

Case Study.
Sipchem.
Saudi Arabia.
Petrochemicals.

Sipchem ups maintenance and reliability performance

Established in 1999, Saudi International Petrochemical Company is a Saudi joint stock company owned jointly by private sector investors of Saudi Arabia and GCC countries. Today, it produces around 2.4 million tonnes of basic, intermediate and polymer products every year at ten integrated plants in Jubail. With a host of complex production processes, maintenance and reliability are key to ensuring safe and efficient operations. One of the plants had to undergo a major unplanned outage in 2014 which required extensive maintenance and repairs and resulted in significant production losses.

Sipchem had already spent a lot of time working with a number of different consultants over the years to improve plant reliability. "We had seen some good results," says Ibrahim A. Al-Rushoud, General Manager Maintenance & Reliability, "but never sustainably. We really wanted to improve efficiency and quality and so achieve excellence throughout the organisation. That meant establishing a defect elimination culture to allow us to realise asset optimisation."



"Our aim is to be one of the top petrochemical companies in the region in terms of safety, reliability, efficiency and quality."

**IBRAHIM A. AL-RUSHOUD, GENERAL MANAGER
MAINTENANCE & RELIABILITY**

Determined to avoid a recurrence of unplanned outages and to improve maintenance and reliability in general, Sipchem decided in late 2014 to call in dss⁺. The chemical company asked dss⁺ to conduct a focused four-week assessment of Sipchem's M&R function.

Focusing on proactive prevention

dss⁺ shone a light on all aspects of the maintenance and reliability function, analysing performance data, carrying out benchmarking and observation studies, conducting focussed interviews with the managerial team, and mapping processes. Jean-Paul Sacy, SMARTO Project team lead sums up the results of the assessment: "The existing M&R culture at Sipchem was mainly reactive with the emphasis on completing urgent actions. That generated constant stress and tension, and hindered the organisation from focusing on prevention and developing a system based on proactive intervention. The result was a high level of fixed costs, which negatively impacted the company's competitive position, particularly in view of the recent shift in oil and gas market conditions."

The solution dss⁺ proposed was to design a transformation program that would prevent reliability problems, solve existing reliability issues, improve planning and scheduling and boost uptime. The consultants identified a range of significant and sustainable improvement opportunities that the implementation of the transformation program should be able to achieve within a three-year timespan by reducing the frequency and severity of reliability incidents and their impact on productivity.

Mr Al-Rushoud explains: "We selected two pilot sites with different plant processes to trial the transformation project, allocated two dedicated, full-time resources, and put together an experienced project team." Sipchem gave the program the name SMARTO – Sipchem Maintenance And Reliability Transformation for Operations.

Project objectives

One of the first things the SMARTO Project team did was to get the project team members to play the Manufacturing Game. Far from being a children's board game this game, developed by a small team of ex-industry inventors, helps the players understand the role of other manufacturing functions by making them take on different positions within the fictional organisation.



When it came to clarifying roles and responsibilities for core processes and interfaces between reliability, maintenance and operations - one of the project objectives - the game experience helped people gain a better understanding of others functions.

dss⁺ installed management systems to enable Sipchem to make more fact-based decisions. Performance dashboards were displayed around the sites so that everybody could see the benefits of SMARTO and in this way drive continuous improvements.

As Jean-Paul Sacy explains, pro-active communication and behavioural change was also vital. "We held a two-day leadership workshop for 25 senior managers who signed up to eight key commitments ranging from a minimum of two line walks per week to increasing the number of times they give and receive feedback. Afterwards, they each had one-on-one coaching sessions to take them through the whole M&R methodology."

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The aim was to set up a management system that would ensure sustainable results through daily, weekly and monthly review meetings. The tracking and reporting of daily metrics put Sipchem in a better position to monitor overall performance. To this end, Sipchem's M&R General Manager also agreed to measure 10 new Key Performance Indicators (KPIs) based on those used by dss+. They were:

- Percentage of High Priority Notifications
- Number of Overdue Work Orders
- Number of Open Work Orders
- Manpower Utilisation
- Planning Efficiency
- Schedule Compliance
- Planning Accuracy
- Maintenance Cost as a percentage of the Plant Estimated Replacement Value (ERV)
- Maintenance Inventory Value as a percentage of the ERV

As it progressed, the SMARTO project progressively put in place corrective actions to deliver major improvements in the KPIs. The main project objective however was to design, develop and implement the four core processes of M&R: Planning and Scheduling, Solving Reliability Issues, Preventing Reliability Issues and Improving Uptime.

"As the SMARTO project manager, my focus has been to ensure that the Sipchem project team members worked hand-in-hand with the dss+ consultants to jointly deliver the program's objectives, both operational and financial, as set by the Sipchem leadership".

SAAD R. AL-ENAZI, SMARTO PROJECT MANAGER, SIPCHEM.



