

## Process Safety Site Visit to Improve PSM Culture

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Even assuming that the equipment and systems in the organization are perfectly designed to ensure process safety, these designs are living systems used by employees. For this reason, these systems must be understandable, usable and accepted by the employees, that is, a culture to which they are attached. It is aimed to reach the employee, in order to ensure, maintain and improve process safety culture in the organization. To achieve this, there are weekly important event sharing hours, safety themed competitions and more. Tüpraş took interaction one-step further and started process safety site visits. This paper covers how collaborative process unit site visits contribute to the development of a safety culture within the organization.

Keywords: PSM, safety culture, site visit, visible leadership, internal audit, employee participation, culture development, workplace learning

### INTRODUCTION

A person reflects the culture of that society in which he/she was born and raised. Culture is shared patterns of learned behaviour. For example, drinking Turkish coffee after meals is a Turkish culture. Even if you are not Turkish, when you drink the Turkish coffee served here after dinner, after a while, you may start to crave Turkish coffee after meals. Because you are used to it and the people around you do the same. In that case, culture can be a saviour for business life by making use of its ability to be acquired and become a habit later on. Especially in a very hazardous sector such as oil refinery, one of the most important topics that should become a culture is safety.

There are many applications that will contribute to the development of safety culture in Tupras refineries. Weekly incident sharing hours and safety competitions are organized. In addition, Tupras refineries started to organize site visits as a new practice that under the PSM elements topics. Refineries are audited or get support from accepted audit firms for reasons such as legal obligation, insurance risk surveys, ranking better than other refineries and mostly not having life and property loss due to any process safety accident. With these reasons and the experience gained from previous audits, Tupras has laid the foundations of its own site visit guide.

The site visit guide supervises the PSM items with the questions in the prepared checklist, provides a different perspective due to the variety of seniority and positions of the participants, and reinforces the visible leadership. In addition, it improves the PSM knowledge of the employees and enables to find and compare potential safety vulnerabilities in different process units in the refinery.

### SCOPE OF THE SITE VISIT GUIDE

#### Site Visit Guide Checklist Questions

As mentioned earlier in this paper, the questions in the site visit guide checklist prepared are based on learning from previous audits. Questions include process safety management elements, actions learned as a result of events occurring in the refinery history, and best practices globally.

The main topics covered in the checklist are process safety information system, chemicals, process hazard analysis, operational procedures, management of change, incident investigation and reporting, high-risk operational procedures, emergency response, training and competence, pre-start-up safety review, mechanical integrity and assurance of quality. Many of these titles are specific requirements that OSHA (Occupational Safety and Health Administration) considers necessary for an effective and compliant process safety management program. [1]

