

Knowledge Sharing Workshop

Managing risk of MOC

By
Vamsi Krishna Garaga
Suryakant Prajapati

27-02-2023

Disclaimer



Any statement, opinion, prediction, comment, or observation made in this presentation/publication are those of the presenter/author only and in no condition should be construed necessarily representing the policy and intent of Reliance Industries Ltd. (RIL).

The information presented herein are of the presenter/author's own and in no way RIL attracts any liability for any inconsistency or irregularity in terms of the accuracy completeness, veracity, or truth of the content of the presentation/publication. In addition, RIL shall not be liable for any copyright infringement and misrepresentation for the presented content as the content is presumed in good faith to be a creation of presenter's/author's own mind.

The scope of this presentation/publication is strictly for knowledge sharing purposes and not necessarily to provide any advice or recommendation to the audience/readers. Any endorsement, recommendation, suggestion, or advice made by the presenter/author shall be in his personal capacity and not in professional capacity as an employee of RIL. Any person acting on such endorsement, recommendation, suggestion, or advice will himself/herself be responsible for any injury/damage.

New Reliance for a New India



Largest and most complex single site refinery at Jamnagar with 1.4 MMBPD crude refining capacity; **vertically integrated** portfolio across O2C value chain, among **lowest cost positions** and **global top 10 rankings in key products**

Jio-bp 51:49 fuel retail JV

A **global leader** and one of the **long-term winners**



Largest digital services provider in **India – 419.9 mn subscribers** (Jun'22)

1st operator¹ to **cross** 400mn subscribers in a **single country market**

Strategic investment by **Facebook & Google** and investments by **marquee financial investors** totaling to **\$20bn for ~33% stake** in Jio Platforms Limited



Largest Organized Retailer in India

208 mn registered customer base with a **diversified product portfolio** of groceries, fashion & lifestyle, consumer electronics and connectivity across **15,866 stores across 45.5 mm sq. feet** (Jun'22)

Investments from Silver Lake Partners, KKR, GA, TPG, Mubadala, GIC, PIF and ADIA totaling **~\$6bn for ~10% stake** in Reliance Retail Ventures Limited



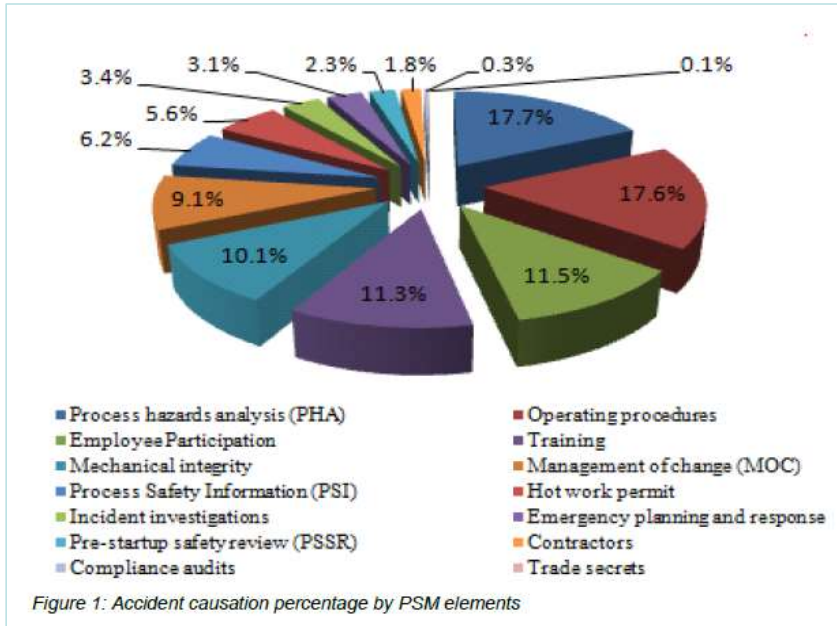
Opportunity to accelerate New Energy and New Materials businesses based on RIL's vision of clean and green development

- **Integrated Solar Photovoltaic module factory**
 - Establish and enable at least 100GW of solar energy by 2030
- **Advanced Energy Storage Battery factory**
 - Collaborate with global leaders in battery technology to achieve the highest reliability round-the-clock power availability
- **Electrolyser factory**
 - Manufacture modular electrolysers of highest efficiency and lowest capital cost
- **Fuel Cell factory**
 - Fuel cell uses oxygen from the air and hydrogen to generate electricity, emitting non-polluting water vapour

