

Maintenance and Alteration of Aircraft

November 2, 1964	First issue
October 25, 1973	Amended
April 26, 1989	Amended
October 13, 2000	Amended (KU-KI-1242)
October 1, 2005	Amended (KOKU-KU-KI-682)
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Airworthiness Division, Aviation Safety and Security Department
Japan Civil Aviation Bureau
Ministry of Land, Infrastructure, Transport and Tourism

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Subject: **Maintenance and Alteration of Aircraft**

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1. General

1-1 Purpose

This circular is to clarify, when maintenance or alteration is performed on the aircraft airworthiness-certificated under Article 10, paragraph 1 of the Civil Aeronautics Law (Law No.231 of year 1952, hereinafter referred to as “Law”), the category of the work and required action after performance of the work and explain:

- whether the work shall be applied to the inspection of repair or alteration under Article 16, paragraph 1 of the Law,
- whether the work shall be performed and certified by the approved organization for aircraft maintenance or alternation under Article 19 paragraph 1 of the Law,
- whether the work shall be only certified by the first class aircraft maintenance technician or by the second class aircraft maintenance technician (hereinafter referred to as “aircraft maintenance technician”), by the first class aircraft line maintenance technician or by the second class aircraft line maintenance technician (hereinafter referred to as “aircraft line maintenance technician”), otherwise by the aircraft overhaul technician (hereinafter all category of technician above shall be generally referred to as “qualified mechanic”) under Article 19 paragraph 2 of the Law, or
- whether the work is not required any certification by the qualified mechanic,

and further to provide concrete examples of work belonging to each category of work in the attachment table.

However, since the aircraft, especially the aircraft categorized as transport T is complicated in its structure and systems and it is difficult to show all work contents of it, examples of work contents shown in this Circular are described with focusing on those of small aircraft of which repair manual, etc. does not always give sufficient information, in general. On the large aircraft or the aircraft of which repair manual, etc. has been well prepared, if method of the particular repair is not established, the examples shown in this Circular shall be correspondingly applied.

1-2 Definitions

Terms used in this Circular shall be defined as follows:

a. Maintenance

Overhaul, check, inspection, replacement, corrective action against malfunction, etc. and their combination, and necessary work to continuously maintain requirements for strength, structure and performance in order to maintain air safety of the aircraft, compliance with noise standards and engine control

standards for exhaust emission (hereinafter referred to as “airworthiness, etc.”). Maintenance is composed of preservation and repair, but alteration is not included.

b. Preservation

Necessary work to maintain airworthiness, etc. under the condition that the airworthiness, etc. is not impaired from the aircraft. In general, work normally required (including necessary check and inspection), when aircraft is used for air navigation within the operating limitations.

c. Repair

Restoration work (including verification of function and overhaul of aircraft and components) to restore or maintain the airworthiness, etc. of the original design, when the airworthiness, etc. is impaired or may possibly be impaired because the current condition of aircraft is apart from the original design.

d. Alteration

Work to change to the specification of original design in performance, function, etc. (alteration, modification)

e. Approval

To acknowledge airworthiness, etc. by the Minister of Land, Infrastructure and Transport.

f. Parts applicable to specification approval

The parts of which specification is to be approved by the Minister of Land, Infrastructure and Transport under the provision of Article 14, paragraph 1 of the Civil Aeronautics Regulations (hereinafter referred to as “CAR”). (Refer to Circular No.1-004 “General Policy and Procedures for Type/Specification Approval for Components” Part V, “Parts applicable to specification approval”.)

g. Approved parts

Component, part, material, etc. (hereinafter referred to as “*parts*”) which are included in design drawing or parts list (parts catalog) accompanied with type certification, airworthiness certification, type approval or specification approval (except for those which have been verified separately for design through the inspection of repair or alteration, etc. and have not been confirmed conformity of its quality of the *parts* to be replaced). To put it concretely, approved parts shall come under the either item of ① through ⑥ below. Manufacturer of the approved parts in Japan shall indicate with pass stamp for inspection, type of aircraft, engine, etc., and part number of the said parts so that the said parts may have been manufactured as approved parts and passed the inspection conducted by the said manufacturer.

- ① Among the *parts* which are to be installed on the aircraft type-certificated or airworthiness-certificated, *parts* which have been manufactured in

accordance with the design drawing approved upon type certification or airworthiness certification by the manufacturer approved on those certification.

- ② The *parts* which have been manufactured in accordance with the design drawing approved upon approval of type design change on the aircraft by the manufacturer approved on that approval.
- ③ Among the *parts* of component or part which have obtained type or specification approval, those *parts* which have been manufactured in accordance with the design drawing upon approval by the manufacture approved on that approval.
- ④ *Parts* which have been manufactured in accordance with the design drawing approved upon approval of change in type or specification of the *parts* by the manufacturer approved upon that approval.
- ⑤ Those *parts* which are to be installed on the imported aircraft, imported component or imported part and which have been approved to install on the concerned aircraft, etc. in accordance with the official specification, the parts list (parts catalog), etc. approved by the authority of the state of manufacture of the said *parts*, equivalent official organization or manufacturer.
- ⑥ *Parts* which have been approved as PMA parts under the parts manufacturer approval system in the United States. (Refer to Circular No.3-009, titled “Handling of PMA parts”.)

h. Parts applicable to spare part certification

Engine, Propeller and Component listed in Article 27 of the CAR.

i. Approved organization

The organization whose one or more capabilities specified in each sub-paragraph of Article 20, paragraph 1 of the Law have been approved by the Minister of Land, Infrastructure and Transport under the provision of the same Article as listed j through m below.

j. Approved organization for aircraft production and inspection (AOAPI)

Approved organization approved the capability to manufacture aircraft and conduct the inspection after completion of manufacture of the aircraft under the Article 20, paragraph 1-(2) of the Law. The AOAPI can certify the parts related to the type certification of the said aircraft under the Article 17, paragraph 3-(2) of the Law. Further, a part of current inspection on aircraft shall be omitted upon inspection for airworthiness certification on the aircraft which has been manufactured and inspected after completion of manufacture by the said organization and certified airworthiness.

k. Approved organization for aircraft maintenance or alteration (AOAMA)

Approved organization approved the capability to perform maintenance or alteration of the aircraft under the Article 20, paragraph 1-(4) of the Law. The AOAMA can certify the aircraft on which this AOAMA performed the work under the Article 19 paragraph 1 and the Article 19-2 of the Law.

l. Approved organization for parts production and inspection (AOPPI)

Approved organization approved the capability to manufacture aircraft parts and conduct the inspection after completion of manufacture of the parts under the Article 20, paragraph 1-(6) of the Law. The AOPPI can certify the parts under the Article 17, paragraph 3-(1) of the Law.

m. Approved organization for parts repair or alteration (AOPRA)

Approved organization approved the capability to perform repair or alteration of aircraft parts under the Article 20, paragraph 1-(7) of the Law. The AOPRA can perform certification under the Article 17, paragraph 3-(3) of the Law.

n. Parts regarded as having spare part certification

Parts applicable to either of ① through ⑤ below.

