



# Airworthiness Bulletin

**AWB 01-038 Issue 1 - 27 November 2023**

## **Suspected Unapproved Part - Bell Helicopters 206, 214ST, and 505 - Main Rotor Blade Retaining Bolt Nut**

An Airworthiness Bulletin is an advisory document that alerts, educates and makes recommendations about airworthiness matters. Recommendations in this bulletin are not mandatory.

### **1. Effectivity**

Nut associated with the retaining bolt of the main rotor blade on Bell 206, 214ST, and 505 helicopters of unidentified origin.

### **2. Purpose**

To advise operators and maintenance repair organisations of a suspected unapproved part that has been supplied to industry in lieu of Original Equipment Manufacturer (OEM) PN **206-011-119-005** and Federal Aviation Administration (FAA) Parts Manufacturing Approval (PMA) PN **2AA-011-119-005**<sup>1</sup>, that could potentially compromise the structural integrity of the main rotor hub assembly.

### **3. Background**

A defect report was submitted to CASA via the online Defect Reporting System (DRS) by a maintenance organisation conducting maintenance on a Bell 206 helicopter that is registered and operating in Australia.

The nut of the blade bolt securing the main rotor blade to the hub assembly was observed to be defective, with the upper mating surface not in full contact.

Please refer to *Figure 1* and *Figure 2*<sup>2</sup> for photos of the defect. Further, please refer to *Item 7 of Figure 3*<sup>3</sup> for the location of this nut on in relation to the hub assembly<sup>4</sup>.

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<sup>1</sup> The FAA approved PMA part can only be installed on certain hub assemblies when installed on specific Bell 206 variants. Details can be found online via the FAA's '*Dynamic Regulatory System*'.

<sup>2</sup> Photographs reproduced with permission from the operator.

<sup>3</sup> Illustration reproduced with permission from the Type Certificate holder.

<sup>4</sup> Please refer to the current revision of the Illustrated Parts Catalogue to view specifics of the model you are operating or maintaining.



The retaining bolt and nut secures the main rotor blade to the hub assembly and serves to hold the grip tangs firmly together. Failure of this mechanism has the potential to result in structural failure of the hub assembly with catastrophic consequences.

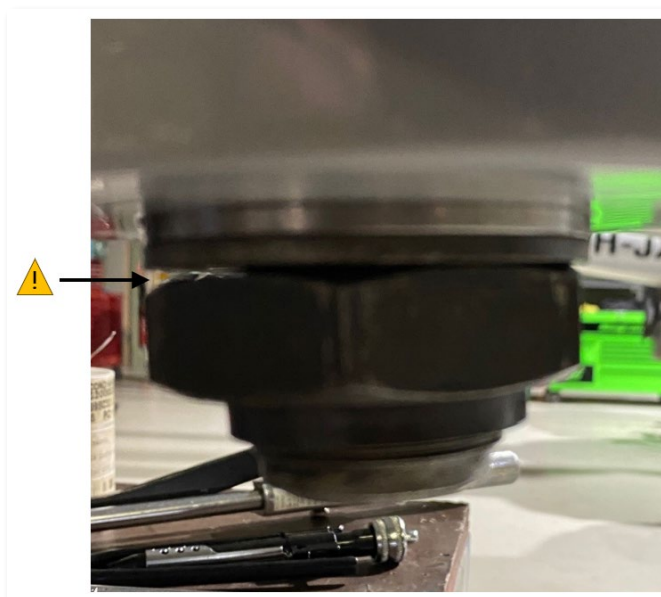


Figure 1 – Retaining bolt nut mating surface was observed to be not in full contact.



Figure 2 – Estimated contact area.

