

FACTUAL REPORT - ATTACHMENT 7

FAA-NTSB Correspondence

AIRWORTHINESS

ERA21FA233

McKenny Van

From: Torgerson, Anne (FAA) [REDACTED]
Sent: Monday, July 19, 2021 9:44 AM
To: McKenny Van
Cc: Hempen, Patrick (FAA); Rigsby, Matthew (FAA)
Subject: NTSB Request 21-
Attachments: BHI-200-111 PSCP Rev D final 9-13-19-FAA Acc.pdf

Follow Up Flag: Follow up
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Categories: Active Investigation

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Hi Van,

This is in response to NTSB Request 21-241. Please see response below and the attached document.

1) SR00933DE PSCP: Please provide PSCP for the project (Most recent revision prior to certification) Doc No BHI-200-111 Rev. D, Dated 04-Sept-2019: PROJECT SPECIFIC CERTIFICATION PLAN -BLACKHAWK MISSION EQUIPMENT, LLC - SUPPLEMENTAL TYPE CERTIFICATE for the UH-60A & S-70A/C MODEL HELICOPTER - INTERNAL WATER TANK & SNORKEL INSTALL-FAA Project No. ST7314DE-R - *We reviewed the document and found no proprietary mark or stamp. Document is attached.*

2) STC SR00933DE SSA: Please provide System Safety Assessment for the project Doc No: BHI-214-101, REVISION: A, DATE: FEBRUARY 3, 2020 – FUNTIONAL HAZARD ASSESSMENT AND SYSTEM SAFETY ASSESSMENT FOR THE INTERNAL WATER TANK AND SNORKEL ON THE BLACKHAWK MISSION EQUIPMENT, LLC UH-60 & S-70 SERIES ROTORCRAFT - *We reviewed this document and found that it does contain a proprietary mark. The body of the report does not, but an appendix A, added in this revision, does have a proprietary mark. This report is a copy of a hose strength test done by RKG Enterprises of San Antonio Texas. This document is not attached.*

3) STC SR00933DE: Snorkel pull test. Was the lightning cable evaluated and tank structure considered? Was a fully integrated test performed? To address this question, the FAA used the following documents:

- 1. FHA/SSA report BHI-214-101, Rev A, dated 02/03/2020 – *We reviewed this document and found that it DOES contain a proprietary mark in appendix A. This document is not attached.***
- 2. Structural Analysis report BHI-212-115, Rev IR, dated 29 Apr 2020– *We reviewed the document and found no proprietary mark or stamp. This document is not attached, but can be provided.***
- 3. Weight and Balance Report BHI-212-221 Rev IR, dated 03/02/2020 - *We reviewed the document and found no proprietary mark or stamp. This document is not attached, but can be provided.***
- 4. Master Drawing List MDL BME-007-MDL, Rev A, and sub-drawings –*We reviewed these documents and found that all drawings contain proprietary markings including the MDL and:***
 - Tank Assembly drawing – LECA180002*
 - Hose Assembly Drawing – BME-007-100*
 - Tank Assembly Installation Drawing - BME-007-001*
 - Wire Routing Drawing – BME-007-200*
 - These documents are not attached.*

- **SR00933DE Snorkel Company pull tests: Were power and bonding cables considered?** No. From appendix A of FHA/SSA (ref 1), there is no evidence that either were installed during this company pull test

- **SR00933DE Snorkel Company pull tests: Were the tank structure and orientation considered?** No. In appendix A of FHA/SSA report (ref 1), there is no evidence that tank structure or tank orientation were considered during this company pull test. The report states, the purpose of the test was to determine the strength of the hose assembly (which did not include the bonding cable and power cable). - Appendix A of the FHA/SSA report (ref. 1) shows images/pictures of the hose installation in the test fixture. The installation angle in the fixture does not match the installation angle when installed on the water tank with respect to gravity (reference drawing BME-007-001).

SR00933DE Snorkel company pulls test: Was a fully integrated test performed (tank, hose, pump power cables, and bonding cables installed to be representative of type design installation)? - No. The FAA found no fully integrated test data or representative mock up test.

The stated mitigation in FHA/ SSA (ref 1), table 2, item 7 for the pump snagging on underwater hazards is the pump assembly separates from the aircraft/ hose at 2500 lbf. It is not clear where this 2500 lbf mitigation value comes from, how it is verified, controlled or maintained.

Appendix A of FHA/ SSA (ref. 1) states that it is a test of the hose assembly strength therefore is not a functional test of any calibrated pump separation/breakaway requirement. Further, drawing BME-007-200 (hose assembly-ref 4) has no information (a limit, control, or calibration) regarding a 2500 lbf functional separation/breakaway requirement for the pump from the hose.

Stress report (ref 2) analyzes the water tank to snorkel attachment strength. The FAA found the hose weight in this report isn't consistent with the Weight and Balance report (ref. 3). Additionally the stress report does not consider pump operating cases (i.e. pump thrust + water weight in hose + hose weight), and does not consider a 2500 lbf (pump separation/breakaway requirement) load imparted by the hose to the tank connection as a mitigation.