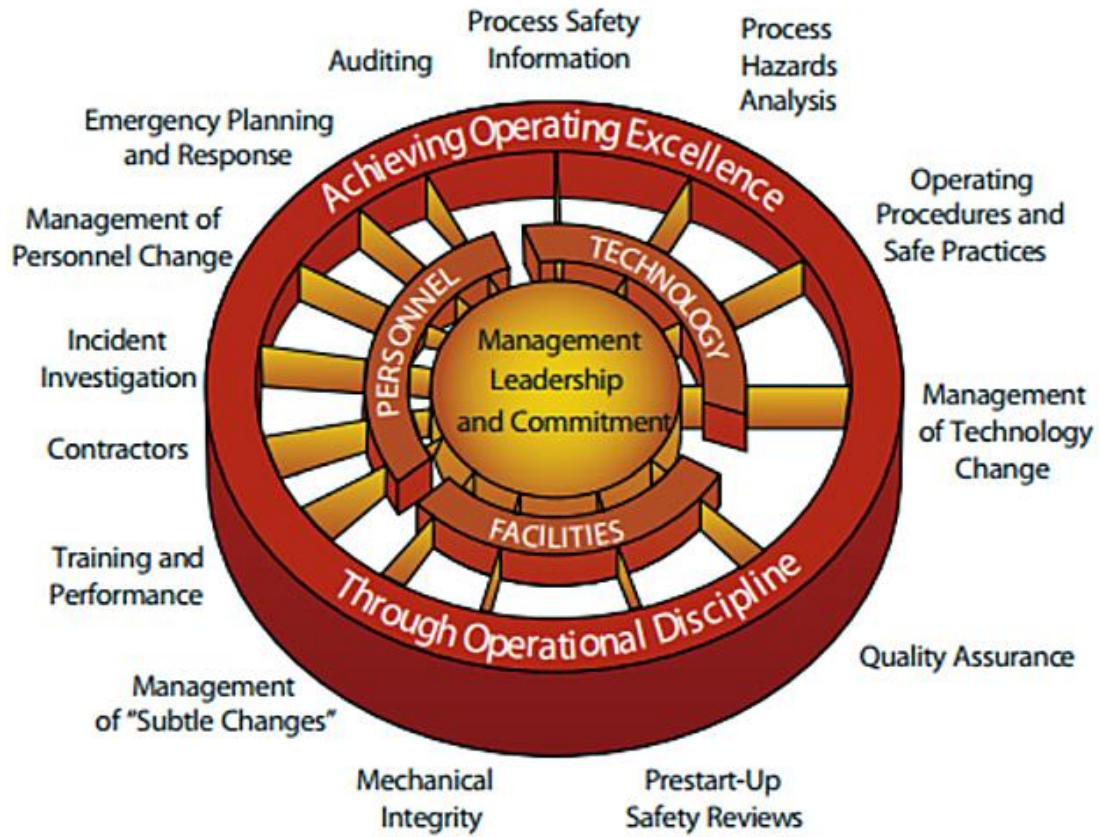


Figure 1: Elements of a Process Safety Management System [2]

### Participants

Field operators, control operators, head operators, operations engineers and even field managers can attend this process safety department guided site visit and talk about PSM topics. Employees see their leaders in the field and model safety behavior and attitude.

Moreover, while topics such as mechanical integrity, critical equipment, and emergency response are covered, employees from the relevant disciplines are also invited to visit. In this way, differences with other departments and good practices are exchanged. Different perspectives are gained.

### Frequency and duration of visits

#### Frequency

Site visits are planned for a different process unit every month. There are two points to note here. Firstly; during the year, the same unit is visited twice, there should be a minimum of 3 months between two visits, to observe the development and change throughout the year. Secondly, care is taken that a different guide from process safety department will visit the process unit for the second time. In this way, it is ensured that the quality of visits is maintained within the process safety department and, in a way, internal auditing is carried out.

*Table 1: Example of Annual Site Visit Calendar*

	Unit A	Unit B	Unit C	Unit D	Unit E	Unit F
Jan	Visitor 1					
Feb		Visitor 1				
Mar				Visitor 2		
Apr					Visitor 3	
May			Visitor 3			
Jun						Visitor 2
Jul	Visitor 3					
Agu		Visitor 2				
Sep				Visitor 1		
Oct					Visitor 2	
Nov			Visitor 1			
Dev						Visitor 3

**Duration**

A site visit is aimed to be at least 2 days. The visit should not be as short as filling out a questionnaire, nor long enough to distract employees. Since there is a shift system, the number of days is also important to reach different shifts and employees. Different steps such as shift change, field control of the operator at the beginning of the shift, work permit, on-site maintenance work should be observed during the visit.

*Table 2: Example of Site Visit To-Do Calendar*

	1 <sup>st</sup> Day	2 <sup>nd</sup> Day
09:00-10:00	Meeting and Info about Visit	Work Permit
10:00-11:00	Process Safety Information System	Operational and High-Risk Operational Procedures
11:00-12:00	Process Hazard Analysis	Emergency Response
12:00-13:00	Lunch Break	
13:00-14:00	Management of Change and Pre Start Up Safety Review	Chemicals
14:00-15:00	Incident Investigation and Reporting	Mechanical Integrity and Assurance of Quality
15:00-16:00	Shift Change	Closure (Agreeing on Findings and Creating an Action Plan)

**Approach to employees during visits**

These visits should create a sense of learning something new and being cared for, rather than a feeling of being questioned. The questions should be reinforced between the conversations rather than yes-no questions, and the mistakes that are known to be correct should be corrected instantly. Care should be taken not to offend employees who fail to answer among their

friends. Employees should be monitored on a routine workday, so they should be asked to do what they do on a normal workday.

