



Optagon™

assessment and optimisation of the reliability and availability of oil and gas facilities

Germanischer Lloyd (GL) has developed a computer package named Optagon to undertake assessment and optimisation of the reliability of oil and gas facilities. The package has been used extensively during the design phase of oil and gas facilities but has capabilities that are also applicable to facilities currently in operation.

Optagon enables particular aspects of offshore and onshore processing to be effectively modelled by using the Monte Carlo approach.

For example, a gas pipeline has a storage capacity that, should a failure occur to halt supply from a platform, may not result in an immediate loss of supply to onshore facilities. This is called bulk storage and can be modelled using Optagon.

In addition, seasonal demand profiles and increased production rates to make-up for failures (particularly useful when considering the effects of different gas contracts) can be modelled.

Components are entered into Optagon in the form of a reliability block diagram, with the user providing appropriate failure and repair rate characteristics. Optagon can be operated in two modes: single or multiple run. Single run mode enables the user to see individual events, such as a failure of a component, and their consequences. It also enables the user to step through the simulation event by event and validate the model being used. Multiple run mode enables statistical results to be generated.

In particular, Optagon provides mean and standard deviation values for the system failure rate, the shortfall in output, the unavailability and the total cost



Finding the optimum configuration for a system which minimises overall cost (capital and operational) might require the investigation of a wide array of components and resources. This can be time-consuming, so Optagon also has an automated optimisation process for determining the appropriate configuration of systems. This enables optimisation to be undertaken in a fraction of the time required for modelling all the possible system combinations separately.

Case Study

Optagon has been used in a wide variety of tasks associated with oil and gas facilities. A particular example where Optagon was of significant benefit was following the discovery by BG International of an offshore gas field with significant reserves.

Minimum facilities were to be located offshore. Equipment details were considered and Optagon simulations of the proposed configuration were undertaken using appropriate reliability data. In addition, details of the costs involved, the gas sales agreement and a discount factor were included. A particular onshore generator configuration was proposed. The capital costs of generators varies between approximately £100,000 and £600,000 depending on design and power output. Optagon was used to compare various generator configurations so that the appropriate configuration was used in the final design. The plant design proposed also had a low level of redundancy and Optagon was used to demonstrate that stand-by pumps should be included.

A single run of Optagon enabled these decisions to be made. Previously, all the various generator and pump configurations would have required modelling. Using Optagon the optimisation was done automatically resulting in time and money savings.

Optagon is now available on a consultancy basis.



GL Industrial Services

Holywell Park, Ashby Road, Loughborough
Leicestershire LE11 3GR, UK

Phone: +44 1509 282000

Fax: +44 1509 282525

oilandgas@gl-group.com · www.gl-group.com/oil-and-gas