SERIOUS INCIDENT

Aircraft Type and Registration:	Airbus Helicopters EC175B, G-EMEA
No & Type of Engines:	2 Pratt & Whitney Canada PT6C-67E turboshaft engines
Year of Manufacture:	2016 (Serial no: 5024)
Date & Time (UTC):	10 July 2018 at 1040 hrs
Location:	Aberdeen Airport
Type of Flight:	Commercial Air Transport (Passenger)
Persons on Board:	Crew - 2 Passengers - 16
Injuries:	Crew - None Passengers - None
Nature of Damage:	Nose landing gear collapsed and minor damage to forward fuselage
Commander's Licence:	Airline Transport Pilot's Licence (Helicopters)
Commander's Age:	54 years
Commander's Flying Experience:	276 hours on type Last 90 days -119 hours Last 28 days - 33 hours
Information Source:	Air Accident Report Form sent to the pilot, Incident investigation report carried out by the operator and subsequent enquiries

Synopsis

The helicopter was returning to Aberdeen after a routine passenger flight. During a normal approach to land the landing gear appeared to deploy normally but at touchdown the nose landing gear collapsed due to the failure of the A-frame pintle pin. Owing to a low fuel state the passengers were disembarked whilst the helicopter was in a low hover. The aircraft was then landed safely, using sandbags to support the fuselage.

During the subsequent investigation, the operator identified that a bush, which should have supported the pintle pin, had not been fitted into the A-frame when it was installed 50 flying hours before the incident flight (Figure 1). The investigation identified several human factors issues which contributed to the accident, including shift staffing levels, lack of experience and fatigue. The helicopter manufacturer subsequently published Service Information Notice 3259-S-32 notifying operators of this failure mode and an Alert Service Bulletin (ASB) 32A003, requiring an inspection to ensure the correct installation of the pintle pin bushing. The ASB was subsequently mandated by EASA Airworthiness Directive 2018-0190.

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History of the flight

The helicopter had returned to Aberdeen and completed a normal approach to land. When the landing gear was selected DOWN, all the indications were normal but during the landing the flight crew heard a "crunching noise" and the helicopter appeared to settle in a more nose-down attitude than normal. The flight crew brought the aircraft back into the hover and requested assistance from their engineering organisation.

An inspection, conducted while the helicopter was hovering, confirmed that the nose landing gear actuator had separated from the A-frame and both were hanging from the landing gear bay. Due to a low fuel state, passengers were disembarked with the helicopter in a low hover. It was then hover taxied to another stand where it landed on sandbags, placed by ground engineers, to support the forward fuselage.

Investigation

A subsequent examination, carried out by the operators engineering organisation, identified that the separation of the A-frame from the actuator had been caused by failure of the pintle pin which secured the A-frame to the landing gear actuator (Figure 1). The head of the failed A-frame lower pintle pin was identified during an inspection of the landing site. The pintle pin bushing was found to be missing from the installation.

Approximately 50 hours prior to the incident flight, on 7 June 2018, the A-frame (Figure 1) had been replaced during a routine maintenance input following reports of "notchy" steering.

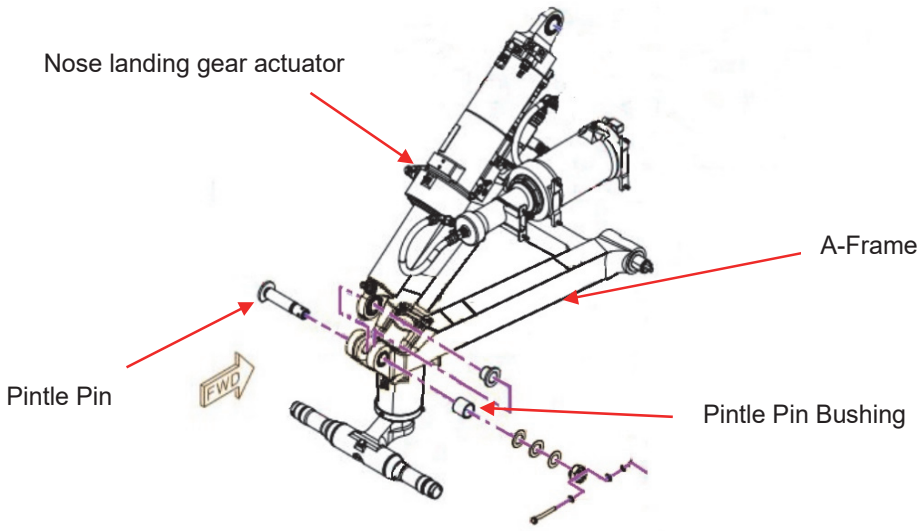

Figure 1

EC175 Nose landing gear actuator and A-frame

The operator's investigation identified that the Aircraft Maintenance Manual (AMM) procedure, detailed on a number of work cards, for the replacement of the A-frame had not been completed correctly. This details that on removal the pintle pin bushing has to be removed from the A-frame being replaced and installed in the replacement A-frame.

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This transfer had not been carried out, so the A-frame fitted to G-EMEA did not have a pintle pin bushing fitted. The design of the nose landing gear is such that, when the nose landing gear actuator is attached to the A-frame confirmation of the presence of the pintle pin bushing is problematic. An independent inspection, carried out on completion of the task, did not identify that the bushing had not been installed. The lack of bushing caused wear and eventual failure of the pintle pin.

Information, obtained by the operator after this event, showed that, prior to this incident at least two other operators had experienced similar events. Following these events, the helicopter manufacturer issued an update to the AMM work cards relating to the A-frame replacement on 15 June 2018. The revisions made the wording relating to the re-installation more explicit and provided an additional diagram to highlight the correct installation of the bushing. The updated work cards were received by the operator on 18 June; 11 days after the replacement of the A-frame.

The investigation also identified that the engineer tasked with the replacement of the A-frame was also responsible for supervising a team of non-type rated engineers and had not completed the task before. In addition, the engineer had only taken two rest days over the preceding 31-day period. This had not been identified by the shift managers and contravened the company's fatigue management procedures. It is possible that these factors contributed to the failure of the engineer to transfer the bushing.

Safety action

Following this incident to G-EMEA, the operator revised its procedures regarding work time monitoring and reminded staff of their responsibilities to follow company fatigue management procedures. The operator introduced a 'complex task' job card for the H175 nose landing gear leg replacement task. Additionally, the operator reviewed the engineering manpower, supervision and experience levels needed for base maintenance inputs.

On 13 July 2018, the helicopter manufacturer published Safety Information Notice (SIN) No 3259-S-32 which notified other operators of this, and previous, nose landing gear pintle pin failures. The SIN highlighted the need to remove and reinstall the pintle pin bushing during A-frame replacement.

As a result of another operator identifying an incorrectly fitted pintle pin bushing, the helicopter manufacturer published Emergency Alert Service Bulletin (ASB) 32A003 in August 2018. This required a one-off inspection of the EC175 nose landing gear pintle pin bushing. In addition, operators were required to review helicopter maintenance records to identify any occasions where bushings had been misinstalled or found not fitted. ASB 32A003 was subsequently mandated by the EASA with the publication of Airworthiness Directive 2018-0190 on 31 August 2018.

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