① Parts which the AOPPI has manufactured and inspected after completion of manufacture related to the approval and has certified airworthiness.

② The aircraft parts which the AOAPI has certified airworthiness related to the concerned approval.

③ Parts which the AOPRA performed repair or alteration related to the approval and has certified airworthiness.

④ The imported parts which have been airworthiness-certificated or have been approved by any other foreign state which is a Contracting State to the Convention on International Civil Aviation.

⑤ The imported parts which have been manufactured, repaired or altered and confirmed to be airworthy by a foreign entity which has been approved by a foreign state in accordance with the concerned standards and procedure, both of which have been confirmed to be equivalent to or more than those of Japan in respect of the capabilities in manufacturing, repair or alteration of parts by the Minister of Land, Infrastructure and Transport.

o. Scheduled maintenance

Maintenance which contains various works to be performed within the specific period established by operating hour, flight cycle, etc. The contents are various according to the aircraft type and time, and when categorize the work, category shall be determined by focusing the content of each work which is composed of

the said scheduled maintenance. For example, if the work comes under general preservation, the concerned scheduled maintenance shall be determined as general preservation, and if the work comes under minor repair, the concerned schedule maintenance shall be determined as minor repair.

p. STC

Approval for partial design change (supplemental type design) of the aircraft type-certificated by the Minister of Land, Infrastructure and Transport, which is conducted by a person other than the holder of the type certificate under the provision of Article 13-(2), paragraph 1 of the Law. The aircraft approved for supplemental type design by the Minister of Land, Infrastructure and Transport shall be regarded as having type certification upon inspection for airworthiness certification, etc. under the provision of Article 13-(2), paragraph 2 of the Law.

q. Equivalent STC

Approval for partial design change of the aircraft not having type certification. STC is partial design change of the aircraft type-certificated, on the other hand, equivalent STC can be approved on the aircraft which has been airworthiness-certificated by Japanese Authority and shall have same privilege as STC. (Refer to Circular TCL-164, titled “Approval for partial design change conducted on the aircraft not having type certification”.)

1-3 Category of work and required action after the work

Category of work and required action after the work is shown in the table below according to the highest category of work performed.

a. For aircraft under Article 19 paragraph 1 of the Law

Category of work			Required action after performance of the work					Inspection by Minister of Land, Infrastructure and Transport
			Entry into aircraft logbook	Certification by aircraft line maintenance technician	Certification by aircraft maintenance technician	Certification by aircraft overhaul technician	Certification by AOAMA (Note 2)	
Maintenance	Preservation	Minor preservation						
		General preservation	○	×	×	×	○ (Note 3)	
	Repair	Slight repair	○	×	×	×	○ (Note 3)	
		Minor repair	○	×	×	×	○ (Note 3)	
		Major repair	○	×	×	×	○ (Note 3)	
Alteration	Minor alteration		○	×	×	×	Either one is applicable (Note 4)	
	Major alteration		○	×	×	×	Either one is applicable (Note 4)	
Repair which may affect noise			○	×	×	×	○ (Note 3) (Note 5)	
Alteration which may affect noise			○	×	×	×	Either one is applicable (Note 4) (Note 6)	
Repair which may affect engine emissions			○	×	×	×	○ (Note 3) (Note 7)	
Alteration which may affect engine emissions			○	×	×	×	Either one is applicable (Note 4) (Note 8)	

○: Mandatory action required by the Law

×: Action not allowed

(Note 1) “Aircraft under the Article 19 paragraph 1 of the Law” means an airplane or helicopter for use of air transport service with more than 60 passenger seats or with maximum take-off weight over 27,000 kg (Since 30 March 2008, an airplane or helicopter for use of air transport service with more than 30 passenger seats or with maximum take-off weight over 15,000 kg).

(Note 2) AOAMA can certify works within its approved limitations and ratings.

(Note 3) The certification by AOAMA is based on the provisions of Article 19 paragraph 1 of the Law, which means the work and certification by AOAMA is compulsory.

(Note 4) The certification by AOAMA is based on the provisions of Article 19-2 of the Law, which means the work and certification are performed by AOAMA instead of the inspection of repair or alteration by the Minister.

(Note 5) AOAMA can certify the repair only if its method has been established and noise level after the repair has been approved.

(Note 6) AOAMA can certify the alteration only if its design change has been approved and noise level after the alteration has been approved.

(Note 7) AOAMA can certify the repair only if its method has been established and engine emissions level after the repair has been approved.

(Note 8) AOAMA can certify the alteration only if its design change has been approved and engine emissions level after the alteration has been approved.

b. For aircraft other than aircraft under Article 19 paragraph 1 of the Law

Category of work			Required action after performance of the work					
			Entry into aircraft logbook	Certification by aircraft line maintenance technician	Certification by aircraft maintenance technician	Certification by aircraft overhaul technician (Note 1)	Certification by AOAMA (Note 2) (Note 3)	Inspection by Minister of Land, Infrastructure and Transport
Maintenance	Preservation	Minor preservation						
		General preservation	○	Either one is applicable				
	Repair	Slight repair	○	Either one is applicable				
		Minor repair	○	×	Either one is applicable			
		Major repair	○	×	×	×	Either one is applicable	
Alteration	Minor alteration		○	×	×	×	(Note 4)	Either one is applicable
	Major alteration		○	×	×	×		Either one is applicable
Repair which may affect noise			○	×	×	×		Either one is applicable (Note 5)
Alteration which may affect noise			○	×	×	×		Either one is applicable (Note 6)
Repair which may affect engine emissions			○	×	×	×		Either one is applicable (Note 7)
Alteration which may affect engine emissions			○	×	×	×		Either one is applicable (Note 8)

○: Mandatory action required by the Law

×: Action not allowed

(Note 1) Aircraft overhaul technician can certify for the limited classification of work.

(Note 2) AOAMA can certify works within its approved limitations and ratings.

(Note 3) The certification by AOAMA is based on the provisions of Article 19-2 of the Law, which means the work and certification are performed by AOAMA instead of the certification by qualified mechanic or inspection of repair or alteration by the Minister.

