MANAGEMENT OF CHANGE

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CHAPTER 1 — MANAGEMENT OF CHANGE PRINCIPLES

If you're in a bad situation, don't worry, it'll change. If you're in a good situation, don't worry, it'll change.

John A. Simone, Sr.

INTRODUCTION

The root cause of virtually all accidents is uncontrolled change. Leaving aside sabotage and other malicious acts, all industrial facilities are designed and operated to be safe, clean and profitable — yet accidents continue to occur. In every case, the fundamental cause of each accident is that someone, somewhere lost control of the operation, *i.e.*, they allowed operating conditions to deviate beyond their safe range. Hence, the proper management of change is the foundation of all safety and accident prevention programs; an effective Management of Change (MOC) creates an atmosphere of 'no surprises'. Likewise, the day-to-day lives of everyone associated with that operation will flow more smoothly and productively when the plant operation is stable. It is when there are upsets and unexpected problems that managers are subject to out-of-hours telephone calls from the plant, complaints from unhappy customers and unsolicited offers of help from corporate headquarters.

In spite of its importance to safe and successful operations MOC is often considered to be one of the most difficult elements of process safety to implement and control. For example, in March 2011 the 7th Global Congress for Process Safety had an entire session entitled, *Management of Change — The Most Difficult PSM Challenge.* No other element of PSM received such an 'honor'.

When companies in the process industries first implemented Management of Change (typically in the late 1980s or early 1990s), the topic was perceived as being essentially technical. However managers now increasingly recognize that organizational changes can be equally important in terms of plant operation and safety, and that such changes should be incorporated into the MOC program. The topic of organizational change is discussed further on page 32.

This ebook provides guidance as to what 'change' means in the context of a Management of Change program. Guidance is also provided on the implementation of an MOC program. The guidance presented here should be used in context; each company and facility must design a program that meets its own needs and circumstances. The ideas and concepts in this ebook merely provide a foundation for the design and development of facility-specific programs.

The definition used in this ebook for the term 'Management of Change' is as follows:

Management of Change is process to ensure that changes that would take operating conditions outside the safe range are properly evaluated, and that appropriate additional safeguards are implemented.

The meaning of 'safe range' is discussed in Chapter 2.

PROCESS SAFETY MANAGEMENT

Management of Change is part of the overall topic of Process Safety Management (PSM). The purpose of a PSM program is to provide an integrated management system that ensures that a facility operates in the way that it was intended to operate: it is clean, safe and productive. PSM incorporates the elements of traditional Process Safety Management (PSM) programs. However an effective PSM program goes beyond just safety — it aims to improve all aspects of a facility's operation.

ELEMENTS OF PROCESS SAFETY MANAGEMENT

The elements of the PSM system are shown in Tables 1 and 2. Table 1 shows the OSHA (Occupational Safety & Health Administration) standard used for process facilities such as chemical plants and refineries in the United States. Table 2 shows the corresponding list for the SEMS (Safety and Environmental Management Systems) from BSEE (the Bureau of Safety and Environmental Enforcement — covering offshore oil and gas operations in the United States).

In each Table the MOC element has been bolded.

Table 1
Process Safety Elements (OSHA)

1.	Employee Participation
2.	Process Safety Information
3.	Process Hazards Analysis
4.	Operating Procedures
5.	Training
6.	Contractors
7.	Prestartup Safety Review
8.	Mechanical Integrity
9.	Hot Work
10.	**Management of Change**
11.	Incident Investigation
12.	Emergency Planning and Response
13.	Compliance Audits
14.	Trade Secrets

Table 2
Process Safety Elements (BSEE)

1.	General
2.	Safety and Environmental Information
3.	Hazards Analysis
4.	Operating Procedures
5.	Training
6.	Pre-Startup Review
7.	Assurance of Quality and Mechanical Integrity of Equipment
8.	Safe Work Practices
9.	**Management of Change**
10.	Investigation of Incidents
11.	Emergency Response and Control
12.	Audit of Safety and Environmental Management Program Elements
13.	Records and Documentation

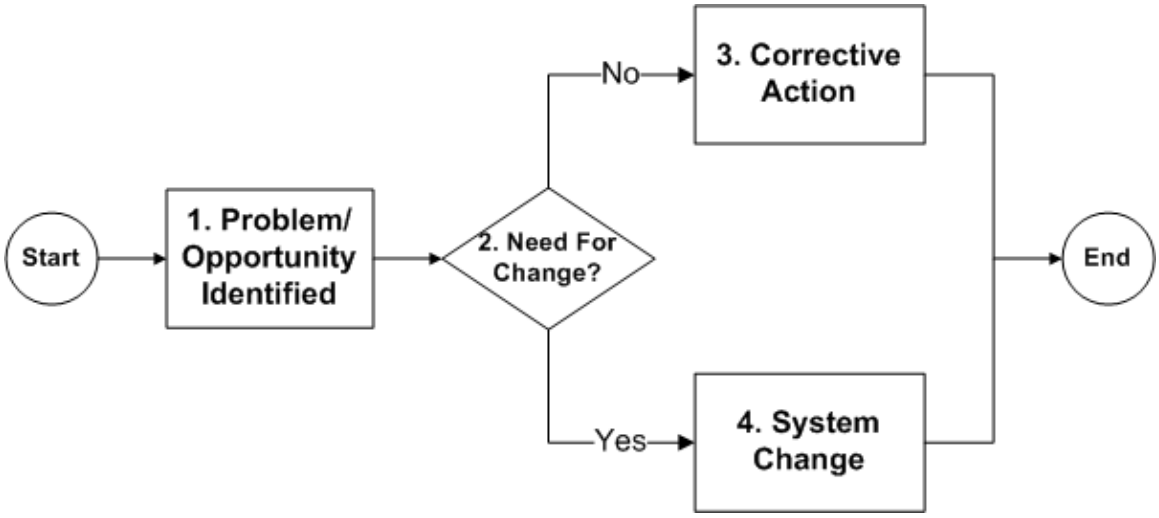
The elements of PSM interact strongly with one another. With regards to Management of Change, using Table 1 as a reference, most changes will require as a minimum that the Safety Information (element 2) be updated, new Operating Procedures and Training will be required (elements 4 and 5), the Equipment Integrity program (element 8) will require modification, and a Prestartup Safety Review (element 7) will be needed before the change is implemented.

