

Management of Change (MOC)

Critical Success Factors

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OVERVIEW

- Management of Change (MOC) is recognized as an essential part of Process Safety Management (PSM) Program
- Implementation approach varies from site to site
- Perception of how effectively MOC is implemented is corrected by incident investigation analysis and audits findings
- How can effectiveness of MOC be enhanced and ensured?
- What are the critical success factors for MOC?



INCIDENTS WITH MOC LINK

YEAR	PLACE	CHEMICAL / INCIDENT	FATALITY	LINK
1974	Flixborough, UK	Cyclohexane	29 dead	A plant modification occurred
1976	Dow chemical factory, King's Lynn.	Zoalene	1 dead	Process was changed to incorporate the drying stage
1984	Bhopal, India	Methyl Isocyanate	2000+ dead	Identification of Safety Critical elements
1986	Chernobyl, USSR	Radiation	31 dead	Test to determine how long turbines would spin
1988	Piper Alpha	Gas Rupture Explosion	165 dead	Diesel fire water pumps start in manual mode
1989	Phillips, TX	Isobutane/Ethylene	24 dead	No double block system
1991	Channelview, TX	Waste Water Tank Explosion	17 dead	No MOC for conversion to spent acid
1998	Longford, Australia	Explosion	2 dead, 8 injured	MOC HAZOP reviews
2005	Texas City, TX	Explosion	14 dead, 80 injured	Temporary facilities
2005	Buncefield, UK	Explosion		Independent high-level switch. Use of padlock not clear
2013	Williams Geismar Olefins Plant	Explosion	2 dead, 167 injured	Checklist based MOC review

MANAGEMENT OF CHANGE – CRITICAL SUCCESS FACTORS

SCOPE OF CHANGE

1. SCOPE OF MANAGEMENT OF CHANGE – WHAT TO INCLUDE?

Conventional

- Chemicals/materials used in process, catalyst, inhibitors etc.
- Technology
- Equipment modifications
- Materials of construction change
- Procedures; operations, maintenance
- Operating beyond safe upper and lower limits
- Process Control and Emergency Shutdown
- Emergency response plan, equipment and organization

1. SCOPE OF MANAGEMENT OF CHANGE – WHAT TO INCLUDE?...CONTD.

Industry Practices

- Plant capacity
- Deviations from design standards
- Organization structure & personnel changes
- SHE Critical equipment, instrument, devices and system list
- Carseal and blinds list
- Process/raw material chemical suppliers (RIK)
- Equipment supplier changes (RIK)
- Instrumentation; orifice plate, flowmeter size, control valve (trim, body, actuator), design and installation
- Modifications to safety valve, rupture disk, thermal RV etc
- Re-routing of piping with no impact on P&ID

MANAGEMENT OF CHANGE – CRITICAL SUCCESS FACTORS

RECOGNITION OF CHANGE

2. RECOGNITION OF CHANGE

Industry Practices

- Develop RIK & Non RIK Example
 - Brainstorming by functional groups
 - Document examples of RIK & Non RIK Changes
 - Keep list evergreen and part of MOC system
 - Use document as training/awareness tool
- Include change recognition as part of initial training
- Online tests to ensure employee understanding and awareness
- Quiz, tool box, bulletins to highlight importance
- Process Safety Audits focus on changes that bypassed MOC
- Clear management process defined when in employee in doubt

