

## Pit Stop

### Achieving World-Class Maintenance Standards

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#### Background

- South American petroleum producer
- Has committed management staff and motivated workforce willing to assume greater responsibility
- Wants to increase production to successfully compete in the global energy market while gaining recognition as a world-class organization with outstanding capabilities
- Seeks to implement a comprehensive equipment maintenance program with quantifiable standards, procedures and employee training



#### Client Challenge

Until recently, this South American petroleum producer was a wholly owned, state-run entity with a low-bid philosophy. It is now working to increase production and compete in the global market with other petroleum producers. In keeping with this new mission, the client wants to be recognized as a world-class organization with outstanding capabilities.

Among its significant strengths, the company has a committed management staff and a workforce willing to assume greater responsibility to help guide the organization's future. However, to accomplish its goals, several hurdles will first need to be overcome. Among them and particularly important is the need to upgrade maintenance standards, including planning, scheduling and work procedures so the company can compete with other producers on a level playing field.

## Scope of Project

Using sound TPM and Lean Technology fundamentals to:

- Implement a “Pit Stop” maintenance program that will promote leadership and pride among team members
- Establish a “cleaning-to-inspect-process” to find sources of contamination and appropriate countermeasures
- Develop a written documentation system to establish the parameters of the project, including individual work responsibilities, desired deliverables and meeting schedules
- Develop a color-coded tagging system to differentiate organizations responsible for repairs or adjustments
- Emphasize safety in all phases of activity
- Bring equipment up to “Visual Factory” standards by appropriately marking and posting all relevant information where it can be best utilized

## Implementing a “Pit Stop” Program

To improve maintenance standards, equipment care and related uptime, RWD is working with the client to implement a “Pit Stop” program. “Pit Stop” is a systematic approach to updating, cleaning and improving equipment without taking it out of service for a major overhaul.

A large portion of the training needed to implement “Pit Stop” focuses on promoting a sense of leadership in those team members chosen to act as trainers for the rest of the facility. Each “Pit Stop” is led by one of these trainers who directs the planning meeting, as well as the actual field work. Just as the crew chief is responsible for what occurs in the pit during a race, the leader of the team completing a “Pit Stop” is in charge of the equipment in the facility that is being overhauled.

Planning consists of all aspects need to complete the job at hand, from the initial start-up safety meeting to the one that finalizes the results obtained. In addition to planning and conducting these meetings, the leader is also responsible for creating the job plan, making sure everyone understands the task so nothing is left to chance, and assigning enough people to the project to successfully complete the plan.

RWD’s role in this process is to train these “Pit Stop” leaders to make sure they have a firm grasp of their role and what is necessary to succeed. In particular, leaders must set an example, gaining cooperation from team members without dictating and assigning. To this end, they are encouraged to include everyone in the planning and not try to shoulder all the work. When participants have a say in what is to be accomplished, they feel a greater level of ownership and produce results that are superior to what can be produced through coercion or dictatorial means.

“Pit Stop” participants take great pride in their work. For example, in one refinery, an operator opened a blow-down valve with no drain attached and covered a pump that had just had a “Pit Stop” performed on it with crude oil. The “Pit Stop” crew talked to the operator about this incident and followed up with an email detailing what had happened and their displeasure with it. This email not only went to their supervisor and the operator’s supervisor but also to the top management of the refinery, including the general manager. Even though this was only the fifth “Pit Stop” this team had performed, their sense of equipment ownership and dedication to excellence was evident to all parties. These strong positive values have continued with each subsequent “Pit Stop” and represent the kind of example we hope to inculcate in all employees.

## The Tools for Success

Before crews perform a “Pit Stop,” they receive all the necessary training to succeed. These training sessions also provide the forms needed to document their work and any problems they encounter while updating equipment. Individual crews are further encouraged to get together and establish procedures and requirements to make sure they can sustain the level of excellence they have achieved.

