



Short Description (ver. ASAP 6.3.1. Build 131)

February 2016

ASAP – the preferred risk analysis tool

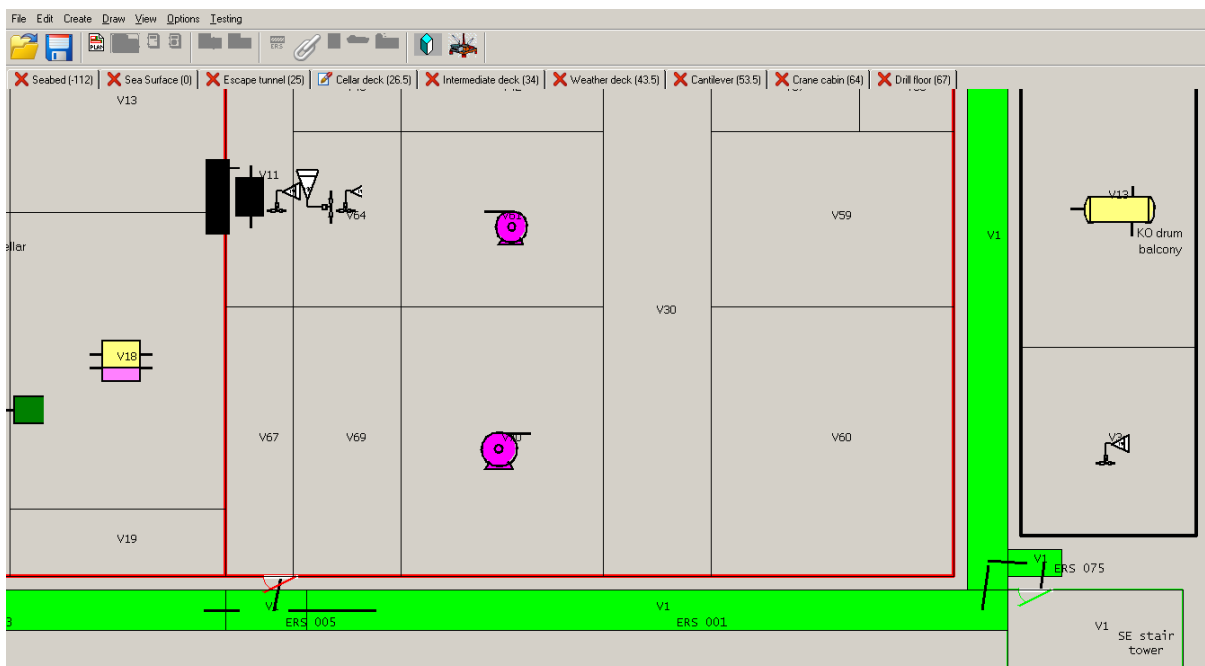
The Advanced Safety Analysis Package (ASAP) is a software tool that estimates the risk to personnel and loss of main safety functions related to flammable and toxic leaks, fires and explosions on oil and gas facilities both offshore and onshore. The software analyses a chain of events following a leak by taking into account ventilation conditions, process conditions, safety barriers, escape possibilities, layout and manning distributions. In what follows, a short description of ASAP is given to highlight the key features.

Building blocks

ASAP consists of a set of modules. All modules are interconnected such that any result data and information possessed or produced in one module are automatically transferred to other modules which need this information. Consequently, there is no need to transfer data manually and user errors are therefore minimized.