(Note 4) Minor alteration on gliders (including powered gliders) can be certified by aircraft overhaul technician instead of inspection by the Minister of Land, Infrastructure and Transport or certification by an approved organization.

(Note 5) AOAMA can certify the repair only if its method has been established and noise level after the repair has been approved.

(Note 6) AOAMA can certify the alteration only if its design change has been approved and noise level after the alteration has been approved.

(Note 7) AOAMA can certify the repair only if its method has been established and engine emissions level after the repair has been approved.

(Note 8) AOAMA can certify the alteration only if its design change has been approved and engine emissions level after the alteration has been approved.

1-4 Records

1-4-1 Entry into aircraft logbook

Entry matters into aircraft logbook shall be provided in Article 142, paragraphs 2 and 3 of the CAR. When works were performed listed below, date of performance, location, reason, position and name of replacement part, and date of certification with regard to the said work shall be entered into aircraft logbook, and certifying staff shall sign its name or enter name and put seal on it. If another form is established and controlled as a part of aircraft logbook for editing purpose, these items may be entered into the form above.

- a. Replacement of the parts applicable to spare part certification and time controlled parts.
- b. Scheduled maintenance.
- c. Those works required to entry into aircraft logbook, which were performed based on airworthiness directive, circular, etc.
- d. Works performed based on the service bulletin, etc. issued by manufacturer.
- e. Installation or removal of the parts (such as agricultural aerial spray equipment, airborne public address equipment, etc.) which initiates change in

airworthiness category.

- f. Maintenance (excluding minor preservation) and alteration listed in the table of Article 5-6 of the CAR, and repair and alteration which may affect on noise and engine emissions listed in the second and right side column (b) and (c) of the table under Article 24 of the CAR.
- g. Major works performed on inspection for airworthiness certification.
- h. In addition to those listed in items a through g, works required record which have effect on airworthiness, etc.

1-4-2 Entry into check sheet or its equivalent

When daily check, scheduled check, corrective action against the malfunction, etc. on the aircraft, airframe, engine, propeller, components, etc. are performed, recording form shall be prepared and following matters listed below as well as necessary matters regarding the concerned items to be recorded shall be entered into it, and a person who performed the work (or qualified mechanic for the work for which certification shall require the qualification of qualified mechanic (Qualification shall be entered with competence certificate number, except for the case that name of qualified mechanic and its qualification shall adequately controlled in accordance with approved maintenance process manual or exposition)) shall sign its name, or enter name and put seal on it. However, matters on item g may not be entered into the daily check sheet.

- a. Kind of recording form (name of check sheet, name of check record, etc.).
- b. Form number or mark for the said recording form established by the user.
- c. Type of aircraft.
- d. Nationality and registration mark.
- e. Date of performance.
- f. Location of performance.
- g. Total time (T.T) and time since last overhaul (T.S.O) or time since last check (T.S.C) at the time of performance of the work

1-4-3 Record-keeping

With regard to the records of maintenance, those listed in items a and b shall be maintained with sure in accordance with the method described in items a and b respectively. And when the aircraft and engine, propeller, etc. have been sold or title transferred, the records related to those articles shall be transferred to the new owners or users.

- a. The records listed in items ① through ④ (excluding records related to

overhaul) related to the aircraft and engine, propeller, etc. shall be maintained for 90 days since these articles were abandoned or since these articles were out of service permanently, and records listed in item ⑤ shall be maintained for one year since the said certification or by the time of next airworthiness certification, which comes later (when the concerned aircraft, or engine, propeller, etc. were abandoned or these articles have been out of service permanently, and as for the aircraft having continued airworthiness certificate, related records shall be maintained for one year since the concerned certification)

- ① Total operating hour (hour, day, cycle) of the aircraft and parts with life limit
- ② Compliance status with required matters of airworthiness directive, etc.
- ③ Details of major repair and alteration
- ④ Time since overhaul (hour, day, cycle) of the aircraft and parts specified overhaul period
- ⑤ Maintenance records representing that the certification by AOAMA (the certification of under Article 19 paragraph 1 or Article 19-2 of the Law) and the certification by the qualified mechanic (the certification of under Article 19 paragraph 2 of the Law) has been appropriately performed

b. Records of overhaul performed on the aircraft and engine, propeller, etc. shall be maintained by next overhaul (if the concerned aircraft or engine, propeller, etc. have been abandoned or these articles have been out of service permanently, the records shall be maintained for one year since the concerned overhaul.)

1-5 Special provisions

Even if the work of which category is specified in this Circular, Authority could direct required action by changing the category of work through airworthiness directive (TCD), service bulletin issued by manufacturer or approved by the authority of the state of manufacture in consideration of design (material, structure, strength, etc.) and other matters.

The air carrier can obey the approved maintenance process manual.

2. Preservation

2-1 Minor preservation

Out of works categorized as preservation, those works as listed below, which can be performed without any special knowledge and experience. Those works shall not require certification by qualified mechanic, however, shall be performed by technician

under the guidance of technician who has considerable experience, knowledge and skills, pilot with flying competence certificate of the concerned aircraft and who has taken education and training of maintenance for that aircraft, or qualified mechanic, in principle.

- a. Simple preservation works such as replacement of approved parts which do not need the adjustment of rigging or clearance and complex assembly work, replenishing and draining of oil, etc.
- b. Preflight check related to an aircraft categorized other than transport C or transport T (check and maintenance task performed during period from landing to next departure (but except for the corrective actions against the malfunctions discovered on that check and engine test run) hereinafter same meaning) (The preflight check which contains the work categorized beyond general preservation shall be excluded.) (Note)

2-2 General preservation

Preservation works other than minor preservation, such works as listed below:

- a. Fastening work of which torque is specified in the standards or at specific value.
- b. Simple adjustment or fastening work of which gap clearance or dimension is specified at specific value.
- c. Replacing parts which are approved parts inapplicable to spare part certification and parts which have obtained specification approval.
- d. Preflight check related to an aircraft categorized either transport C or transport T (The preflight check for all work categorized as falling short of minor preservation shall be excluded).
- e. Scheduled maintenance (The scheduled maintenance which contains the work categorized beyond general preservation shall be excluded (refer to paragraph 1-2o)).

(Note) For preflight check for private aircraft, see Notes for 2-2-1 of Circular No.3-024 titled "Maintenance of Private Aircraft."

3. Repair

3-1 Slight repair

Repair works not requiring the complicated check such as inspection of power plant, under slight range influence on airworthiness and uncomplicated work, such as replacing the parts which have been certified to install to that aircraft (as for replacing parts shall be limited to the parts applicable to spare part certification, such parts shall

be limited to those which have obtained that certification (including parts regarded as having spare part certification. The same thing shall be applicable in paragraph 3-2.)).

