



GUIDANCE NOTES ON

MANAGEMENT OF CHANGE FOR THE MARINE AND OFFSHORE INDUSTRIES

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Foreword

Change is inevitable within any type of business. It arises from the need to respond and adapt to varying conditions. Modifications may be required to the equipment, operational policies, and organizational structure or personnel. Whenever a change is made, the potential consequences of that change should be assessed before implementation. History has illustrated the potential negative consequences associated with uncontrolled change.

If a change is technically inappropriate, poorly executed, its risks poorly understood, or management fails to ensure communication to key personnel, accidents or other undesired consequences can result. Thus, a formal and effective management of change program plays a critical role in preventing accidents and losses. A management of change program is one of the most challenging aspects of a safety management system to implement successfully. It requires organizational support, assignment of necessary resources, and a clear, defined process. ABS offers these Guidance Notes to the maritime and offshore industries as a tool to aid in the development and implementation of an effective management of change strategy to optimize existing safety and risk management efforts.

These Guidance Notes become effective on the first day of the month of publication.

Users are advised to check periodically on the ABS website www.eagle.org to verify that this version of these Guidance Notes is the most current.

We welcome your feedback. Comments or suggestions can be sent electronically by email to rsd@eagle.org.

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SECTION 1 Introduction

1 General

A Management of Change (MoC) system is a combination of policies and procedures used to evaluate the potential impacts of a proposed change so that it does not result in unacceptable risks. Developing an effective MoC strategy requires establishing, documenting, and successfully implementing formal policies to evaluate and manage both temporary and permanent modifications in the facility or ship including equipment, materials, operating procedures and conditions, and personnel.

These Guidance Notes highlight key considerations for developing and maintaining a successful MoC process for ships and offshore facilities. The process is consistent with safety and environmental management systems (SEMS) best practices.

These Guidance Notes explain the core principles to be considered and describe key functions and interrelationships for consideration at various levels of a representative organization. Supplemented by models and examples to be used in planning and developing an effective MoC system, these Guidance Notes are intended to educate and assist management representatives and personnel responsible for initiating and coordinating changes.

Successful organizations are dynamic and constantly undergoing change in striving for innovative and cost effective solutions to achieve sustainability in a robust and competitive business environment. A disciplined management of change system will not only minimize significant impacts on safety and the environment, but will incorporate strategies in managing the associated business risks on quality, continued commerce, and security.

3 Why Manage Change?

History has many examples of inadequately managed changes that resulted in catastrophic accidents. A well-documented MoC program can be used to demonstrate an organization's commitment toward due diligence in risk mitigation efforts.

There are characteristics relative to the nature of marine or offshore operations which convey heightened importance on the implementation of an effective MoC program. For example, the limited space for emergency spares means that many emergency repairs carried out at sea are to remain until appropriate spares can be procured. Similarly, limited crew, crew fatigue, and crew turnaround can lead to the implementation of changes whose associated impacts are not thoroughly understood.

Risk management strategies and strong administration form the basis of an effective MoC program. An ability to sufficiently analyze and understand the effects and consequent risk associated with the impact of a proposed change will provide the organization with vital insight in deciding upon and concluding change.

Designing safety into the MoC program can effectively decrease the occurrence of undesirable change-induced incidents. Studies into the causes of incidents reveal that severe injury accidents occur at a disproportional rate during unusual and non-routine work activities. The establishment of policies to manage equipment, operational and organizational deviations from the existing condition will improve safety, promote environmental compliance, safeguard property, and preserve business reputation.

SECTION 2 Recognition of a Change

1 Program Scope

A system that requires change management to be carried out for every single modification is likely to become onerous and circumvented. For this reason, it is important to pay special attention to the activities and systems for which the MoC program will be implemented, the life-cycle applicability of the MoC, the type of changes to be evaluated, and boundaries and overlaps with other administrative programs or elements.

1.1 Activities and Systems within the MoC Program Scope

An MoC program can include the whole enterprise, or alternatively, have a physical scope limited to certain systems or activities. The reasons for limiting the scope on the program can stem from the desire to enhance the effectiveness of the program, or the fact that the program was born to help deal with problems in a specific area, or to support a regulatory compliance effort.