Table of Contents

- Contribution to Process Safety Incidents
- MOC and linkage to Process Safety Elements
- Replacement in Kind vs Change
- MOC & Types of MOC
- MOC – Process Flow
- MOC – Important Aspects and Examples
- Performance Indicators
- Goals
- MOC_PSSR Governance
- How could we achieve?
- Challenges

Contribution to Process Safety Incidents



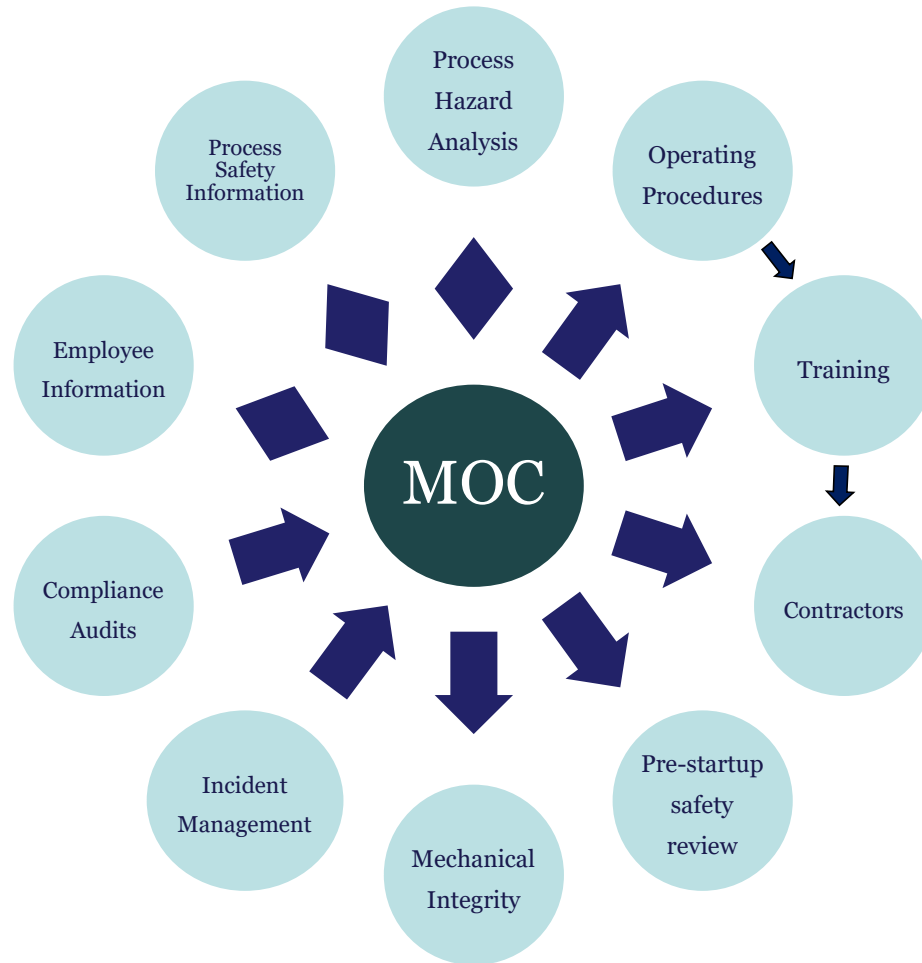
According to Chemical Engineering transactions Vol 56, 2017, MOC contributes to 9% and PSSR contributes 2% among other

← Process Safety element in PSI

Source: Chemical Engineering Transactions, Vol 56 (Journal of the Italian Association of Chemical Engineering)

“OSHA believes that one of the most important and necessary aspects of a process safety management program is appropriately managing changes to the process.”