THE CHANGE PROCESS

Before launching into an MOC program, it is important to make sure that the problem or issue at hand does, in fact, require a system change. For example, if a pump seal is leaking too frequently, someone may propose that a new type of seal be installed. However, it may be that the problem could be alleviated merely by making sure that existing training programs for the operations and maintenance technicians are applied more thoroughly.

The manner in which a proposed change can be evaluated is illustrated in Figure 1.

Figure 1
The Change Process



Step 1 — Problem / Opportunity Identified

The change process starts when someone, referred to later in this ebook as the *Initiator*, recognizes that there is a problem that requires correction, or that there is an opportunity to improve the operation. By suggesting that the system can be improved and filling out the appropriate paper work the initiator triggers the Management of Change process.

The identification of the need for change is the most important step in the whole MOC process; if no one takes the initiative to suggest change, then no improvements will ever be made. Therefore it is vital all personnel, including office and contract workers, participate in the change management process. In particular, senior employees such as managers, technical experts and experienced supervisors need to be willing to listen to the ideas of those who do not possess their knowledge or seniority. An employee's lack of experience does not mean that he or she cannot come up with useful insights and suggestions. Indeed, lack of experience may even be an advantage at this stage of the MOC process; the initiator may be able to perceive issues more clearly than those who have lived with them for years.

Step 2 — Need For Change

As already discussed, when someone requests that a change to the system be made, it is very important to make sure that the problem or opportunity cannot be better addressed simply by making sure that existing management systems are being executed properly. It often is tempting to call for a change without making sure that the current equipment and procedures cannot resolve the issue. Such a temptation should be resisted.

Step 3 — Corrective Action

If the analysis of the change request shows that the problem or opportunity can be addressed by using existing systems more efficiently (or maybe with just a few minor modifications), then the appropriate corrective action should be taken. Only if such corrective action is not feasible should the MOC system (Step 4) be triggered.

Step 4 — System Change

If it is agreed that a system change is needed (either to address a safety/environmental problem or to capitalize on an opportunity for increased profits) then it is important not to leap to the immediate and obvious solution. Where possible a root cause analysis of the problem or opportunity should be carried out. Without such an analysis there is a danger that the final solution will focus on the symptoms rather than the real cause of the problem. Hence the problem may recur. Even if the first proposed system change works, it may not be the most economical or practical alternative.

The first standard example at www.stb07.com/process-industry-examples.html shows a tank containing a hazardous liquid, RM-12. There may be a concern that the tank can overflow and cause a serious safety and environmental problem. In such a situation the first response of many technical people would be to change the instrumentation on the tank, say by having a new high-level interlock to shut off the incoming flow of liquid. Yet a root cause analysis may show that the high level problem has nothing to do with the operation of the tank itself. Other responses, such as those listed below, may be more effective than simply adding another interlock system.

- Reorganize the work force so that T-100 receives more operator attention; hence any high level problems are more likely to be nipped in the bud.
- Install a second tank in this service to provide extra capacity.
- Increase the capacity of P-101 so that liquid can be removed from T-100 more quickly.
- Find alternative uses for RM-12 so that surplus does not need to be stored in T-100. If the need for T-100 can be removed then the hazard will also be removed ("If it's not there, it can't leak").
- Reduce the rate at which the tank is filled by making the fill valve in the feed line smaller, thus giving the operators more time to react to the high level problem.
- Provide better secondary containment around the tank so that, if there is a spill, it can be contained so that the expensive RM-12 can be recovered and recycled.
- Modify operations in Unit 100 so that the flow of RM-12 into T-100 is stabilized.
- Modify operations in Unit 200 so that the flow from T-100 can be increased.

A thorough root cause analysis may uncover a common cause effect whereby one issue is affecting many parts of the operation. For example, if may be found that the root cause of fluctuations in T-100 is a problem with the quality of the instrument air. Addressing that issue will help fix a broad range of problems simultaneously.

REGULATIONS

Management of Change is integral to all process safety regulations and industry standards. Two organizations, OSHA and BSEE, have already been referred to. Their actual rules with regard to MOC are shown below.