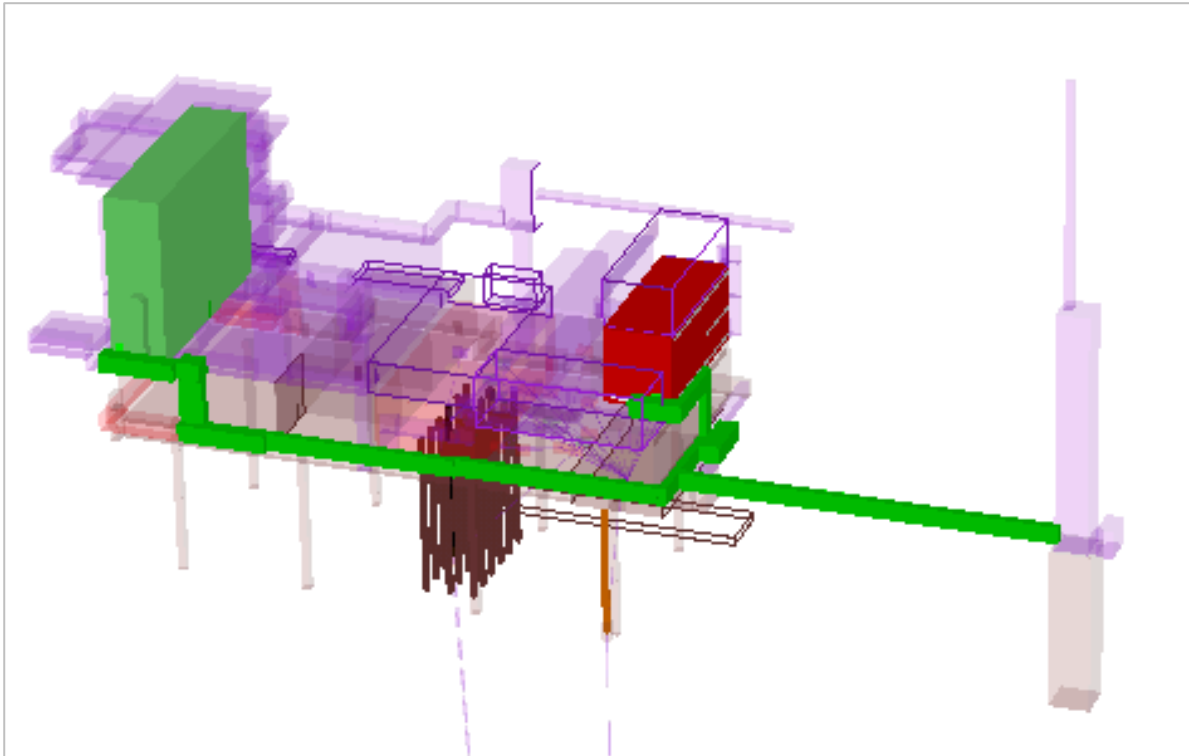
The geometry module

Here, the 3D geometry of the facility is modelled. The User models hazardous and non-hazardous areas on the facility, escape routes, ventilation openings, confinement and congestion, leak sources, detectors and ignition sources.

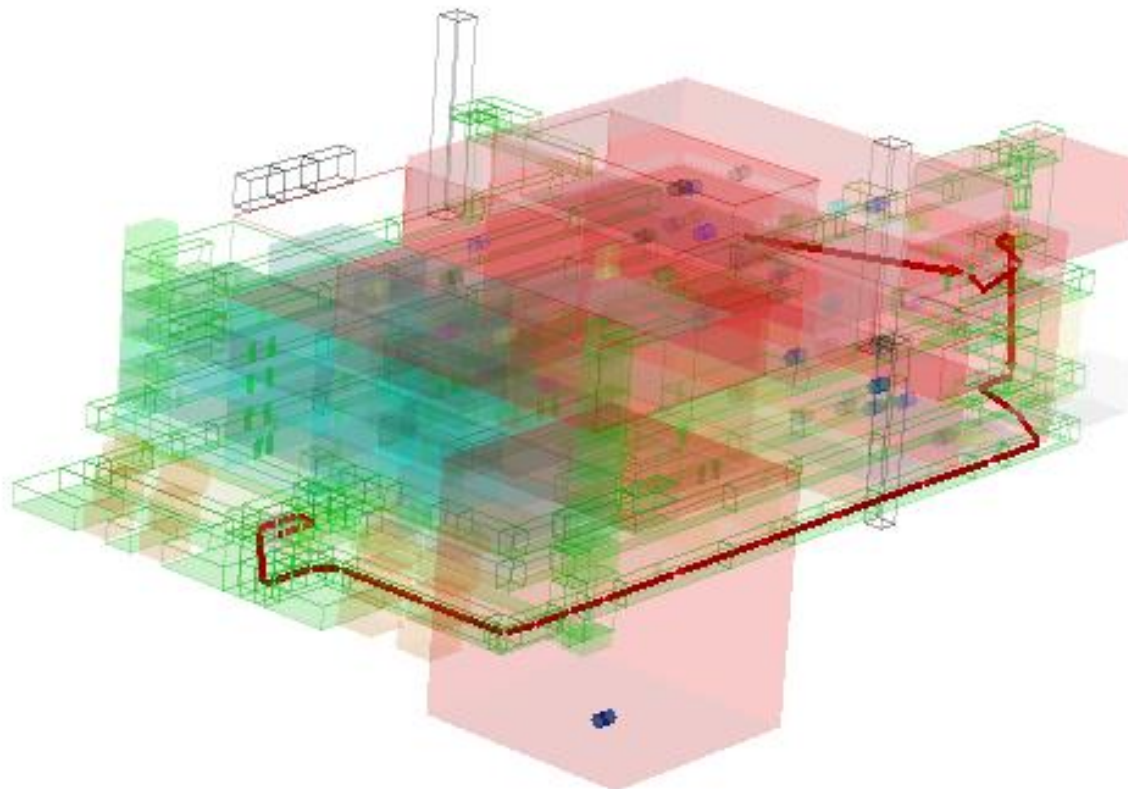


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After modelling, the geometry can be viewed in 3D;

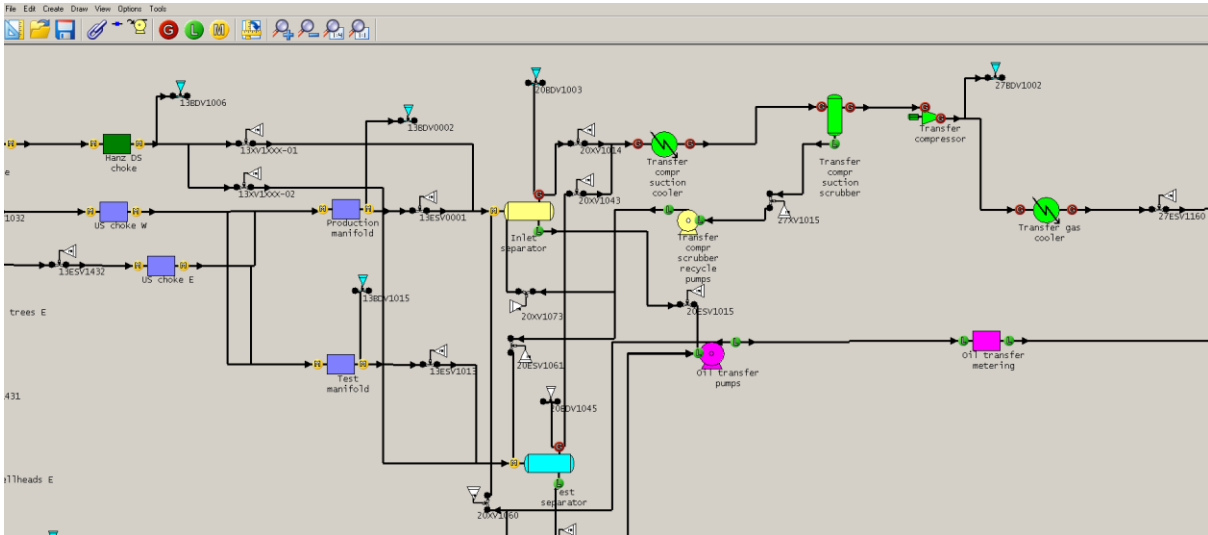


Also the various escape routes can be viewed individually;