The criticality of a system or activity can be used as a parameter for determining whether or not a system should be part of the MoC program scope. The premise is that impacts associated with a critical system change are likely to be of serious consequences, thus managing through an MoC program could make a significant and positive difference.

The systems and activities that may be considered critical in a marine environment because of their potential health, safety and environmental impacts, will depend heavily on the type of ship or offshore facility, the operations carried out, and the hazardous materials/cargo handled. Section 2, Table 1 shows typical examples of systems and high level activities which may be considered critical. Note that each activity involves numerous types of subtasks, all of which should be governed by an MoC program. For example, construction activities in the offshore industry include initial construction, onsite construction, repairs, modifications, pipe laying operations, sand blasting and painting, welding, crane operations, electrical equipment modification, facility decommissioning, etc.

TABLE 1
Critical Activities/Systems Typically Governed by an MoC Program

<i>Offshore</i>	<i>Marine</i>
• Drilling • Production • Processing • Construction • Well Services (workover, completion, servicing) • Pipelines	• Propulsion • Steering • Navigation • Cargo (containment, handling and monitoring) • Structure (repair, modification, sand blasting, welding, hoisting/lifting, electrical, etc.)
<i>Common to Offshore and Marine</i>	
• Emergency systems (fire protection, gas detection, life saving, life support) • Ballast control • Communications • Hazardous areas • Security • Supervisory control systems (computer programs) • Fuel gas • Utilities	

Note that although criticality of systems is used as criteria for a limited-scope MoC program, changes in non-critical systems can also present significant impacts, thus greatly justifying the need and benefits of more comprehensive MoC programs.

Scope of MoC Program – Contracted Equipment and Personnel

In offshore activities, reliance on specialized contracted operators presents some unique challenges. For example, an offshore lease-holder company field utilizes mobile offshore drilling units, owned and operated by a drilling contractor, for drilling, construction, well servicing, etc. These activities can present significant health, safety, and environmental impacts. All parties involved are likely to have some degree of liability if an accident occurs during these activities. The lease-holder company shall require an MoC program for these critical activities, even when carried out by contractors. The contractors may have their own MoC program to manage changes, but the lease-holder must be satisfied that is in line with the lease-holder's goals from such a program and that it is functioning adequately.

1.3 Life-Cycle Phases

The MoC process is applicable throughout the life-cycle of a ship or offshore facility, but it may be distinctively applied at each stage. When developing an MoC program, one important aspect to define is the life-cycle stages for which it will be required.

A typical breakdown of the life-cycle of a ship or offshore facility would include the following stages:

- Design
- Construction
- Start-up
- Operation (including inspection and maintenance)
- Dry-dock or extended shutdown
- Decommissioning

The techniques used to evaluate the change, the people available for review and approval, the time frames for reviewing and implementing the change, etc., will differ between stages. During a facility design stage, there are many changes, but there will be fewer records to update than if the change occurred at an operating stage of the facility. When evaluating changes at a design stage, the impact or risk assessment techniques, which are a strong function of the available information, may be different than for more mature life-cycle stages. Tools such as software simulations, quantitative risk analysis, etc., prove invaluable at the early stages, even though they are more effort and resource intensive.

At operating stages, the changes will require a larger amount of information to be reviewed and updated such as drawings, maintenance and inspection plans, training programs, emergency plans, etc. In older operating ships or offshore facilities, the access of information may involve old paper records instead of completely electronic documentation.

Towards the end of life, the change management may be simplified. It may involve fewer closeout tasks, fewer updates of associated documentation, less rigorous sign-off procedures, limited or no training needed as a result of the changes, etc. There will be a decommissioning plan, where the impacts of all the activities planned have been carefully analyzed and mitigated against. The definition of the types of changes to be managed may then become “deviations from the decommissioning plan”.

1.5 Types of Changes

Most changes controlled by an MoC program fall into one of the following categories: equipment, operational or organizational changes.

