
Part 66 Maintenance Approval - Oral Examination Syllabus

**Duplicate Safety Inspections for
Maintenance Personnel**

Scope of Approval

Privilege for the performance and certification of second (2nd) person Duplicate Safety Inspections in accordance with the requirements of Rule 43.113

Syllabus

Reference	Maintenance Task Requirement	Scope	Examining rated LAME to initial in column
			Demonstrated competence / understanding
Applicable maintenance manuals for the type(s) of aircraft <ul style="list-style-type: none"> • Standard practices • Flight controls • Engine controls Maintenance texts - e.g.: <ul style="list-style-type: none"> • CAAUK CAP 562, Leaflet 20-80 Control Systems • FAA AC43.13-1B • ASA Aviation Mechanic Handbook <ul style="list-style-type: none"> ○ by Dale Crane 	Assembly Rigging - e.g. <ul style="list-style-type: none"> • Range of movement • Cable tensions • Clamping of control cables Locking mechanisms - e.g. <ul style="list-style-type: none"> • Lock wiring • Split Pinning • Torque values 	Demonstrate knowledge and skill of maintenance tasks using manufacturer's instructions and standard engineering practices.	

Part 1 Control System – definition;			
means a system that has the ability to directly change the flight path, attitude, or propulsive force of an aircraft, and includes the flight controls, the engine and propeller controls, the related system controls, and the associated operating mechanisms			
43.113 Duplicate Safety Inspection Requirements - ref Appendix A, rule 43.113 & AC43-1			
Demonstrate understanding and practical application of rule requirements			
43.113(a)	Purpose of duplicate inspection What to look for <ul style="list-style-type: none"> • Functions correctly • Assembled correctly • All locking mechanisms in place and correct 		
43.113(b)	Who performs the 2nd Inspection <ul style="list-style-type: none"> • Nominated by 1st person • Has adequate <ul style="list-style-type: none"> ○ training, and ○ knowledge, and ○ experience; for the particular duplicate inspection that he/she is performing.		
43.113(c)	Certification <ul style="list-style-type: none"> • Identification of control system • Detail of scope and extent • Certification statement 		
43.113(d)	Your details - What to record <ul style="list-style-type: none"> • Name, • Signature, • Approval number, • Date 		

91.619	Technical Log Use of Technical log CAA006 and/or CAA400 forms if used to record duplicate inspection.	
--------	---	--

Other applicable maintenance related Rules			
Demonstrate understanding and practical application of rule requirements			
Part 43 & AC43-1	Certification of Maintenance	Specific reference	
43.1	Applicability.	Paras (a)(1) to (4).	
43.51	Persons to perform maintenance.	Paras (a)(4) & (6)	
43.53	Performance of maintenance.	Paras (1) to (11).	
43.69	Maintenance records.	What information is required to be recorded, and where.	
43.101	Persons to certify maintenance.	Paras (a)(4) & (5).	
43.103	Certifying requirements.	Para (a).	
43.105	Certifying after maintenance.	Para (a) – where to enter, statement wording.	
Part 66 AC66-1	Certificate of Maintenance Approval	Aircraft Maintenance Personnel Licensing	
66.153	Eligibility requirements.	Para (1) – applicant to complete two duplicate inspections, including certification, under the direct supervision of the examiner. Para (2)(ii) – an examination to this syllabus.	
66.155	Privileges.	Para (b)(2)(i).	

Record of Examination

I certify that I have carried out an oral and practical examination to the above syllabus and

(Name)

has demonstrated that he/she can carry out the tasks described in the above scope in accordance with the current New Zealand Civil Aviation Rules detailed above.

Name	Signature	LAME Number	Date
.....

Follow-on Action

Examining Engineer

Carry out oral examination using referenced technical data and complete this examination syllabus.