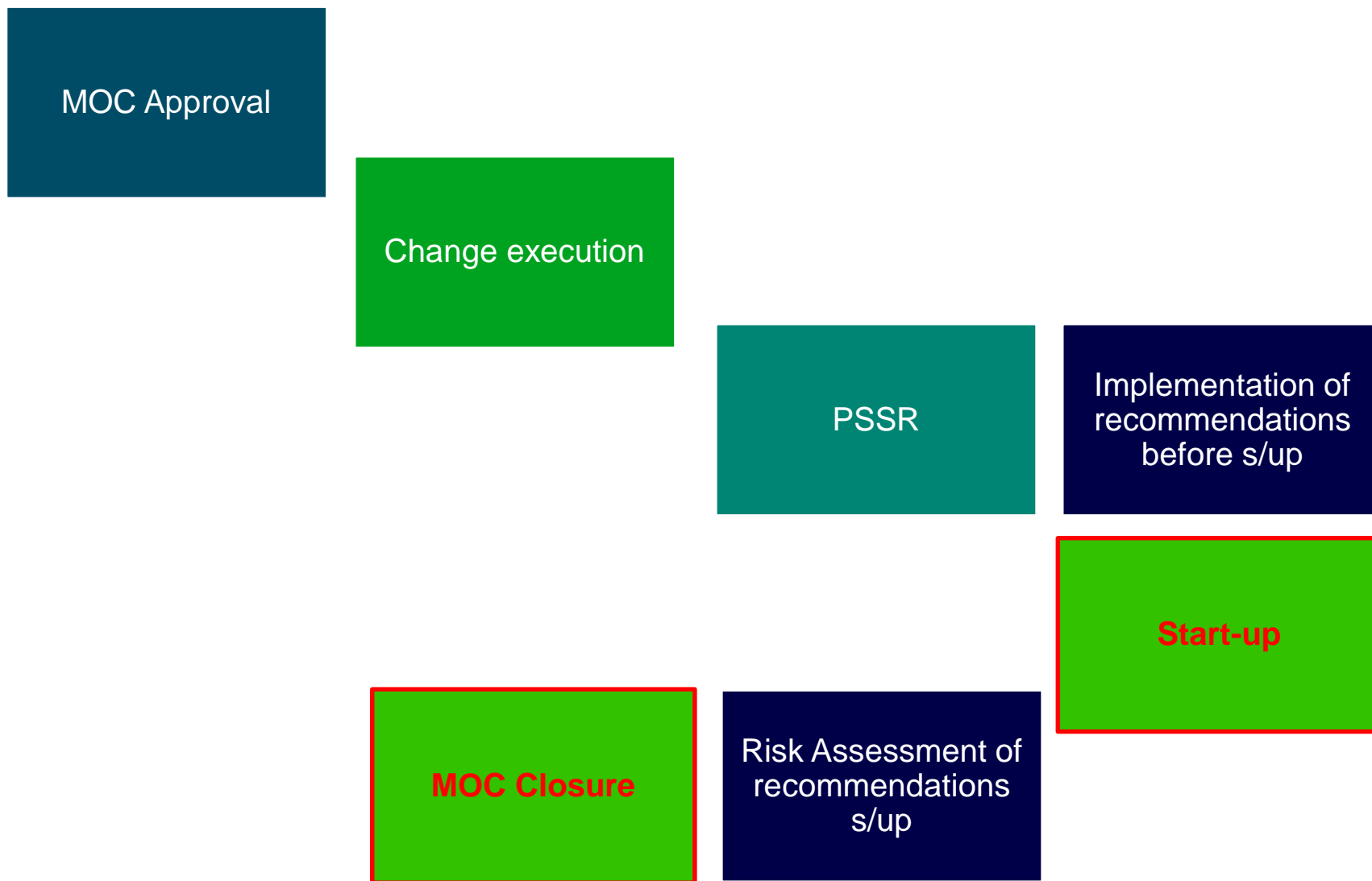
MANAGEMENT OF CHANGE – CRITICAL SUCCESS FACTORS

CHANGE WORKFLOW

3. CHANGE WORKFLOW – INITIATION TO CLOSURE



3. CHANGE WORKFLOW – INITIATION TO CLOSURE....CONTD.



3. REVIEW APPROACH ?....CONTD.

Industry Practices

- Multiple discipline review stages; Process, Project, Instrumentation & Electrical
- Concept Approval by Operation Dept. Meeting

MANAGEMENT OF CHANGE – CRITICAL SUCCESS FACTORS

REVIEW & APPROVAL

4. WHO REVIEWS & APPROVES CHANGE ?

Conventional

- Fixed members (Operations, Process Engineering, SHE Section, Maintenance & Project Engineering)
- Fixed/Variable members dependent on type of change
- Members dependent on level of risk

Industry Practices

- Chairman/Chairmen assigned by Senior Management.
 - MOC fixed members and assigned by name, empowerment to cancel
 - Synergy thru meeting preferred approach. Non-meeting (circulation) approval by exception
 - Guidelines for MOC selection addressed in procedures
 - Process Safety part of review team
 - Employee participation
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MANAGEMENT OF CHANGE – CRITICAL SUCCESS FACTORS

ROLE OF MOC COMMITTEE

5. ROLE OF MOC COMMITTEE

Conventional

- Plant/Process Design
- SHE Impact, Risk Assessment and Mitigation
- SHE Impact, Risks evaluation and mitigation
- SHE Documentation Impact Matrix
- PHA/PSSR need Assessment/Methodology

Industry Practices

- Ensuring leadership in review process
 - Process to determine of current level of risk will increase
 - Implementation strategy and concerns (Online modifications)
 - Screening to ensure PHA if required is triggered
 - No deviations to engineering standards
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MANAGEMENT OF CHANGE – CRITICAL SUCCESS FACTORS

MONITORING QUALITY

6. MONITORING THE MOC QUALITY

Conventional

- A paper filling exercise
- KPIs
- Compliance Audits

Industry Practices

- Routing MOCs through site Element Administrator
- Quality based audits
- Element Administrator & Sponsor

KEY PERFORMANCE INDICATORS (KPIs)

Leading

- % MOC completed in accordance with procedure
- Recognition of change activities by each dept. in accordance with management system
- % change rejected by MOC Committee

