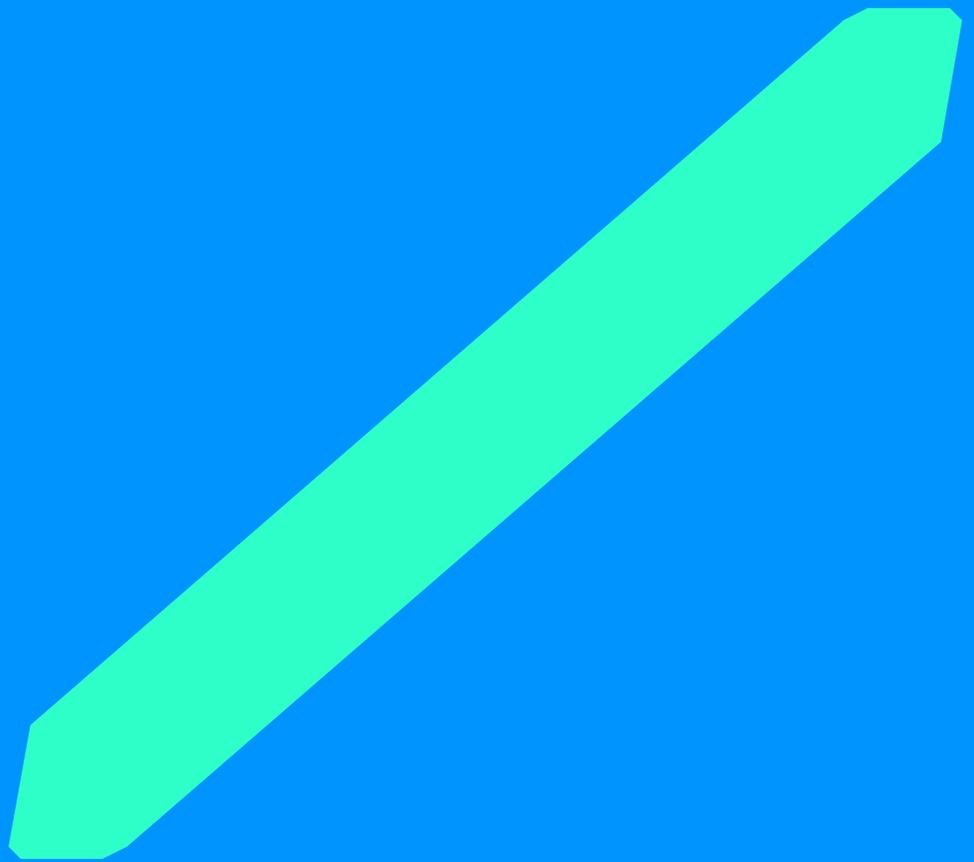


References.



*Industrial Excellence.
Count on 50 years' experience.*



Reference letter

Concerning:

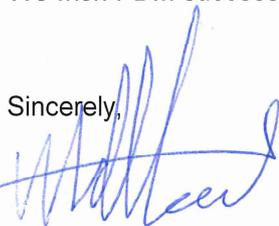
Reference case letter – Shell Moerdijk HoTT pilot implementation project

Hereby, in the name of Shell Nederland Chemie, I, Marcel de Vreede state that PDM Consulting B.V. (further to be called PDM) completed successfully the optimization MSPO project with excellent results and to our expectations.

The project description is attached to this certificate.

We wish PDM success with their further projects,

Sincerely,



Marcel de Vreede
Maintenance manager
Shell Nederland Chemie

Case: Shell Nederland Chemie

Significant cost reduction in asset maintenance by means of proces optimization

BACKGROUND

Shell Nederland Chemie B.V. (SNC Moerdijk) is part of the Dutch Royal Shell group, focusing on converting naphtha, gasoil and LPG to the basic chemicals ethylene, ethylene oxide, ethylene glycol, propylene, propylene oxide, butadiene, and styrene. Located in Moerdijk, the Netherlands, the site was first founded in 1968. The site has three main refinery types with a total production of 4.5 million tons of product per year with a daily staff of 1,300 people (800 Shell staff members and 500 contractors).

ASSIGNMENT

In 2017 and 2018, Shell Netherlands asked PDM to research the affordability of the (planned) maintenance of the MSPO plant by analyzing the Hands on Tool Time (HoTT) of Shell's maintenance crafts and contractors, and by identifying obstacles in performing the maintenance. The results of the scan phase performed in 2017 and 2018 showed that the HoTT on the Moerdijk site was considerably below the official WCM benchmark. Based on these results, SNC Moerdijk expressed the desire to increase their HoTT on planned maintenance to 55% by optimizing their complete maintenance workflow before the end of 2020.