Maintenance Personnel

1. Complete Maintenance Approval Application Form - **CAA [24066/03](#)**

Available at www.caa.govt.nz under frequently used links - Forms

NOTE: remember to sign specimen signature at top of right hand corner on first page

2. Forward all of below to CAA for issue of Part 66 Maintenance Approval:

1. application form - **CAA [24066/03](#)**
2. this **completed examination syllabus** , and
3. **Post to:** Licensing, Civil Aviation Authority, P O Box 3555, Wellington, 6140

Appendix 1 – Rule and AC references

Rule Part 43

43.113 Duplicate safety inspection of control system

(a) A person must not certify an aircraft or component for release-to-service after the initial assembly, subsequent disturbance, or adjustment of any part of the control system of the aircraft or the control system of the component unless—

- (1) the applicable requirements of Subpart C have been complied with; and
- (2) a duplicate safety inspection has been carried out to ensure that—
 - (i) the control system of the aircraft or the component, as the case may be, functions correctly; and
 - (ii) in respect of the maintenance that has been performed, the control system is assembled correctly and every required locking mechanism is in place; and
- (3) the certification and signatures required by paragraphs (c) and (d) have been completed.

(b) The duplicate safety inspection required by paragraph (a)(2) must be carried out by—

- (1) a person who meets the requirement in rule 43.101 to certify the aircraft or component for release-to-service; and
- (2) another person who is nominated by the person specified in paragraph (b)(1) and has adequate training, knowledge and experience to carry out the safety inspection, and who holds—
 - (i) a current aircraft maintenance engineer licence issued in accordance with Part 66; or
 - (ii) a current certificate of maintenance approval issued in accordance with Part 66; or
 - (iii) a current pilot licence with a rating on the aircraft type issued in accordance with Part 61; or
 - (iv) a current authorisation issued by the holder of a maintenance organisation certificate issued in accordance with Part 145; or
 - (v) a current appropriate maintenance engineer licence or approval issued under the appropriate authority of an ICAO Contracting State.

(c) The person specified in paragraph (b)(1) must enter in the appropriate maintenance logbook or worksheet—

- (1) the identification of the control system that has been inspected; and
- (2) the detailed scope and extent of the safety inspection that has been carried out; and
- (3) the following statement—

“We certify that a duplicate safety inspection has been carried out and the identified control system of the aircraft/component functions correctly, and in respect of the maintenance performed, the control system is assembled and locked correctly.”

(d) The following details of each person specified in paragraphs (b)(1) and (b)(2) must be entered the maintenance logbook or worksheet adjacent to the statement required under paragraph (c)(3):

- (1) the name of each person:
- (2) the signature of each person except if the maintenance logbook or worksheet is in electronic format:
- (3) the licence number, approval number, or authorisation number for each person:
- (4) the date of entry.

43.113 Duplicate safety inspection of controls

Background on error capturing

Error capturing forms an important part of the aviation safety net. There are many types of error capturing mechanisms, including functional checks, leak checks, inspection of tasks before signing for work done by others, duplicate inspection, pilot pre-flight checks etc.

A duplicate safety inspection is one of the methods that can be used to capture errors that may occur in the maintenance of 'safety critical' systems.

The rule identifies that they must be performed on control systems, but there may be other safety critical systems (e.g. rotorcraft drive systems) where a duplicate inspection could be considered appropriate by an operator and/or their maintenance provider.

For further reading on errors, including avoiding and capturing error refer to: [CAAUK CAP 716](#) Aviation Maintenance Human Factors and [CAAUK CAP 718](#) Human Factors in Aircraft Maintenance and Inspection.

Duplicate Safety Inspection

When it is required

A duplicate safety inspection must be made after assembly, disturbance, or adjustment of any part of a **control system**. The duplicate safety inspection shall apply to all parts of the control system that have been subject to that assembly, disturbance, or adjustment.

The certifying person is not permitted to issue a release to service for maintenance that includes the initial assembly, adjustment or disturbance of a control system unless a duplicate safety inspection is completed and certified in the logbook or worksheets.

Who performs it

The **first part** of the duplicate inspection would normally be the person who is certifying the work that requires inspecting.

The **second part** of the inspection is to be carried out and certified by a person whom the first certifying person considers to have adequate;

- training,
- knowledge,
- experience

to perform the specific inspection.