3-2 Minor repair

Repair works other than slight repair and major repair, such works as listed below:

- a. Replacing parts applicable to spare part certification which have obtained such certification (except for the work categorized slight repair).
- b. Replacing work of approved parts involving complex assembly work.
- c. Complex adjustment or fastening work of which clearance or dimension is specified at specific value.
- d. Those works of which method has been established in maintenance manual, service bulletin of the concerned aircraft, public standards, etc. are applicable to neither of items ① through ④ below:
 - ① The works requiring experienced skill.
 - ② The work requiring special instruments.
 - ③ The works using parts or equipment which have not been approved.
 - ④ The work having important effect on airworthiness.
- e. Those works newly installing the components, *parts* which have been approved to install on the concerned aircraft by the parts list (parts catalog), service bulletin, etc. in accordance with the method specified in the concerned maintenance manual, service bulletin, etc., which are applicable to neither of items ① through ⑤ below:
 - ① The work involving change in matters related to operating limitations designation.
 - ② The work newly adding major functions.
 - ③ The work requiring experienced skill.
 - ④ The work requiring special instruments.
 - ⑤ The extensive work.
- f. Non-destructive inspection.
- g. Those works with relatively high difficulty, which do not come under category of major repair.

3-3 Major repair

Those works having effect on airworthiness (excluding slight repair), those works which have not been approved for airworthiness certification, type certification, supplemental type certification (STC) or equivalent STC, those works using components or parts which have not obtained type nor specification approval, and complicated repair works having important effect on airworthiness of an aircraft, such as listed below.

- a. Stretching, splicing, welding or similar works thereby which the strength of the

primary structure may be affected.

- b. Works requiring complicated or special techniques or devices.
- c. Replacing parts applicable to spare part certification which have not obtained such certification (except for the parts regarded as having spare part certification).
- d. Overhaul work of a whole or a part (it shall mean large portion of airframe divided for such maintenance program) of airframe
- e. Those repair works using parts applicable to spare part certification or specification approval or repair of structural members for which method has not been established in the repair manual, service bulletin or public standards, which have important effect on airworthiness.

4. Alteration

4-1 Minor alteration

Those alterations not having serious effect on the weight, structural strength, engine operation, flight characteristics, or other factors involved in the airworthiness, which have been approved for type certification, STC or equivalent STC, or those alterations using equipments or parts which have been obtained type or specification approval, and newly using equipments or parts which have been approved to install on the aircraft of the same type or identical type, which have not effect on the weight and limitation of center of gravity and shall be installed on the specified position.

However, those listed below shall be recognized as minor repair instead of alteration.

- a. The works applicable to item 3-2e.
- b. Change of configuration of the said aircraft to the any configuration which has passed inspection for airworthiness certification, inspection of repair or alteration or certification by the approved organization.

4-2 Major alteration

Those works as listed below, which are not included in minor alteration

- a. The works having serious effect on the weight, structural strength, engine operation, flight characteristics or other factors involved in the airworthiness.
- b. Those works using equipment or parts which have not been approved to install on the concerned aircraft.

5. Repair or alteration which may affect noise

Those repair or alteration applicable to either item a through c below, or other repair or alteration which may affect noise, performed on the aircraft which shall be applied to Annex 2 to the CAR. However, alteration to install agricultural aerial spray

equipment, external devices for firefighting, and to install external cargo carrying device on the rotorcraft shall not be applied to noise rules.

- a. Repair or alteration accompanied by the change of configuration of the nacelle and/or other major change of configuration of an aircraft.
- b. Repair or alteration accompanied by alteration of the engines or parts (limited to the acoustic material and their parts which shall affect the noise of aircraft).
- c. Repair or alteration accompanied by a major change in performance of take-off and landing.

6. Repair or alteration which may affect engine emissions

Those repair or alteration applicable to either item a through c below, or other repair or alteration which may affect engine emissions, performed on the aircraft which shall be applied to Annex 3 to the CAR.

- a. Repair or alteration accompanied by alteration of air intake configuration of engines.
- b. Repair or alteration accompanied by alteration of the engines, fuel system and their parts (limited to the combustion chamber and other parts which shall affect engine emissions).
- c. Repair or alteration accompanied by a major alteration in engine performance.

7. Supplementary Provisions

1. This Circular shall be enforced on October 13, 2000.
2. Circular TCM-23-001B-89, titled “Maintenance and alteration of aircraft” (dated April 16, 1989) shall be superseded by this Circular.
3. The category of work on which work are under way or have been applied for official inspection upon enforcement of this Circular shall be the category ruled by the former provisions.
4. Preflight check (excluded the preflight check which contains the work exceeding minor preservation) for the aircraft categorized by transport C or transport T shall be applied to minor preservation by August 31, 2003, regardless of the provision of paragraph 2-2d.

Supplementary Provisions (October 1, 2005)

1. This Circular shall be enforced on October 1, 2005.

Supplementary Provisions (March 28, 2007)

1. This Circular shall be enforced on March 30, 2007.

Supplementary Provisions (June 30, 2011)

1. This Circular shall be enforced on June 30, 2011.

Supplementary Provisions (June 22, 2018)

1. This Circular shall be enforced on June 22, 2018

For further questions or comments regarding this Circular, please contact the following:
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Attachment table

Examples of work applicable to each category

Note 1: This table shows examples of work applicable to each category. Category of work which is not found in this table shall be determined by referring this table.

Note 2: The work which is applicable to plural categories shall be applied to the highest category.

Note 3: Grouping of airframe, power plant and parts shall be shown from the view point of aircraft system, but not work location of the aircraft to be actually performed.

1. Preservation

1-1 Minor preservation

1-1-1 Airframe

- a. Replacing defective safety wiring or cotter pins.
- b. Servicing landing gear wheel bearing, such as cleaning and greasing.
- c. Lubrication not requiring disassembly other than removal of nonstructural items such as cover plates, cowling, and fairings.
- d. Replenishing, draining and cleaning of high pressure oil tank, anti-icing/de-icing fluid tank.
- e. Replacing safety belts.
- f. Replacing seats not involving disassembly of any primary structure or operating system.
- g. Replacing side windows of the aircraft with non-pressurized cabin, where that work does not interfere with the structure or any operating system such as controls, electrical equipment, etc.
- h. Applying protective material or refinishing decorative coating of wings, fuselage, control surface, fairings, cowlings or landing gear.
- i. Applying protective material or decorative coating of the cabin, cockpit when the work does not require partial removal or disassembly/assembly of cabin, cockpit and fuselage.
- j. Repainting of identification on pipes for aircraft systems.
- k. Repairing upholstery and decorative furnishings of cabin, cockpit when the work does not interfere with any primary structure or any operating system, and does not require special works (including removal/installation).
- l. Retorquing pipes for hydraulic system

1-1-2 Power plant

- a. Cleaning, applying decorative coating of each part of engines, washing of engines without engine run.

