



**MARY KAY O'CONNOR
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**Exceeding Regulatory Compliance in Procedure Management:
A Journey towards Operational Excellence**

Submitted by the Procedure Accelerator Division of Innovatia

Todd Muscroft, Blair Morgan, and Alex Palmer

Presenter: Todd Muscroft
todd.muscroft@innovatia.net

Abstract

Proving compliance to well defined and explicitly stated regulations regarding process safety sounds simple, however in practice it involves a huge effort. The sheer volume of information required to be compliant in highly regulated environments can be overwhelming. The large number of people involved compound the complexity, and legacy systems simply don't cut it anymore.

Here we will outline the use of a procedure life-cycle management tool used to improve an organizations ability to comply at a reduced effort and cost. The unique ability to automatically track documentation activities, as well as individual procedure completions, step-by-step, and record all procedure use for simple and fast reporting is at the core of a recently completed compliance management initiative by a leading energy and petro chemical firm. Additional benefits of this approach to procedure management include improved operator efficiency, decreased human factor errors, facilitated continuous improvement, increased consistency of standard work, and reduced effort in authoring and content management will also be explored.

Going beyond compliance, we will outline how leading content management practices and tools can position an organization to seamlessly adopted new technology as they are commercialized and introduced to the market.

Highlights of this approach to procedure management have been empirically measured and include reduced volume of content (up to 40%), reduced procedure review cycle time (up to 25%), reduction in authoring and updating effort (up to 90%), and streamlined process safety management compliance.

Introduction

Past research has identified the importance of standardized work instruction, addressing human factor errors, and the role of process safety management (PSM) in industrial settings. The elements required of a robust PSM regime are outlined by OSHA and other regulatory bodies and massive resources are allocated to satisfying both regulatory obligations as well as continuous improvement initiatives targeting increased efficiency to impact the bottom line.

Compliance management, in the context of PSM, and procedure adherence has proven to be a daunting documentation and auditing challenge. Massive volumes of procedural and operational content need constant revision, review and approval, and the execution of the standardized work, governed by procedures, can be number in the dozens or hundreds per day. Regulatory compliance often requires documentation records of all revisions, approvals, and published procedural documents, and can require yearly review of these documents.

CASE STUDY PART 1: Past project work has made it clear that the volumes of operational content involved in a single facility can be staggering. For example, during a large scale project at a single plant within a refinery, a detailed measurement was done to support the enterprise wide adoption of the methodology and tools. During the test phase, procedures for 633 assets, each with 4 operating procedures, were migrated into a procedure lifecycle management system. This totaled 2,532 procedures. Those procedures were made up of a total of 40,308 statements. Each of these procedures was being managed manually and each statement required review yearly to satisfy regulatory requirements.

Procedure Lifecycle Management

Managing these efforts manually has been done with varying degrees of success, however the emergence of procedure lifecycle management methodology and support tools is changing the way compliance is proven and the way standardized work can be managed and executed in the field.

Implementation: The strategic work of mapping the required information and work function lays the foundation to structure the procedural content, organize and classify documents, and reduce redundant or duplicated content. During the strategy of architecture phase, a rationalized procedure list is created. This is a sort of roadmap or architectural framework for the following phases of the project which guides content creation migration and organizational adoption.

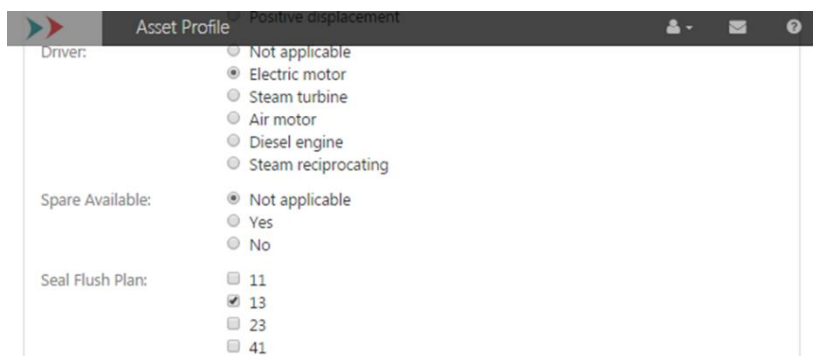


Figure 1: Sample Single Source Content Reuse Pick List

The strategy employed to import and migrate existing content into a procedure lifecycle management system involves a variety of import and content creation tools and methodologies.

The tools and methods chosen are done so based on the current state of procedural content and the available resources to upgrade and improve content to reduce future effort. Once content is imported, built in continuous improvement functions and workflows to make periodic revisions seamless.

Content reuse and single sourcing of content is an important method for reducing the volume of content that requires ongoing maintenance. Reduced management effort can be achieved by using a common statement in two or more procedures. The statement can be truly common between them, or involve some sort of variable such as a changed unit value, pressure, temperature, direction, or ID number. Asset level specificity is achieved by employing variable components to common statements.