The extended SMARTO project team and all involved stakeholders

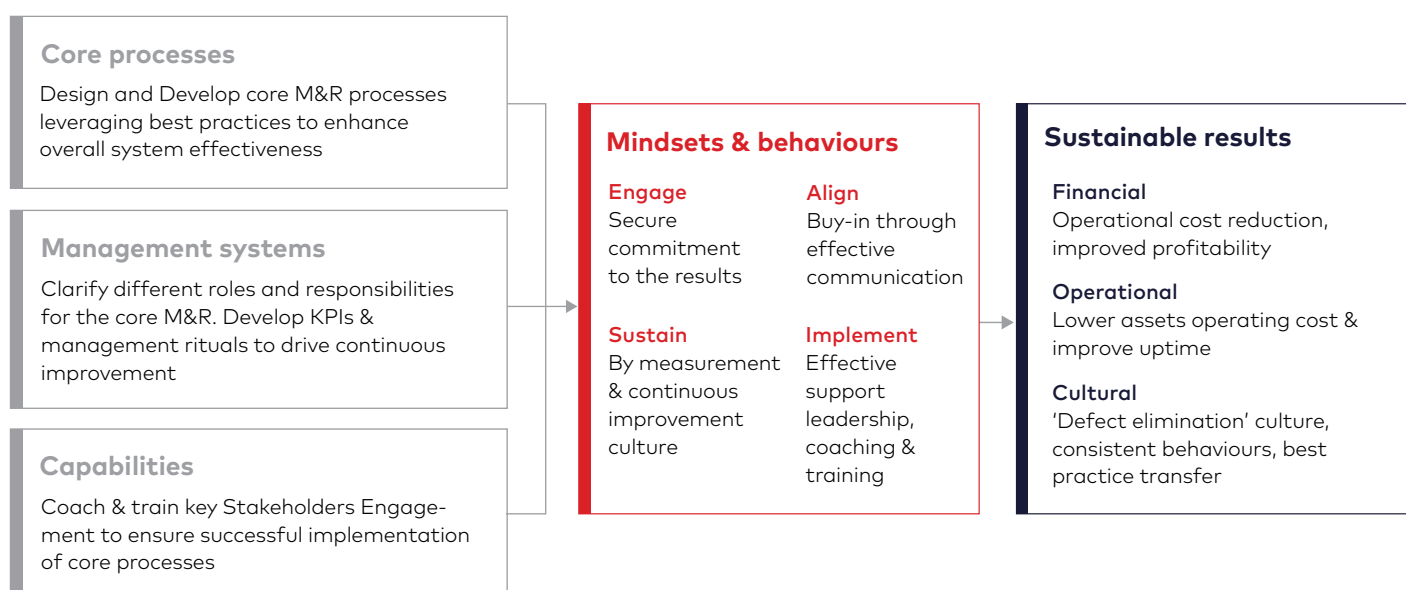


Figure 1: Project structure

Project design and development

During the design phase of the transformation project dss⁺ carried out a series of workshops focusing on the four core M&R processes and capturing best practice in associated process manuals. dss⁺ implemented the UPbase[®] software in the two selected pilot plants which allowed effective and consistent measurement of plant uptime and the allocation of production losses and causes.

At the end of the first year of the transformation, the program is already showing tangible results. Sipchem has changed the way it measures performance and, instead of only focusing on lagging indicators, is now taking a much more proactive approach. What has also changed is that recommendations are now acted on whereas they often used to stay on paper in the past. The implementation of recommendations arising from a Root Cause Failure Analysis (RCFA), led by the SMARTO Project team, has made it possible to eliminate a recurring overheating problem at one of the plants, allowing full production capacity to be maintained during the summer months.

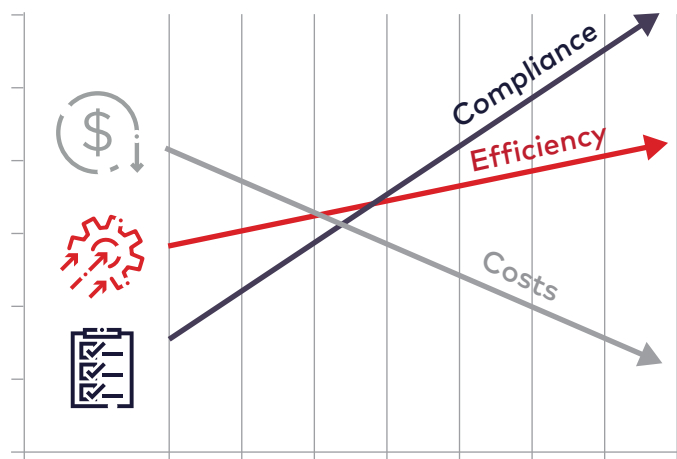


Figure 2: The effect of the SMARTO program over time

The next step for Sipchem is to ensure the full sustainability of some of the early impacts of the SMARTO program, build on the lessons learnt and achieve further continuous improvements by rolling out SMARTO to their remaining plants.

"People are more engaged because they see results. There has been a positive change in culture, commitment, accountability and compliance. We have seen a 20% cut in maintenance costs without compromising output. Our efficiency has improved and that has also started to reduce our contract costs."

**IBRAHIM A. AL-RUSHOUD, GENERAL MANAGER
MAINTENANCE & RELIABILITY**



Assignment

Conduct a focused four-week assessment of Sipchem's M&R function.



Offering

Transformation program.



Impact

- Maintenance spend reduced by an average of 20% year on year without compromising output.
- Schedule Compliance improved from 48% to 100% within two months.
- Backlog slashed by 50% in two months.
- Elimination of some significant, repetitive reliability issues.
- Improved efficiency.
- Reduced contract costs.