- b. Replenishing of fuel, lubrication oil, etc.
- c. Removal or installation of nonstructural items.
- d. Replacing defective safety wiring or cotter pins.
- e. Greasing from grease cup.
- f. Draining oil or water from tank.
- g. Simple removal or installation work of accessories and pipes not accompanying complex work.
- h. Drilling of stop hole of baffle for clacking.
- i. Cleaning propeller surface or removal of decorative coating.
- j. Marking or lettering on propeller surface (except for propeller with full coated).

1-1-3 Parts

- a. Draining water from Pitot-static system.
- b. Cleaning Pitot or static tubes.
- c. Cleaning Venturi tubes.
- d. Repair or applying decorative coating of instrument panel.
- e. Restraining pipes or electrical wires.
- f. Replacing bulbs for interior illumination lights.
- g. Replenishing oil of rotating machines from outside of them.
- h. Replacing guard of toggle switch.
- i. Replacing service cord.
- j. Cleaning antennae.
- k. Replacing approved parts listed below.
 - ① Filter elements
 - ② Fuses
- l. Replacing simple electrical wires (excluding wires having serious effect on airworthiness).

1-2 General preservation

1-2-1 Airframe

- a. Cleaning, replenishing or drain of oil, applying protective material when the work requires partial removal, disassembly/assembly of cabin, cockpit or fuselage.
- b. Charging high pressure gas.
- c. Applying decorative coating exceeding touch-up (excluding the work applicable to items 2-2-1k and 2-2-1x).
- d. Check of static system.
- e. Visual check of metallic or plywood stressed covering, or major structural members.

1-2-2 Power plant

1-2-2-1 Engine

- a. Check of compression pressure of cylinder.
- b. Replacing engine exhaust pipes or intake pipes.
- c. Replacing helicoils.
- d. Replacing gaskets.
- e. Replacing primer pipes.
- f. Setting of valve gap clearance.
- g. Drilling of stop hole of the cylinder cooling fins for cracking.
- h. Applying protective material to the crank case surface.
- i. External check of turbine blades.
- j. Applying protective material outside or inside of engine.
- k. Cleaning fuel and oil strainers or filter elements for fuel and lubrication oil systems.

1-2-2-2 Propellers

- a. Retorquing attach bolts of propellers

1-2-2-3 Other parts relating to power plant

- a. Replacing pipes of various systems (excluding those applicable to minor preservation).
- b. Drilling or plugging holes on the fire wall or diaphragm.
- c. Replacing the rod end bearings.

1-2-3 Parts

- a. Calibration of zero point of the instruments.
- b. Charging batteries or adjustment of specific gravity of electrolyte.
- c. Cleaning contacts of the reverse-flow breaker.
- d. Cleaning contacts of the relays.
- e. Cleaning contacts of the generator control boxes.
- f. Check or replacing of magnetic tip detectors.
- g. Adjustment of fastening torque of the bus connecting nuts.
- h. Replacing bulbs, colored lens or reflectors of various lights (except for those applicable to item 1-1-3f).
- i. Replacing nonstructural items of the radome, etc.
- j. Insulation check of electrical wirings.
- k. Continuity check of electrical wirings.
- l. Removal or installation of batteries for aircraft or for auxiliary power unit.
- m. Periodic replacement of recorded media of software database or loading of the said software (limited to those not having effect on airworthiness, such as NAV data and In Flight Entertainment data)

2. Repair

2-1 Slight repair

2-1-1 Airframe

- a. Replacement of the parts as listed below (As for replacing parts applicable to spare part certification, such parts shall be limited to those which have obtained that certification including the parts regarded as having spare part certification). However, replacement of parts listed in items ⑥ through ⑩ shall be excluded, provided they are integrated with other instruments or combined with other systems.

- ① Tires and tubes.
- ② Wheels.
- ③ Breaks.
- ④ Break cooling fans.
- ⑤ Anti-skid transducers.
- ⑥ Altimeters.
- ⑦ Air speed indicators.
- ⑧ Rate of climb indicators.
- ⑨ Clocks.
- ⑩ Ambient temperature

indicators. b. Repair of *parts* as listed below:

- ① Interior doors.
- ② Quick access inspection panels.

2-1-2 Parts

Replacement of parts listed below:

- a. Replacement of those parts as listed below, of which functional test can be performed as they are installed in position, or of which verification of function after replacement can be easily performed with self-diagnostic function* or its equivalents, such as simple self-test function, BITE function, etc.

- ① Oxygen bottles connected with oxygen system.
- ② In-flight entertainment system.
- ③ Radio telephone (such as VHF and HF).
- ④ In-flight communication system (such as PA, FI, SI and PES).
- ⑤ Other communication system (such as ACARS and SELCAL)
- ⑥ Parts of ATA 35 (OXYGEN) and 38 (WATER-WASTE) (excluding those for preservation work).

* “Self-diagnostic function or its equivalents, such as simple self-test function, BITE function, etc.” refers to a function satisfying the following conditions:

- The soundness of the system can be confirmed using Switches, BITE or CMC, etc.
 - Test results are respectively clarified with a single value, such as Go/No Go or FAIL/PASS Indication, or the values of the test results can be identified with parameters within the permissible scope indicated in MM or TSM, etc., and the interpretation of test results is not required accordingly.
 - Confirmation using external test equipment, such as Protractor used for testing AOA, is not required.
- b. Replacement of those parts as listed below, which do not require complex verification of function, or which have obtained specification approval or which have obtained type approval for specified first aid equipment
 - ① Oxygen generators.
 - ② Specified first aid equipment.
 - ③ Portable fire extinguishers.
 - ④ Lavatory related items (except for parts applicable to preservation work).
 - ⑤ Galley related items (except for parts applicable to preservation work).
 - c. Repair or replacement of those parts as listed below, which require disassembly and verification of function, or which have obtained specification approval (except for works listed in item 1-1-1k).
 - ① Seats (excluding cockpit seats).
 - ② Litters.
 - ③ Berths.
 - d. Replacement of approved *parts* listed below.
 - ① Audio equipment.
 - ② Circuit breakers.