## CHALLENGES DURING SITE VISITS

Of course, some difficulties are encountered during these site visits. These difficulties can be due to personal or workload.

For example, some employees may perceive this as an audit and hesitate to answer questions or go into defensive mode. Sometimes, they may think that their manager will perceive their answers as complaints. At this point, the participation of their own managers in the visit is very beneficial.

Another problem is the employees who have spent many years at the refinery. These employees, who are quite experienced and almost a treasure, may not be satisfied with the changes in the truths they know and the way they do work. In order to overcome this, it is very important to make the employee feel that there is a mutual transfer of experience.

The workload is another challenge for both visitors and employees. Due to the size of some process units or maintenance work, employees may not find time to spare for visits. For this reason, it is important for the efficiency of the visit to choose a suitable time period for both sides for while calendars are created.

For visitors, being in a process unit for 2 days may cause disruption of other work items for which they are responsible. Everyone should know visiting calendar, visits should become a culture, and visitors should not be disturbed for other works during this time. Moreover, it should be ensured that all other departments attach importance to this visit and increase participation.

## BENEFITS OF SITE VISITS

### *Findings*

Thanks to the prepared checklist questions, since all PSM items can be questioned in detail, important findings are revealed. These findings are mostly Tier 3 and 4 (PSE) process safety events.

According to API (American Petroleum Institute) 754: "A Tier 3 PSE points out a difficulty that may prevent the correct functioning of the barrier system, but stopped before it causes a larger (Tier 1 or 2) process safety event such as deviation from safe operating limits. Tier 4 process safety events are also indicative of larger process safety events that may occur in the future, they indicate vulnerabilities in the company's process safety management system. For instance, the number of overdue investigation actions is a Tier 4 PSE." [3]

For this reason, the diversity of this number of findings is very important in order to prevent a larger PSE from occurring. After starting the visits, there is an increase in the number of Tier 3 and 4 PSE notifications reported by the employees.

### *Tracking of actions and eliminate hazards in the sites*

Findings revealed after the visit are followed up in the company's action tracking system. Apart from the employee, all related site managers are informed whether the action was taken on time and how it was closed. Even without entering the action tracking system, the relevant employee are informed about the latest situation by receiving an e-mail.

Since all the precautions and improvements to be taken are recorded with the action tracking system, everything can be followed until the hazard is completely eliminated. Results are obtained more efficiently and quickly because; the delay of the actions, what and how the actions are taken are recorded.

