

Consistent, Well-Documented Asset Operating Procedures Help Drive OpX

By Peter Reynolds

Keywords

Asset Operating Procedures, Refining, Chemicals, Maintenance, Operational Excellence, Process Safety Management, Reliability

Summary

[Innovatia](#), a global supplier of knowledge management solutions headquarters in Saint John, New Brunswick, Canada, recently briefed ARC Advisory Group on the company's innovative [Procedure Accelerator](#) solution for refining, chemicals, and other asset-intensive industries.

With today's tight operating margins and tough economy, manufacturers are hard pressed to ensure availability and safe operation of production

Authoring appropriate operating and maintenance procedures for the diverse range of assets in today's plants and ensuring that those procedures are consistent, up to date, and readily available to plant personnel remains a challenge for many owner-operators in refineries, chemical plants, and other asset-intensive industrial facilities. ARC believes that Procedure Accelerator provides a unique solution for generating and maintaining procedures and verifying that they are performed correctly.

assets. In many asset-intensive industries, failure to operate and maintain processing equipment and other key assets properly can have dire consequences. The skills gap brought on by the current wave of retirements compounds the problem, making it critical for today's plants to capture institutional knowledge.

According to Blair Morgan, Innovatia's General Manager for Procedure Accelerator, through its modular, object-based approach and single-source authoring, the solution can help owner-operators in refineries, chemical plants, and other asset-intensive industrial facilities:

- Capture knowledge to generate appropriate procedures in less time;
- Ensure that the procedures are consistent, up to date, and easily accessible to all who need them; and



- Provide an historical audit trail of the specific procedures performed on any plant asset.

This can help operations teams operate and maintain assets correctly, improve plant safety and equipment reliability, and comply with process safety management (PSM) regulations.

ARC Advisory Group believes that asset-level operating procedures could play a key part in helping owner-operators:

- Improve process safety management compliance
- Improve knowledge transfer among operations staff
- Improve operating safety through continued use of consistent, up-to-date asset procedures
- Attain operational cost savings

Improved Process Safety Management

In today's economy, margins remain weak, operations budgets tight, and hiring freezes continue to challenge manufacturers. While ARC believes that plants are generally running more reliably than in the past and overall utilization appears to be at an all-time high, incidents continue to happen.

Many investigations show that lack of standard operating procedures, training and worker skills are key root causes of major incidents.

According to many recent U.S. Chemical Safety Board (www.csb.gov) investigations, lack of standard operating procedures, training, and worker skills are key root causes of major incidents. This is true in both older established plants and new grassroots plants.

The U.S. Occupational Safety and Health Administration's (OSHA) Process Safety Management regulation is intended to help prevent industrial incidents, including the release of toxic, reactive, flammable or explosive chemicals. In response, the industries affected by this regulation have created programs to help improve:

- Process hazard analysis
- Management of change
- Operating procedures
- Incident investigation
- Mechanical integrity
- Inspection and testing
- Training

Incident investigation reports indicate that over half of the deficiencies recorded show that no procedure was in place. Clearly, this was a contributing factor in lost production, worker injury, or other incident. The 2011 Process Safety Management National Emphasis program review found that OSHA issued citations to 58 of the 60 refineries in which it opened inspections, with an average of 17 citations per inspection.

Eroding Process Operations Experience

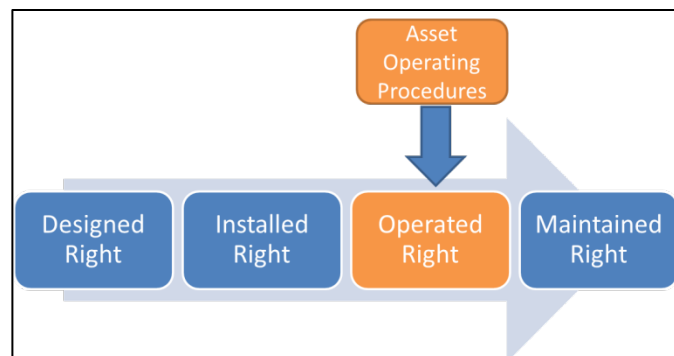
Today's process operations teams do not always get the hands-on training they need to properly start up and shut down a plant, or even deal with routine operational tasks. Although technology has made it easier to capture procedures in electronic format, critical plant information still is not always easy to obtain when most needed to help anticipate, avert, or mitigate incidents.

What's more, the exodus of experienced operators continues, accompanied by an influx of new, less-experienced workers with different knowledge, learning behaviors, and comfort zones than the previous generation.

