



**MOC Best Practices Whitepaper:
Successful eMOC Initiatives, Part I: Redesign**

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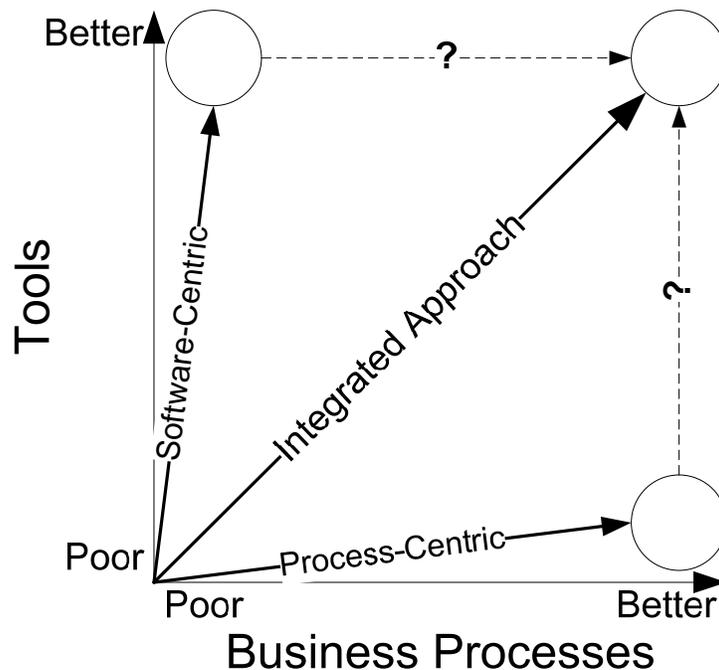
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Approaches For Successful eMOC Initiatives

There is currently a great deal of interest in improving MOC practices. Many companies have launched MOC initiatives, so there's sufficient data to observe some trends and make some tentative conclusions.

An eMOC initiative is usually comprised of a redesign phase, followed by an implementation phase. As shown in the diagram, there are 3 approaches for conducting an eMOC redesign: two are problematic, one is generally more successful.



Process-Centric Approach

This approach consists of an exclusive focus on business process improvements. One would think that this would be welcomed by an author that promotes the notion of best practices, but read on... The process-centric approach involves forming a team of capable and interested individuals to take a critical look at the company's current MOC practices. This may actually be done in a thorough manner, and yield improvements to the existing system. At the end of the improvement process, there's often a desire to implement the new process in some appropriate I.T. tool to leverage the speed and concurrency advantages of electronic systems. The team then quickly becomes disillusioned when they discover that no tool satisfies the new process exactly, and customizing a general-purpose tool is cost-prohibitive.

Software-Centric Approach

This approach consists of an exclusive focus on information technology tool selection. Someone initiates a project to "speed up our MOC process" or to "bring our MOC's into the 21st century" by selecting one of the, apparently, "many" software tools available in the marketplace. Again, one

would think that this would be welcomed by an author that makes his living helping client implement electronic systems, but read on... Unlike the process-centric approach, where team formation is one of the first tasks, in the software-centric approach, looking at software is the first task. Software vendors are very proactive in contacting I.T. and PSM managers at plants, and, it's always interesting to look at a demonstration because one could always learn something from the experience. But if one looks at Company A's product, it's reasonable to also look at products from Company B, Company C, etc.

At that point, a team needs to be formed, in order to conduct the evaluation. Every I.T. manager would insist that such a team have sufficient and engaged representation from the PSM organization—this can't be simply an I.T. initiative. The PSM folks are there to ensure that the software solution will satisfy their needs. Vendor demos are held; project charters are written; funding is requested; evaluations are performed.

The evaluation process turns out to be quite confusing. The different eMOC products all embody some notion of a process model. They're all somewhat similar at a very high level, but differ dramatically in the details. Moreover, the MOC business process models in the eMOC software differ from the process currently implemented at the plant. Which is right? Which is better? Why did the vendor implement a certain feature in this or that way? Should we change our processes? Should we change the software? Every vendor will provide reference sites that one can call, and receive glowing reports about how the software has dramatically improved productivity.

Why is it so difficult to decide?

The problem lies in the premise of doing a software selection. Once that process has started, there is a great deal of pressure to make a timely decision, yet there's insufficient time to really take a critical look at one's own MOC process. So the careful consideration of MOC business process improvements is pushed aside with the hope that there will be time to consider this during implementation. One can always hope...

Integrated Approach

The integrated approach involves forming a team of capable and interested individuals to take a critical look at the company's current MOC practices, similar to the process-centric approach. However, the team differs from process-centric in that it must have a member who is intimately familiar with the variety of eMOC products in the marketplace, and understands the I.T. implications of various aspects of the redesign (e.g. integration with SAP™, Maximo™, etc). This allows the MOC redesign to proceed in such a manner that it's constrained by what's possible using current technology. This avoids the redesign team coming up with ideas that aren't practical given current technology (e.g. "let's have the system decide which P&ID's need to be updated"); this also avoids the redesign team thinking too small and not taking advantage of large timesavers (e.g. MOC action items are integrated with action items from PHA's, audits, etc. so that a person can see all the items s/he is responsible for).