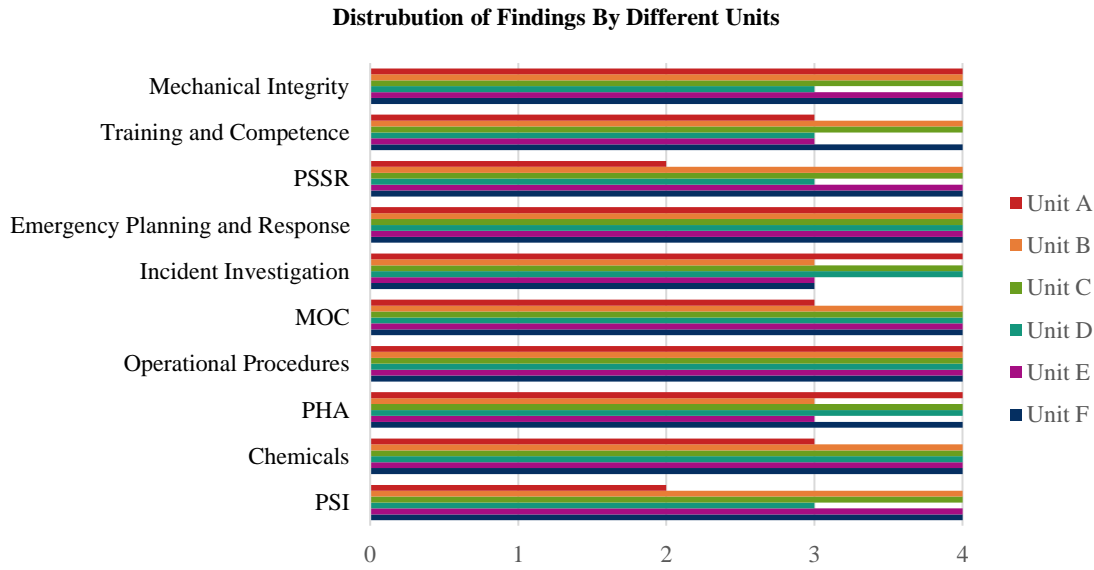
### *Comparison with other units and progress tracking*

With these site visits, besides the elimination of findings, the progress of the process units can be followed and analyzed. Moreover, comparison can be made between units due to scoring system. In order to determine the score, while evaluating the competence or status in the relevant form question, there are options that are excellent, good, standard and poor. Therefore, the improvement can be followed easily by comparing the process unit audit scores. Also, it is easy to see which categories of findings stand out in Unit A or Unit B.

**Table 3: Score Table and Meanings**

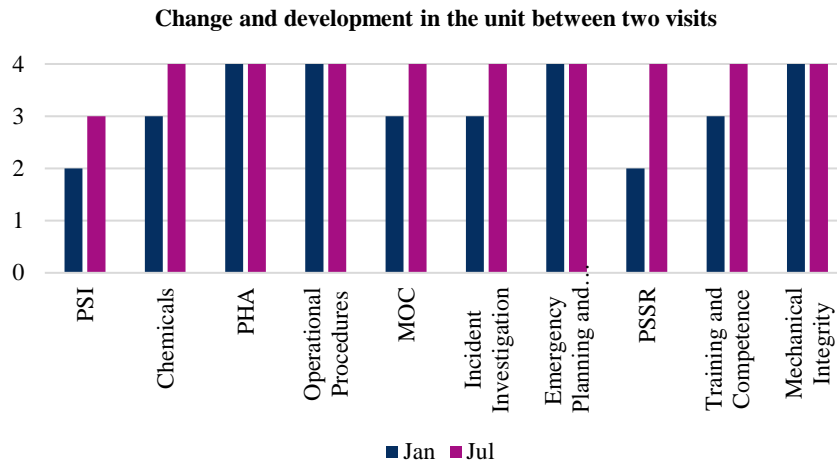
Results	Meaning of Scores
<b>Excellent</b>	3-4 : Standard well known, awareness high
<b>Good</b>	2-3 : Standard is applied, awareness is poor
<b>Standard</b>	1-2: Standards are known but no awareness
<b>Poor</b>	0-1 : Standards unknown

As an example, the graph below shows the distribution of the scores obtained as a result of the visits in the imaginary units according to the PSM elements.