Lagging

- Percentage of changes using MOC
 - Number of incidents with root/contributory causes related to MOC
 - Deviations from approved design as identified by PSSR
 - Number of temporary changes with expired approval
 - Percentage of successful start-ups following plant changes
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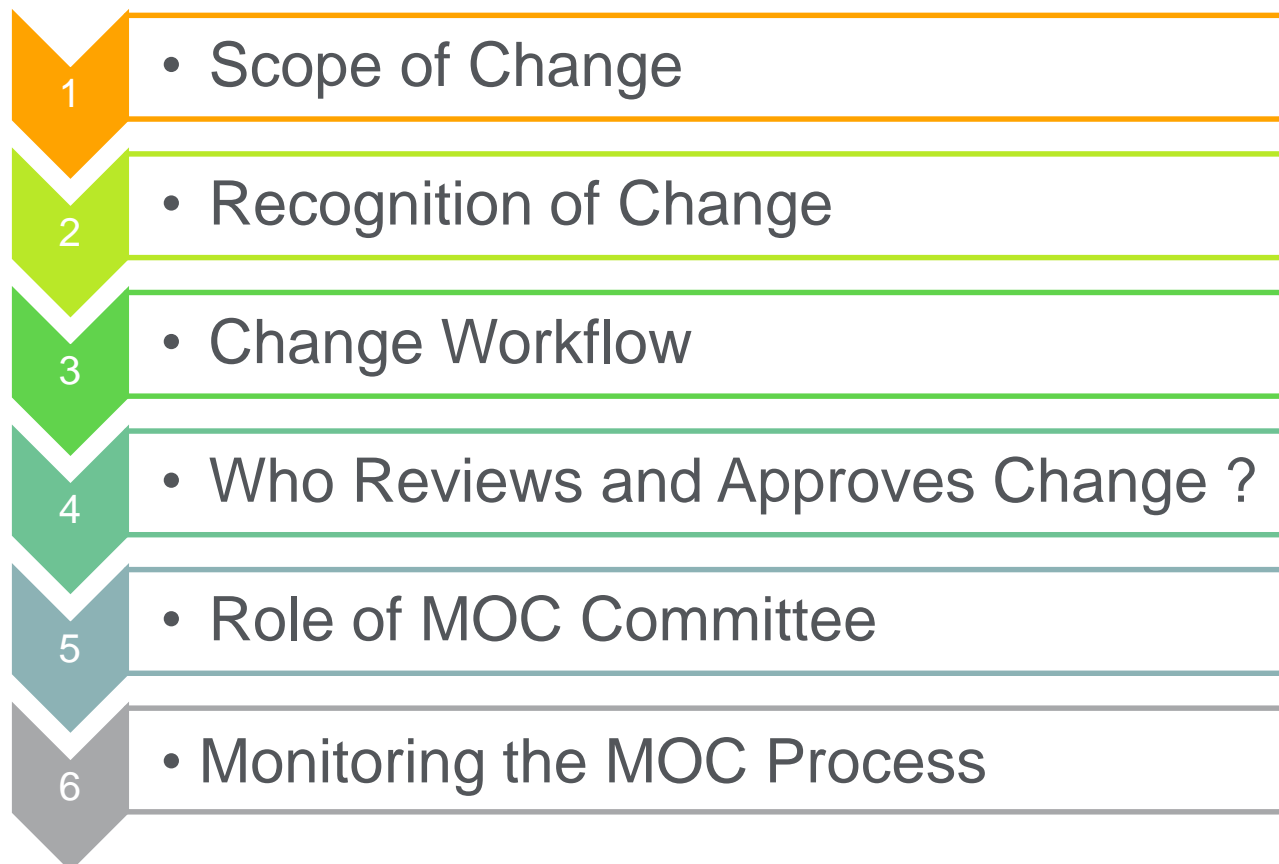
MANAGEMENT OF CHANGE – CRITICAL SUCCESS FACTORS

CATASTROPHIC INCIDENT WARNING SIGNS

MOC WARNING SIGNS

1. MOC is a formality that must be completed
2. MOC is used for major changes only
3. MOC is not triggered
4. Organizational changes not subjected to MOC
5. MOC Review Committee lacks technical depth
6. Failure to recognize operational deviations and initiate MOC
7. Original facility design used for current modifications
8. Instruments bypassed without MOC
9. Weak Process Hazard Analysis (PHA) practices
10. Poor PHA action item and follow-up

SUMMARY OF CRITICAL SUCCESS FACTORS FOR MOC



CONCLUSION

- Your MOC system is only as strong as its weakest link
- Effective design and implementation of MOC system with consideration to critical success factors will ensure high performance and reliability

It is not the strongest of species that survive, nor the most intelligent, but the one most responsive to change

Charles Darwin

Thank You