The process module

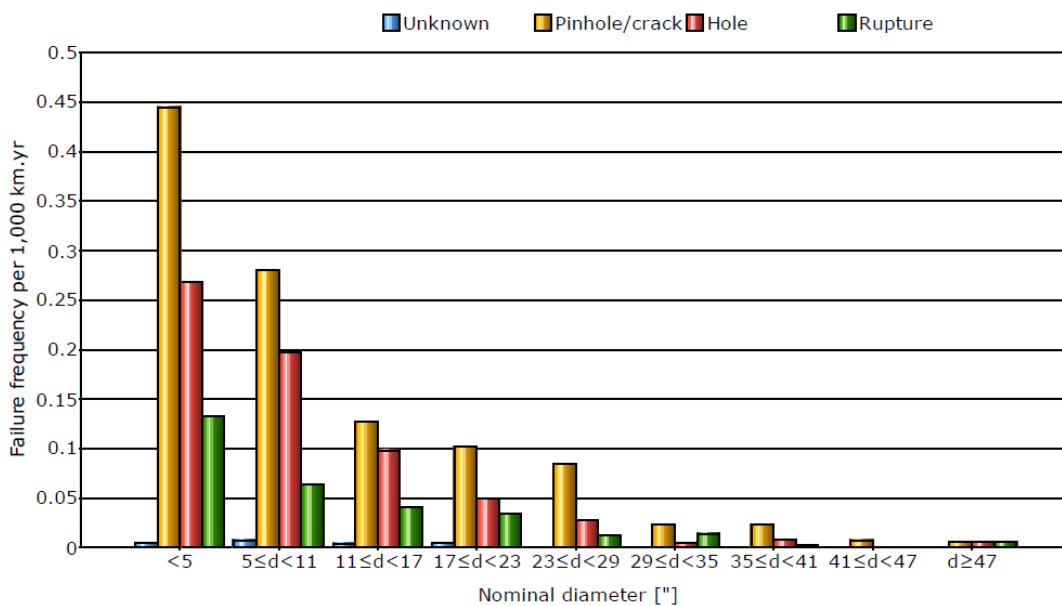
Here, the process flow diagram with emergency shutdown valves and blowdown valves is modelled. Isolatable process segments are indicated with separate colours.



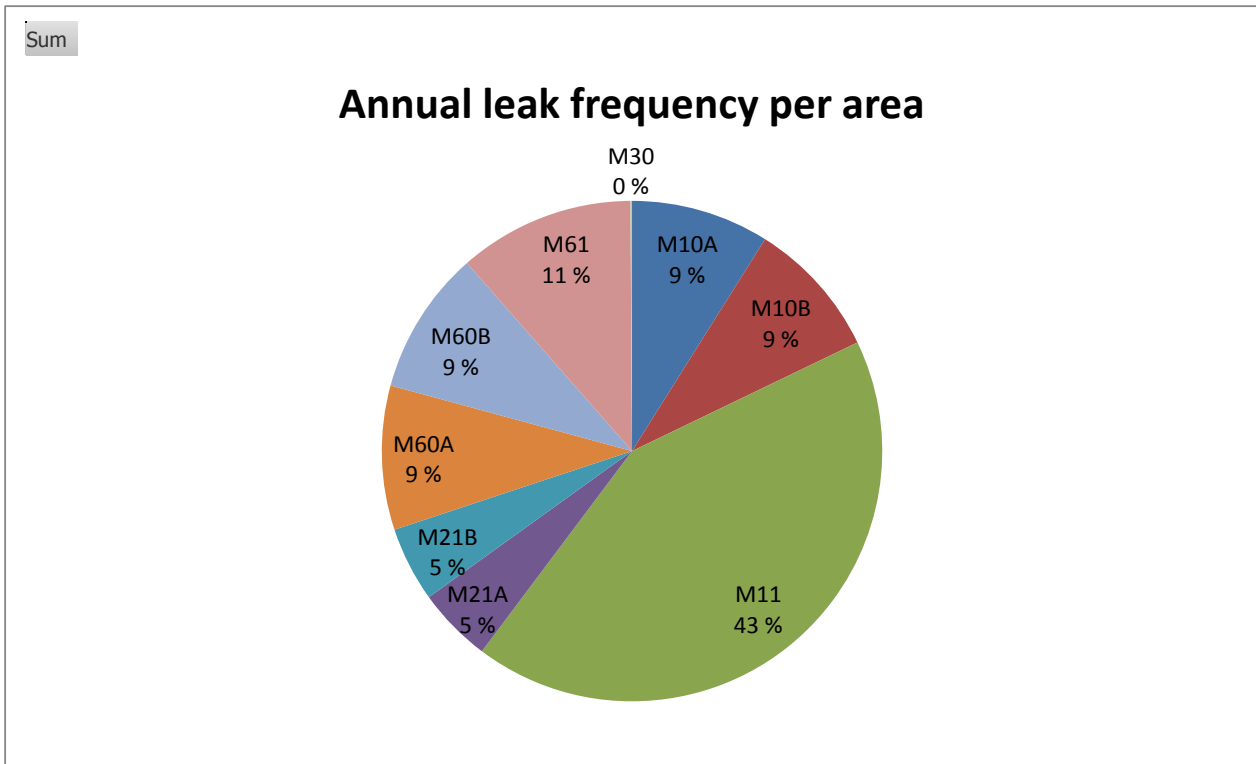
The leak frequency module

Here, the leak frequencies are calculated based on process data, generic leak frequencies and equipment counts.