1.5.1 Equipment

This category addresses equipment or technological changes. Examples of equipment changes may include:

- New equipment
- Replacement or modification of equipment (equipment, ship components, infrastructure including emergency replacements when out at sea)
- Replacement or modification of computer hardware
- Modification to software (logic, interlocks, controls, alarms, instrumentation)
- Bypasses around equipment that is normally in service
- Disabling of safety/critical systems for testing, calibration or repair/replacement, if not covered by procedure
- Modification or removal of safety equipment (fire-fighting equipment, first aid equipment, escape and evacuation, personal protective equipment, etc.)
- Changes to structural support, layout, or configuration
- New maintenance chemicals
- New/changed solid/liquid/gas effluents (e.g., produced fluids, waste products, by-products)
- Change to the utilization of an equipment
- Changes resulting from recommendations originated from non-conformances, root-cause analysis, hazard identification studies, etc.
- Contracted equipment and facilities (e.g., drydocks, repair facilities, contracted drilling equipment for offshore, etc.)

Marine-specific examples include the acquisition of a new ship into a fleet – it could be a sister ship or a completely new type of ship. Offshore-specific examples include new production or process facilities, newly acquired facilities, new fluids used (e.g., process additives, drilling muds, workover completion fluids, pipeline utilization change).

1.5.2 Operational

Changes in administrative controls or management system that define the way processes are conducted throughout the organization. Examples of operational changes include

- Deviation from preventive maintenance or mechanical integrity programs
- Deviation from inspection program or testing frequency
- Deviation from testing methods
- Deviation from operational procedures and safe work practices
- Deviation from repair requirements
- A response to external circumstances that is not defined in standard procedures
- Change to a controlled document
- Implementation of new procedures
- Operations outside current operation procedures and parameters

Marine-specific operational changes include change in trading patterns, new routes or ports, change of ship type (e.g., multi-purpose vessels (when changing between modes)), change in cargo (different specs or new cargo type (e.g., food/fuel)). Offshore-specific operational changes may include changes with personnel transfer to and from the offshore facility such as different or larger aircraft or vessel or other logistics change, deviations from well construction/execution plan, deviations from a simultaneous operations (SIMOPS) plan, etc.

1.5.3 Organizational

This category includes personnel and staffing modifications, such as changes to crew, personnel, management structure, shift manning, company-wide policies, regulations, etc. Changes such as realignment of organizational resources resulting from acquisitions, mergers, new joint ventures and alliances should be evaluated to provide consistency with health, safety, quality, and environmental (HSQE) objectives and to minimize adverse effects on the enterprise risk. When organizational changes take place (changes in reporting relationships, elimination of positions, restructuring, etc.), a change control is needed to verify that the reassignment of responsibilities is clearly evaluated and explicitly documented. More examples of organizational changes may include:

- Changes to onboard management
- Crew turnover/crew change-out by a predetermined percentage
- New crew on board (e.g., different reporting requirements)
- New contractors (e.g., repair crews, crewing agencies, dry docks, repair facilities, etc. For offshore, the list can be extensive: well services, drilling contractors, crew transportation, etc.).
- Transfer of Class
- New and forthcoming regulations
- Acquisitions, mergers, new joint ventures and alliances
- Elimination of positions or restructuring
- Change of key shore-based staff supporting the ship or offshore facility
- Flag change or new flag into fleet
- Crew new to company or new full crew nationality

There may be changes that overlap one or more categories (for example, a major technological change may necessitate modifications to equipment, operations and organization). These categories illustrate to the developers and users of the management system what may constitute a change. However, the MoC process set forth in these Guidance Notes is the same regardless of the type of change.

1.7 Changes not Subjected to the MoC Program

Addressing all types of modifications with the MoC program will undeniably reduce the overall effectiveness of the system without adding significant risk reduction. Types of changes typically not governed by the MoC program include the following:

- Replacement in kind
- Changes that the company chooses to control via other management process such as:
 - Routine personnel changes (crew rotation, shift or tour changes) controlled by operating procedures, safe work practices, training, etc.
 - Routine in-service changes where the operating procedures provide appropriate guidelines for the change, and the operating procedures have been adequately reviewed prior to becoming effective
- Domestic activities (janitorial, food, beverage, laundry, housekeeping, etc.)
- Other types of changes as defined by the company

Replacement-in-kind and changes controlled via other management processes are described in more detail in the following Subparagraphs.

