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## Mandatory Action Jan. 2017

**Issue Date**

January 2017, Rev. 1

**Subject**

Inspection of the Horizontal Stabilizer tail attachment brackets

**Affected Models**

All CH (Chris Heintz designs) series of aircraft. This includes the Zodiac and STOL models.

All Canadian Advanced Ultralight CH (Chris Heintz designs) series of aircraft.

**Compliance Time**

Before next flight

**Required Parts**

As required

**Inspection Frequency**

Annual (on-going)

**Subject/Purpose**

Transportation Safety Board of Canada - **AVIATION SAFETY ADVISORY A1600137-D1-A1**  
**Zenair Zodiac CH-601A—Risk of structural failure of the horizontal stabilizer**

**Inspection:**

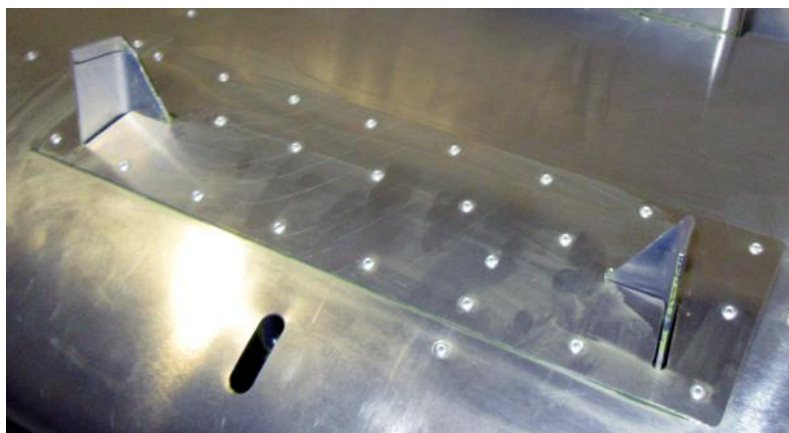
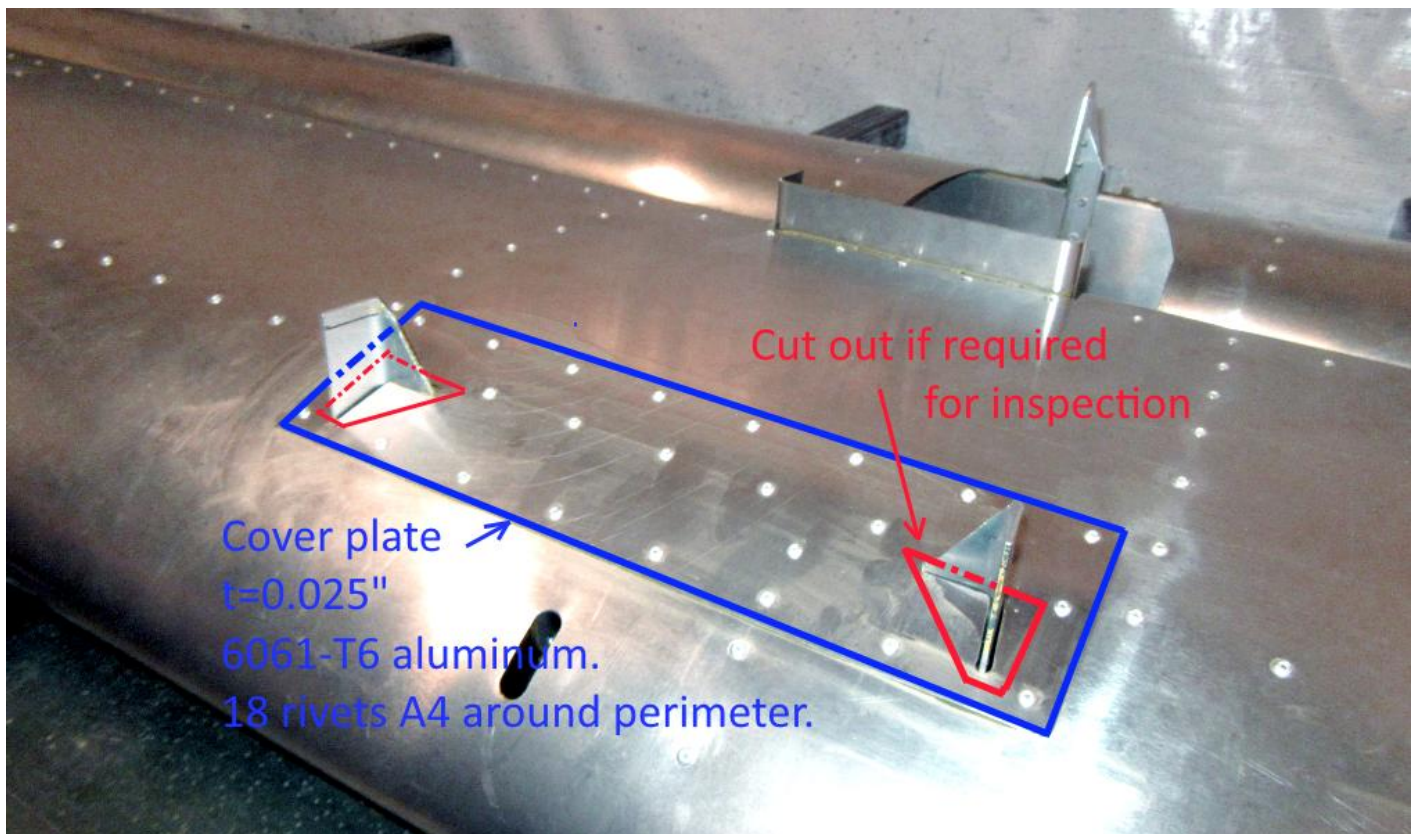
Remove the Horizontal Stabilizer (H.S.) rear and front attachment bolts. Clean the area and inspect the parts. Look for cracks, deformation, improperly installed rivets, rivet and bolt edge-distances, material thicknesses, check that the riveted joints are fastened tightly together and everything else at the attachment brackets on the fuselage and H.S. Inside the H.S., the upper parts of the forward attachment brackets and associated rivets and holes could be viewed by shining a flashlight through the triangular cut-out which the bracket comes out of.

