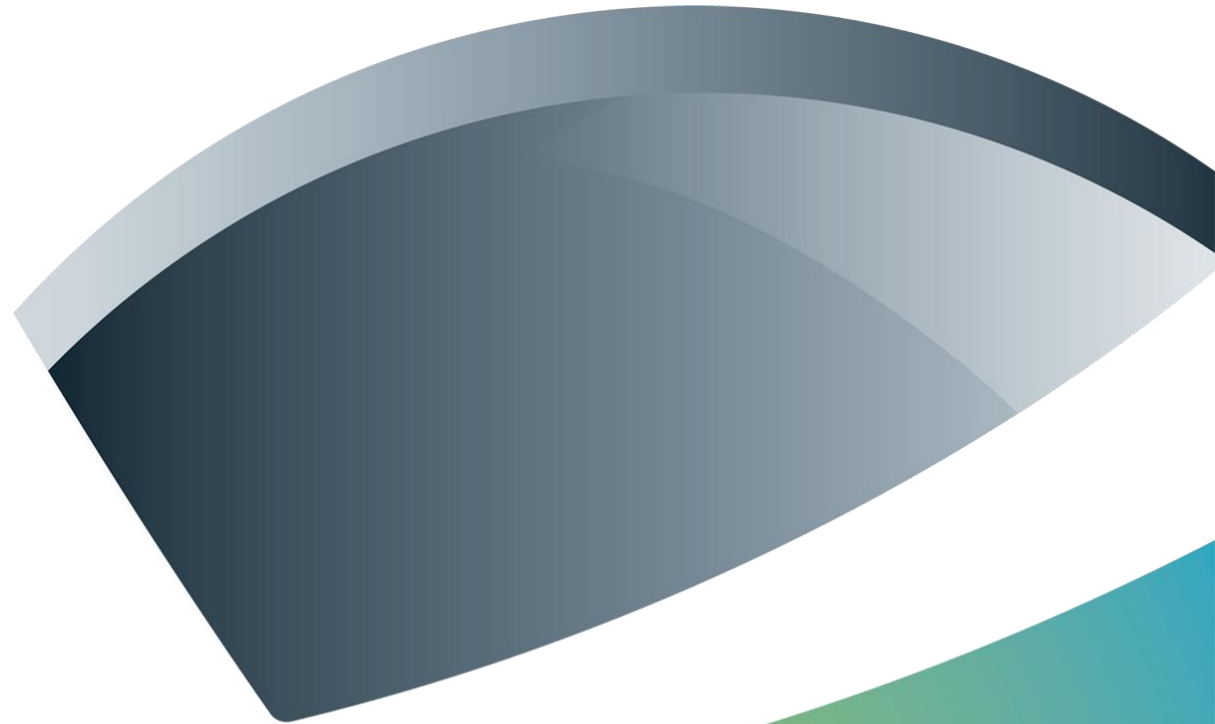




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145.A.48 Performance of Maintenance & Error Capturing Method

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European Aviation Safety Agency Opinion No 06/2013

Critical maintenance tasks

RELATED NPA/CRD 2012-04 — RMT.0222 (MDM.020) — 10/06/2013

Executive Summary

This Opinion addresses a safety issue related to the risk of errors made during the performance of critical maintenance tasks and the need for maintenance organisations to implement methods to capture those errors before the certificate of release to service is issued.

The safety recommendations linked to this Opinion were debated by the working group during the development of this proposal and were listed in the NPA 04-2012.

The specific objective of this proposal is to mitigate the risks linked to the performance of maintenance, by clarifying the requirements for the identification of critical maintenance tasks and the need to implement measures necessary to detect errors made in the performance of those tasks.

This Opinion proposes amending the requirements for performance of maintenance in Part-M namely point M.A.402, and the introduction of specific requirements for the performance of maintenance by Part-145 organisations, namely point 145.A.48

The proposed changes are expected to increase safety and improve compliance.

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Comment Response Document 2012-04 to NPA 2012-04

Comment 56/57 by: *NHAF Technical committee*

Add new bulletpoint: Person who perform inspection must physically present on-site where maintenance is performed.

Justification: To prevent companies for use photos, webcams and other visual interactive aids to send «evidence» to inspector located at different site, other than where the maintenance is performed.

EASA response: Not accepted.

The review group considers that the use of **remote inspection techniques cannot be excluded**



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Remote Inspection Techniques

Noen organisasjoner har fått godkjent prosedyrer som tillater bruk av video/bilder i forbindelse med Independent Inspection av Critical Maintenance Task



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Critical Maintenance Task

Critical Maintenance task means a maintenance task that involves the assembly or any disturbance of a system or any part on an aircraft, engine or propeller that, if an error occurred during its performance, could directly endanger flight safety



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145.A.48 Performance of Maintenance

The organisation shall establish **procedures** to ensure that:

(b) an **error capturing method** is implemented after the performance of any **critical maintenance task**;



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AMC2 145.A.48(b) Critical Maintenance Task

The **procedure** should ensure that the **following maintenance tasks** are **reviewed** to assess their impact on **flight safety**:

1. Tasks that may affect the control of the aircraft flight path and attitude, such as installation, rigging and adjustments of flight controls, electronic or mechanical;
2. Aircraft stability control systems (autopilot, fuel transfer);
3. Tasks that may affect the propulsive force of the aircraft, including installation of aircraft engines, propellers and rotors; or
4. Overhaul, calibration or rigging of engines, propellers, transmissions and gearboxes.