2-2 Minor repair

2-2-1 Airframe

- a. The repair of nonstructural items as listed below:
 - ① Fairings of wings or control surfaces.
 - ② Cowlings.
 - ③ Windshields or windows of non-pressurized cabin.
- b. The repair of those parts as listed below with regard to ribs, the leading edge or trailing edge (excluding critical area).
 - ① One or two adjacent normal shaped ribs of the wing or control surface.
 - ② Part between adjacent two ribs of the wing or control surface leading edge.
 - ③ Edge material of trailing edge and wing tip of the wing or control surface.
- c. Patch repair of fabric covering involving an area equal or less than that required to repair two adjacent ribs.

- d. The patch repair of damaged areas in metal or plywood stressed covering less than 15 cm (6 inches) in any direction without having any effect on ribs, stringers, reinforced materials, etc.
- e. Replacement or adjustment of pressure regulating valves, safety valves, selector valves, etc. of hydraulic system, high pressure air system, cabin pressurization system, etc.
- f. Patch repair of the high pressure non-integral oil tank or anti-icing fluid tank to prevent leaking.
- g. Repair of bladder type fuel tank by the reason other than fuel leaking.
- h. Replacing control cables.
- i. Swaging of control cable or cable end fitting by using certified parts and machine.
- j. Adjustment of wing or control surfaces.
- k. Adjustment of balancing on control surfaces.

- l. Servicing landing gear shock struts by adding oil, air (with dry air or nitrogen gas) or both.
- m. Adjustment of break system.
- n. Verification of fire resistant materials (verification records shall be surely maintained).
- o. Removal, installation or adjustment of deicer boots, cargo sling, agricultural aerial spray equipment, etc. from/on the concerned aircraft (limited to the case that installation of such articles has been approved upon inspection for airworthiness certification, inspection of repair or alteration, etc.).
- p. Replacing the wing tips.
- q. Replacing wing brace struts or tension cables.
- r. Replacing of bubble type windshields.
- s. Repair of slight damage on rotor blades.
- t. Adjustment of rotor blade damper.
- u. Adjustment of rotor blade tracking.
- v. Adjustment of rotor blade balancing.
- w. Repair work which requires engine test run (except for work applicable to major repair).
- x. Measuring weight and center of gravity of the aircraft.

2-2-2 Power plant

2-2-2-1 Engine

- a. Top overhaul of reciprocating engine.
- b. Removal and installation of the cylinders.
- c. Bore scope inspection of inside of the cylinders.
- d. Grinding of valves or carbon removal.
- e. Replacing the valve springs or the push rods.
- f. Installing the piston rings.
- g. Repair of cracked or broken cylinder fins (except for work applicable to general preservation).
- h. External adjustment of fuel pressure or lubrication oil pressure.
- i. Adjustment of position of fuel line cock.
- j. Replacing valve mechanism parts for intake valve, exhaust valve, etc.
- k. Adjustment of ignition timing.
- l. Replacing spark plugs or setting of spark plug gap clearance.
- m. Adjustment of carburetor for richness, idling, etc.
- n. Adjustment of opening of hot air damper for the carburetor.
- o. Replacing high tension cables.
- p. Soldering repair of the shield for high tension cables.

- q. Replacing ignition exciters (limited to use the exciter approved for spare part certification or regarded as having spare part certification).
- r. Removal, installation or inspection of the hot section of turbine engines.
- s. Replacing fan blades
- t. Installation of deferent type of engine from installed so far (limited to the type approved to install by Flight Manual of the concerned aircraft, which has spare part certification or has been regarded as having spare part certification or confirmation by Japanese Authority).
- u. Works involving engine test run.
- v. Function check of engine, auxiliary power unit or thrust reverser.
- w. Function check of fuel pump, fuel control unit or lubrication oil pump.
- x. Confirmation of surging or vibration of turbine engines.
- y. External adjustment of variable vane actuator of turbine engines.
- z. Bore scope inspection of turbine engines.
- aa. Repair of turbine engines except for repair category of major or slight repair (replacing modules, etc. of low pressure compressor, accessory gear box, main gear box, fan case, etc.).
- ab. Repair of modules not accompanying rebalancing work (replacing most front compressor blades of low pressure compressor, etc.).
- ac. Conversion of a turbine engine type based on Circular TCL-138, titled “Procedures for change of type or name in turbine engines”.
- ad. Engine washing performed with rotating the engine.

2-2-2-2 Propellers

- a. Repair of slight damage on aluminum blades.
- b. Rebalancing work of propeller after simple work without any rework (replacing adjustment parts, painting, etc.).
- c. Installation of deferent type of propeller from installed so far, which has been approved to install by Flight Manual of the concerned aircraft (limited to the type using parts which have been approved for spare part certification or have been regarded as having spare part certification).
- d. Tracking check or adjustment.
- e. External adjustment of governor.

2-2-2-3 Other works relating to power plant

- a. Replacing or adjusting turn buckles, guides, pulleys, push-pull rods, bell-cranks, etc.
- b. Grinding or repair of magnet contact points.
- c. Replacing rubber shock absorbers of engine mount.

- d. Conditioning run of transmission or gear box.
- e. Adjustment of lubrication oil pressure.
- f. Adjustment of the play for throttle, mixture control, propeller pitch control system, etc.

2-2-3 Parts

- a. Replacing parts as listed below (including bench test specified in maintenance manual, vender manual, etc.):
 - ① Mechanical instruments.
 - ② Electrical instruments.
 - ③ Gyroscopic instruments.
 - ④ Electronic instruments.
 - ⑤ Mechanical accessories.
 - ⑥ Electrical accessories.
 - ⑦ Electronic accessories.
 - ⑧ Radio communication equipment.
- b. Those works which can be performed with only removing the case (limited to not having effect on sealing).
 - ① Adjustment at adjustment point specified in the manual, etc.
 - ② Repainting of colored marks on scale plate (except for change in colored marks).
- c. Adjustment of vacuum pressure.
- d. Adjustment of warning devices.
- e. Adjustment of limit switches.
- f. Replacing connector nipples, etc. of the case.
- g. Repainting of colored marks on the glass surface (including change in colored marks approved by Flight Manual of the concerned aircraft).
- h. Replacing work of printed circuit boards in the component performed as it remains equipped on the aircraft by the method specified in aircraft or power plant maintenance manual.
- i. Those works of replacing of software media or loading of software to improve reliability by the approved method by service bulletin, maintenance manual, etc., of which change has effect on airworthiness (excluding software involving addition of major function or change to contents of matters of operating limitation designation).
- j. Those works of software change or loading without having serious effect on airworthiness, which aircraft user can change software in the limited scope specified by the manufacturer.
- k. Adjustment of parallel operation of electrical power.