Generic and unit specific leak frequencies can be viewed;



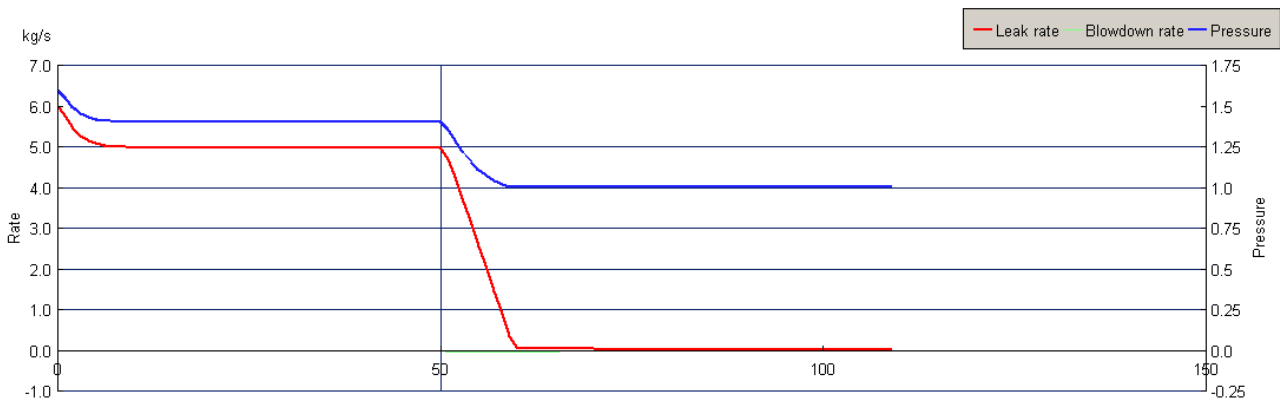
The overall leak frequency picture can be viewed;



The transient leak duration module

Here, the leak profiles and durations are calculated based on fluid containment and on the emergency shutdown and blowdown scenarios.

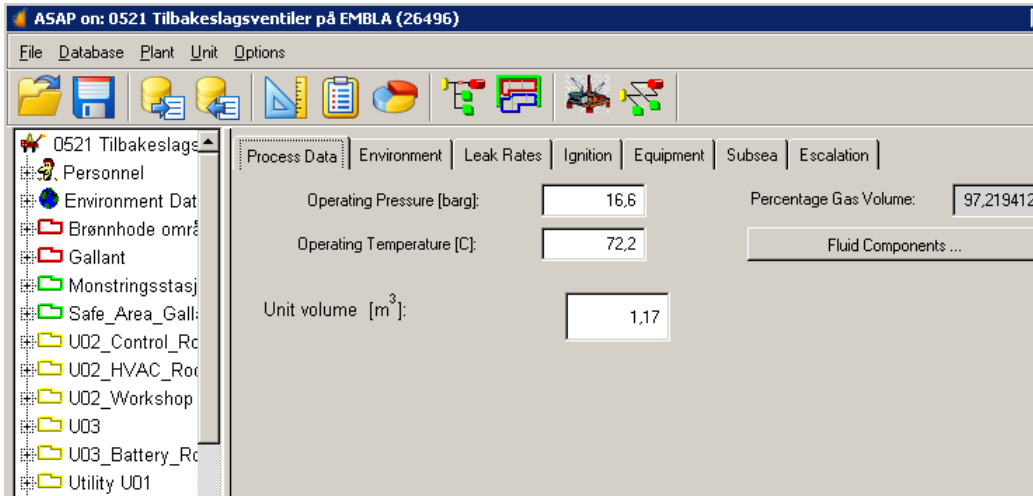
The leak profiles can be viewed;



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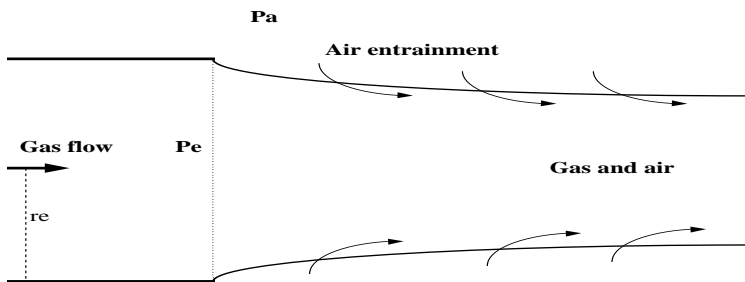
Data entry module

Here, all input data required for the analysis is entered such as process data, reliability data, wind rose data, personnel distribution, detectors, ignition sources, firewater logic, etc.