Use the Airframe Drawings, the Design Standards manual and the assembly instructions when inspecting. If you do not have all the information, purchase it from Zenair Ltd.

<http://zenair.weebly.com/zenair-service-area.html>

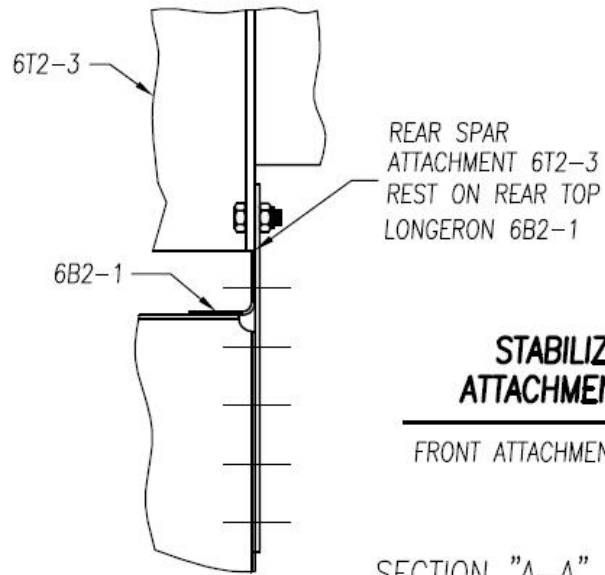
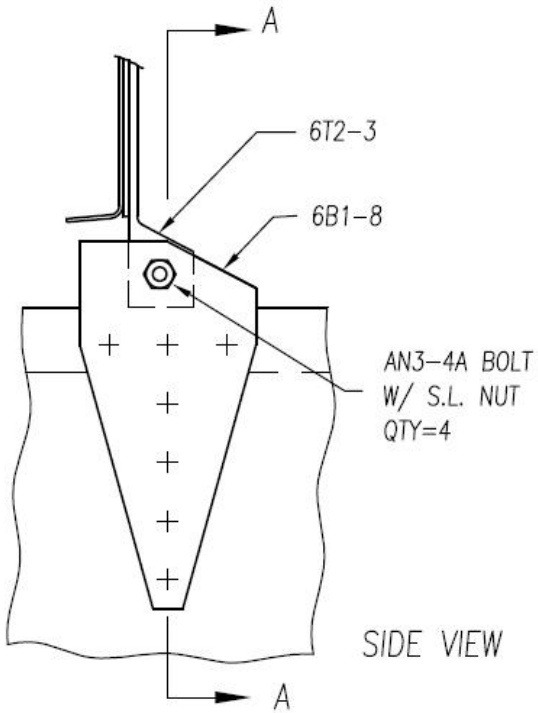
If you did not assemble the airframe, hire a certified aircraft mechanic to complete the inspection.