Linkage with Process Safety Elements



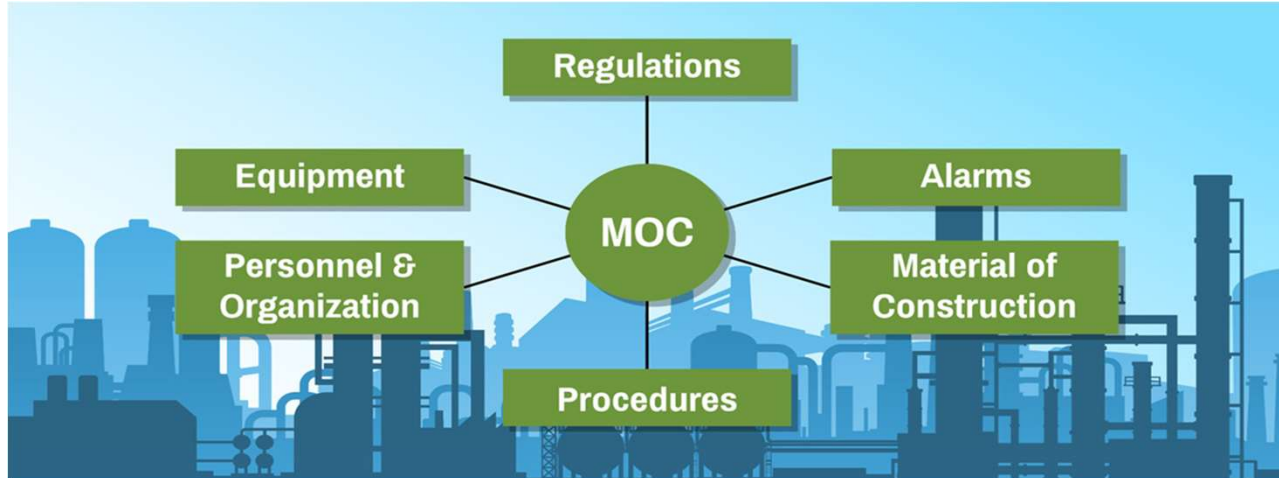
Examples of Changes those Should Be Managed or Could Increase Risk

- Process equipment changes such as materials of construction design parameters, and equipment configuration
- Process control changes such as instrumentation, controls, interlocks, and computerized systems, including logic solvers and software
- Safety system changes such as allowing process operation while certain safety systems are out of service
- Site infrastructure changes, such as fire protection, permanent and temporary buildings, roads, and service systems
- Operations and technology changes such as process conditions, process flow paths, raw materials and product specifications, introduction of new chemicals on site, and changes in packaging
- Changes in inspection, testing, and preventive maintenance, or repair requirements, such as lengthening an inspection interval or changing the lubricant type used in a compressor
- Changes in procedures, such as standard operating procedures, safe work practices, emergency procedures, administrative procedures, and maintenance and inspection procedures
- Organisational or staffing changes such as reducing the operators on shift, changing the maintenance contractor for the site, etc
- Other changes that feel like change but does not fit into the definition of Change, e.g Relocating Lab in same Building, Adding deleting emergency response rolling stock : Ambulance under maintenance)

Replacement in Kind(RIK) vs Change

Replacement in Kind : An identical replacement or any other alternative specifically provided for in the design specification, as long as the alternative does not in any way adversely affect the function or safety of the item or associated items

Change : Any modification, alteration, or adjustment to a covered process that is not a “replacement in kind”



Replacement in Kind vs Change

Replacement in Kind	Change
Repairing a corroded vessel to restore its original wall thickness	De-rating the vessel to operate at a lower pressure consistent with the decreased wall thickness
Replacing vessels or piping with equipment having the same dimensions, configuration, metallurgy, wall thickness, pressure and vacuum rating, design temperature, heat treatment, etc.	Changing from carbon steel to stainless steel Changing from Schedule 40 to Schedule 80 piping
Replacing an instrument with an identical spare	Replacing a vortex shedding flowmeter with a magnetic flowmeter
Replacing an instrument with an identical spare	Changing material of construction of diaphragm of pressure transmitter
Recharging a fixed fire protection system with the same firefighting agent previously used	Replacing a Halon system with a CO2 system
Increasing inspection frequency based on accepted engineering methods (e.g., remaining life calculations) in accordance with established facility procedures	Reducing maintenance frequency due to resource constraints

Definition: MOC is the process which enables user to manage the changes proposed through other business processes (like, PHA, Audit, LFI, MI, compliance management etc.) safely.

Why do we need a formal process -

- Process changes potentially invalidate prior risk assessments
- Process changes may introduce new hazards
- All changes which are not replacement in kind must be reviewed, risk is assessed & authorized prior to implementing

Why is it important ?

