



# Federal Aviation Administration

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## Memorandum

Date: June 30, 2009

To: Jorge A. Castillo, Acting Manager, Rotorcraft Standards Staff, ASW-110

From: Mark R. Schilling, Acting Manager, Rotorcraft Directorate, ASW-100

Prepared by: Sharon Miles, ASW-111

Subject: Equivalent Level of Safety (ELOS) Finding for Bell Canada Certification/Type Validation on Model 429 Helicopter

ELOS Memo No.: TC2486RD-R/A-2

Regulatory Ref: 14 CFR part 27 for §§ 27.307(b)(5), 27.723, 27.725, 27.727

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This memorandum documents an evaluation made by the Rotorcraft Directorate on the establishment of an ELOS finding for the Bell Model 429 helicopter.

### **Background**

Bell Helicopter Textron Canada, Limited (BHTCL) has applied for a finding of ELOS for its Model 429 skid landing gear as regards 14 CFR part 27 for §§ 27.307(b)(5), 27.723, 27.725, 27.727, whereby a finding of compliance is proposed to be accomplished by analysis rather than by test. BHTCL applied to Transport Canada Civil Aviation (TCCA), the Certification Authority, and FAA as the Validation Authority. TCCA has granted an ELOS finding.

### **Applicable regulations**

14 CFR part 27 for §§ 27.307(b)(5), 27.723, 27.725, 27.727

### **Regulations requiring an ELOS finding**

14 CFR part 27 for §§ 27.307(b)(5), 27.723, 27.725, 27.727

### **Description of compensating features or alternative Methods of Compliance (MOC) which allow the granting of the ELOS (including design changes, limitations or equipment need for equivalency)**

The finding of compliance against the aforementioned paragraphs would be done by finite element analysis.

Finite element analysis is a widely used analysis software for modeling dynamic events such as impacts and drop tests. The software was used to size the design of the initial gear prior to testing.

A comparative evaluation of the finite element analysis landing gear drop test predicted behavior versus actual drop test data was carried out for a number Bell helicopter models. The results show very good correlation between analysis and test in terms of loads and accelerations.

**Explanation of how design features or alternative Methods of Compliance (MOC) provide an equivalent level of safety intended by the regulation**

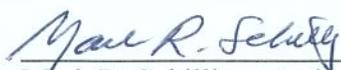
An Equivalent Level of Safety finding should be approved for 14 CFR part 27 for §§ 27.307(b)(5), 27.723, 27.725, 27.727 to allow use of the BHTCL finite element analysis for the Bell 429 landing gear based on the predicted behavior and actual test data showing very good correlation between analysis and tests in terms of loads and accelerations.

**FAA approval and documentation of the ELOS finding:**

The FAA has approved the aforementioned ELOS finding in project issue paper A-2. This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The Rotorcraft Directorate has assigned a unique ELOS Memorandum number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS Memorandum number should be listed in the Type Certificate Data Sheet under the Certification Basis section. As example:

Equivalent Safety Findings have been made for the following regulations:

14 CFR part 27 for §§ 27.307(b)(5), 27.723, 27.725, 27.727 documented in ELOS Memo TC2486RD-R/A-2.



Mark R. Schilling, Acting Manager, Rotorcraft Directorate,  
Aircraft Certification Service, ASW-100



Date