DRIVING OPERATIONAL DISCIPLINE THROUGH QUALITY WRITTEN PROCEDURES

Brian D. Rains
Global Process Safety Management Leader
DuPont Sustainable Solutions
Safety Resources
Wilmington, Delaware
During the 2010 ASSE Conference, I focused on the broader subject of Operational Discipline and I presented an 8-Step process that I have used effectively to strengthen the Operational Discipline Culture of an organization (Exhibit 1). In this paper, I will concentrate on Step 4 of this process: “Focus on the It.”

**8 STEP OD IMPLEMENTATION METHODOLOGY**

- Step 1: Be convinced improved OD is needed
- Step 2: Assess the current state
- Step 3: Develop a comprehensive roll-out plan
- Step 4: Focus on the It
- Step 5: Establish priorities
- Step 6: Strengthen discipline processes
- Step 7: Implement
- Step 8: Audit, audit, audit

At DuPont, safety is a Core Value. This means that our primary emphasis is placed on building a strong safety culture, which will not only enable excellence in safety performance, but will also form the foundation for excellence in all areas of operations, including cost management, asset reliability, quality control, people management, operations performance (yields, alarms managements, etc.)

This is never more evident than in the prominent placement of “Achieving Operating Excellence through Operational Discipline” in our Corporate Process Safety Management Model (Exhibit 3).

**THE ROLE OF QUALITY PROCEDURES**

Through my experience of leading manufacturing organizations in many settings and on several continents, I believe that the most important step in this 8 Step Methodology is to focus on what we expect people to do. Most organizations, especially those handling hazardous materials or performing hazardous operations, invest considerable effort in preparing written instructions and procedures. Written procedures have many functions, including enabling consistent operations and behaviors. In addition, they serve as a vehicle for codifying technology, best practices and
experience. So why do so many companies find that employees are not following these instructions and procedures?

Here is my fundamental premise—if management desires to develop a culture where workers follow procedures, they must first invest in and confirm that the procedures are indeed helpful, accurate and owned by the users. However, if management provides procedures that are lacking in any of these key areas, but insists that they be followed, they are actually contributing to a weak Operational Discipline Culture. When this occurs, workers are placed in the untenable position of selecting between two unacceptable options: either they follow a procedure that will knowingly yield a poor result, or they disregard the procedure in favor of performing the work “the way it should be done,” while knowingly disregarding management’s compliance directive.

WHICH PROCEDURES ARE MOST IMPORTANT TO INCREASING OD?

There are numerous types of procedures that exist in a manufacturing facility. Not all are created to be equal or have the same potential impact on operational performance and/or risk avoidance. Some of the procedures that often exist in a facility and that most often contribute to unacceptable consequences, both on-site and off-site, are the following:

1. Management Procedures or Managing Systems
2. Safety Procedures
3. Operating Procedures
4. Maintenance/Repair Procedures
5. Testing or Quality Procedures
6. Emergency Response Procedures

I believe that all of these procedure types are important and have the potential to contribute, or not contribute, to the Operational Discipline Culture of an organization. I have listed these six in their relative order of importance in building a strong OD culture.

First, management must set the proper tone and example to build OD by establishing and then following appropriate Managing Systems. Whenever possible, these systems should be documented and accessible to those that need to be knowledgeable. Unfortunately, these are often the most neglected procedures since managers often consider business processes less important to document. They are usually mistaken in this belief.

After Managing Systems, Safety Procedures are the next important. Safety is a priority and it is imperative that all employees contribute to this priority. Thus, Safety Procedures receive high organizational visibility and failure to comply with them can quickly undermine safety and OD culture. Not only does compliance to safety procedures cut across all organizational boundaries, safety is aligned with our instinctive behaviors to pain avoidance and self preservation. Having excellent safety procedures can go a long way towards building a strong culture of Operational Discipline.

Operating Procedures are the next most important since they not only touch a large plant population, but they contribute to achievement of the facility’s performance goals. Maintenance, Quality and Emergency Response Procedures are also important, especially to those who work with them most often.
Driving operational discipline through quality written procedures

Recent events highlight the need to follow good procedures

Unfortunately, there have been a number of recent, high-profile incidents that, once investigated, have highlighted how failures in either the quality of procedures or adherence to them can cause catastrophic results. The April 2010 Deepwater Horizon incident in the Gulf of Mexico is the most costly and damaging incident in recent history, and possibly the worst of all time. The January 2011 report by the Presidential Commission on the Deepwater Horizon Incident brought to light the importance of written procedures, as quoted below. I’ve underlined critical pieces within the quotations.

“BP has caused a number of disastrous or potentially disastrous workplace incidents that suggest its approach to managing safety has been on individual worker occupational safety but not on process safety. These incidents and subsequent analyses indicate that the company does not have consistent and reliable risk-management processes—and thus has been unable to meet its professed commitment to safety. BP’s safety lapses have been chronic.”

