



Risk analysis of LNG terminal:

Tractebel Engineering International

To meet the projected growing demands for natural gas in Portugal, GALP Energia has decided to implement a green-field Liquefied Natural Gas (LNG) terminal on the west coast of Portugal. The detailed engineering and construction of the LNG receiving terminal is done by a consortium, for which Tractebel Engineering International is acting as leader and is responsible for the process and safety design. Tractebel Engineering International requested DNV, an independent foundation, to perform a Quantitative Risk Assessment of their design.

Critical issues

Although a preliminary risk study was performed at an early stage, a more rigorous approach to risk contour development and possible preventative measures was necessary during the detailed design phase. This risk assessment should validate the design efforts in order to enable relevant authorities to release an operational permit.

Solutions

A Quantitative Risk Assessment (QRA) was carried out, in line with the philosophy suggested within EN1473. A detailed survey was conducted to select potential accident scenarios related to the LNG terminal and its activities. For each of the scenarios consequence modelling was performed using PHAST, a DNV developed Software.

In most failure cases the probability of occurrence was generated based on generic data. In some specific cases however fault tree analysis was applied.

Finally, the risk analysis was concluded by evaluating each individual scenario by means of a frequency-consequence matrix (as proposed by EN1473). The global risk picture was also calculated by means of the DNV software package, SAFETI, allowing the presentation of the results as Risk Contours and fN graphs.

As a final result of the risk assessment, risk mitigation measures were proposed for the most critical scenarios.

Value delivered

DNV contributed to the project through its expertise and knowledge gained in similar quantitative risk assessments of LNG terminals around the world. This allowed Tractebel Engineering to adopt a safe, practical design for their LNG terminal.

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