



# US\$30 million benefits identified as TOA refinery improves plant availability

“The main reasons we selected Shell Global Solutions... substantial technical experience and the results that Merit had obtained in other refineries... I am extremely satisfied,” engineering manager

## Situation

Toa Oil Company Ltd, Japan, had suffered crippling maintenance costs and low equipment reliability at its Kawasaki refinery. Poor operational performance was affecting production and rendered it uncompetitive within the increasingly fierce Japanese market. This was further substantiated by a Solomon benchmarking exercise which rated it as a below average performer.

The company recognised that optimisation of maintenance procedures would reduce costs, improve operational reliability and performance and restore the refinery's competitiveness within the market.

Management believed that the sustainability of performance enhancements was essential in guaranteeing a clear future for the refinery. They needed to introduce change and improve operational practises that would achieve long-term enhanced performance, while respecting cultural and language differences within the organisation.



Shell Global Solutions has immense experience with developing fit-for-purpose solutions and technical concepts to enable the transferral of knowledge across cultural boundaries. Such skills have become fundamental in their approach to a client's situation.

## Benefits

A Shell maintenance and reliability review proposed a series of recommendations that would reduce the frequency of shutdowns from a two-year to a four-year cycle. The associated increased plant availability would provide identified financial benefits estimated at US\$30 million.

A three-year implementation programme was initiated in 2000. Within two years, the Solomon Maintenance Index (MI) had been significantly reduced from 26.1 to 12.6.

During the review, the MERIT team defined new approaches to maintenance at the refinery. Radical changes were introduced to existing working practices that have been long embedded within the Japanese organisation. Under Shell Global Solutions' guidance, the team forged strong relationships and Toa staff fully endorsed the programme's actions, ensuring success of the new maintenance strategy.





## Client Verdict

*Toa President, Mitsuo Moriya, declared the programme a success: "I am extremely proud of what my staff have achieved."*

*Koji Maeda, engineering manager, Toa Oil Company Ltd: "We now scrutinise the business impact of any maintenance activity by applying risk-assessment techniques. For example, it is now common to challenge shutdown and routine activities by asking questions such as: 'why am I doing this?', 'what level of risk will I accept?', 'are there any alternatives?'. This is quite a mindset change, but we had to make it to become a leading refinery."*

*Koji Maeda believed an important factor in successfully applying this western methodology in Japan was the Shell Global Solutions consultant who acted as resident maintenance and reliability advisor: "He was always available to reassure Toa staff and management and hence smooth the implementation process. Mindset change is also about looking at things from another perspective. This is certainly much easier when facilitated by a person coming from another culture who has already made the same journey."*

Toa and Shell Showa have since integrated two nearby refineries into one complex. Implementation of the review's recommendations at Toa Kawasaki has helped to align refinery performance and magnified the benefits of this merger. This single complex can now operate with increased competitiveness within the Japanese market.

## Solution

The Shell manufacturing enhanced reliability and improvement review (Shell MERIT) provided a strategy to achieve increased performance by reducing maintenance costs and improving plant availability.

A MERIT review team was established, combining the site knowledge of client personnel together with the experience of Shell Global Solutions' staff. This team was responsible for reviewing maintenance procedures using the new techniques introduced by the consultants.

- First, a root-cause analysis methodology was applied across the whole site to eradicate recurring defects;
- Then, the Shell Risk-Based Inspection methodology (S-RBI) and Shell Reliability-Centred Maintenance (S-RCM) were used to create an optimum maintenance regime.

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For further information please contact:

**[OGNL-businessconsultancy@shell.com](mailto:OGNL-businessconsultancy@shell.com)**  
**[www.shellglobalsolutions.com](http://www.shellglobalsolutions.com)**

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