Best Practice MOC & PSSR Process

NAEM's EHS, Sustainability Software and Data Management Conference

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Agenda

• Introductions & Definitions
• PSM, MOC & PSSR Origins
• MOC & PSSR Best Practice Details
• How does Technology help?
• MOC & Automation Truth and Fiction
• MOC Best Practice Growing Trends

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Who wrote the paper?

• Mike Bearrow is a professional engineer, with a BS in Mechanical Engineering from Texas A&M University (class of 1982).

• **Boeing Aerospace** – System Safety & hazard analysis on the space shuttle, F-111 Fighter Bomber; **Halliburton** – Design Engineer – Trucks & Skids; **McDonnell Douglas** – System Safety NASA Orbiter **Boeing Helicopters** – System Safety, CH-47 SOF

• **SAIC, DS&S, OSyS, CDS, RR** – Process Safety Management consultant and VisiumKMS team member since 1992. His mentors include Ray Brandes, Dr. Geoff Kaiser, and Ian Sutton.

• Rolls-Royce Global Process Safety Lead
Who gets to present it?

- Thelma Kipe is a Vice-President with Rolls-Royce in the R² Data Labs Group
- 40 years experience with oil & gas and petrochemical companies and processes; 20 years experience in business process mapping & improvement
- Eastman Chemical – Safety specialist – wrote programs to calculate safest transportation method of various chemicals between certain cities
- Exxon – EHS specialist focused on incident management, industrial hygiene, MSDS and chemical inventory
- Oracle – EHS software product manager; air, water, waste, permitting, audits, IH, training, change management
- Rolls-Royce – Strategy and business development; PSM product manager; change management, incident management, audits, risk assessments, corrective actions; operational excellence
Safe Harbor Statement

- All opinions expressed herein are those of the author/speaker and not necessarily of Rolls-Royce plc or any living thing.
Rolls-Royce Background

World-class Product and Service Provider

£79.8 bn Order Book

49,900 Employees

46 Global Locations

VisiumKMS
Integrated solution that underpins EH&S business processes

- Incident Management
- Risk Assessment,
- MOC, PSSR,
- Task and Audit Automation
  and more....

ROLLS-ROYCE ARE EH&S DOMAIN & INDUSTRY EXPERTS

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What Verdantix is Saying about RR & VisiumKMS

• “A major differentiator for Rolls-Royce (maker of VisiumKMS) is their commitment to be a direct participant in the industries which it serves. Between its industry event attendance, thought leadership showcases, and in-house implementation experience, Rolls-Royce has a very strong understanding of the EHS and PSM challenges within the chemicals and O&G sectors.”

Verdantix is an independent research and consulting firm with expertise in environment, health, safety and quality as well as energy, real estate, facilities and maintenance.
What is a Best Practice?

• A best practice is a **method, process or technique that has consistently shown results superior** to those achieved by other means, and can be used as a benchmark.

• A Best Practice gives a company or facility a **tangible competitive advantage**.

• Might **improve EHS performance, product quality and also lowers cost**.

• Gives management more visibility, control and influence over outcomes.
MOC and PSSR Origins

- PSM is process safety management and it comes from OSHA
- MOC and PSSR come from PSM
  - MOC is management of change
    - A process for ensuring change is accomplished in a safe manner
  - PSSR is Pre-Startup Safety Review
    - A quality check that MOC is done correctly
- They are complimentary elements – and designed to be somewhat redundant.
- PSM is the “Best Practice” standard for managing risk & continuous improvement in high hazard industries like chemical plants, refineries, E&P, pharmaceuticals in the world…
- PSM was designed by industry for industry…
About PSM and Change Management...

• All **continuous improvement** requires change and all change has **inherent risk**.

• Risk is introduced when **intended** or **unintended** change occurs.

• Whether that risk manifests itself into an accident, mishap or poor result is **dependent on the quality of change management or MOC**.

• MOC & PSSR process help ensure that we do not **deviate from the design intent** of the system/process that is under going change…unless we do it with fore thought, deliberation and care….you might even say with skepticism.
Why we have MOC and PSSR Requirements
1984 – Bhopal, India—Toxics Released

- 2,500 immediate fatalities; 20,000+ total
- Many other offsite injuries
1988 Piper Alpha – North Sea

• Began production in 1976,

• Operated by Occidental Petroleum (Caledonia) Ltd. Producing ~10% of oil and gas in the North Sea,

• An explosion and resulting fire destroyed it on July 6, 1988, killing 167 men, only sixty two crewmen survived.
2010 Deepwater Horizon – 87 days, 200 million Gallons

3 months watching the release live via tv news and webcasts...yuk!
Now we have PSM and MOC for Offshore

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What Unintended Change Looks Like...