Have a great day.

Anne

Anne Torgerson
Aviation Safety
Accident Investigation, AVP-100
FAA
800 Independence Ave., SW
Washington, DC 20591
[REDACTED]

McKenny Van

From: Rigsby, Matthew (FAA) [REDACTED]
Sent: Tuesday, January 25, 2022 6:42 AM
To: McKenny Van
Cc: Cabak, Matthew (FAA); Hempen, Patrick (FAA); Reinert, Mike (FAA)
Subject: RE: DEN ACO questions

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Van, Apologies for the delay, on these answers and some full answers still reside with the DER's. A lot these questions are why the FAA is creating a working group to evaluate current and future similar STC applicants.

1. *Why wasn't the snorkel hose classified as an external load? Non jettisonable, Class D external load? (29.865)*

During development of the **(Project Specific Certification Plan)** PSCP, it was felt that 29.865 is directed toward human external cargo and non-human external cargo. As discussed in ref /1/, the proposed certification basis from the original submission of the project specific certification plan (PSCP) BHI-200-111, Rev IR to the final PSCP rev D did not have 29.865 in the certification basis for the project, because the snorkel was not considered external cargo load.

The load classification (A, B, C or D) was not considered given the background above.

2. *If it's not an external load, then is it classified as structure and that rotor blade clearance must be verified? (29.661)*

Yes the hose's structural aspects were required to be consider by the PSCP and finding of compliance was required for the project to the 29 Subpart C- Strength Requirements.

With respect to 29.661 – rotor blade clearances during operation, the applicant's proposed certification basis from the original submission of the project specific certification plan (PSCP) BHI-200-111, Rev IR to the final PSCP, rev D did not have 29.661 in the certification basis for the project.

At the time of project development, the FAA Standards Staff reviewed the PSCP with no comment regards to the lack of 29.661. Further, the Seattle ACO was working a very similar snorkel project which also did not include 29.661 in that applicant's certification basis. The FAA team accepted the applicant's proposed certification basis which did not include 29.661.

3. *Why didn't the tank structural analysis include lateral loads on the snorkel support?*

Subpart C-Strength Requirements in the PSCP, for General (29.301, 29.303, 29.305(a), 29.307(a)), for flight loads (29.321-29.251 & 29.561(a)(c)) were part of the certification basis. This would have required determination of the lateral and dynamic forces on the snorkel to be used in the analysis.

As recorded in the NTSB's verbal interview notes with Airframe delegated project DER, Rolf Hammerquist; Rolf states "*Lateral or dynamic loading of the snorkel support appears to not have been considered*". The report father noted that "*Generally, Mr Hamerqusit thought that the program would have been looking at lateral loads on the*

snorkel support, but he could not recall if it was discussed or if there was rationale for not including it in the analysis.”

4. Why didn't the tank structural analysis include the vertical snag load of 2500 lbs on the snorkel support?

The static strength of the hose assembly was tested. Recommend reaching out to the following DERs if additional info is needed:

- Rolf Hammer –FAA Airframe DER
Phone: [REDACTED]
E-mail: [REDACTED]
- Todd Seach – FAA Mechanical System DER (including system safety assessment)
Phone: [REDACTED]
E-mail: [REDACTED]
- Frankie Marrero BME project manager (Formerly FAA Management DER)
Phone number [REDACTED]
E-mail: [REDACTED]

5. Why the FHA/SSA doesn't address snorkel contact with rotor system?

The FHA/SSA did not include snorkel contact to the rotor system due to required compliance to 29.251 – Vibration, using flight testing. Flight Test data showed that under normal operating parameters the snorkel structure would not create excessive vibrations to lead to the failure mode of the snorkel contacting the rotor system. This results satisfied 29.1309, “The equipment, systems, and installations whose functioning is required by this subchapter must be designed and installed to ensure that they perform their intended functions under any foreseeable operating condition.”

Recommend reaching out to the following DERs if additional info is needed.

- Rolf Hammer –FAA Airframe DER
Phone: [REDACTED]
E-mail: [REDACTED]
- Todd Seach – Mechanical System DER (including system safety assessment) contact:
Phone: [REDACTED]
E-mail: [REDACTED]
- Frankie Marrero BME project manager (Formerly FAA Management DER)
Phone number [REDACTED]
E-mail: [REDACTED]

6. Why didn't flight-test either test at angle of bank (AOB) greater than 30 degrees or establish a 30 aob limitation?

From LA Flight Test: Flight Testing was accomplish up to 30 deg. AOB in both directions (see table 5) as can be found in the company flight test report BHI-213-107, Rev A. There was not an AOB limitation created by the applicant as part of the STC.