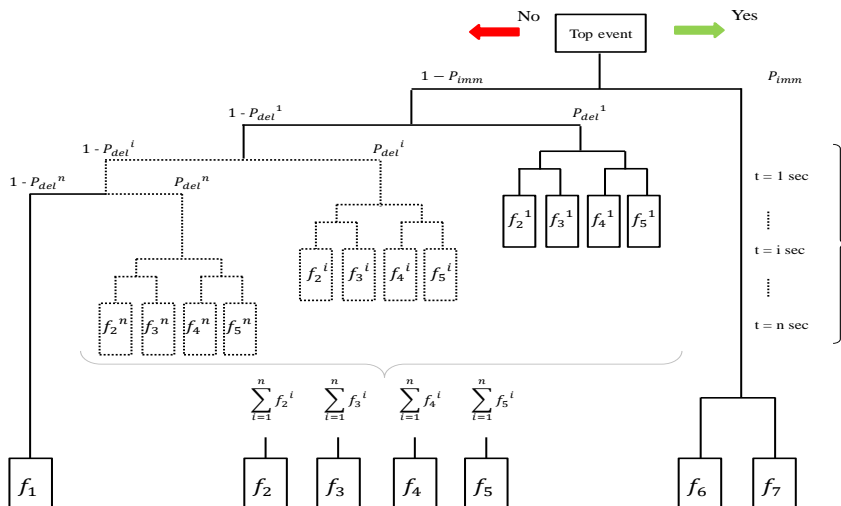
Consequence assessment module

Here, the package of all consequence models are found such as jet dispersion, pool spread, gas dispersion, smoke dispersion, ventilation model, fire models, explosion model



Event tree and risk analysis module

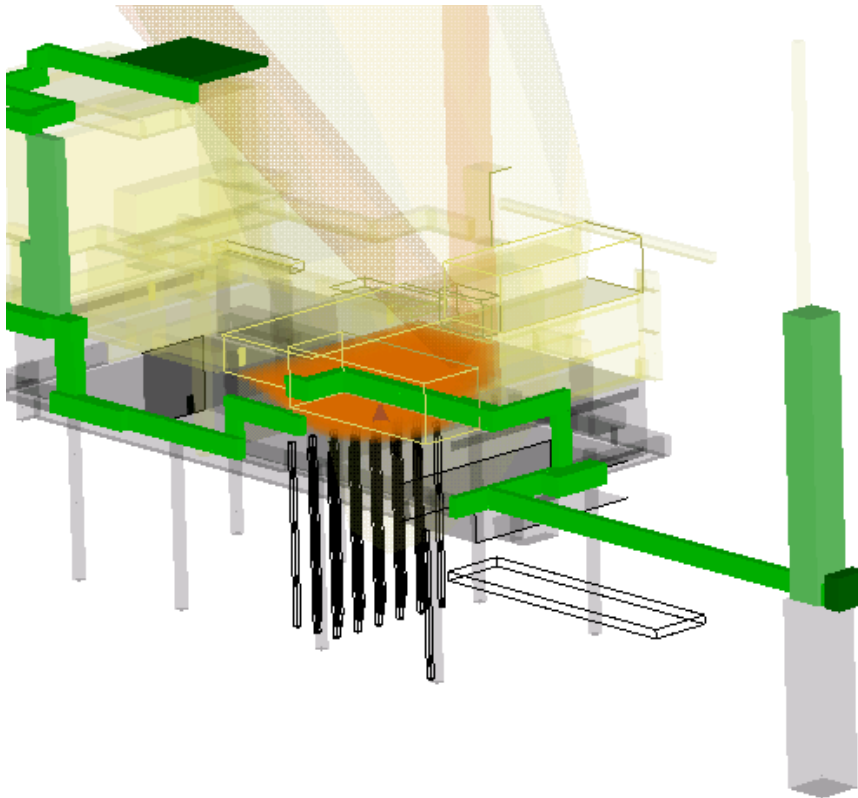
Here, the analysis part is found which defines and calculates number of scenarios (top events), number of end events, branch probabilities, personnel risk, escape and evacuation risk, risk to main safety functions



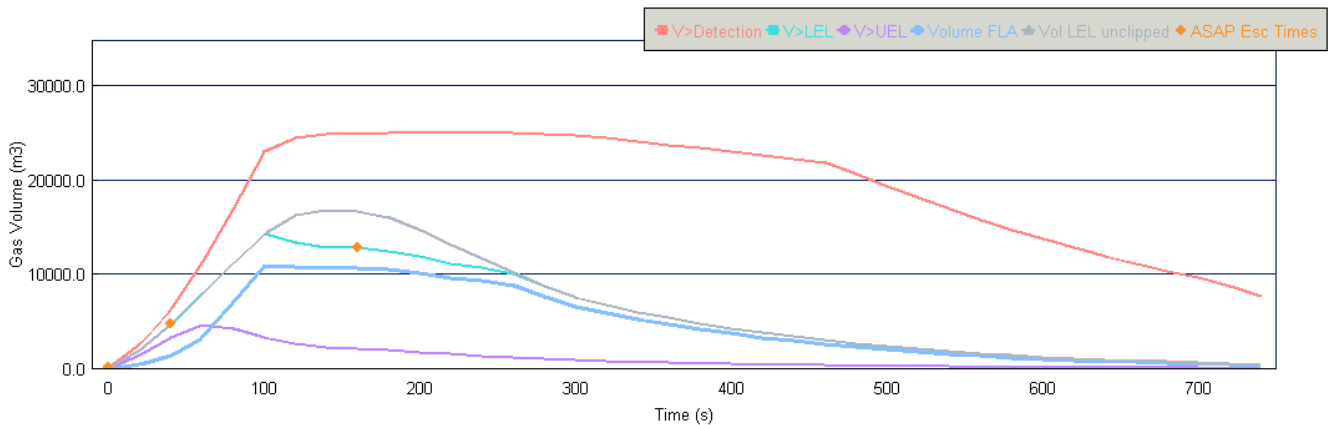
Results module

Here, all intermediate and final results are found. These are also available from the Oracle database.