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AMC2 145.A.48(b) Critical Maintenance Task

The **procedure** should describe which data sources are used to identify critical maintenance tasks. Several data sources may be used, such as:

- (1) information from the design approval holder;
- (2) accident reports;
- (3) investigation and follow-up of incidents;
- (4) occurrence reporting;
- (5) flight data analysis;
- (6) results of audits;



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145.A.65(b) Safety and quality policy, maintenance procedures and quality system

The organisation shall establish procedures agreed by the competent authority taking into account **human factors and human performance** to ensure good maintenance practices compliance with the applicable requirements established in 145.A.25 to 145.A.95



AMC.A.30 Personnel Requirements

	Managers	Planners	Supervisor	Certifying staff and support staff	Mechanics	Specialised Service staff	Quality audit staff
Ability to manage third parties involved in maintenance activity		X	X				
Ability to confirm proper accomplishment of maintenance tasks			X	X	X	X	
Ability to identify and properly plan performance of critical maintenance tasks		X	X	X			
Understanding critical maintenance task		X	X	X	X		X

145.A.47 - Production planning

When establishing the production planning procedure, consideration should be given to....

- ✓ scheduling **critical maintenance tasks** during periods when staff are likely to be most alert.



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Error Capture Methods

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Eksempel på Critical maintenance Tasks fra -145 organisasjon

2.23.1 TABLE. Minimum list of critical tasks affecting safety

Critical Maintenance tasks AS350 B3	Independent inspection Detailed	Independent inspection Visual/Photo	Leak check
Installation of Main gearbox	X		
Installation of Tail gearbox	X		
Installation of Tail rotor blade		X	
Installation of Tail rotor driveshaft front- or aft section	X		
Installation of Engine	X		
Installation of Starflex	X		
Installation of Main Rotor Mast	X		
Installation of Main Rotor Sleeve	X		
Rigging of main/tail rotor controls	X		
Installation of Main servo	X		
Installation of Tail rotor servo	X		
Installation/connection of other flight controls Single items (NA dual controls)		X	
Installation/connection of oil / fuel / other fluid or gas tubes/hoses or filters / components			X
Installation of HMU (engine fuel control)		X	
MR track & balance with adjustment of main rotor pitch link(s)		X	
Retorque after 600 FH inspection		X	
Assembly of flight controls after 300 FH swashplate guide inspection	X		
Installation of main fuel tank	X		



Eksempel på Critical maintenance Tasks fra -145 organisasjon

DI Chart Aircraft:

ATA and aircraft system	Installation of parts/ components, including O-rings and gaskets	Functional checks	Rigging and Adjustments	Verify torque and free running torque	Safety wiring & installation of locking devices	Removal of test equipment, rig pins and safety devices
22 AUTO FLIGHT	Only valid for parts that are mechanically connected to flight control system. NOTE: AFCS tests not included unless any parts/component affecting the system is installed, adjusted, removed or deactivated.					
	X	X	X	X	X	X
24 ELECTRICAL POWER	Only valid for replacement of aircraft batteries and engine mounted components					
	X			X	X	X
26 FIRE PROTECTION	Only valid for replacement of smoke/fire extinguishing bottles and squibs.					
	X	X			X	X
27 FLIGHT CONTROLS						
	X	X	X	X	X	X
28 FUEL	CDCCL items.					
	X			X	X	
29 HYDRAULIC POWER	Only valid for engine mounted components.					
				X	X	
32 LANDING GEAR						
	X	X	X	X	X	X



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AMC3 145.A.48(b) Error Capturing Methods

- (a) Error-capturing methods are those actions defined by the organisation **to detect maintenance errors made when performing maintenance.**
- (b) The organisation should ensure that the error-capturing methods are **adequate for the work and the disturbance of the system.**

A **combination of several actions** (visual inspection, operational check, functional test, rigging check) **may be necessary in some cases.**



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AMC4 145.A.48(b) Independent Inspection

“Is one possible error-capturing method”

An **independent inspection** is an inspection performed by an ‘**independent qualified person**’ of a task carried out by an ‘**authorised person**’,



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AMC4 A.48 (b) (a) (3)

The '**authorised person**' issues the **CRS** or signs off the completion of the task **after the independent inspection** has been carried out satisfactorily



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Independent Inspection

An independent inspection should ensure

- ✓ **Correct assembly, locking and sense of operation**



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AMC4 145.a.48 (b) (d) Reinspection

(1) **Reinspection** is an error-capturing method subject to the **same conditions as an independent inspection is**, except that the ‘authorised person’ performing the maintenance task is also acting as ‘independent qualified person’ and performs the inspection

(2) **Reinspection**, as an error-capturing method, should only be performed in **unforeseen circumstances** when only one person is available to carry out the task and perform the independent inspection. The circumstances **cannot be considered unforeseen** if the person or organisation has not assigned a suitable ‘independent qualified person’ to that particular line station or shift.



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Oppsummering

- **Critical Maintenance Task** krever en error capture metode
- **Error Capture metode**
 - må ivareta intensjonen
 - må være tilpasset det arbeidet som skal inspiseres
- **Intensjonen med error capture metode:**

“to detect maintenance errors made when performing maintenance”



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SPØRSMÅL?

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