# The Management of Change (MoC) in Maintenance

Management (1997)

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# INTERNATIONAL AIR SAFETY SUMMIT



# Outline

- Context
- Importance for Maintenance
- Trigger event | process | tools
- Experience and difficulties
- Real life case



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# Change happens !

### Change forms the basis of Aviation progress and evolution, but we must change **Safely**. Safety shall be designed into the change.



### Changes create can hazards or modify existing ones



new

### Changes can potentially modify perceived risk dramatically



# **MoC and SMS | Keypoints**









Aviation service providers must implement an SMS based on 4 pillars and 12 elements: Safety Policy and Objectives, Safety Risk Management (SRM), Safety Assurance and Safety Promotion

The SRM process must identify hazards and manage the associated risks, in order to reduce and control risk to an acceptable level

**Changes** may introduce new hazards or modify hazards already identified, affecting the risk profile of services and operations; hence organizations shall manage risks related to changes

A structured and documented process must be used for assessing how the existing risk profile is affected by a change, using existing processes for hazard identification, risk assessment and mitigation





# **MoC Context**



- Large or small
- Internal or external
- May affect the existing risk level

- Trigger event identification
- Significance analysis
- SRM tools to assess changes







# **Objectives of MoC**





- Identify changes that may affect the existing level of safety and security, the sustainability and profitability of the organization
- Describe known and probable outcomes of such changes
- Identify and manage risks that may arise from those changes
- Produce an action plan to eliminate hazards, or to avoid, accept or mitigate (control) those risks
- Monitor effectiveness of risk mitigation (control) actions
- Manage risks during the transition period

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# Why Moc is important for Maintenance



Unless properly managed, changes may result in inadvertent introduction of new hazards, or modification of existing ones, exposing the organization to new or increased risks

(such changes may exist in organizational structures, facilities, scope of work, personnel, documentation, policies and procedures)

# Why MoC is important for Maintenance

...but they **recognize** changes can introduce new hazards or activate latent ones if not properly managed

Effective maintenance organizations seek to improve processes...



# Why MoC is important for Maintenance



Any change, large or small, should receive proactive attention for safety implications and its potential impact on human performance and limitations

Primary responsibility rests on the team proposing or implementing the change

Changes can only be successful if all affected are personnel involved and participate in the process

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# engaged,



# loC is mportant for Maintenance





structured **framework** for managing all aspects of a change

An organized approach maximizes effectiveness, engages personnel and minimizes risks inherent to the change



# Provides principles and a



# Why MoC is important for Maintenance





### What we want to achieve

Discover new hazards before they affect operations

Update hazard log to assist in normal risk management

Challenge existing risk controls for adequacy

Update policies and procedures to reduce risk to ALARP

Engage employees in risk management operations

Improve risk analysis methodologies

Improve risk and safety culture



# **Trigger event | when to perform MoC**

### Safety and Security

- Top factors
- Reaction to ineffective risk controls

### Process

- Process alteration
- New or amended regulation
- New provider or subcontractor
- Financial and economical
- Reputation issues



Change is the catalyst for the organization to perform hazard identification and risk assessment when a trigger event is identified



### Organization

- Structure and accountabilities
- New type or additional aircraft
- New route, schedule, service, location
- Procedure, work layout, IT, technology
- Personnel (key, number, turnover)
- Facilities and equipment

### Market

- Competition
- Commercial
- New customer
- Loss of major customer



# The process | how to perform MoC

### Effective MoC should be based on 4 essential resources







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# The process | how to perform MoC