Flames, heat radiation and smoke can be viewed;

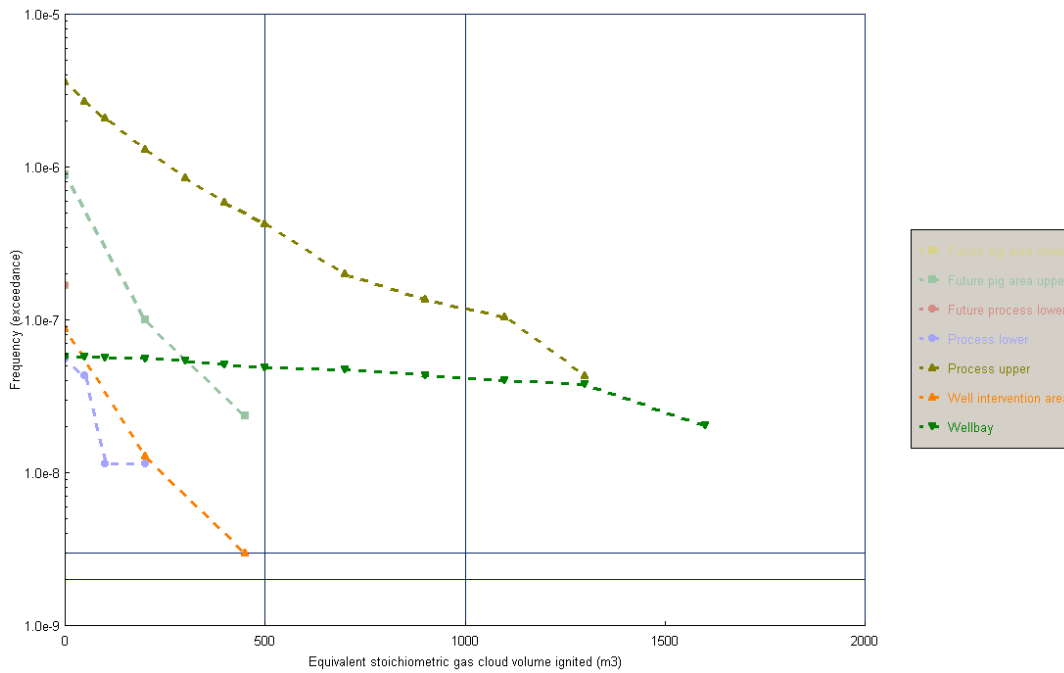


Transient gas cloud development can be viewed;