Everything put in place to perform a “Pit Stop” is based on the ability to apply Lean Technology fundamentals and sound total productive maintenance (TPM), to real-life situations. (TPM is the systematic execution of maintenance by all employees through small group activities to achieve zero breakdowns and zero defects.)

The first step in the process is “Cleaning to Inspect.” This cleaning component is a vital step, especially in a refinery where a coating of crude can hide a multitude of equipment problems. Once equipment is cleaned, it is easier to find the sources of contamination and countermeasures can then be put in place to prevent future occurrences.

After cleaning, it is time to look for deviations from the accepted norms of equipment operation and to examine any subsystems connected to the chosen equipment. Items in need of attention are either repaired during the “Pit Stop” or tagged for later attention with work-order initiated repairs.

This written documentation is a large part of what happens before, during and after a “Pit Stop.” The first item of documentation which starts the actual process is called the “Pit Stop” Agreement. This agreement specifies:

- The equipment to be worked on
- Start and stop times
- Who the facilitators and plant champions are
- Items of responsibility and the desired deliverables from the “Pit Stop”
- Meeting times and attendees for the Alignment and Agreement meeting, the Pre- and Post-event meetings and for the Review of Deliverables

Documentation is of the utmost importance in disclosing problems observed during a “Pit Stop.” It simply does not make sense to depend on memory to get problems resolved when it is easy to record observations and use this record to guide repairs. This written record also helps to prevent using memory lapses as an excuse for inactivity or for not solving documented problems.

RWD uses a tagging system so that nothing is overlooked when establishing the final deliverables for a “Pit Stop.” These tags are used to differentiate the organizations responsible for repairs or adjustments. The plant then establishes a color code for these tags based on groups, making it readily apparent who the responsible party is even without reading the tag. In addition, each tag is listed on a separate Tag Log so that even if the tag is removed there is still a written record of the defect.

This documentation is also the starting point for a list of items the operator can include on a daily or weekly Autonomous Maintenance list. This documentation provides steps that can be included in scheduled preventive maintenance to better optimize time spent on various procedures. The team creates an open item matrix to prevent items from being overlooked and having to be revisited later.





During a “Pit Stop,” equipment is digitally photographed before any work is started to provide a visual record of its initial condition. Additional photographs are taken to document the work performed. These after-photos showcasing the results of a “Pit Stop” allow team members to claim bragging rights and create positive competition between teams. As such, they are a good motivator to keep improving each “Pit Stop.” A picture is also taken of all lube points and other key areas of the equipment. These images are later used to create a pictorial lube map showing the location of each lube point.

### Safety First

Before each “Pit Stop,” everyone is apprised of the safety situation in the plant and any specifics involved in the job to be performed. Team members are also checked to make certain they are wearing the proper personal protective equipment for each phase of the job, and they are reminded to be aware of their surroundings. Throughout this process, performing the work safely is the number one focus and is even more important than making equipment improvements.

At RWD, we believe it does not matter how many improvements we make or how efficiently we can make an operation run if people get hurt in the process. By making the proper effort, we can always find a safe way to accomplish any goal. Accordingly, no “Pit Stop” can be considered successful if anyone is harmed in the process of completing the work.

### Finishing Steps

Finally, for a “Pit Stop” to be considered complete, the equipment and the area must be brought up to “Visual Factory” standards. The operator must identify the liquid level in the sight glass for minimum and maximum operating ranges. The operating ranges of all other gauges must be labeled, lube points have to be identified, and lube reference information and single-point lessons should be posted where everyone can utilize them.

Only after all these steps have been completed and all supplies are properly stored can the team come together to discuss what they found and close out the “Pit Stop.” In this final phase, individuals are assigned to follow up on action items and assure timely completion of the work. In order for the team to feel an appropriate sense of satisfaction about a “Pit Stop” they must know that they took all the necessary actions to bring equipment back to a like-new state and that through their actions, they are producing inventory and ensuring future jobs.