A review of incidents across industry indicates that ineffective management of “Change” process can lead to failure due to:

- “Change” management focusing only on the expected benefits without properly considering the possible disadvantages;
- Focusing on technical “Change” rather than all types of “Change” e.g., organizational, materials and legal and regulatory requirements;
- Failure to communicate “Changes” to the people affected by the “Change”; and
- Failure to update or revise key documents such as operating/maintenance procedures

Types of MOCs

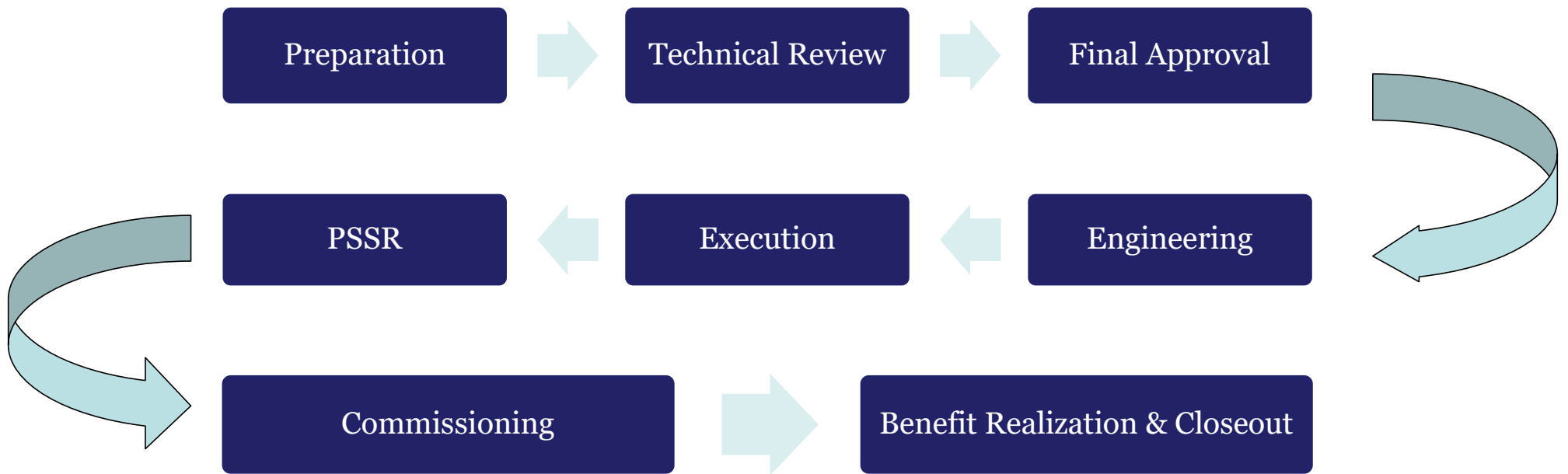
- MoC – Personnel : Changes to People
- MoC – Process : Changes to Plant
- MoC – Subtle : Changes to Procedures/Policy



MoC – Process Types:

- Permanent MoC : Changes which are permanent in nature
- Temporary MoC : Typically part of a test, optimization trial etc (Changes of “Temporary” nature will have a maximum validity of 180 days from Date of Implementation)
- Emergency MoC : Any change is precipitated by an un-forecast or sudden event and Implementation of the emergency Change is necessary to ensure safe shutdown or operation until permanent repairs are made.(Duration of emergency change is 48 Hrs.)

MOC Process Flow



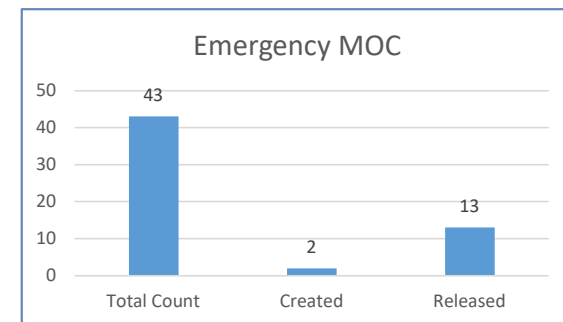
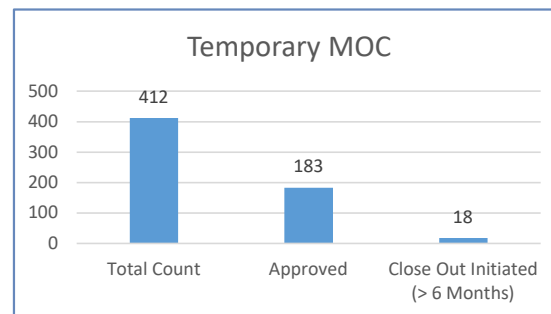
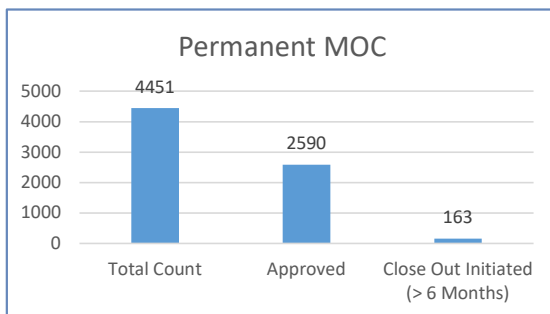
MOC – Important aspects during different stage of MOC

“Change” proposals shall be methodically evaluated. It is important that any departures from original “design intent” are recognized and the associated HSSE & Operational risks are identified, suitably evaluated, mitigated and appropriately approved.