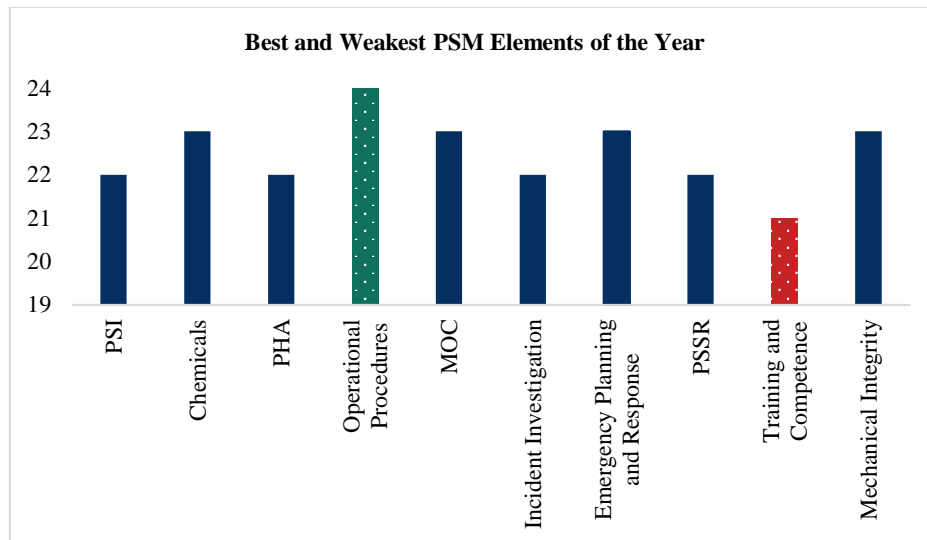
**Graph 1: Distrubution of Findings By Different Units**

Moreover, by comparing the scores of the visits to the same unit at different times, the progress of the unit and its points of improvement can be easily followed.



**Graph 2: Change and development in the unit between two visits**

Since PSM elements that are strong in the refinery and need improvement can be determined annually by using the analyzes in the field visits, action plans can be prepared accordingly in the next year, and it can be aimed that all PSM elements are close to perfection.



**Graph 3: Best and Weakest PSM Elements of the Year**

#### ***Visible leadership and keep in contact with employees***

The fact that the managers of the employees also participated in the site visit proves how important the perception of safety is for the refinery. After all, the employee's role model is usually their manager. Knowing that their manager will appreciate them when they do a job safely rather than fast is one of the most important tools to increase safety awareness of the employee.

This is a win-win system that contact with site workers is kept alive, and their opinions are sought. By this way, employee participation is ensured. The motivation of the employees, who feel that their opinion is important, increase and can focus on the work better. Employees can do their job more safely, want to learn, and improve themselves in order to do better.

In fact, this can be clearly observed during a second visit to the same site. Employees describe how they applied what they learned during the past time period. As they begin to question the work they do, this time the employees begin to ask questions to the visitors. They get used to the learning process and want more.

#### ***Improve knowledge and skill level of the employees about the PSM***

It also contributes to the knowledge and skill level of the employees about the PSM. Employees in the field are of course very aware of the risks in the field, the hazardous jobs they need to pay attention to, the instructions given to them and their responsibilities. But thanks to these visits, they also have the opportunity to learn about the reasons for their practices. They reinforce the knowledge they have learned from their masters with international standards and global good practices.

It is really important to develop the PSM knowledge of the employees, because they are in the field 24 hours a day. Instant reporting of a potential hazard, correct response to an emergency, and careful approach to safety-critical equipment save lives.

#### ***Be ready for other audits all the time***

As it will be a continuous visit schedule, findings and points for improvement will be continuously revealed and corrected. As the visiting culture continues to evolve, so does the quality of the findings. The refinery, which constantly undergoes various external audits, will not reveal any new findings that were not anticipated in the possible next audits, and even if there is a finding, the action plan will already be ready.

## **CONCLUSION**

Safety culture is very important as it represents the shared set of common values, experiences, beliefs, characteristics so that reveals the way of doing work that is adopted by the majority of employees and affects the performance of companies to a great extent. This cultural change will help company sustain improved Process Safety Management (PSM) performance and it also contributes to the knowledge and skill level of the employees about the PSM.

As these site visits are a collaborative effort involving all employees from top to the bottom, it will continue to contribute greatly to the development of the safety culture. In this way, to identify areas open to improvement by revealing differences, the reduction in the number of Tier-1/2 process safety events will also be evidence of this improvement. With the contribution of new site visits, process safety is now a culture for Tupras employees, just like drinking Turkish coffee.

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