1.7.1 Replacement-in-Kind

A replacement-in-kind is a change wherein an item, process, or person meets the specified criteria for the item it is replacing, if such criteria exist. This may take the form of an identical replacement, or an alternative that is specifically designed within specifications criteria and therefore will not adversely affect the function of the system.

An MoC program should disregard changes that constitute a replacement-in-kind and focus on evaluating proposed temporary or permanent changes that are outside of the existing specified criteria.

It is true that even a replacement obtained from the same manufacturer may have small differences from the original item it is replacing. The manufacturer may have utilized upgraded machinery, employed slightly different materials of construction, or may have stored the equipment at different environmental conditions. However, these physical changes may be considered minor component modifications that fall within the tolerable range of existing documented specifications. The limited risk of replacement-in-kind can be controlled outside the MoC program using other tools such as purchase requisition processes, checklists, safe work practices, etc.

1.7.2 Change Control via Other Administrative Systems

MoC is only one system among many management system practices normally in place within an organization. A shipping or offshore company will likely have comprehensive administrative systems to manage designated issues such as procurement, crew staffing, project management and job risk assessment, just to name a few.

An organization may opt to employ these administrative systems to control certain types of ordinary changes without the need of the MoC program. This point can be illustrated by looking at project management during design and construction. One of the best methods of preventing and controlling occupational injuries, illnesses, and fatalities is to “design out” potential risks early in the design process. During preliminary design stages, changes are constantly taking place as more detailed information is presented and the technical blueprint matures. It is impractical to consider implementing an MoC for every change or option contemplated by design (and sometimes construction) teams. Nonetheless, a control mechanism for change management should be effectively incorporated into project management so that changes are monitored through to completion to minimize the potential risk of failure in project objectives, and in turn, improve safety through design.

Careful consideration should be taken in aligning the MoC process with or developing it in conjunction with existing company policies and regulatory requirements. An organization may choose to control certain changes outside of the MoC program by employing their uniquely customized strategy for controlling the risk of the change. Activities whose changes are to be controlled under other administrative programs should be documented as clear exceptions to the MoC program.

Interfaces with other safety management processes should also be outlined in the MoC program. The MoC program will most likely receive inputs from and provide outputs to other business areas. For instance, proposed changes involving equipment replacements are likely to request, as well as provide, equipment specifications data to the procurement department. Similarly, the review of a proposed personnel change onboard, will need data on competencies, education, training, and experience on the personnel involved in the change from human resources and staffing. The interrelationship of core activities and policies should be well defined and understood to avoid duplication of effort, or omission of important activities. Early consultation with personnel responsible for comparable management processes currently in place in the organization is key to promoting efficiency in the MoC program design.

Controlling Changes Outside the MoC Program – Sometimes It Makes Sense

A new sailing route is a common type of change for a ship. Before sailing on a new route, there are many issues that need to be evaluated to determine their significance and what actions may be required to deal with them:

- *Navigation (up-to-date charts and navigational aids)*
- *Tides and weather*
- *Pilots*
- *Security (up-to-date information on war/piracy activity)*
- *Additional traffic*
- *Crew familiarity*
- *Under-keel clearance*
- *Communication*
- *Sovereignty*
- *Duration (water, fuel, provisions),*
- *etc.*

The evaluation of these issues is standard duty for the navigating officer (usually the second mate) responsible for defining the voyage. The navigating officer is likely to use a checklist for navigational plan changes, as well as discuss the planned voyage with the master who would sign off on it. This is normal and routine practice and the subject of extensive professional training and judgment. Subjecting this evaluation to new requirements using the MoC system will likely be unnecessary, and add extra burden to personnel at the bridge. Route changes are thus, a good example of a change that most marine companies would choose to control using processes outside the MoC program.