If you are not able to properly inspect inside the H.S. forward attachment brackets and associated rivets, cut out the area as shown in the following sketch. Add a cover plate after inspection as shown. Fasten into place with 18 rivets A4 around the perimeter of the cover plate.

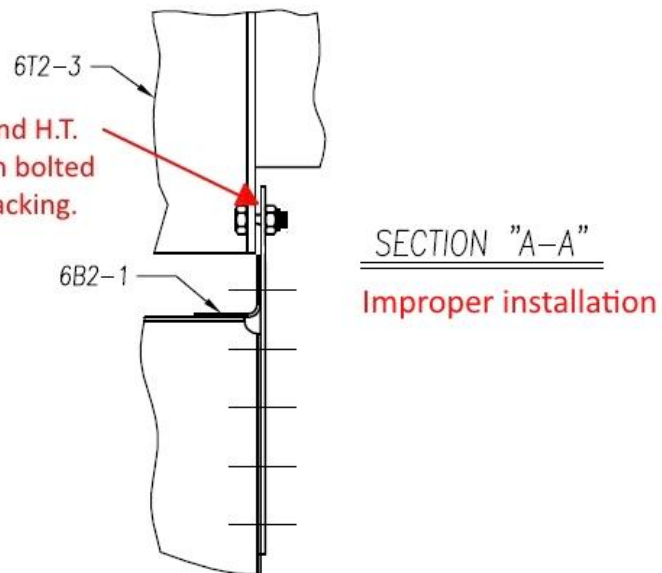


If the brackets are to be replaced, the cut out holes can be made larger. See FAA AC-43-13-1B section 4-32, Figure 4-16 when adding a covering.

Inspection continued.

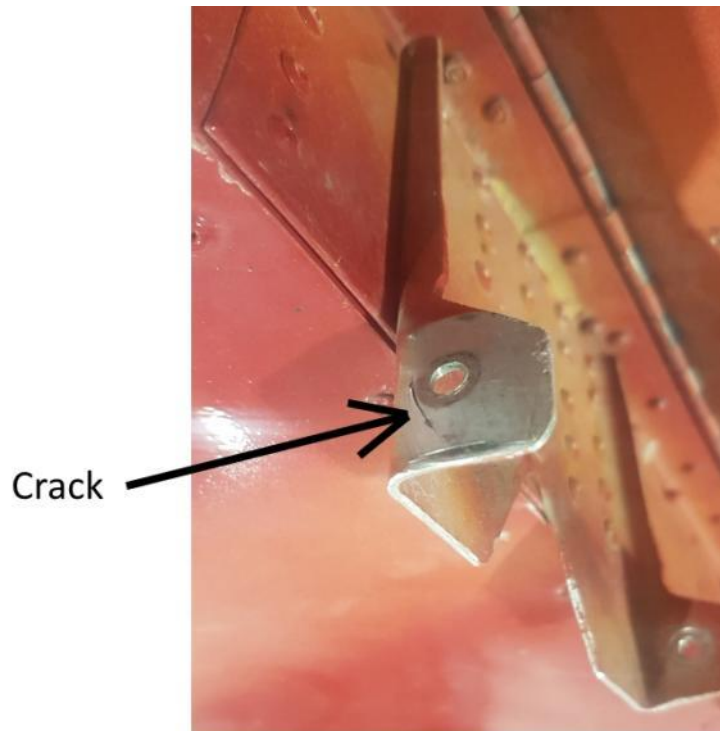


Gap between the fuselage fitting and H.T.  
is not acceptable. Parts will be stressed when bolted  
resulting in possible cracking.



Above assembly drawing is for a typical CH 601 aircraft. Each CH design is different. Use your airframe model blueprints (drawings) and not the above example for inspection and installation.

Inspection continued.