PROJECT APPROACH

The pilot project approach exists of five phases:

1. Project preparation phase
2. Scanning phase
3. Analysis phase
4. Implementation phase
5. Securing and documenting the change.

1 – Project preparation phase

In the project preparation phase a series of Hands on Tool Time (HoTT) measurements were taken at the Moerdijk site, which have given insight into the effective work time of the site contractors. Based on the insights received from the measurements, a pilot project for one contractor was set up, focusing on one production unit, the Moerdijk Styrenemonomer and Propeneoxide factory (MSPO).

2 – Scanning phase

Next, at the start of the scanning phase, a site project team was formed with members of all disciplines concerning the project: Shell maintenance, Shell operations and contractor Kentech. A scan was performed to identify the root causes of the limitations resulting in a lowered HoTT in the complete process. As a result of this phase, a detailed strategic project plan with seven work areas and specific milestones was set up.

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3 – Analysis phase

During the analysis phase, the team has worked on designing specific process solutions and tools. During the pilot project, the focus was put on improving six areas identified during the scanning phase.

Moreover, a great efficiency increase was accomplished by:

- a) Designing and working with “Effectively Good” method cards, highlighting the desired way of working.
- b) Introducing job durations calculation using the established norms and site factors.
- c) Loading the schedule and introducing tightness to and optimize and increase daily work output.
- d) Separating the responsibility between work preparation and job organization.
- e) Optimizing the contractor’s startup routine (Talk of the day, toolbox, WO handover, retrieving materials, tools and permit).
- f) Introducing a “Self-HoTT” measurement card to continuously monitor and control process obstacles.

4 – Implementation phase

During the implementation phase of the pilot project, PDM has been intensively involved in both the tweaking and implementing of the process optimization tools as well as managing the change with support of Shell’s maintenance excellence team during the pilot project.

Moreover, the contractor Kentech was intensively involved during this phase to achieve a mutually beneficial process, and increase communication between both parties.

To monitor and control the efficiency improvement three KPI’s were monitored: the planning efficiency, the schedule attainment and lastly the earned/burned hours ratio which compares the hours spent to the hours planned.

5 – Securing and documenting the change

During the securing and documentation phase, all the designed processes were documented and prepared for replication to other factories on the plant. Additionally, the process users were extensively coached top down to guide the change in the way of working and guarantee acceptance. Furthermore, a continuous improvement plan based on the Deming cycle was implemented to guarantee the constant improvement of the process quality. Lastly, regularly planned effectiveness checks were set up to monitor and correct the implemented process, resulting in a fully secured and controlled process enhancement loop.

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PROJECT RESULTS

As a result of the process change, an increase in the Earned/Burned (E/B) of 33% was recorded for the contractor Kentech. Moreover, this increase in E/B translates to a Hands on Tool Time (HoTT) nearing the goal set for this contractor for 2020 in the MSPO production unit. Furthermore, the increase in efficiency translates into considerable maintenance cost savings. Additionally, the backlog of the maintenance on the MSPO production unit has been significantly reduced.

Way of working

- Clear objectives (KPIs) were rolled out to the work floor.
- Clear process descriptions with effective gatecheck/validation checks were written.
- Clear separation of responsibilities between job preparation and work organization was implemented.
- A paper-based HoTT form was introduced to monitor daily obstacles in job execution.
- The priorities of “efficiency blockers” to solve were based on measured obstacles (Pareto).
- A more effective work execution has been accomplished by actively solving HoTT blockers in a weekly meeting with all responsible parties.
- Scheduling based on benchmark hours has been introduced and loading of the schedule has been increased/optimized.
- Start of the day duration has been significantly improved.

Capability-building

Weekly capability training has supported the site management team in effective leadership with regards to change and planning optimization.

Contractor approval

The HoTT pilot project was a project beneficial for both Shell and the contractor Kentech. Moreover, as a result of the project:

- More insight into the job progression compared to the estimated job duration was achieved.
- Material storage has been optimized leading to a reduction in transportation and waiting time.
- A more clear and complete job scope is received due to effective gate keeping.
- There has been a more direct communication with Shell and clearer process targets have been set up.

Future savings

The process optimization results of the current pilot project show a great potential for all Shell sites worldwide. Moreover, an extensive manual for the way of working at the MSPO has been drawn up together with a replication plan to reduce the replication time and effort required. By utilizing the designed tools and copying the new efficient standard way of working to all contractors and production units, substantial savings on maintenance costs can be achieved for the entire MSPO site.

The impact of our work

Together with our contractors and our own employees, PDM has provided insight into the improvement potential in a very acceptable way with regard to the execution of maintenance activities.

By implementing a new structure on the shopfloor, the behavior of the employees has also changed, which has given Shell a considerable saving and where we can realize further roll-out. Others have not been able to do this before.

Marcel de Vreede – Maintenance Manager – Shell Nederland Chemie