NOTE: The basic flight manual for this TC does include a 30 deg AOB limitation for sling loads and hoist loads, although this would not clearly apply to a snorkel operations

Best Regards,
Matthew Rigsby
Sr. Accident Investigator
FAA Office of Accident Investigation, AVP-100

North Tower, 5N-318
10101 Hillwood Parkway
Fort Worth, TX 76177

Please feel free to provide Feedback:

http://www.faa.gov/about/office_org/headquarters_offices/avs/stakeholder_feedback/avp/

From: McKenny Van <van.mckenny@ntsb.gov>
Sent: Thursday, December 2, 2021 2:18 PM
To: Rigsby, Matthew (FAA) <Matthew.Rigsby@faa.gov>
Subject: DEN ACO questions

Matt,

Here are the main questions I have regarding the certification of the BME STC.

1. Why wasn't the snorkel hose classified as an external load? Non jettisonable, Class D external load? (29.865)
2. If it's not an external load, then is it classified as structure and that rotor blade clearance must be verified? (29.6611)
3. Why didn't the tank structural analysis include lateral loads on the snorkel support?
4. Why didn't the tank structural analysis include the vertical snag load of 2500 lbs on the snorkel support?
5. Why the FHA/SSA doesn't address snorkel contact with rotor system?
6. Why didn't flight-test either test at aob greater than 30 degrees or establish a 30 aob limitation?

VAN S. MCKENNY IV
Aerospace Engineer (Helicopters)
National Transportation Safety Board

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McKenny Van

From: Rigsby, Matthew (FAA) [REDACTED]
Sent: Tuesday, May 3, 2022 8:28 AM
To: McKenny Van
Subject: PCP question

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Van, talking with the AIR folks the aircraft is ELIGIDABLE to do External load per the TC, but would still need to get FSDO (certificate office) approval to do so. See matts wording below.

Best Regards,
Matthew Rigsby
Sr. Accident Investigator
FAA Office of Accident Investigation, AVP-100
[REDACTED]

North Tower, 5N-318
10101 Hillwood Parkway
Fort Worth, TX 76177

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http://www.faa.gov/about/office_org/headquarters_offices/avs/stakeholder_feedback/avp/

From: Bryant, Matthew (FAA) <Matthew.Bryant@faa.gov>
Sent: Friday, April 22, 2022 8:04 AM
To: Rigsby, Matthew (FAA) <Matthew.Rigsby@faa.gov>
Subject: RE: Blackhawk Mission Equipment, UH-60A, SR00933DE Updated NTSB MEMO

Matt,
The part 21.25 regulation is below: Yes the can do operations under the items highlighted below.

I would check with flight standards, but as I understand it the external load operations as part (1), (2) or(3), they would still need to gain FSDO approval to operate under part 91 and part 133.

Hope this answers your question. If not let me know.

Part 21.25

[(a) An applicant is entitled to a type certificate for an aircraft in the restricted category for special purpose operations if he shows compliance with the applicable noise requirements of Part 36 of this chapter, and if he shows that no feature or characteristic of the aircraft makes it unsafe when it is operated under the limitations prescribed for its intended use, and that the aircraft--]

(2) Is of a type that has been manufactured in accordance with the requirements of and accepted for use by, an Armed Force of the United States and has been later modified for a special purpose.

(b) For the purposes of this section, "special purpose operations" includes--

(1) Agricultural (spraying, dusting, and seeding, and livestock and predatory animal control);

(2) Forest and wildlife conservation;

(7) Any other operation specified by the [FAA].

From: Rigsby, Matthew (FAA) [REDACTED]
Sent: Thursday, April 21, 2022 10:39 AM
To: Bryant, Matthew (FAA) [REDACTED]
Subject: RE: Blackhawk Mission Equipment, UH-60A, SR00933DE Updated NTSB MEMO

Matt on the PSCP page 13 on certification basis paragraph the highlighted portions below that mention rotorcraft external loads and carriage of cargo, does that mean anything in the restricted TC R0012DE, is applicable?? Limitation and permissions etc..

Certification Basis

This STC project certification basis is 14 CFR Part 21.25(a)(2), (b)(1)(2) and (b)(7), and 14 CFR Part 29 Amendment 29-1 through 29-24.

*Ref. The BHI H60 (UH-60A) series helicopter are type certificated restricted category helicopters certified to 14 CFR Part 21.25(a)(2), (b)(1)(2) and (b)(7), **Part 29 AMDT 29-0 rotorcraft external load operations and carriage of cargo.** (Ref. TC R0012DE)*

Ref. The Sikorsky (S-70A (H5NE) & S-70C (H3NE)) series helicopter are type certificated restricted category helicopters certified to 14 CFR Part 21.25(a)(2), (b)(1)(2) and (b)(7), Part 29 Amendment 29-1 through 29-24, rotorcraft external load operations and carriage of cargo. (Ref. TC H2NE, H5NE & H3NE)

Best Regards,
Matthew Rigsby
Sr. Accident Investigator
FAA Office of Accident Investigation, AVP-100
[REDACTED]

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