“BP’s safety culture failed on the night of April 20, 2010, as reflected in the actions of BP personnel on- and offshore and in the actions of BP’s contractors. BP, Halliburton, and Transocean did not adequately identify or address risks of an accident—not in the well design, cementing, or temporary abandonment procedures. Their management systems were marked by poor communications among BP, Transocean, and Halliburton employees regarding the risks associated with decisions being made. The decision making process on the rig was excessively compartmentalized, so individuals on the rig frequently made critical decisions without fully appreciating just how essential the decisions were to well safety—singly and in combination. As a result, officials made a series of decisions that saved BP, Halliburton, and Transocean time and money—but without full appreciation of the associated risks.”

Not only did they comment on the operations of BP, but also on their two primary contractors – Transocean and Halliburton.

“A survey of the Transocean crew regarding “safety management and safety culture” on the Deepwater Horizon conducted just a few weeks before the accident hints at the organizational roots of the problem. The research, conducted at Transocean’s request, involved surveys and interviews with hundreds of employees onshore and on four rigs, including Deepwater Horizon, which was surveyed from March 12 to March 16. The reviewers found Deepwater Horizon ‘relatively strong in many of the core aspects of safety management’. But there were also weaknesses. Some 46% of crew members surveyed felt that some of the workforce feared reprisals for reporting unsafe situations, and 15% felt that there were not always enough people available to carry out work safely. Some Transocean crews complained that the safety manual was ‘unstructured, hard to navigate, and not written with the end user in mind;’ and that there was ‘poor distinction between what is required and how this should be achieved’. According to the final survey report, Transocean’s crews ‘don’t always know what they don’t know. Front line crews are potentially working with a mindset that they believe they are fully aware of all the hazards when it’s
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highly likely that they are not.’ ”

“Halliburton, BP’s other major contractor for the Macondo well, is one of the world’s largest providers of products and services to the energy industry. It has offices in 70 countries, and Halliburton-affiliated companies have participated in the majority of producing deepwater wells and contributed to most of the world’s deepwater well completions. Yet notwithstanding, it had clear experience and expertise in cementing—a $1.7 billion business for the company in 2009. Halliburton prepared cement for the Macondo well that had repeatedly failed Halliburton’s own laboratory tests. And then, despite those test results, Halliburton managers onshore let its crew and those of Transocean and BP on the Deepwater Horizon continue with the cement job apparently without first ensuring good stability results.

On a positive note, the Presidential Commission also elected to shed light on other industries that have very successfully managed operational risks. Of particular interest has been the truly outstanding record of the nuclear Navy:

“Even inherently risky businesses can be made much safer, given the right motivations and systems-safety management practices. Civil aviation and nuclear-fueled electric power are two good examples of industries that have had to manage the risk of catastrophic failures and losses. In the public sector, the United States Navy also faced the challenge of improving safety in its nuclear-power vessels—and did so.”

“Between 1915 and 1963, the U.S. Navy lost about one submarine every three years to noncombat causes. In 1963, when the nuclear-powered USS Thresher was lost during a deep test dive, 112 naval personnel and 17 civilians perished. The Navy investigation went far beyond immediate causes and ‘found deficient specifications, shipbuilding practices, and maintenance practices, along with inadequate documentation of construction and maintenance actions and deficient operational procedures.’ After the Thresher loss, Admiral Hyman Rickover, then head of the nuclear Navy, told his staff to establish a system to ensure that such an accident would never recur. The new SUBSAFE system was established within 54 days of the loss of the Thresher, and no SUBSAFE-certified submarine has since been lost.”

“SUBSAFE has two goals, both crucial for submarines: maintaining the watertight integrity of the hull, and maintaining operability and integrity of critical systems that allow control and recovery from a flooding hazard. The system covers the administrative, organizational, technical, design, material-control, fabrication, testing, work-control, auditing, and certification aspects of submarine development and operations.” (Exhibit 4)

“As important as procedures, SUBSAFE establishes a mindset—in this case, a questioning attitude and what the officers call chronic uneasiness, summarized in the saying, ‘Trust, but verify.’ ”
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PRINCIPLES OF THE NAVAL “SUBSAFE” SYSTEM

- Top management commitment to safety
- Clear and written safety requirements
- Education, not just training
- Regular rewriting of requirements
- Separation of powers and assignment of responsibilities
- Emphasis on rigor, technical compliance, and work discipline
- Documentation capturing what is done and why it is done
- Participatory audit approach and requirements for objective quality evidence
- Program based on written procedures, not personality-driven
- Continual certification of a facility
- Accountability and accompanying responsibility
- Special efforts to be vigilant against complacency

Exhibit 4. U.S. Navy SUBSAFE System Principles

An analysis of these 12 principles indicates that 7-out-of-12 (58%) specifically speak to the need for a strong, written procedure program plus the accompanying review and training. Another four speak to establishment of a supportive culture of Operational Discipline and accountability. The remaining item describes the important role of top management commitment. It goes without saying that leadership commitment and support is required for each of the 12 principles to be realized.