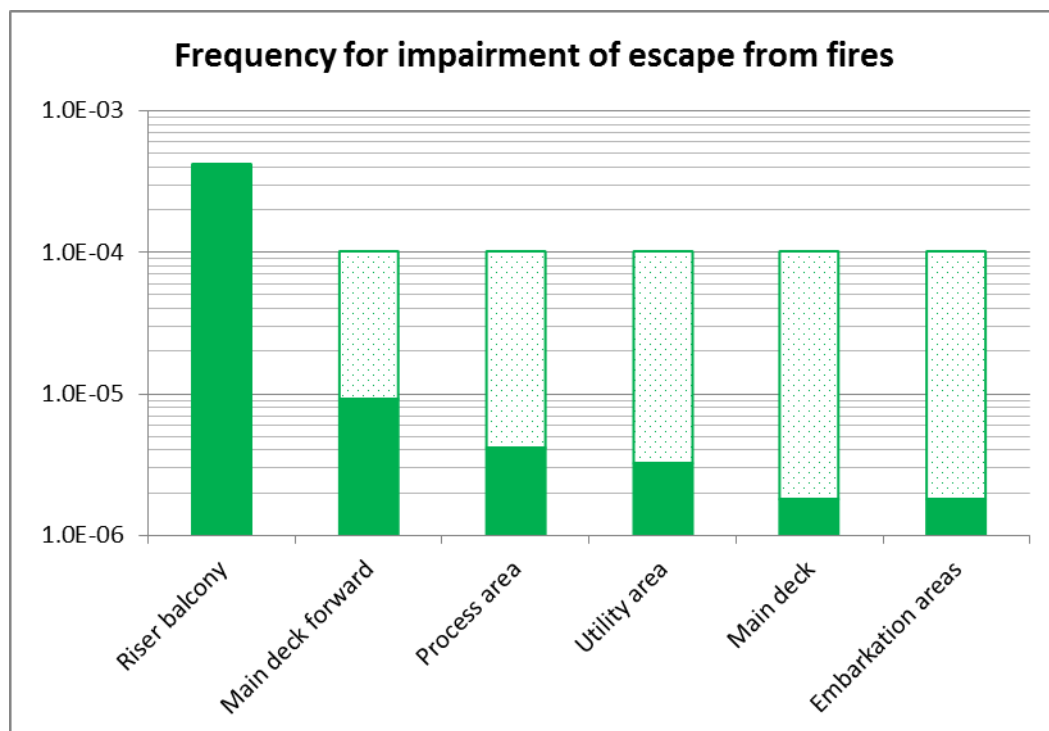


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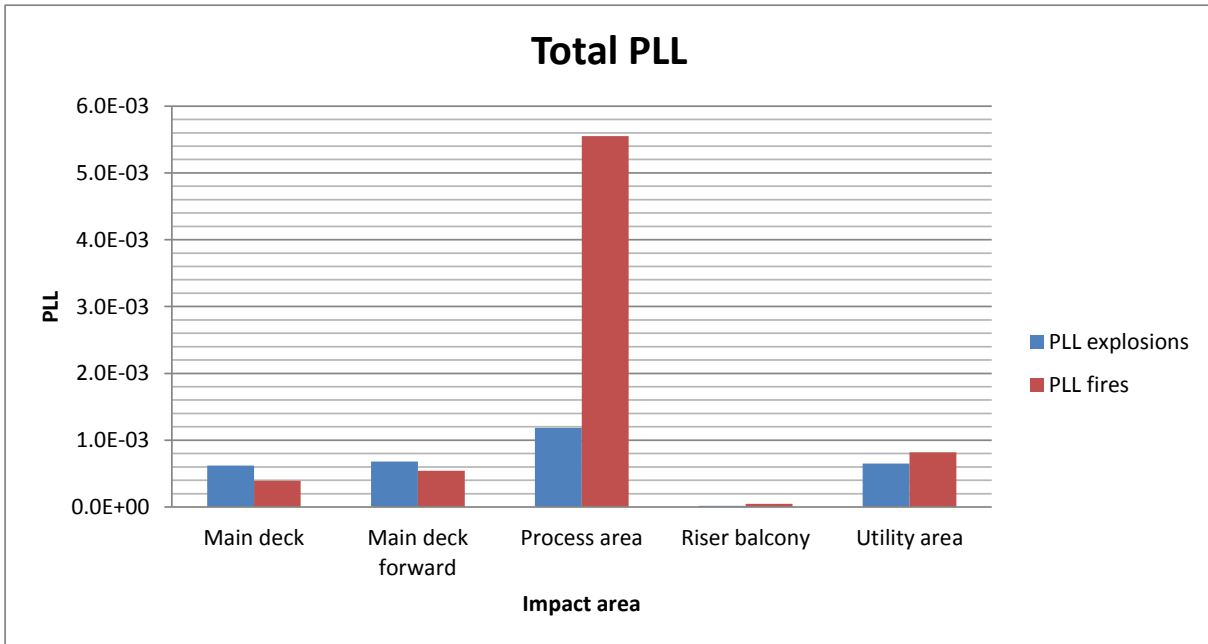
Frequencies of ignited gas clouds (cumulative);



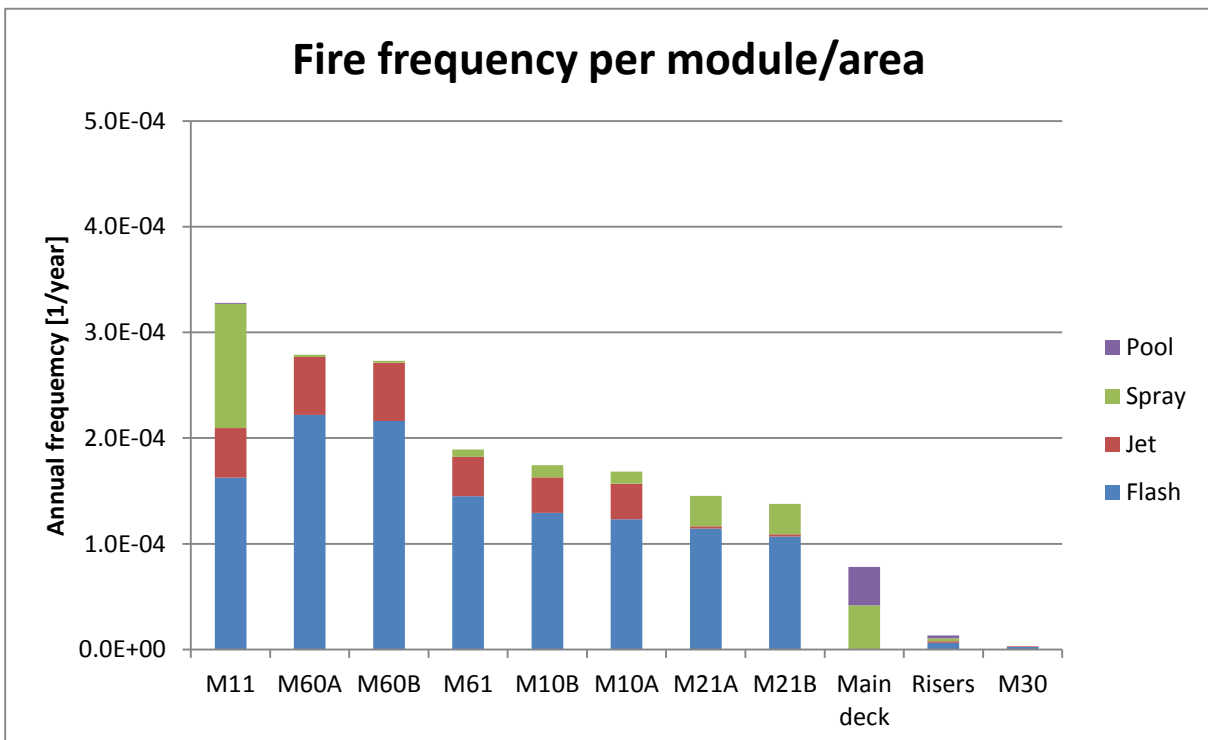
Impairment of escape routes;



Potential Loss of Life;



Fire frequencies;

