



Safeti™ Hazard Analysis

Managing your plant safely and responsibly

DNV Software

Understand your hazard

Bringing effective hazard management to your desktop



Key Challenges

With growing global competition and more stringent legislation and regulation, there is increasing pressure for companies operating major accident hazard facilities to accurately evaluate the potential hazards associated with their operations.

Questions being asked are:

- “What are the major hazards on my plant?”
- “How can I ensure these are managed as cost effectively and safely as possible?”
- “How can I preserve and consolidate corporate knowledge at a time when industry is continually changing and becoming leaner?”
- “How do we set about achieving excellence in safety without compromising financial performance?”
- “What should I do in response to an emergency?”

Some of the key challenges faced by industry includes:

- How do I develop the most cost effective methods for managing the hazards inherent in my plant?
- Can I determine the most hazardous activities in my operation?
- How effective are the safeguards I have put in place?
- What mitigation measures should I implement?
- What is the environmental impact of my plant and how can I manage this?

Any accident can lead to injuries and fatalities, damage to the environment or destruction of property. The challenge is to ensure these are managed safely and responsibly to improve business performance, minimise downtime and effects on people, property and the environment.

Our Innovation

The Safeti Hazard Analysis package can help in your daily work throughout the life cycle of your plant. It provides tools to ensure the safe design, construction and operation of your plant. Whether investigating the findings of a HAZOP or screening your plant for the most hazardous processes, the Safeti Hazard Analysis package can help.

The Safeti Hazard Analysis package provides a complete solution for comprehensive consequence analysis, for compliance with legislation or emergency responses planning. In addition, for those seeking a balanced approach to managing environmental, social and economic impact, our Environmental Performance System can help.

The package combines the capabilities of PHA-Pro®, the leading HAZOP and PHA software, with those of Phast, the industry standard consequence and risk analysis application. The combined power of these applications make this package the most comprehensive available for managing your hazardous facilities.

Manage your hazard

Through all stages of the plant life cycle



Configured to meet your exact requirements

The Safeti Hazard Analysis package is available in a number of configurations to match your exact requirements. With the industry standard Phast application at its core, it is the most widely used, impenhensively validated and expertly supported package on the market.

Whether you want to perform basic hazard analysis or advanced effects modelling or minimise effects on the environment, we can provide you with the tools you need. In addition, for expert users, direct access to all models is available through Excel, providing much more control over all inputs and outputs. These models are available in groups for discharge, dispersion, fires and radiation and explosions.

Other features include a built-in database of more than 1500 chemicals, import and export of models from study to study, an input wizard to guide you through study setup and built-in GIS for data input and visualisation of results.

“I have always been impressed with the effort DNV Software puts into communicating with Safeti users, and in listening to our needs for ongoing development of the software.”

Martin Dennehy, Manager – Process Safety Europe, Air Products

Select from a range of models

A wide range of models is available for an extensive range of scenario types. For calculating discharge there are models for

- Long and short pipelines
- Leaks from pipes and vessels
- Relief valves and rupture disks
- Catastrophic rupture of vessels
- Vent from vapour space
- Tank remove collapse and removal

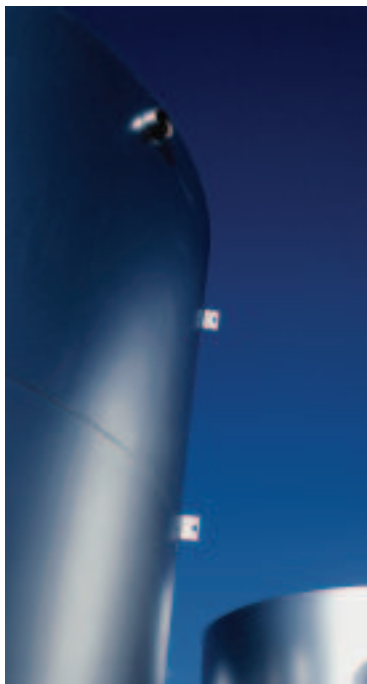
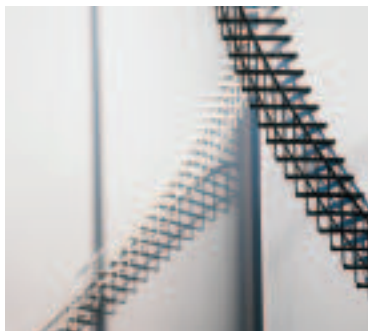
In addition our “User Defined Source” model allows you to use any of the more specific models described above as a starting point for your dispersion calculations, adjusting the starting conditions to more realistically reflect your own physical situation as necessary.

For dispersion there is the default industry standard Unified Dispersion Model (UDM) and an additional model for dispersion taking account of the effect of building wakes.