PROCEDURES + OD = EFFECTIVENESS

As shown in Exhibit 5, the state of operational effectiveness is the product of the quality of the management standards and the Operational Discipline. Weakness of either (or both) will result in ineffective operations and safety incidents.

Exhibit 5. Safety performance is a function of the safety management systems and level of execution

Management should not insist upon compliance to procedures until the procedures are of sufficient high quality to merit compliance.

OPERATING PROCEDURES BEST PRACTICES

As mentioned previously, a critical building block in the development of a resilient OD culture is a strong Procedures Program. I have developed what I believe are 11 essential elements or Best Practices that should be incorporated into a facility’s (or a corporate) Procedures Program. (See Exhibit 6.)
1. A procedures “Standard” describes what is expected and by whom.
   A “procedure for procedures” will not only establish clear expectations and the basis for monitoring progress (via metrics and audits), it will also establish procedures as a top management priority that will be supported with resources, time and money.

2. Every procedure has a single person owner.
   Even though this seems like a simple concept, in my experience it is rarely fully in place. Procedure owners own the quality of the content, the review processes and can provide instructor led training.

3. Procedures are well written and easily followed. Visuals and other technology tools are employed.
   Procedure writing is a skill. Many organizations have dedicated procedure writers who have developed this skill internally. Some elect to hire professional writers, while others will include procedure writing as part of their other duties.

   Despite your particular approach, the quality of the writing must not suffer. Poorly prepared procedures will not be as readily followed. Additionally, I have seen in my work, both inside DuPont and outside the company, many examples of creative use of educational tools including color, pictures, diagrams and even embedded videos. Placement of laminated versions of procedures where they are most often utilized is another creative approach to encourage their use and value.

4. Content is consistent with core documents and balances comprehensiveness with user needs. A consistent format is used universally with appropriate procedure headers.
   There must be clear accountability in the development of a procedure for its accuracy. In particular, operating procedures must be consistent with technology documentation. All procedures must also be consistent with corporate requirements and all applicable regulations.

   It is easy to over burden procedures with interesting, adjacent information that describes “why” a procedure is important. And although understanding the reasons behind the procedure are important, too often these words of context can either confuse the reader or simply get in the way of finding the most important “what to do” information. Finding the right balance between these two needs should be influenced by the criticality of the procedure.

   Ease in management of a procedure is facilitated when a common header format is used for all of a facility’s procedures. The title, the procedure’s owner, the location of the master copy, importance/risk mitigation classification (see #5 below), dates of its last revision and its next required revision, and also an appropriate procedure number should be included. An optional procedure revision history can also prove useful.
5. Every procedure is classified as to importance and risk mitigation.

Key to applying the right level of resource support to the maintenance of a procedure is classifying all procedures as their importance and criticality. Several factors can be used but the most straightforward is simply a brief consequence analysis: “What is the worst thing that could happen if this procedure were not followed correctly?”

I have observed companies use a simple Tier I, Tier II and Tier III approach. Others impressively integrate their Risk Registry or Risk Classification System (Category I to V, for example) into the way they classify procedure importance.

6. All procedures are routinely reviewed, consistent with #5, by an appropriate cross section of the organization.

Reviewing procedures for accuracy and completeness must become an important ritual in every organization. I have observed this process occur every 12 months for the most critical procedures to every 6 years for the least critical. Of course, proactive changes to a corporate standard, a process or equipment that may render an existing procedure inaccurate must trigger an immediate procedure review. See #8 below.

Essential to any review process is adequate time and use of the “right” people. Procedure owners should plan three months in advance of a procedure expiration date so that the quality of the review is not compromised.

7. A verification strategy is applied to all procedures, consistent with #5.

As cited previously, the U.S. Navy SUBSAFE motto became “Trust but Verify.” The same approach should be employed for all procedures, consistent with the procedures criticality. Trust that employees will perform the procedure correctly but just in case, verify.

There is a wide range of verification techniques available to organizations. On one end of the spectrum is a duplicate review of every step with initials. For example, this occurs in the cockpit of commercial airliners before every flight. This may be appropriate for your most critical procedures.

On the other end of the spectrum may be little or no verification, assuming, of course, that the individual is trained and competent to perform the task. The principle is that appropriate verification strategies should be identified and applied to all procedures. An appropriate action is determined by the procedure’s criticality classification.

