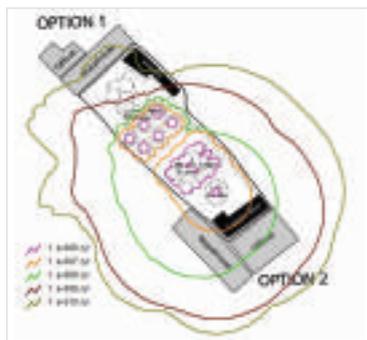
It calculates the initial discharge, as the material expands from its storage conditions to atmospheric, through dispersion, as the material mixes with air and dilutes, and the subsequent toxic or flammable effects. Phast includes a wide range of models for discharge and dispersion as well as flammable, explosive and toxic effects.

Discharge

- Phast requires basic information about storage or process conditions and material properties in order to perform discharge calculations
- The software comes with an integrated material property database containing more than 1,600 pre-defined pure component chemicals
- Various discharge scenario options have been implemented to represent common process failures, and model their behaviour. These include:
  - Leaks and line ruptures from long & short pipelines
  - Catastrophic ruptures
  - Relief valves and disc ruptures
  - Tank roof collapse
  - Vent from vapour spaces
  - In building release effects

Dispersion

The dispersion models within Phast are able to model the following phenomena

- Dispersion of gas, liquid and two-phase releases

- Liquid droplet thermodynamics calculations and liquid droplet rainout
- Pool spreading and vaporisation
- Building wake dispersion effects for vapour releases

Flammable Effects

For releases of flammable material Phast calculates

- Radiation profiles and contours from a range of fire scenarios including pool fires, flash fires, jet fires and fire balls, including cross-wind effects on a jet fire
- Vapour Cloud Explosion modelling using industry standards models including the TNO Multi-Energy, Baker Strehlow Tang and TNT Equivalence models
- Overpressure contours from Boiling Liquid Expanding Vapour Explosions

Toxics effects

- Graphs of toxic concentration profile
- Indoor and outdoor toxic dose prediction
- Reporting of distance to specific dose and concentration
- Calculated exposure time and use as "averaging time" for passive dispersion effects

Phast Risk

Phast Risk allows you to combine the flammable and toxic consequences from each scenario in your QRA model with their likelihood to quantify the risk of fatalities. Phast Risk allows you to take account of local population distribution,

Managing process industry risk

Phast Risk, the most advanced tool available for quantifying process plant risks incorporating all the capabilities of Phast Consequence

Discharge — Dispersion

Liquid flashing to 2-phase
Vapour
Liquid
Liquid gas
Evaporating droplets
Evaporation
Rainout
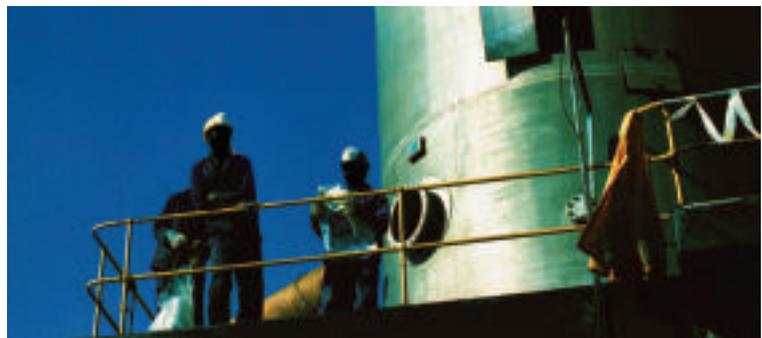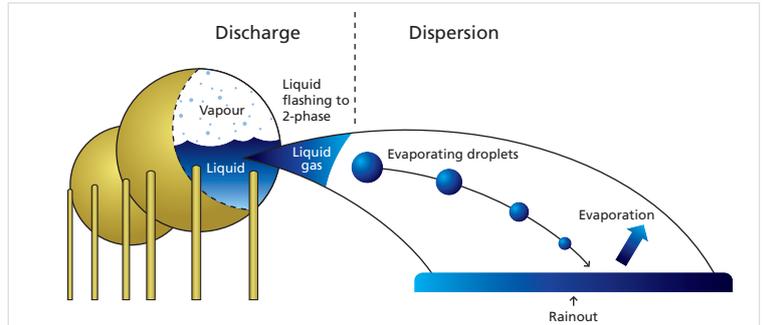
sources of ignition, land usage and local prevailing weather conditions. It is designed to perform all the analysis, data handling and results presentation elements of a QRA within a structured framework.