Unintended Change - A $5B platform had an incorrectly plumbed, 6-inch length of pipe allowed water to flow freely among several ballast tanks that set forth a chain of events causing the platform to tip into the water.
MOC and PSSR Best Practice Details

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Best Practice MOC and PSSR Should:

• Make business choice disciplined
• Turn complexity into clarity
• Convert creativity into productivity
• Put your principles into practice
What Kinds of Change Are There?

• All ideas for improvement require change
  - Operational excellence revolves around ideas for improvement
  - Simple or complex

• Three categories:
  - Corrective actions – Reactively fixing things
  - Preventive actions – Proactively adjusting, tweaking things
  - Continuous improvements - ideas for increasing production, reducing manufacturing costs or increasing product quality.

• They all should be analyzed for impact (positive and negative) and executed with care.
The Change Universe

IN-KIND CHANGE

Continuous Improvement Actions

Corrective Actions

Preventative Actions

NOT IN-KIND CHANGE

CHANGE MANAGEMENT

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Elements of Best Practice MOC and PSSR

• Site Configurable increased for increased adoption

• Optimum Workflows
  - Simple, Complex, Process, Personnel, Technology
  - Driven by Change Type
  - All steps and content should be relevant and understood
  • No 100 question MOC Evals for 99% of the changes
  • Strive for no “NA” responses

• Simple and Complex should be connected

• MOC Must be Connected to PSSR – almost always

• Optimum Communication – reminder/notifications

• Imbed Operational Experience – your content

• Enable Non-Invasive Reporting

• Make it Mobile where the job is done if you can…
When is MOC Required?

- OSHA requires that you establish & implement written procedures to manage changes (except for "replacements in kind") to:
  - Process chemicals,
  - Technology,
  - Equipment, and
  - Procedures (operating, maintenance...),
  - as well as changes to facilities that affect a covered process.

- Documenting change is best practice but the process by which change is documented must be flexible and right sized to drive positive outcomes.
When is PSSR Required? **Trust but Verify!**

- Pre-Startup Safety Review (PSSR), is not part of the MOC process per se.

- It is a **complimentary element** of the EPA RMP rule & OSHA PSM standard.

- A **redundant check** or review to ensure that an MOC has been implemented in a quality and safe manner, but it is **Never a Doing Step**.

- OSHA PSM requires that the employer shall perform a pre-startup safety review for new facilities and for modified facilities when the modification is significant enough to **require a change in the process safety information**.

- **Process safety information includes all information about the process.**
Collecting & Vetting Change Ideas

- Recommendation, corrective action, preventive action, action items, items, suggestions, ideas, proposals, process improvement, Request, Continuous Improvement, quality idea, initiatives, optimization, brainstorm, good catch, innovation, inspiration, things to do, change request, what would you think about? how would it work if? safety suggestion

Idea → Requires MOC?
- Yes → MOC or Complex Change
- No → Simple Change

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Rolls-Royce
Best Practice Simple Change

- **Biggest Driver of Change** - Continuous improvement aimed at improving safety, environmental performance, quality or efficiency

- Recommendations can be managed as “in-kind” or “not in-kind” – simple or complex

- “In-Kind” is simple, routine and/or well understood change

- You should standardize your simple change process so it’s repeatable, measurable and more readily understood

- Illustrate the correct process and visually progress users through the workflow

- Use email notifications and reminders
Best Practice Simple Change

- Idea Generator
  - The author proposes their idea. Who, what, where, why, when.
- Proposal
- Accept & Assign
- Decision
  - 1. Approved for implementation
  - 2. Reject change: Acceptable risk
  - 3. Reject Change: Incorrect basis
  - 4. Activate MOC workflow
- Action
- MOC Evaluation

Feedback
Best Practice MOC and PSSR Workflow

• Complexity is not your friend

• “Live” on screen workflow turns complexity into simplicity.

• Simple…No Spaghetti designs with 20 approval steps… Tidy, clean, efficient, understandable is the goal…

• The following workflow is considered the best practice for MOC and PSSR. It is used for >100,000 MOCs per year. Developed over 24 years.
And this is where the engineering managers team went insane and mutinied...
The author proposes their idea. Who, what, where, why, when...

