Standards Parts
Concerns & Solutions

The opinions are that of the presenter.

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Background

- **Standard parts – nuts & bolts**
  - Used on many aircraft
  - Gov't or industry standard
  - No gov't approval or oversight

One of the failed nuts on an Airbus

- **EASA actions**
  - Some nuts failed too frequently (MS21042 & NAS1291)
  - Drafted Continued Airworthiness Review Item (CARI)
  - Received industry push back

Standard Fastener WG Objective

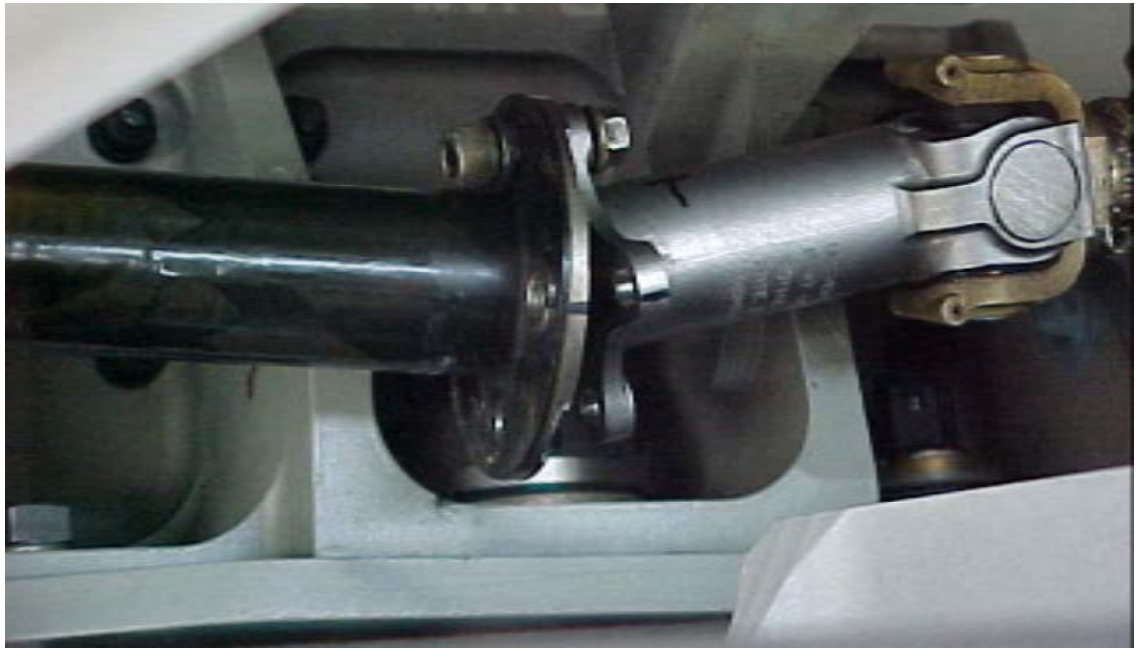
Industry requests a coordinated decision & action on the standards parts issue

- **Cont'd airworthiness**
- **New type designs**

Single-Nut Failure Scenario

- **Tail rotor drive shaft – 2015 accident**
- **Only 1 nuts or bolts needs to fail**
- **Multiple nut & bolt vendors**

Multiple-Nut Failure Scenario



- **Focus**
  - **Thin-walled high-strength steel nuts**
  - **Transport cat. airplanes & rotorcraft**
  - **Failure that prevent cont'd safe flight**

Reported Problems

Aircraft Design		Reports
	Inappropriate for critical applications	None
	...	None
Manufacturing		
	Cracks	Many
	Visual Defects	Many
	Improper Locking	Some
Installation		
	Galling	None
	...	None

Causes

Cracks	Hydrogen Embrittlement	Manufacturing Induced Cracks, Folds, Seams	Wrong Metal Composition
Visual Defects	Gouges, Nicks	Improper Threads	
Improper Locking	Improper Geometries		

Solutions ?

- **Focused quality checks?**
  - On the nuts
  - On the manufacturer

- **Qualified standard fasteners?**
  - Consistently meet quality standards
  - Authorities promote / require qualified fasteners

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