Phast Risk allows you to quickly identify major risk contributors so that time and efforts can be directed to mitigating these highest risk activities. Based on effects calculations and population vulnerabilities, Phast Risk can integrate over all scenarios and weather conditions to estimate the total risk. The established individual and societal risk indicators are predicted by Phast Risk across your facility and surrounding area using the classical QRA methodology. Risk ranking reports can be produced at points of strategic importance to show the relative influence of the various failure scenarios and their contribution to both the individual and societal risk metrics.

A key benefit of Phast Risk is the ability to identify major risk contributors and differentiate these from incidents with worst case consequences which might otherwise dominate the safety reviews. Whilst medium scale incidents have lesser consequences, they may have a higher frequency, which, when combined with their hazardous effects, generate a higher level of risk. Time and effort directed to mitigating high consequence but often low frequency events may not be well spent. Phast Risk helps you direct this effort more effectively.

Phast Risk also provides facilities to help you manage large quantities of input data, including scenarios, parameters, wind roses, ignition and population, and combine these in many ways. This is critical when looking at sensitivity analyses and assessing the merits of a range of risk reduction measures.

Benefits
- Facilitates cost reduction in terms of losses and insurance
- Allows optimization of plant and process design
- Assist in compliance with safety regulators
- Enables quicker response to hazardous incidents
- Improve engineer's understanding of potential hazards
- Regular software upgrades incorporate industry experience and expertise, and advances in consequence modelling technology

Product mode		Extensions		
		Multi Component	Financial	Explosion*
Phast^{FX}		X	X	X
Phast Consequence	Micro	X	X	X
	Standard	✓	✓	X
Phast Risk	Micro	✓	✓	X
	Standard	✓	✓	✓

* Not available until version 6.6.

Phast modes available and supported extensions, within each mode.

Extensions to Phast

We are continuously improving our technology, adding extensions to support your specific engineering needs

Phast subscribers can trust in our continuous development of Phast, responding to advances in operational experience and changing user requirements through regular product review and upgrades. We are committed to develop new extensions to our technology to meet specific needs from our customers and these will be improved and extended in each subsequent release.

Financial Extension
The Financial Consequence extension is used to assess situations which present potential hazards not only to life but also to the environment, property and business and help quantifying their severity in financial terms. Phast Financial helps you to estimate the cost of a particular release of a given material under specified conditions. The Financial Risk extension helps you to calculate the broader financial risks associated with accidents and can be used to help manage your business risk and assess appropriate levels of insurance.

Blast Extension for Explosion Risk
The Blast extension permits more accurate explosion modelling and thus better risk predictions. It provides all the extra functionality required to assess overall risks taking account of protection provided by different types of structure and areas of congestion on your plant. Models supported include the Multi Energy and Baker Strehlow

Tang explosion models and a number of industry standard vulnerability models.

Multi-Component Extension
The multi-component extension to Phast provides greater accuracy for liquid or two-phase mixture releases compared to the standard pseudo-component approach. The composition of each component of the mixture is calculated throughout the discharge and dispersion phases of the release.

Phast is used by more than 1000 customers around the world making it the most widely used application of its kind. With dedicated technical support available from 5 locations globally, a comprehensive world-wide training programme and regular updates available to maintained customers, the service we offer our customers is second to none.

DNV Software is the commercial software house of DNV serving more than 3,000 customers in the maritime, offshore, and process industries.
DNV Software is a market leader in software development of design, strength assessment, risk, and information management.