Where do you find this person?

Your I.T. organization is the first place to look. They may have resources or know of resources that can participate on an MOC redesign team, months before any specific software is to be evaluated. But I.T. organizations are often very, very lean nowadays, so they may not be able to contribute a resource for a redesign initiative. There are also consulting organizations, who have the requisite expertise in MOC business processes, current eMOC tools and related I.T. integration experience.

This integrated approach implies that consideration is given to both the business process aspects of eMOC and the electronic systems aspects. The most efficient way to organize the work is to divide it into two streams: the “process redesign stream” and the “tools and integration stream”. Each of these would run concurrently.

The Process Redesign Stream

The MOC process redesign typically takes place over a series of a few weeks. In the following section, the total work is divided into a couple of dozen topics. Within each topic, there are some key considerations that ought to be addressed to ensure a viable MOC process. The list of topics is fairly complete; the list of considerations is incomplete and simply a starting point for planning purposes.

General MOC Issues:

- Challenge every assumption built into the current and future processes.
- Should we use concepts like “Initiator”, “Owner”? Are these roles different?
- What other roles exist and what are their responsibilities at each step?
- Information access rights: who can create, modify, view, approve, which MOC’s, and which attachments (i.e. associated documents)?
- Glossary: create a glossary of relevant terms (e.g. MOC, PHA, PSSR, HAZOP), with clear distinctions between them.
- Decide how best to interact with the MOC subprocesses:
 - PSI update
 - Hazards evaluations
 - Inspection, after implementation
 - PSSR

Select MOC Lifecycles:

- Use the Gateway MOC Lifecycle as a starting point. Validate against the CCPS guidelines.
- Define which lifecycles are allowable: full vs short? Permanent vs temporary? Emergency?

Redesign Initiation:

- Rules for what constitutes a change? Most companies have site-specific examples for what is a replacement-in-kind, and therefore not part of the MOC process.
- When things fall into a gray zone between “definitely IS an MOC” and “NOT an MOC”, how is this decision process documented, for future reference?
- What constitutes an adequate description of the “Technical Basis for Change”? How is this documented? Who should approve it?

Redesign the Work Scoping:

- Review the rules for classifying the change, and scoping the “work” needed to complete the MOC.
- Consider the benefits of an asset-based, rather than a document-based approach.

Redesign how the Change is Designed:

- What are the requirements for PSI update?
- How do updated and redlined documents get into an MOC?
- When and how do they become “official”, released documents?
- How do document updates for MOC interact with capital project initiatives?
- How does one avoid the problem of multiple revisions all being perceived as being “current”?

Redesign Impact Analysis:

- What rules govern whether an MOC requires:
 - A process hazards analysis. If so, what kind of PHA?
 - A safety analysis?
 - An environmental analysis? If so, to what level of detail?
 - An industrial hygiene analysis?
 - A cost analysis? Of course, this isn’t required by OSHA, but it may be required to obtain approval of a discretionary MOC.

Redesign Approvals:

- Which individuals/roles should approve which MOCs at which point?
- Delegation of authority: when an approver is away, who approves in their place? How is that implemented?
- What are the mechanics of the approval process, either paper or electronic?

Interaction with Work Scheduling:

- How are the MOCs reflected or scheduled in SAP™ or other maintenance management applications?
- How are work orders triggered? Should this be integrated with MOC?

- How are long lead time items triggered? Should this be integrated with MOC?

Interaction with Mechanical Integrity:

- Where is inspection data stored, especially inspections that are performed in association with an MOC change?
- How does the MOC process “know” when the inspections are complete?

Interaction with Training, Notifications:

- How is training triggered in the context of an MOC?
- What records are kept? Where?
- Who should be notified? When?
- Is training “complete”, and is start-up permitted if people are absent and not everyone gets trained?

Interaction with PSSR:

- What level of detail is appropriate for a PSSR? Should multiple, different PSSR processes be available: e.g. mini, full?
- What are the criteria for deciding whether mini or full are appropriate?
- How are PSSR findings/action items managed?

Redesign Close-out:

- What are the requirements for close-out of an MOC?
- Do all documents have to be in final form, or are redlines sufficient for close-out?
- What metrics should be gathered or validated during close-out?
- Should field walkdowns be conducted as a QA step? If so, how are MOCs selected for this level of QA? Randomly? Risk-based?

Redesign Rules for Temporary MOCs:

- What is the default duration for a temporary MOC?
- Once the MOC has reached the Temporary Operations stage, what are the mechanisms to:
 - Restore the plant to its original condition?
 - Extend the duration of the temporary MOC?
 - Make the temporary MOC permanent?