- l. Replacing brushes which have been approved.
- m. Cleaning armature or replacing brushes of the electric generator.
- n. Periodic replacement of recorded media of software database or loading of the said software (limited to those having effect on airworthiness).
- o. Repair works involving engine test run (excluding works applicable to major repair).

2-3 Major repair

2-3-1 Airframe

- a. Repairs to the following primary structural items of an airframe involving the strengthening, reinforcing, splicing, and manufacturing, etc. and their material change:
 - ① Box beams.
 - ② Monocoque or semimonocoque wings or control surfaces.
 - ③ Spars or spar flanges.
 - ④ Wing stringers or chord members.
 - ⑤ Thin sheet webs of beams.
 - ⑥ Keel and chine members of boat hulls or floats.
 - ⑦ Wing main ribs and compression members.
 - ⑧ Corrugated sheet compression members which act as flange material of wings.
 - ⑨ Wing brace struts.
 - ⑩ Fuselage longerons and frames.
 - ⑪ Members of the side truss.
 - ⑫ Main seat support braces and brackets.
 - ⑬ Landing gear brace or struts.
 - ⑭ Axles.
 - ⑮ Wheels.
 - ⑯ Skis, and ski pedestals.
 - ⑰ Parts of the control system such as control columns, pedals, torque tubes, brackets, or horns.
- b. The repair of damaged areas in metal or plywood stressed covering exceeding six inches in any direction, the repair of portions of skin sheets by making additional seams, and the splicing of skin sheets.
- c. Repair of fabric covering involving an area greater than that required to repair two adjacent ribs.
- d. Replacement of fabric on fabric covered parts (limited to wings, fuselage, stabilizers, and control surfaces).

- e. The works related to rotorcraft listed below.
 - ① Replacement of outer laminations of the blade
 - ② Replacement of metal covering of blade leading edge.
- f. Replacing or repair of tail boom of helicopter (except for the case of either ① or ②).
 - ① Those changes using tail boom attached adequate certificate issued by the authority of the state of manufacture or the approved organization for aircraft maintenance and inspection (AOAMI), of which attaching bolt holes have been reworked by the manufacturer of the aircraft, and replacing work is performed with ease or not involving in-flight inspection.
 - ② Repair of tail boom only at the approved organization for aircraft maintenance or alteration (AOAMA) (limited to the organization at where the repair work of only tail boom carried in is approved), and reinstallation work after the repair is performed with ease or not involving in-flight inspection.

2-3-2 Power plant

2-3-2-1 Engine

- a. Any disassembly work exceeding top overhaul.
- b. Repair work by welding, plating, and metalizing, etc.
- c. Replacing valve guides or valve seats
- d. Replacing cylinder liners.
- e. Chrome plating of inside of the cylinder.
- f. Boring of the cylinders.
- g. Engine heavy maintenance (EHM) for turbine engines.
- h. Replacing transmission gear for helicopter (excluding partial disassembly of transmission which is performed with ease in accordance with work procedures).
- i. Overhaul of transmission for helicopter.
- j. Those replacing works of modules of high pressure compressor, high pressure turbine, low pressure turbine, etc. for turbine engines, which accompany installation or removal of main bearings.
- k. Those works related to modules for turbine engines, which accompany rebalancing work.
- l. Welding repair of major engine parts, or metalizing or plating works of major rotating parts for turbine engines.

2-3-2-2 Propellers

- a. Inlay work on wood blades.
- b. Retipping of wood propellers.

- c. Replacement of outer laminations on laminated type propeller.
- d. Replacement of metal covering of blades.
- e. Repairing bolt holes in the hub boss and inserting work of bushes.
- f. Repair of steel or plastic blades.
- g. Straitening of metal or plastic blades.
- h. Any repairing to steel hubs.
- i. Shot-peening, shot-blasting or rolling work of blades.
- j. Repair of major damages on aluminum blades.
- k. Replacement of anti-icing boots for propeller or rotor blades.
- l. Overhaul of propellers.
- m. Shortening of blades not exceeding the approved limits in the specification for the propeller.
- n. Repairs to composition blades.

2-3-2-3 Other works related to power plant

- a. Straightening or welding work of engine mounts (limited to truss construction).
- b. Patch repair of fuel tank or lubrication oil tank.
- c. Welding work (limited to major repair category).
- d. Repair of bladder type fuel tank for fuel leaking.

2-3-3 Parts

Repair except for slight repair and minor repair, or overhaul for the parts listed below or identical level of parts.

- a. Mechanical instruments.
- b. Electrical instruments.
- c. Gyroscopic instruments.
- d. Electronic instruments.
- e. Mechanical accessories.
- f. Electrical accessories.
- g. Electronic accessories.
- h. Radio communication equipment.

3. Alteration

3-1 Minor alteration

3-1-1 Airframe

- a. Those alterations of changes to aircraft weight or corresponding center of gravity, which shall not result in an increase in the maximum certificated weight or center of gravity limits of the aircraft specified in the designation for operating limitation.
- b. Those alterations to install aerial photo shooting hole in the fuselage, aerial

leaflets drop hole, airborne public address equipment, agricultural aerial spray equipment, ADF antennae, etc. using same parts and method as approved for the same type of aircraft, which shall not have any effect on the various systems, and not involving cutting of stringers, frames, etc.

- c. Those changes of dimension (clearance, etc.) desirable for manufacturing or assembly of the parts, which shall not have serious effect on strength and operating characteristics.
- d. Those changes of increasing thickness of structural members, which does not involve extensive change in design or shape.
- e. Those change of cable guide for control system, which shall not change the cable routing from that of original design.
- f. Alteration of landing gear as listed below.
 - ① Change in inner parts of shock struts.
 - ② Change in wheels (limited to change to wheels of which specification is not specified in the specification for that aircraft).
 - ③ Change in length, mechanism, etc. of landing gear parts.
- g. Work of opening hole for photo shooting in the window panel of non-pressurized cabin.

3-1-2 Engine

3-1-2-1 Engine and propellers

- a. Change in piping from fixed piping to flexible piping or vice versa.
- b. Change in routing for piping or electrical wiring.
- c. Conversion of an aircraft engine type, by using components or parts which have obtained type approval or its equivalent.

3-1-2-2 Other works related to power plant

- a. Partial changes to the cowling, which have not any effect on cooling, fire proof, strength and aerodynamic characteristics.
- b. Change in routing of piping or electrical wirings, which shall not have direct relation to airworthiness.
- c. New installation of hopper to the lubrication oil tank.
- d. Change of location of drain or vent port.