## Formal analysis, conducted in a planned manner, based on PDCA

### Validation

- Significance analysis
- PIA: Preliminary Impact Assessment

| ¥ | | ¥ | | ¥

Risk manager validation

### Identification

• Identify candidate changes

**(//)** 

- Record and characterize details
- Establish the context

### Planning

- Identify hazards
- Assess risks
- Plan the change
- Control chart





Assess audit needs





# Continuous improvement



# MoC | tools used at TAP M&E

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	Segurança da TAP-ME?						iente?)		Não		
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PROC	A mudança poderá ter impacto nos processos e/ou nos respectivos requisitos?	Sim	Requisitos significativos não cumpridos, obsoleto ou não competitivo: C	Ocasional: 100	C100					novo procedimento, novo tipo de aeronave, novo tipo de motor)?	5111
COMPL	A mudança poderá levar a falhas na compliance? (Findings levantados, reclamações de	Sim	Minor findings, warranty claims, renegociação contrato: D	Ocasional: 100	D100		ração do				
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AIRW	TAP Air Portugal ou dos nossos clientes?	Não								Alterações processuais decorrentes de exigências impostas por cliente?	Não
	A mudança poderá levar a impactos operacionais da TAP Air Portugal ou dos nossos									Implementação do um projeto complevo?	Cim
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s	Resultado indica necessidade de continuação de avaliação do risco. Avaliação deverá ser fe	ita via auditoria físi	ica.								
lações	Executar auditoria física e caso sejam levantadas NCs, definir ações corretivas e garantir o f	fecho das NC	Ferramenta de Análise:	N/A							



- Platform: excel & macro programming
- Management: Safety Office
- Data input: team proposing or managing the change
- Risk analysis: Safety Office



SAFETY MANAGEMENT SYSTEM

### ANAGEMENT OF CHANGE

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### **MoC** | where we stand today MAINTENANCE **& ENGINEERING** TAP M&E routinely performs MoC when following scenarios are met



- Changes in approval scope
- Changes in key personnel



Changes in organizational structure



Introduction of new customer, product, service or location



Construction or conservation burden in facilities



New (or stoppage of) strategic or critical equipment









# MoC | where we need to go TAP M&E has plans to extend MoC to the following subjects



Market behaviour and trends



**Business** decisions



New or updated procedures



Team composition







# Difficulties

## Like any element of SMS, MoC must be constantly promoted

- Gain top-level endorsement
- Remember to identify trigger events
- Accept the way risk is managed
- Create ownership of a change
- Implement effective risk controls
- Monitor risk control performance
- Manage interfaces Customers <> Providers <> Authorities





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## ...a new aircraft type is introduced in the fleet ?

MoC is performed involving:

- Operator
- Airworthiness
- Maintenance
- Training
- Airports
- Outstations
- Ground handling
- Other providers













...a new aircraft type is introduced in the fleet ?

- Larger wingspan, different sharklet
- Different dimensions
- Parking, towing, jacking
- New engines, systems, materials
- Different tools, equipment, consumables
- Training requirements
- Etc.

Mitigation action plan implemented





### Existing hazards update / new hazards identified (Maintenance examples):



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> CS-TU A330-900 (ne TAP Air Portug TSN 01:46 hours CSN 1 cycle Aircraft Damage Wing Tip – LH side

**Probable cause: Human Error Risk previously known: YES Risk already mitigated: YES** Additional mitigation required: YES **Probable risk trend: Increase** 

Towing from polyvalent apron to RWY 35 parking positions LPPT, 25 JUN 2019, 02:00 a.m.

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**Injuries: none Costs: under estimation CS-TUL: AOG 17 days** Wing Tip removal + repair

Horizontal S







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Airbus A330neo

Airbus A330ceo







### Contributing factors:

Organizational

- Night shift
- Reduced manpower

Human

- Wrong perception, lack of awareness
- Complacency, acquired habits

Technical

- Wingspan: 4 meters longer on A330neo
- Nav light: different placement



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# What could happen if... once again













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# Conclusions

- Changes should be planned and treated in a structured manner
- MoC process should be based on PDCA cycle
- Unexpected changes could benefit from SRM methodologies
- MoC must control risks during and after the change
- Residual change risks must be monitored by safety assurance actions
- Untreated / uncontrolled change risks could result in expensive events



## MAINTENANCE





# Thank you!



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Jorge Leite **TAP Maintenance and Engineering** Director of Quality and Safety



### **AIR** PORTUGAL

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