8. Content is maintained up-to-date via a robust Management of Change Process (MOC).

Failure to identify and mitigate new risks that are introduced via facility, technology and even organizational change are often the cause of serious, even catastrophic incidents. MOC processes are intended to methodically review changes so that incidents are prevented. Codification of the proper way to implement and execute desired changes must include procedure reviews (See #6) and revisions plus the corresponding appropriate training. (See #9)
9. Initial and refresher training is provided at a frequency consistent with #5. Written, field, and supervisory assessments are performed.

It goes without saying that accurate, up-to-date procedures are of little, real value if their users are not knowledgeable and familiar with the content. Training must be done initially, and periodically thereafter to ensure that knowledge is not lost. For critical procedures, refresher training may be required annually. Other less critical procedures should be less frequent.

It is critical that managers have full confidence in each individual's demonstrated ability to follow procedures. Job Cycle Checks, conducted by peers and/or supervisors are an effective way of demonstrating acquired skills. Other more formal assessment methods should also be employed as appropriate.

10. Procedure revision documents are controlled without impacting broad access to the procedures.

Document control is essential. Many facilities utilize systems and standards such as ISO 9000 to bring structure to the document management process. Hopefully, the rigors of these approaches do not get in the way of an equally important priority – procedure access. Auditing of both document controls and ease of access, including how much time it takes for users to access key procedures will allow managers to judge whether an appropriate balance between these two priorities has been achieved.

11. Continuous improvement is driven by metrics and audits.

If the procedures standard (See #1) is properly prepared, it will be very straightforward for an organization to collect appropriate metrics (overdue procedure reviews, overdue procedure training, overdue MOC procedure updates, etc) as well compare actual performance vs. expectations via proactive auditing. Continuous improvement requires data (metrics and audit results) that illustrate where improvement opportunities can be found. A sampling of Audit Questions that can be utilized to probe the strength of an organization’s Procedures Program is contained in Appendix I.

THE 11 BEST PRACTICE PROCEDURES

1. Procedures “Standard”
2. Single person owners
3. Well written, easily followed and visual
4. Consistent, comprehensive and user friendly content
5. Importance and risk classified
6. Reviews
7. Verification Strategies
8. Robust change management process
9. Initial and refresher training plus assessment
10. Revisions controls but accessible
11. Metrics and Audits

Exhibit 6. The 11 Best Practice Procedures
CONCLUSION
Quoting again the Presidential Commission that investigated the Deepwater Horizon incident, “The United Kingdom Health and Safety Executive formally defines the safety culture of an organization as ‘the product of individual and group values, attitudes, and perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization’s health and safety management.’ A more popular description is that safety culture means doing the right thing even when no one is watching. There are two kinds of safety: occupational safety, which refers to keeping people safe, and process safety, which refers to the procedures for minimizing risk more generally.”

In conclusion, minimizing risk via a strong Operational Discipline culture will help build a firm foundation of detailed and accurate procedures that will contribute to less frequent and less serious industrial incidents. If organizations follow the formula outlined above, it will assist in improving OD culture and the degree of Operational Excellence that a business can attain. Regardless, continuous commitment and effort by management will be required to sustain these gains.

For more information visit us at: www.sustainablesolutions.dupont.com

Dupont Sustainable Solutions SAFETY RESOURCES
APPENDIX I.

Sample Procedures Program Audit Questions

- Does the area communicate revisions to Procedures to personnel who have a need to know? Is this documented?

- Are Procedures readily accessible to personnel who work in or maintain the process?

- Have Procedures been developed and documented for each operating area? Do the procedures provide clear instructions for conducting activities effectively and safely?

- Do the Procedures contain a safety, occupational health, and environmental control section?

- Is each equipment piece described sufficiently to provide key process requirements and limitations, i.e. size, materials of construction, heating and cooling provisions, services, etc.?

- Are the standard operating conditions (SOC’s) listed for each process step:
  - Preferred range or aim
  - Minimum and Maximum conditions
  - Consequences of deviation (above the maximum and below the minimum)
  - Steps to correct and/or avoid deviation

- Is there a formal system for preparation, control, approval and authorization of Procedures?

- Are Procedures being reviewed and reauthorized at intervals? Do revision dates on individual procedures reflect that reviews are on schedule? Are any reviews overdue?

- Are there provisions to ensure that the Procedures remain consistent with the documented technology?

- Are operators and mechanics included in the reviews to verify that sound practice is reflected in the Procedures and to stimulate suggestions for changes and improvements?

- Are the Procedures written in a style and format that is clear and understandable to users?

- When changes are made to Procedures that involve changes to the documented process, is the authorization in conjunction with a Management of Change authorization document?

- Are the Procedures free of “unauthorized changes”?

- Is job specific training developed and deployed that addresses the specific safety and health hazards and procedures applicable to an employee’s assignment?

- Is refresher training being provided to each employee at an appropriate frequency to ensure that the employee understands and adheres to current procedures?

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