The UDM takes source data from any of the linked discharge models described above and models all phases of the cloud dispersion from the initial jet phase right through to the passive phase. In addition, Phast will automatically perform effects calculations appropriate to the

Industry leading tools

For assessing the consequences of hazardous releases



particular release material and conditions being modelled. For example, for flammable materials, Phast will automatically calculate all possible flammable and explosive outcomes if there is any possibility that these outcomes will be realised.

The second dispersion model in Phast is the Building Wake Model (BWM). This is used to model the dispersion from the roof or chimney of a building at any orientation or for any wind direction, where the dispersing cloud is entrained in the downwind recirculation zone in the wake of the building.

One of the key strengths of the modelling available in the Phast application is the automated linkage of models for discharge, dispersion and effects, specific to the particular scenario of interest.

Across industry sectors and applications

The Safety Hazard Analysis package is currently used in a many industries including

- Oil and gas
- Chemical manufacture
- Governments and regulatory authorities
- Consultancy and design services
- Insurance companies
- Universities

Our extensive client list is second to none and contains almost all the major international oil, gas and chemical companies.

Particular applications include

- Plant layout and building siting
- Inventory planning
- Pollution control
- Emergency planning
- Safety case preparation
- Assessment of possible effects of non-standard operation
- Cost benefit analysis of different options throughout the plant life-cycle

For compliance and improved performance

Whether you're looking to comply with local legislation or improve the design and performance of your plant, from the environmental, economic or social standpoint, we can help. The applications available within this package have been used for many years to ensure compliance with a broad range of safety regulations around the world including RMP, COMAH and Seveso.

In order to make compliance more straightforward a number of features have been included with direct relevance to these and other regulations including

Innovative solutions

For discharge, dispersion and flammable and toxic effects



Emergency Response Planning Guidelines (ERPG) averaging time, Immediately Dangerous to Life or Health (IDLH) concentrations and user defined averaging times, for example.

Hazard Identification

The Safeti Hazard Analysis package includes PHA-Pro®, the leading HAZOP and PHA software developed by DYADEM, which has been adopted as the standard HAZOP tool by thousands of corporations worldwide.

Screening Analysis

For simple screening analysis, a number of standalone models are available within the package which help you assess a wide range of flammable and explosive effects.

These include:

- Flammable models, including resulting radiation effects, for jet fires, pool fires and fireballs.
- Explosion models, to calculate overpressure and impulse effects. Available models include the Baker Strehlow, TNO Multi-Energy and TNT explosion models and the BLEVE Blast model.

Comprehensive Consequence Analysis

For more comprehensive consequence analysis, an extensive range of models are available for a wide range of phenomena, with automatic linkage from one model

to the next. Using these you are able to examine the progress of an incident from the initial release to far-field dispersion, including

- Discharge
- Rain-out
- Pool spreading and evaporation
- Dispersion
- Flammable and toxic effects

All results can be displayed in graphical or tabular form with the ability to view cloud development dynamically as the release progresses. Population, assets and equipment, other infrastructure and sources of ignition can all be placed graphically on a map using the built-in GIS.

The full extent of the cloud can be visualised, and the effect of the release on population, the environment, assets and equipment can be assessed, from the standpoint of injuries and fatalities, or financially.

Head office:

Oslo

DNV Software
NO-1322 Høvik
Norway
Tel: +47 67 57 76 50
Fax: +47 67 57 72 72

e-mail: dnv.software@dnv.com
web: www.dnvsoftware.com

DNV Software regional offices:

Busan

Det Norske Veritas
DNV Software
Nambusan P.O. Box 120
Busan 613-011
Republic of Korea
Tel: +82 51 610 7700
Fax: +82 51 611 7172

Kobe

Det Norske Veritas
DNV Software
Port P.O. Box 77
Kobe 651-0191
Japan
Tel: +81 78 291 1305
Fax: +81 78 291 1330

Marseille

Det Norske Veritas
DNV Software
16 Impasse Blancard
13007 Marseille
France
Tel: +33 (0) 4 91 13 71 66
Fax: +33 (0) 4 90 54 46 89

Rio de Janeiro

Det Norske Veritas
DNV Software
Rua Sete de Setembro
111/12 Floor
20050006 Rio de Janeiro
Brazil
Tel: +55 21 3722 7200
Fax: +55 21 2507 5012

Houston

DNV Software
16340 Park Ten Place
Suite 100
Houston, Texas
77084-5132
USA
Tel: +1 (281) 721 6700
Fax: +1 (281) 721 6880

London

DNV Software
Palace House
3 Cathedral Street
London SE19DE
United Kingdom
Tel: +44 (0) 20 7716 6525
Fax: +44 (0) 20 7716 6738

Kaohsiung

Det Norske Veritas
DNV Software
4F-C, No. 7
Suhwei 4th Rd.
Kaohsiung 802
Taiwan
Tel: +886 7 536 7759
Fax: +886 7 536 7769

Shanghai

Det Norske Veritas
DNV Software
House No. 9
No. 1591 Hong Qiao Road
Shanghai 200336
China
Tel: +86 21 3208 4518
Fax: +86 21 6278 8090