3 Recognition of a Change

All employees should have the liberty to suggest modifications that they believe will have a positive impact on their workplace. The MoC process is initiated when someone, anyone, either identifies the need for change, or recognizes that a change situation is developing.

The first consideration after recognizing a potential change is deciding whether or not the change is a replacement-in-kind. When there are no specifications or guidelines available, it is up to the judgment of those involved in the change to decide if it is an in-kind replacement. There are three questions that should assist in this decision.

- i) Does the change involve identical specifications?
- ii) Does the change involve identical service parameters?
- iii) Is it a routine replacement?

A positive answer to ALL three questions usually confirms an in-kind replacement. The considerations on how the change affects the factors mentioned in Section 2, Table 2 can also aid in the determination of whether a change is in-kind or not.

TABLE 2
Factors for In-Kind Determination

<i>Specifications</i> Physical, mechanical, electrical, or chemical specifications	Considerations should include materials of construction, measurements, grade weight, strength, tests, performance, maintenance chemicals, etc. A change in vendor or manufacturer for the item should trigger a management of change process which involves procurement as well as the responsible technical personnel.
<i>Service</i> Operating conditions/range	Service temperature, service pressures, fluids to which replacement item is exposed , if exposed to atmospheric conditions, etc.
<i>Routine</i> Replacement is due to item being at the end of its usable life	Replacement at the end of the item's usable life. If the replacement is an upgrade, then it should be treated as a change. Routine replacements that are occurring more frequently than anticipated could indicate a persistent problem with the item. In such cases, an investigation should take place to determine if an underlying change condition may have developed and be the cause of the failures.

When attempting to evaluate 'non-physical' modifications such as those to personnel, organizational structure, reporting, and procedures, it is considered best practice to employ the assistance of competency and training matrices in deciding if the adjustment may present a risk to current operations and be considered a 'change' in the work environment. These matrices would include factors such as competencies, length of service, experience in industry, training with similar systems/equipment, etc. Any specifications such as existing policies, processes and procedures, organizational charts, etc., should be considered in deciding if a proposed organizational change constitutes a replacement-in-kind.

If doubt persists regarding whether a change is in-kind, the conservative and safe approach is to proceed with the MoC process, or consult with the company's MoC coordinator who can help with the determination.

Section 2, Table 3 provides typical examples of change scenarios that can be encountered in the marine and offshore industries and reasoning to assist the decision of whether or not they are to be controlled by the MoC program.

TABLE 3
MoC Decision Checklist for Typical Marine and Offshore Changes

<i>Change</i>	<i>If the Answer to Any Question is "No", Change is to be Controlled by the MoC System</i>	<i>Yes</i>	<i>No</i>
Ship/Facility Mode	- Is the new mode of operation equivalent to a previous mode of operation that was managed successfully? - Is the present crew familiar with this mode of operation? - Have all shore and shore-interface modifications for the new mode of operation been carried out before? - Does mode change require modification to procedures and manuals?	☐ ☐ ☐ ☐ 	☐ ☐ ☐ ☐
New equipment or software	- Does the new equipment have same performance, functional, material, maintenance, control systems and dimensional specifications as old equipment? - Are the existing procedures applicable to this new equipment?	☐ ☐ 	☐ ☐
New hazardous cargoes/ hydrocarbon/chemical	Does new cargo/hydrocarbon/chemical have similar properties to previous in terms of: - Fire and explosion - Toxicity - Corrosiveness - Reactivity - Spill response - Physical properties (boiling and freezing points, thermal expansion, decomposition, vapor pressure) - Chemical compatibilities with other cargoes/materials handled?	☐ ☐ ☐ ☐ ☐ ☐ ☐ 	☐ ☐ ☐ ☐ ☐ ☐ ☐
Handling new cargoes/material	- Are existing equipment and crew skills adequate for safe handling, loading or unloading of the new cargo/material? - Are procedures for handling new cargoes/materials available?	☐ ☐ 	☐ ☐
Personnel	- Does the new candidate meet the competencies, training, education, and experience requirements for the position? - For organizational changes ashore (eliminating positions, restructuring, etc.), do reporting relationships, job responsibilities, work load, etc., remain unchanged?	☐ ☐ 	☐ ☐
Contractors	Changes to contractors working in areas or activities so designated by company or regulation, should be subject to MoCs, unless the contractor change is a "replacement-in-kind". A positive answer to all the questions below is a good indication of replacement-in-kind. - Have contractors worked with company before? - Are contractors familiar with company regulations and personnel? - Have contractors worked with this type of ship/facility before? - Have contractors worked with this type of equipment before? - Have contractors worked in this location before? - Have contractors been qualified (competency, financial, insurance, billing) by the company before? - Will there be company resources to properly monitor and supervise the quality of the work and the safety of the contracted personnel?	☐ ☐ ☐ ☐ ☐ ☐ ☐ 	☐ ☐ ☐ ☐ ☐ ☐ ☐
Corrective Action Requests/ Hazard Analysis Recommendations	Changes initiated as a result of a non-conformance, corrective action, incident investigation, hazard analysis, etc., can have the potential to affect onboard and shore operations and as such should be evaluated via the MoC system. - Is the change a replacement in kind? - Is the type of change exempt from the company's MoC program?	☐ ☐ 	☐ ☐
New regulations, procedures, standards, registry	The preliminary impact analysis may take the form of a gap analysis to identify the new requirements proposed and how the new requirements change the current ways. This type of change almost always requires an MoC to comprehensively identify potential impacts and develop an implementation plan.	MoC almost always required.	