To combat these factors, owner-operators must consider their plant operating procedures and the role the operators will play in safe operations.

North American Refinery Implements Operator-Driven Reliability Program

At one large North American refining company, corporate management aimed to increase asset reliability, information transparency, and operator effectiveness and standardize the operator work processes to help reduce operating costs by \$.05 per barrel of crude feed. Management aligned these objectives with a safety culture across the refining business lines.



Elements Needed to Ensure Reliability

The company defined the four elements it believed were essential to ensure reliability: 1. “designed right,” 2. “installed right,” 3. “operated right,” and 4. “maintained right.” While numbers 1 and 2 are clearly not within the operations scope, operations management was convinced that operators could have at least as big an impact on plant reliability as the maintenance department.

To help reduce maintenance cost and decrease recordable injury frequency, the company worked with Innovatia to institute an operator-driven reliability

Operators were given a relatively broad role that extended to basic care of the equipment; including cleanliness, minor maintenance, and early detection of potential failures. Here, AOPs provided the operators with appropriate guidance.

program (ODR). This program included elements of minor maintenance, operator rounds, effective communications, and asset operating procedures (AOP). Key behaviors such as pride of ownership were instilled as part of the ODR training program. It was also essential to define roles for both maintenance and operations. Oper-

ators were given a relatively broad role that extended to basic care of the equipment; including cleanliness, minor maintenance, and early detection of potential failures. Here, AOPs provided the operators with appropriate guidance.

The scope for the initial pilot area included nearly 3,000 rotating assets, each containing AOPs for normal startup, normal shutdown, prepare for maintenance, and return from maintenance. Since the refinery’s existing paper-based operation procedures were inconsistent and outdated, the company made developing a technology solution to enable accurate procedures the cornerstone of its ODR program. To do so using conventional methods, the operations team would have faced an estimated ten years to author, approve, and distribute procedures to the refining area teams. However, after implementing Procedure Accelerator, this task was completed in just six months.

According to the refiner, ODR program benefits included \$200,000 in maintenance cost reduction for the initial pilot area, plus:

- Improved operator decision support
- Improved safety
- Performing repairs before a failure
- Reduced fines and litigation by through PSM compliance

- Improved consistency of operator tasks including roles, responsibilities, expectations, and accountability
- Improved forecasting of maintenance costs

Asset-Level Procedures Often Neglected

Design engineers spend significant time and effort to ensure that plant assets are installed and commissioned correctly. However, in most cases, very little attention is given to generating appropriate procedures for the assets once the engineering and commission teams have turned them over to plant operations. The procedures that do get handed over are generally unit level, generic, and “procedure type.” It’s not unusual for asset operating procedures, often written in haste following plant startup, to quickly become outdated. That’s because change is inevitable and paper-based systems typically are ineffective tools for maintaining current procedures in a dynamic environment.

Single-Source Authoring

At the heart of Procedure Accelerator is an object-oriented library of procedures. Information about a given asset can be created once and then reused multiple times. Information can be updated at the source and all outputs updated immediately and available for use in operator tasks.

Standard components used in assets (like a pump or valve) have a library of associated procedure steps. When an asset contains a particular component, the procedure can be created by simply selecting the particular steps from the library. This step is repeated for the other components within the asset. Effective re-use of asset information eliminated much of the time-consuming work typically required to write procedures.

According to the company, in addition to saving time and effort, Procedure Accelerator provides users with important benefits, including

- Consistent wording and format
- Reduced review and approval cycles
- Consistent information across all assets
- Audit trail capability for monitoring and reporting for PSM compliance

Procedure Accelerator also supports master asset models by integrating to enterprise asset management systems and other document management systems for the historical repository of completed procedures.

Conclusion

Managing risk is critical for today's industrial enterprises. However, limited resources and more complex processes present greater likelihood for safety and environmental incidents.

ARC Advisory Group believes a proactive process safety management program is critical for success. Enterprises must identify and document risks to people, assets, product quality, and the environment. They should also be able to present a comprehensive process safety management program that includes asset operating procedures, risk reduction, plant reliability, mitigation of loss, and avoidance of unplanned outages to insurance providers, regulators, or in a court of law should that need arise as proof that the enterprise is managing risk in a systematic manner.

Leading refining and chemical companies have implemented operational excellence (OpX) initiatives largely to help reduce risk and company exposure. OpX requires accurate, consistent, up-to-date procedures that are readily available to those individuals that require them.

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transfer knowledge about correct operational procedures. This can help plants ensure safe and efficient operation, meet regulatory requirements, and achieve operational excellence. To the best of ARC's knowledge this is the only third-party tool of its kind.

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