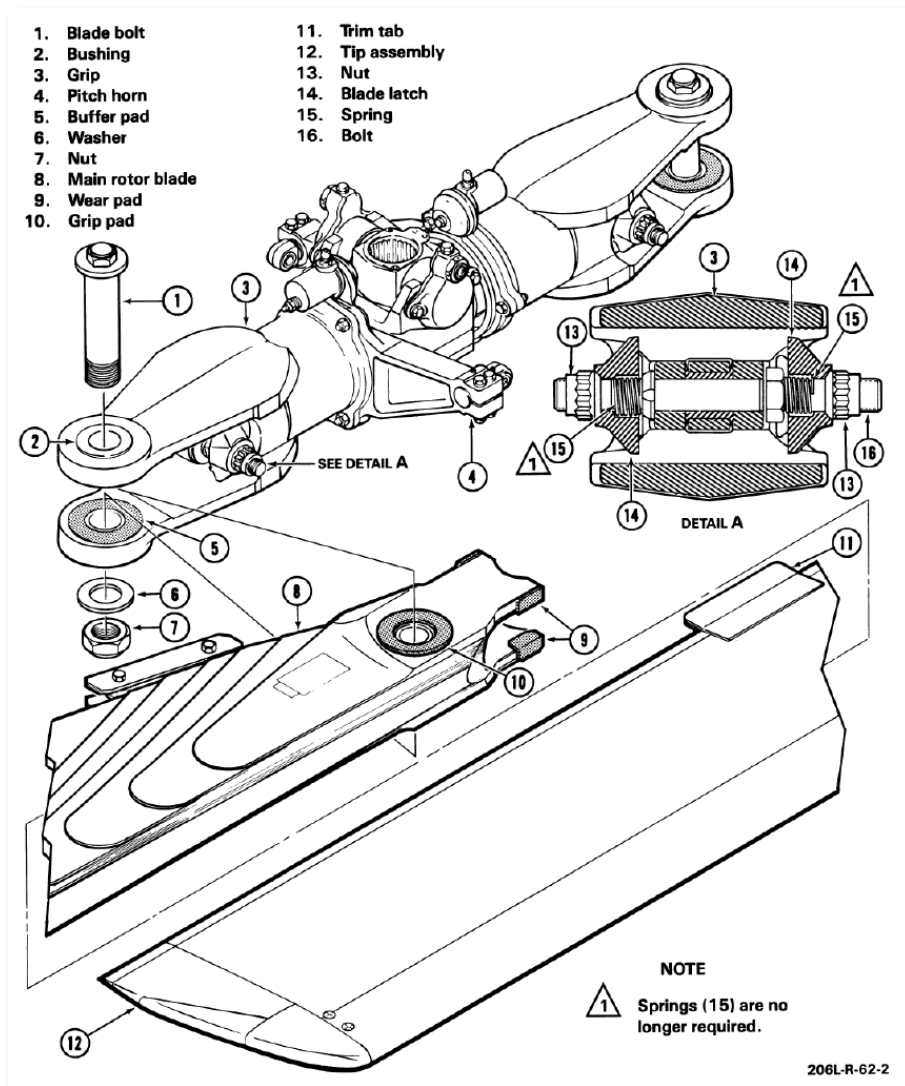


Figure 3 – Main rotor hub and blade installation typical of the Bell 206.

#### 4. Investigation and Findings

CASA has engaged with the operator, maintainer, OEM, and PMA manufacturer to establish the facts about the defective nut. CASA further requested assistance from the Australian Transport Safety Bureau (ATSB) to conduct a metallurgical analysis on the defective nut. The analysis has conclusively found that:

- a manufacturing error has occurred during formation of the major features of the nut. The bore was found to be both off-centre and at an inclined orientation.
- there was nil evidence of maintenance error (e.g. cross-threading; over-torquing)
- the defective nut had likely been manufactured using a low-carbon steel that did not meet the specifications of either the OEM or PMA part
- there are nil identification marks to indicate that the nut is either OEM or PMA.



In addition to the laboratory findings reported by the ATSB, the maintenance history and related documentation (such as stores inventory pick lists) provided to CASA by the operator and maintenance organisation have been reviewed.

As a non-serialised part, there is nil back-to-birth traceability. There is also nil record of the nut being replaced on the related main rotor hub.

Accordingly, the investigation has concluded that the defective nut is a suspected unapproved part of unknown and unverifiable origin.

## 5. Recommendations

CASA recommends that aircraft owners, operators, and maintenance organisations of Bell 206, 214ST, and 505 aircraft; and related parts suppliers and distributors inspect their aircraft and/or parts inventory for any articles that might be defective and/or from an unknown or unapproved source, noting that:

1. the OEM drawing requires that the P/N is marked in  $1/16$ " characters on two opposing wrenching flats, using a vibrating stylus or steel stamp
2. the PMA drawing requires that the P/N is marked (on two opposing wrenching flats) prior to plating by etching or laser, and then marked in permanent ink after plating.

CASA further recommends all maintainers of Bell 206, 214ST, and 505 helicopters strictly adhere to standard practices relating to the torquing of nuts, as reflected in Chapter 2 of the Bell Helicopters' *Standards and Practices Manual (SPM)*. Whilst the tare-torque being within range does not guarantee the nut has been manufactured to specifications, a reading outside of the limits stated in the SPM should not be accepted and may be an indication of a suspected unapproved part.

In the event of any findings, the following actions are recommended / requested:

1. prior to further flight, at a minimum:
  - a. replace the nut with a serviceable part of confirmed origin;
  - b. inspect the grip tangs for evidence of damage;
  - c. inspect the bolt in accordance with the corresponding Bell Helicopters Component Repair & Overhaul Manual (CR&O) to verify serviceability.If in doubt, contact the Type Certificate holder for further instructions.
2. given that the suspected nut may have historically alternated between the two rotor blade positions, it is recommended to inspect the grip tangs and bolts associated with both rotor blades
3. take photos of the defect prior to any disassembly. For close-ups, 'macro' mode on your camera will likely provide clearer photos
4. quarantine all removed parts as you may be asked to hand these over to CASA to assist in further investigations.



## 6. Reporting

Please report all findings to CASA and the Type Certificate holder, including any photographic evidence as attachments. Reports to CASA can be made via the [Defect Reporting System](#).

For further information, please refer to the defect report page on the [CASA website](#) and [Advisory Circular 20-06](#).

## 7. Enquiries

Enquiries about the content of this Airworthiness Bulletin should be made via the direct link email address:

[AirworthinessBulletin@casa.gov.au](mailto:AirworthinessBulletin@casa.gov.au)

or in writing, to:

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National Operations and Standards  
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