SECTION 3 Management of Change Process

1 Terminology

Approver. A member of management or senior officer who reviews the initial change form to confirm the need for change and validate the preliminary impact assessment and the implementation plan. If the change has major impacts and it is particularly complex, the approver is strongly suggested to request further detailed risk assessment. Ultimately, the approver decides if the change can be executed.

Change. Changes are modifications, additions, or substitutions for any aspect within the organization that are outside the company's present specifications.

Change Owner. Supervisor/officer with responsibility in the area where the change is proposed and who works with the initiator in preparing the change form request. If the initiator shipboard is an officer or above, then the initiator and the change owner are one and the same.

Initiator. Person proposing change or identifying an occurring latent change. It can be anybody within the company. The initiator works with the change owner to prepare the supporting documentation requested by the MoC program

MoC. Acronym for "Management of Change". It is also used to refer to a proposed change that is going through the management of change process.

MoC Form. The MoC form is essentially the record for each change. The form is essential to allow the necessary information to be gathered and recorded efficiently and effectively.

MoC Log. The MoC log functions like a register or record book of all changes onboard. The information contained in the log can show at a glance which changes are open, which are about to expire, and which are late and where actions need to be taken. The MoC log can be paper-based or electronic.

Onboard MoC Coordinator. Someone onboard who keeps a log of all the MoCs and current status of each change. This may be one of the onboard engineers whose responsibility is similar to those of the shore-based MoC coordinator. His/her job is to verify that changes are completed in a timely manner and updated and closed out as required. The onboard MoC coordinator has the responsibility to see that all the change owners onboard are on track with their MoCs.

Replacement-in-kind. When an item, process, or person meets the existing specified criteria for the item it is replacing, it is typically not considered a change, but a replacement-in-kind.

Shore-side MoC Coordinator. The shore-side MoC coordinator tracks MoC program performance, including the status of MoCs and MoC actions, and undertakes audits of MoC programs fleetwide. This role typically falls upon someone shore-based with HSQE responsibility, although a ship may have an onboard MoC coordinator in addition to the shore-side coordinator.

3 MOC Process

Regardless of a company's culture, organization, values, and programs, the key steps discussed in this Subsection should be considered when designing any formal management of change program. The process set forth in these Guidance Notes defines six distinct steps, as follows:

- i)* Initial Review
- ii)* Senior Review
- iii)* Detailed Risk Assessment
- iv)* Approval
- v)* Implementation
- vi)* Verification and Closeout

An overview of the MoC process is depicted in the flowchart of Section 3, Figure 1.

FIGURE 1
MoC Process Flowchart