Additionally that person must hold one of the following documents:

- a current aircraft maintenance engineer licence issued in accordance with Part 66; or
- a current certificate of maintenance approval issued in accordance with Part 66; or
- a current pilot licence with a rating on the aircraft type issued in accordance with Part 61; or
- a current authorisation issued by the holder of a maintenance organisation certificate issued in accordance with Part 145; or
- a current appropriate maintenance engineer licence or approval issued under the appropriate authority of an ICAO Contracting State.

The person performing the second inspection must be made aware of the requirements to be familiar with the tasks and technical data involved.

What is a control system

For the purpose of this rule, a **control system** is defined in Rule Part 1 -

means a system that has the ability to directly change the flight path, attitude, or propulsive force of an aircraft, and includes the flight controls, the engine and propeller controls, the related system controls, and the associated operating mechanisms:

A control system includes all associated units, whether mechanical, electrical, electronic, hydraulic, or pneumatic.

For fixed wing aircraft, the systems include the attachments of, and means of actuating—

- primary control surfaces
- tabs
- air brakes
- flaps

For rotorcraft, the systems include—

- the attachments of all rotary control surfaces
- the means of operating collective pitch, cyclic pitch, and yaw control

For engines and propellers, the systems include all associated units – mechanical, hydraulic, electrical, electronic or pneumatic – that control

- power output
- power absorption
- emergency operation

Performing the inspection

As part of performing a duplicate inspection both persons need to be familiar with the particular control system and have available the relevant technical data e.g. manufacturer's maintenance manual or instructions for continued airworthiness (ICAs) that detail maintenance requirements specific to the system.

Each of the persons performing a duplicate inspection must verify that—

- **all parts of the system which have been disturbed** are assembled and function correctly, the inspection should include checks to ensure-
 - correct rigging
 - correct locking
 - no possibility of fouling or jamming
 - e.g. ensuring control cables are correctly routed and any work aid cable locking mechanisms removed
- **for the complete system**, the controls function throughout their range of travel in each mode, and with each alternative means of actuation,—
 - freely and in the correct sense
 - without excessive backlash
 - with the correct static friction

During installation of control systems, all system components that will not be accessible for inspection after complete assembly of the aircraft must have a duplicate inspection performed before concealment.

After initial assembly of a new aircraft, or the reassembly of an aircraft after maintenance, a duplicate safety inspection must be completed as the final operation on the control system before flight.

The table below, provides guidance on best practice when performing an Duplicate Inspection:

Duplicate Safety Inspection ‘Best Practice’

Both parts of the duplicate inspection must be carried out by suitably qualified persons
The second part of the duplicate inspection should be carried out by a person not involved in the original task
Inspection and checks should be carried out thoroughly, and not influenced by any knowledge concerning the competence of the original technician who did the work of the certifying technician who carried out the first check. Thoroughness of inspection should not be interpreted as a lack of trust in the accuracy of the original work.
It should take place as soon as possible after the task has been completed and the original inspection has taken place, with the dates and times of both inspections recorded.
For control systems, the duplicate inspection should cover checks for full and free movement (freedom and range of movement) and correct sense in relation to the movement of the control.
Measurements should be taken, e.g. range of movement, clearances, tensions, operating performance, etc., compared against required figures (maintenance manual limits) and recorded. When checking the range of movement of the control surfaces, it is important that the controls should be operated by the pilot’s controls and not by handling the control surfaces. It should be ensured that all obstructions, such as trestles, are out of the way of control surfaces.
Avoid just recording “complied” or “satis” as results of checks; record the nature and extent of the movement or result of the inspection observed during each step of the check and ICA reference and revision status.

Certification of inspection

Following the inspection, certification of a duplicate safety inspection is to be entered in the aircraft log book or other acceptable maintenance record, it should:

- Clearly identify the control system,
- Detail the scope and extent of the inspection
 - This should clearly identify what parts or sections of the control system have been inspected.
- Quote the specific statement required by rule 43.113(c)(3)

“We certify that a duplicate safety inspection has been carried out and the identified control system of the aircraft/component functions correctly, and in respect of the maintenance performed, the control system is assembled and locked correctly.”

Each certifying person must enter:

- their name
- licence, approval or authorisation number,
- signature,
- and the date of the inspection,

adjacent to the above entry.