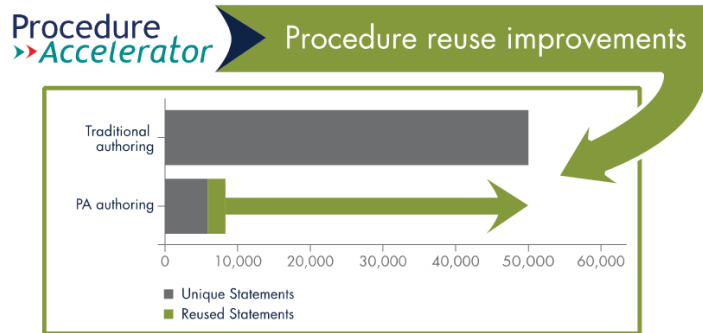


Figure 2: Content Volume Reduction from Content Reuse

CASE STUDY PART 2: The rationalized procedure list, content migration and procedure lifecycle management tools and work flows were employed to reduce the above mentioned inventory of procedural content. Leveraging common statements and reusable content the volume of content was reduced from 40,308 statements to under 10,000 total statements, 690 of which are reusable action statements. Variable components within reusable statements are based on asset specific characteristics such as, motor type or fluid type in the case of simple pumps. This approach to content management of procedural content led to a reduction in the overall number of procedures required as well as a reduction in the total volume of content required to be maintained to produce each procedure. Not only is the body of content smaller, but it is also in objectively better overall condition – meaning that it is more readable, easily accessed and followed, and is accessible on any device with access to a web browser.

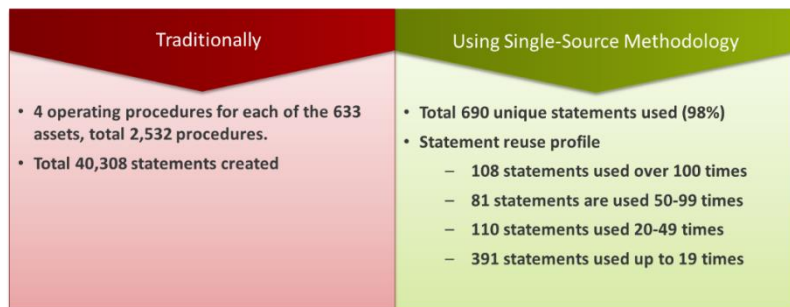


Figure 3: Benefits of Single Source Content Reuse

Impacting the Front Line, this increase in usability has inherent operational benefits as well as implications for continuous improvement and compliance management. Having procedures be easy to access, easy to find and simple to follow reduces human factor errors. The ability to interact with procedures gives operators the ability to flag ambiguous or misleading statements for review and suggest improvements to content. By engaging in a social review process, engagement is facilitated and continuous improvement work flows are automated and occur as front line staff encounter issues.

Procedure Name	Expiry
N-PU553A - Pump - Prepare for Maintenance	DRAFT
N-PU553A - Pump - Return from Maintenance	DRAFT
N-PU553A - Pump - Shutdown	DRAFT
N-PU553A - Pump - Startup	DRAFT

Figure 4: List of Available Procedures

Procedures are easy to find and all steps are recorded with metadata, including the operator who complete the step and time it was completed. Single procedures can be completed, in tandem, by operators with different roles, for example a field operator and a control room operator by leveraging a network, a group or unit of operators. Each step is checked off and when decision points are encountered, the next step is not available for completion until the decision point has been made. All completions are tracked and can be incorporated in compliance management reporting and stored for quick and easy reference in the case of an incident investigation or audit.

Seal Flush Prestart		
8.	FO	<p>VERIFY that any valves in the seal flush circulation lines are fully open (normally no valves present). (Seal Plan 11)</p> <p>More details</p> <p>Display when Seal Flush Plan = 11</p> <p>Seal Plan 11 View inline</p>
9.	FO	<p>VERIFY that any valves in the seal flush line are open. (Seal Plan 13)</p> <p>More details</p> <p>Display when Seal Flush Plan = 13</p> <p>Seal Plan 13 View inline</p>
10.	FO	<p>VERIFY that any valves in the seal flush circulation lines are fully open. (Seal Plan 23)</p> <p>More details</p> <p>Display when Seal Flush Plan = 23</p> <p>Seal Plan 23 View inline</p>

Figure 5: Sample Procedure from Point of View of a Field Operator (FO)

Elements of procedure lifecycle management include the creation, review/publishing, use/action/revision, and audit of procedural content. Each of these functions should be incorporated into a procedure life-cycle management tool/system for it to be optimal for long term and efficient use. By considering these elements holistically, they can be linked to facilitate a continuous improvement loop that ensures that content is kept up to date, and that learning from one operator is shared across operators and across facilities.

Compliance Management is supported by recording virtually every key stroke by both the operators as well as writer's editors and reviewers. Version control is automatically managed and previous versions are stored for auditing, reference, and roll back. Publishing the latest approved version only is an important way to ensure that the latest safe content is always served to users when called for.



Figure 6: Elements of the Procedure Lifecycle

Looking to the Future

A good procedure management lifecycle tool is important to position your operation for the quick and easy adoption of technology as it is commercialized and developed. By having a solid foundation of easily reusable content in a structured data base, you can leverage already curated and approved content in various forms for training, performance support tools, Analytics, machine learning, wearable hardware, and augmented reality which will define the digital workplace into the future.