Redesign Rules for Short MOCs:

- Should Short form MOCs be permitted?
- If so, what kinds of (common) changes qualify to be proceduralized as short MOCs?

Redesign Emergency/Urgent MOCs:

- Are emergency MOCs permitted?
- If so, is there a distinction between emergency (i.e. off-hours, with little paperwork) MOCs and urgent MOCs (i.e. off-hours, with no paperwork)?

Interaction With Action Item Management:

- How are actions that MUST be completed during an MOC managed?
- How are actions that do not have to be completed during an MOC managed (e.g. painting)?
- Is there a central repository for action items?
- Are there “too many” action items? Why?

Interaction with Long Lead-Time Items:

- What mechanisms should be in place for triggering long lead-time items, such as:
 - Development of adequate training materials?
 - Environmental permits?
 - Procurement of long lead-time items.

Redefine Resource Allocation:

- Are there sufficient resources to do all the MOCs?
- How are MOCs prioritized?

The Tools and Integration Stream

In addition to the business process optimization tasks described in the first stream, this stream aims to support the process with information technology. Again the work is divided into a number of topics for consideration.

Toolset Goals:

- Is the intent to implement a toolset that will support the MOC process for the next 10 years, or is the toolset a stop-gap measure until a longer term solution can be implemented? Most readers would wonder why one wouldn't always implement a long-term solution, but sometimes there are timing or other constraints which make it impossible.

Review Existing (i.e. currently installed) eMOC Software. Many companies already have software for doing some part of the MOC process, but the users are dissatisfied with what they presently have. It's important to critically review the capabilities or shortcomings of the present state:

- Have there been specific complaints from users? Are these showstopper issues or “nice to have” issues?
- Since MOC data constitute corporate records, does the current tool provide the ability to manage records in accordance with corporate and statutory records management requirements?
- Are electronics signatures supported?
- Are audit trails available?
- Is there invalid data in the current system? How much?
- Is the current software sufficiently flexible to handle the redesigned MOC process?
- Do people have sufficient access to the MOCs and attachments to do their job?
- Does the system restrain unauthorized people from performing tasks they are not permitted to perform?
- Is the eMOC system integrated with an Enterprise Content Management system.
- Are there technical or architectural issues that have caused problems?
- Is MOC status reporting adequate?

Review Enterprise Content Management:

- Does the company have a standard Enterprise Content Management, “ECM”, system?
- Should the eMOC attachments (e.g. updated P&ID’s) be stored in the ECM system?
- Is there a corporate requirement/mandate to store all documentation in the ECM system?
- Since MOC data constitute corporate records, does the ECM system provide the ability to manage records in accordance with corporate and statutory records management requirements?
- Are electronics signatures supported in ECM?
- Are audit trails available in ECM?
- Is the current ECM system sufficiently flexible to either handle or interface with the redesigned MOC process?
- Are there technical or architectural issues with the ECM system?

Review Candidate eMOC Applications:

- This is the evaluation activity mentioned in the Software-centric approach, but note how far down on the list of all tasks it occurs.
- Using the redesigned process and understanding of current I.T. environment, develop a plan for evaluating candidate vendor offerings.
- Prepare detailed implementation plans.

Other Tasks to Consider

The purpose of this whitepaper was to list, in a fairly detailed manner, the considerations needed to:

- redesign the MOC business process
- select suitable tools to support the new process.

Once these things are accomplished, there's still considerable work involved in implementing the new solution, but implementation will be covered in a future whitepaper.

Starting Small

It's easy to become overwhelmed by the large amount of work implied by the bullet points in the previous sections. Obviously the overall redesign work needs to be broken down into a manageable plan. A reasonable path would be as follows:

1. Conduct a “gap analysis” whose aim is simply to understand the current state, in each of the areas outlined by the aforementioned topics. Spending one hour on each Process Redesign Stream topic would be reasonable. The idea is not to “solve” any problems, or redesign the MOC process—the idea is simply to understand what work needs to be done. The Tools and Integration Stream has fewer topics, and they would require between a half and a full day to scope. At Gateway, the gap analysis is called an “eMOC Readiness Assessment™”—but that's simply a more formal label for “gap analysis”.
2. Conduct the redesign activities. The gap analysis will lead to the development of a redesign project plan. The next step is executing this plan.
3. Implementing the redesigned system. As mentioned previously, implementation shall be covered in a future whitepaper.

Abbreviations

AIChE	American Institute of Chemical Engineers
CCPS	Center for Chemical Process Safety, a service of the AIChE
DCS	Distributed Control System
eMOC	Electronic MOC
ER	Entity-Relationship
ERP	Enterprise Resource Planning
MOC	Management of Change
MSDS	Material Safety Data Sheet
OSHA	(U.S.) Occupational Safety and Health Administration
P&ID	Piping and Instrumentation Diagram
PHA	Process Hazards Analysis
PSI	Process Safety Information
PSM	Process Safety Management
SAP®	SAP is a vendor of ERP software

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