



Shell's risk and reliability management approach saves 8% per year in maintenance costs for Stanlow

The Stanlow refinery implemented the approach as part of a larger improvement strategy and enhanced the Maintenance Index performance from middle 3rd quartile in 1998 to top 2nd quartile in 2002

Situation

In the 1980s and 1990s the Shell UK-based Stanlow refinery had equipment reliability problems with key process units. In the absence of proprietary tools to address these issues, the refinery was forced to develop and implement a home-grown risk based maintenance solution. Stanlow achieved significant improvements to their reliability performance but these new techniques only provided an 80% solution. The team aspired to become a world-class refinery and to do so they needed to close the 20% gap by enhancing performance and reducing their UK£25 million per year (>US\$45 million) maintenance costs.



In the late 1990s Shell Global Solutions* had further developed Stanlow's pioneering work to create industry-compliant risk and reliability management tools and Stanlow decided to utilise these new tools to upgrade their own system.

In 1998, the refinery began the Operational Reliability Action Plan (ORAP project), a UK-wide initiative introduced by the Shell UK Refinery Operating group (SUKOP). The Stanlow ORAP project had two targets first, to improve operational reliability while reducing maintenance costs by 25%, £7.8 million (>US\$13.9 million). Secondly, to increase and sustain plant availability in order to become a world-class refinery.

The role of Shell Global Solutions in the Stanlow ORAP project was to provide fast-track training and an implementation framework for the Shell risk and reliability management process.

Benefits

In 2002 the refinery completed the ORAP project on schedule and successfully implemented the Shell risk and reliability management concepts and outcomes. The team accomplished both their key objectives and also achieved significant quick wins.

The ORAP project realised its target reduction of 25% in maintenance costs with one third of this saving being attributed to the Shell Global Solutions' methodology. An overall reduction of 8% per year, UK£2 million per year (>US\$3.6 million) in maintenance costs was achieved by:

- Optimising the balance between maintenance effort and risk. An estimated overall reduction of 10% on preventative maintenance using the Shell risk-centred maintenance approach.
- Optimising inspection plans and asset integrity analyses to improve the identification and management of high integrity risks. Annualised inspection efforts reduced by 10% over the equipment life cycle using the Shell risk-based inspection approach.



- Optimising testing strategies that focused on higher criticalities. A 50% workload reduction in the safeguarding systems was achieved using the Shell instrumented protective functions approach.

In addition, several quick wins amounted to more than UK£12 million (US\$22 million), for example preventing an unplanned shutdown and avoiding a catastrophic failure.

Improving operational reliability and optimising the balance between risk and reliability has helped to create sustainable improvements for Stanlow. The results of the 2002 Solomon refinery performance benchmarking study shows that the performance of the refinery's Maintenance Index has moved from middle 3rd quartile in 1998 to top 2nd quartile in 2002. At the same time, operational availability that was already 1st Quartile, has continued to improve.

The refinery also recognised the further value of incorporating the Shell risk and reliability management process into other activities:

- Design maintenance/inspection plans for change/new projects.
- Improve engineering** procedures.
- Define personnel tasks and targets.
- Develop an optimised shutdown scope.

The aim will be to create aligned improvements to operational reliability across the site and provide a sustainable increase in plant availability.

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Client Verdict

Jon Mason, Stanlow Engineering Manager:

"We saw the move toward the best-practice risk-based system introduced by Shell Global Solutions as imperative and absolutely essential to the success of our ORAP project.

"The quick wins alone have provided us with a fast payback. Within six months of implementation we have prevented an unplanned shutdown of GSU2 (V3459/60) and avoided a potentially catastrophic failure in HDT2 which together could have cost the business UK £12 million!

"Using this integrated methodology to review integrity and reliability had provided us with a tremendous boost to our fast-track implementation. We were able to clearly define our goals at the start of the project and ensure that the whole cross-functional team remained aligned until we reached our objectives."

Solution

The Shell risk and reliability management concept offers a risk-based decision process to align the maintenance, inspection and safeguarding of equipment. The methodology uses an efficiently structured, iterative approach to determine preventative maintenance and monitoring tasks that are required to achieve the desired plant availability and integrity with optimal effort.

Shell Global Solutions' facilitators conducted a series of onsite workshops for key Stanlow personnel. The refinery team was provided with the tools and a framework to design and implement the new changes. While Shell Global Solutions provided helpdesk support throughout the implementation to facilitate a smooth transition.

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