3-1-3 Parts

- a. New installation of the parts as listed below and identical level of parts to the aircraft.
 - ① Mechanical instruments.
 - ② Electrical instruments.
 - ③ Gyroscopic instruments.
 - ④ Electronic instruments.

- ⑤ Mechanical accessories.
 - ⑥ Electrical accessories.
 - ⑦ Electronic accessories.
 - ⑧ Radio communication equipments.
 - ⑨ Navigation lights.
 - ⑩ Landing lights.
 - ⑪ Taxi lights.
 - ⑫ Anti-collision lights.
 - ⑬ Instrument lights.
 - ⑭ Batteries.
 - ⑮ Audio equipment.
 - ⑯ Radome.
- b. Alteration of the parts listed below and identical level of parts (including material change).
- ① Purge valves.
 - ② Relief valves.
 - ③ Modulation valves.
 - ④ Oil separator.
 - ⑤ Filters
 - ⑥ Flexible shafts.
 - ⑦ Vibrators.
 - ⑧ Booster coils.
 - ⑨ Reverse current breakers.
 - ⑩ Relays.
 - ⑪ Electrical filters.
 - ⑫ Transformers.
- c. Those works of replacing of software media or loading of software to add new major functions by the approved method in service bulletin, etc. or change to contents of matters of operating limitation designation, which includes changes having effect on airworthiness.
- d. Those works of replacing of software media or loading of software, which was developed originally by the aircraft user without having serious effect on airworthiness.

3-2 Major alteration

3-2-1 Airframe

- a. Alteration involving design change in structural members or extensive change in their shape as listed below:

- ① Wings and stabilizers.
 - (1) New installation of tanks in the wings.
 - (2) Change in covering thickness or in wing shape.
 - (3) Change of covering from fabric to metal.
 - (4) New installation of slots, etc.
 - (5) Alteration of attaching points
- ② Fuselage
 - (1) New installation of aerial photo shooting hole, etc. (excluding items applicable to paragraph 3-1-1b).
 - (2) Change in covering thickness.
 - (3) Changes involving change in visibility.
- ③ Control surfaces.
 - (1) Change in deflection angle range.
 - (2) Alteration of hinges for control surfaces.
 - (3) Change of balance weights for adjustable stabilizer or for control surfaces.
 - (4) Change in area of control surfaces.
 - (5) Change in covering thickness or shape of cross section of control surfaces.
- b. Alteration involving design change in structural members or extensive change of their shape as listed below:
 - ① Spurs.
 - ② Ribs.
 - ③ Stringers.
 - ④ Frame.
 - ⑤ Attaching hardware.
 - ⑥ Wing brace struts or tension cables.
 - ⑦ Truss structure.
 - ⑧ Fairings.
 - ⑨ Balance weights.
 - ⑩ Mechanisms operated by hydraulic oil, high pressure air, electrical power, etc.
 - ⑪ Rotor blades.
 - ⑫ Transmissions.
- c. Those alterations of changes to aircraft weight or corresponding center of gravity, which shall result in an increase in the maximum certificated weight or center of gravity limits of the aircraft specified in the designation for operating limitation.
- d. Changes to the basic design of the hydraulic, cabin pressurization, de-icing,

heating, cooling, electrical or fuel systems, regarding such as change in pipe diameter, etc.

- e. Changes to the wing, horizontal stabilizer, vertical stabilizer or movable control surfaces which affect flutter and vibration characteristics.
- f. New installation or changes of systems or parts which have relation to strength, flight characteristics, control or ground maneuver of the aircraft.
- g. Conversion of aircraft configuration, such as from passenger airplane to cargo airplane.
- h. Those new installation of special equipment, such as agricultural aerial spray equipment, cargo sling, hoist, external sling device, which are not approved to install such equipment to the concerned aircraft.
- i. Conversion of an aircraft engine or propeller of which type is not allowed to install by the specification for that aircraft.

3-2-2 Power plant

3-2-2-1 Engine

- a. Changes in performance or structure of the engine, as listed below.
 - ① Change in rating or rev speed.
 - ② Change in compression ratio.
 - ③ Change in reduction ratio.
 - ④ Change in supercharging ratio.
 - ⑤ Change in major structural members.
 - ⑥ Change in valve timing or ignition timing.
- b. Replacement of engine inner parts with parts which are not approved parts or not approved parts.
- c. Installation of an accessory which is not approved for the engine.
- d. To use the engine without accessories that are listed as required equipment on the aircraft or engine specification.
- e. To use other grade of gasoline than approved, or other kinds or rating of jet fuel or lubrication oil than approved.
- f. Alteration of fuel system, such as installation of new fuel flow indicator, new fuel pump, etc.
- g. Conversion of thrusting method of engines (such as, from reciprocating engine to turboprop engine, from turboprop engine to turbojet engine, etc.)

3-2-2-2 Propellers, rotorcraft

- a. Shortening of blades exceeding approved limit by the specification for the propeller.
- b. Replacement of accessories with ones other than approved by the specification

for the aircraft.

- c. Changes in maximum allowable rev speed of variable-pitch propeller or allowable pitch angle range (limited to the case exceeding approved limits by the specification for the aircraft).
- d. Any alteration involving affect static or dynamic balance for propeller.
- e. Alteration of conversion from metallic fixed-pitch propellers to wooden fixed- pitch propellers or vice versa (limited to the unapproved case by the specification for the aircraft).
- f. Alteration of conversion from fixed-pitch propeller to variable-pitch propeller or vice versa.

3-2-2-3 Other works related to power plant

- a. Changes in shape, capacity, material or location of fuel tanks (including water-methanol tank) or lubrication oil tanks.
- b. Change to replacement of accessories not approved by the specification for the aircraft.
- c. Changes in material, location or shape of fire wall.
- d. Changes in shape, location or material of exhaust pipes.
- e. Changes in shape, location or material of intake ducts.
- f. Change in shape, location or material of cylinder baffle plates.
- g. Changes in shape, location or material of engine mounts.
- h. Changes in shape, location or material of cowlings or nacelles.
- i. Changes in piping location for fire extinguisher agent, material of piping or discharging range of the agent of fire extinguishing system.
- j. Changes in pipe diameter of various fluid systems.
- k. Change in shape or material of thrust reversers.
- l. Changes to the design of flight control system (including changes in material and routing).

3-2-3 Parts

- a. Alteration of parts by the method other than specified by the manufacturer.
- b. Changes to the basic design of radio communication equipment approved by type approval or TSO.
- c. Replacement of software media or loading, which is changed involving serious effect on airworthiness.