Feedback

The MOC review(er) should review the evaluation step to ensure its appropriateness, thoroughness & understand the resulting actions. The MOC can then be approved for implementation or denied with comments?

Action Plan

Hazard review & planning step. Analyzing the change for intended results, creating actions to mitigate risk and creating actions to ensure all affected process safety information is updated.
PSSR – A check or review that the MOC process has been completed in a quality manner. All hazards are mitigated and all safety critical PSI and training are completed.

Operations management reviews the MOC & PSSR to ensure it is safe to operate. If it is, then the approval for startup is given and affected staff are notified.

In conducting the evaluation & PSSR Steps, actions can also be accomplished after startup. These actions can be pre-programmed (automatic) or ad-hoc in nature (Post-Startup Actions).
Even more best practice - MOC w/HAZOP

1. Proposal
2. Accept & Assign
3. Evaluation
4. Approval
5. Action

- Ask Questions (Guidewords, Checklists)
- Adequately Safeguarded?
  - Y: Do until all answered.
  - N: Mitigation

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How does Technology help?

• Makes the collection of ideas easy - **Idea Funnel** at the source of the risk.

• Analytics against MOC/PSSR data can drive improvements in **operational excellence**

• Automatic **alerts** when MOC and PSSR actions are assigned, closed and past due ensure diligence and accountability.

• Save ideas that are not **timely** for the **future**.

• **Technology does not forget or retire.**
How does Technology help?

• Illustrate your MOC workflow (picture driven) and enforce your MOC and PSSR process on screen whether it be simple or complex.

• Helps ensure change is appropriately identified, evaluated, approved and executed by the right people, in the right order, at the right time.

• Helps ensure you are asking the right questions and they are answered by the right people.

• Makes poor change management easier to identify and correct through management surveillance.

• The goal of a best practice automation is to manage change efficiently and effectively.
Words of Caution

• Using other than Best of Breed solutions will **sub-optimize** your best practice faster than anything you can do, and it will likely defeat the purpose of the automation.

• **MOC and PSSR are operations processes;** 95% of your users are engineers, operators and managers - not accountants, IT “geeks”, mechanics or maintenance planners. **Design it for them or you will be sorry!!**

• There is danger in automating a business process you do not fully understand!

• **Experience and good decision making is still required.** You can't fix stupid with automation, but you can help.
Best Practice MOC & PSSR Process Results

- **Faster Time to Value** - Efficient and Effective Change Management Knowing that you have an assignment and a deadline.

- **Awareness of Priorities and Resource Requirements**

- **Visibility of Risks and Risk Mitigation Efforts**
  - Including Emergency Changes, Temporary Change, expired temporary change...

- **Non-intrusive** way to measure performance and the health of the MOC business process.

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MOC & Automation Truth and Fiction

• Managing Change is about **optimizing operations efficiently and effectively. Not compliance!**

• PSSR is not a doing step…ever!

• PSSR should be done on any change where quality is important. 😊

• MOC is not a form routing/documentation exercise.

• There must be an **implementation or action step** or the change happens by magic or pixy dust.

• Waiting until you design **the perfect business process** and then deciding on technology is impractical.
MOC & PSSR Automation Trends

• **Risk Ranking Matrix Usage** – Current & Future risk & Delta

• **MOC metrics might help predict the future**
  - No MOCs - suspicious
  - Too many Emergency MOCs - Bad
  - Too many Past Due MOCs - Bad
  - Expired Temp MOCs - Bad
  - SU before Approval or all PSSRs complete
  - Post Startup Actions >30, 60, 90 days aged
  - Work orders that are change without MOCs
  - Expired MOCs + Near Misses + Past Due Incidents + ___ = ???

• Leading Indicators of poor management

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MOC and PSSR Automation Trends

• **Smart Checklists - Standardization of Best Practice Evaluation & PSSR Content**
  – Get your experts in a room and define best practice for all similar sites (not all sites)
  – Evaluation – Specific for the change
  – PSSRs – Specific for the change
  – Actions – PSI and risk assessment mitigation needs for the specific change

• Connecting MOC with your **CMMS**

• Completion of PSSR in the **field**
Intrinsically Safe Automated PSSR Checklists

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About Change

• *It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is most adaptable to change.*