- The potential impacts arising from the proposed “Change” shall be evaluated.
- “Change” shall be revisited if a considerable period of time (more than a year) has elapsed between the time of Risk Assessment for the potential impact of change and the execution of the change
- Legal impacts shall be studied
- Change to be evaluated using a risk assessment involving both relevant subject matter experts and representatives of those impacted by the Change.
- A hazard identification and risk assessment for operation (implementation) of the Change is performed when complete, e.g., revised procedures, drawings, training, competency assessment
- A hazard identification and risk assessment (HITRA) for the execution stage is performed
- Human factors aspects of any Change are identified and addressed
- During each stage of the MOC process, one option that shall always be considered is ‘No Change’
- Available options for achieving the desired Change should be explored (wherever applicable/possible) at an early stage and should not be dependent on one single option, including evaluation of associated HSSE hazards and risks.

Management of Change

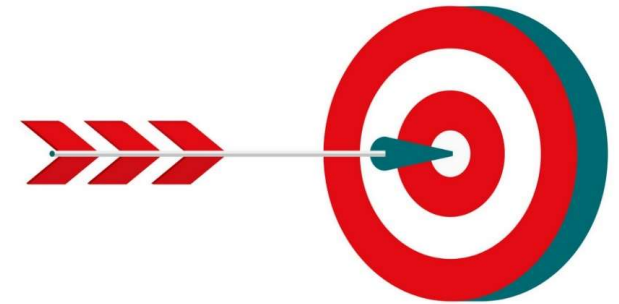
- No of incidents due to MOC failure
- MOC close out period – 6 month after commissioning for all MOC.
- Emergency MOC time duration – Regularization within 48 hrs. after implementation of change”
- Temporary MOC duration –6 month after implementation.
- PSSR Category-B punch points - 60 days after recommendation
- No of changes implemented without formal MOC process



Note: Numbers shown in above graphs are for illustrative purpose only

Goals

- Reduce the number of MOC related incidents and Process Safety audit findings
- Expand MOC into the process/project life cycle and nontraditional types of changes
- Monitor MOC performance at sites from remote location, in real time and cost-effective way
- Quickly diagnose MOC problems without having to perform or wait for audit
- Make MOC systems more fault tolerant and resistant to circumvention or human error
- Monitor MOC performance and efficiency in a practical way
- Achieve better MOC results with fewer resources, if possible



MOC_PSSR Governance

- Network Steering Committee
- Meeting Frequency: Quarterly
- Typical Agenda:
 - Safety Contact (Incident where MOC failure led to event)
 - Leadership Expectations
 - MOC_PSSR KPI (Areas of concern and areas where progress is visible)
 - Site updates (Observations during quality reviews, self-verification, assurance and audits)
 - Sharing of best practices by sites
 - High Value Learnings (External LFIs)
 - Improvements in current quarter and planning for next quarter
 - Update on open points during last NST

How could we achieve?

- **MOC:**
 - Alignment on requirement of MOC (RIK vs Change)
 - IT enablement and resolution of pain points
 - Inclusion of IT as NST member
 - Provision of comments feature to ensure relevant stakeholders comments are captured
 - Introduction of WBS system
 - MOC procedure alignment across all sites, checklists were updated (Pre-PHA, Project Manager, Closeout)
- **PSSR:**
 - Migration from hard copy to tool
 - Procedure alignment and standardization of checklists
 - Enhancements in tool (Standard checklists, improved UI, dashboard, technology upgradation)
- **Common:**
 - Integration of MOC with PSSR
 - MOC ON-HOLD process roll out
 - Sharing of Best Practices and incidents with MOC failure as root cause of event
 - NST Meetings organized as per predefined frequency. Members ensured functioning of sub-committees at site

- Scope for improvement in Sense of Vulnerability
- Detailed information related to MOC not provided in some cases
- Quality of Pre-PHA in some cases is not satisfactory
- Involvement of experienced and relevant personnel during review and PHA
- Delay in closeout of the MOC post implementation
- Scope for improvement in communicating the details of change to the affected people

A malfunctioning MOC program = Increased Risk

Thank You