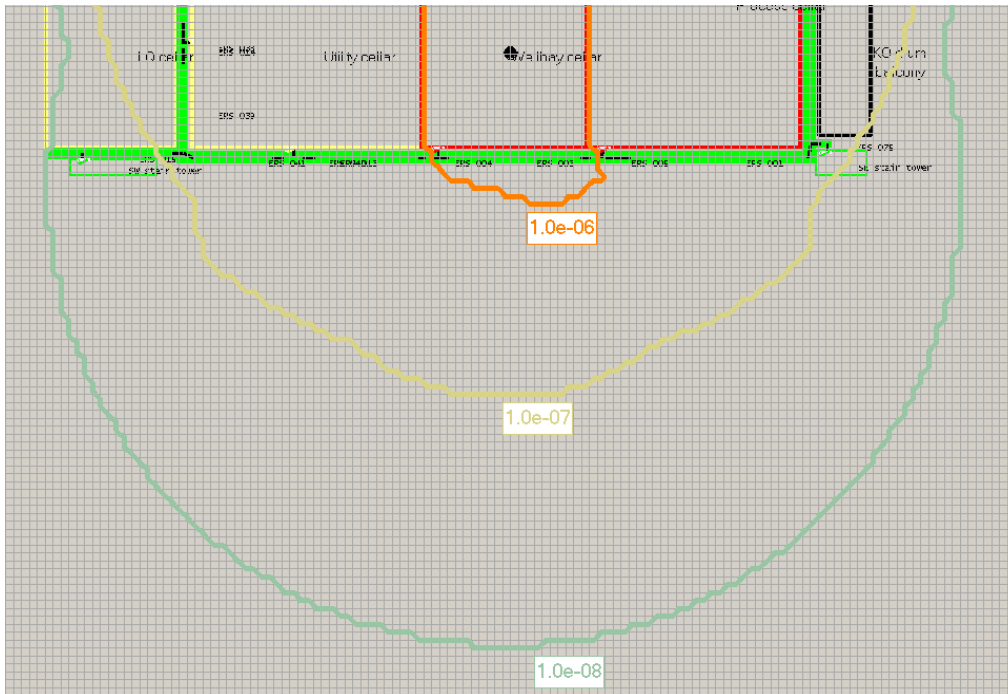


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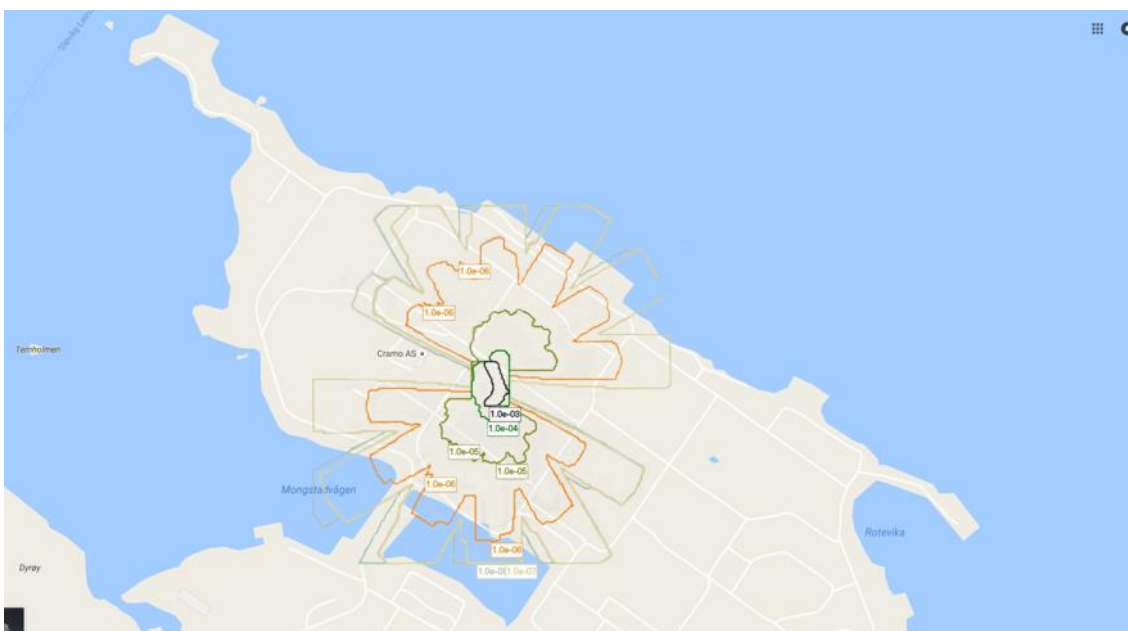
Risk contour plot module

Here, risks are presented graphically on a facility layout drawing/site map.

Individual risk contours for heat radiation;



Individual risk contours for toxic and flammable dispersion;



Software development and history

The development of the risk analysis tool Advanced Safety Analysis Package (ASAP) started in 1988. The program specifications were written by the risk analysts in Aker Engineering's Safety department and programmed by professional software developers.

Substantial development has been invested in the program continuously over the last 28 years. The increase in computing capacity has enabled more complex models and large number of scenarios to be handled in one analysis. The program has also been tailored to provide risk measures and models required by the Norwegian facilities regulations and NORSOK. In the latter years the major changes in the software have been to implement the transient cloud, detection and ignition model (required) in the Z-013 appendix G as well as contour plots.

New ASAP versions have been issued approximately once every other year, more frequent in the latter years. Program patches are implemented more frequently with minor bug fixes, user interface changes, changes to improve performance and/or minor functionality changes. Accessibility to the analyses in ASAP and/or from the Oracle database is not affected by implementation of patches and the analyses are therefore fully available in the same version.

In 2000 Lilleaker Consulting was established and the year after the ownership of ASAP was bought by Lilleaker. Today the development of ASAP is administrated by YouTrack, which is an agile software project management tool. The development of the software is based on iterative and incremental development where requirements and solutions evolve through collaboration between the model developers (risk analysts in Lilleaker), software developers (Veloxit), program testers (risk analysts in Lilleaker) and users. Each new release of ASAP (versions) is validated before a new version of ASAP is officially released.

In the last part of 1990 an ORACLE database was implemented to store all input data and results. This facilitated the reporting and testing of results, as the analysts is free to «slice and dice» the data to meet client requirements or examine particular areas of interest for the specific QRA.