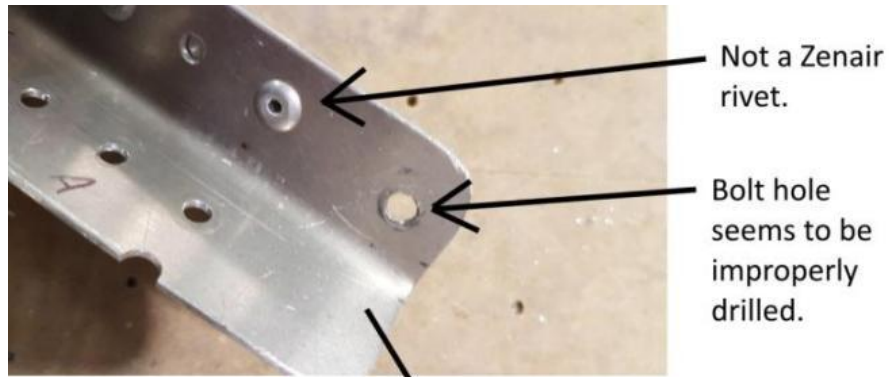
View of H.S. rear attachment bracket. A crack is developing in the part. Part must be replaced.



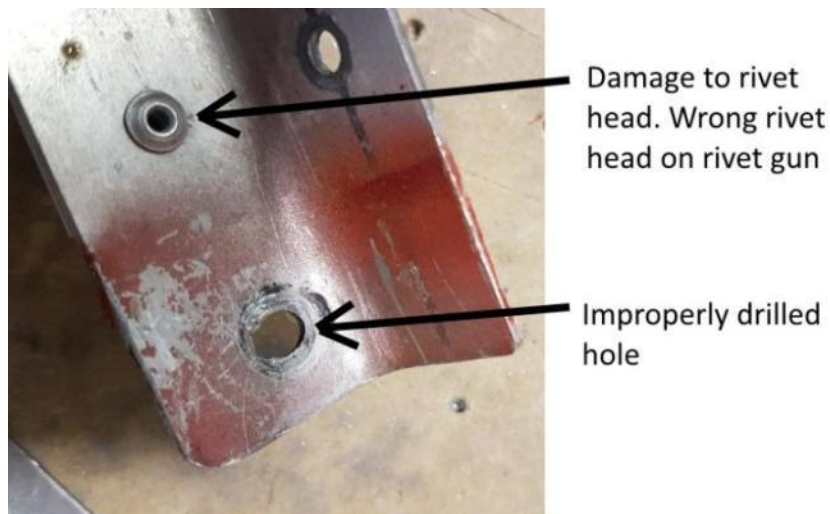
Strange hole.  
Part must be changed.

View of H.S. front attachment bracket. Bolt hole was not properly drilled. Part must be replaced.

Inspection continued.



Bracket attaching horizontal stabilizer to fuselage.  
This is not an original bracket.



Above parts must be replaced.



Above part must be replaced.

Inspection continued.



Above part must be replaced. The two above photos are from the same aircraft. It is possible that due to an elongated hole, the stabilator bracket cracked as the bolt was moving in the hole.



Above part must be replaced.

Above photos are from a few CH 601 aircraft. Each CH design is different. Use your airframe model blueprints (drawings) and not the above examples for inspection and installation.

**Action:**

Replace parts that do not match the aircraft airframe blueprints (drawings). Replace parts that have been drilled or assembled incorrectly. The H.S. must fit snug to the fuselage fittings. Bolts when tight must not bend the H.S. fittings. Correct type rivets must be installed properly as per the design standards manual. If you did not assemble your airframe, hire a certified aircraft mechanic to complete this task. Log book entry must be made. When reinstalling, use new AN bolts and self locking bolts. Torque them as per AC 43-13 1B and 2B. Do not over tighten the bolts. Once installed, check control cable tensions, all connections, interferences, etc. See [http://www.newplane.com/Service\\_Letters\\_Bulletines/Control%20cable%20tensions%20Zodiac.pdf](http://www.newplane.com/Service_Letters_Bulletines/Control%20cable%20tensions%20Zodiac.pdf) including all other continued airworthiness documentation and make sure your aircraft is up-to-date before flying. When the aircraft is parked outside, lock the control cables. Strong winds can cause significant damage to the control system.

For additional information contact Zenair Ltd.

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*Our File Reference*  
A16O0137-D1-A1

06 December 2016

Mr. Aaron McCrorie  
Director General, Civil Aviation  
Transport Canada  
330 Sparks Street, Place de Ville  
Tower C, 5th Floor, Area A  
Ottawa, Ontario  
K1A 0N8

**Subject: AVIATION SAFETY ADVISORY A16O0137-D1-A1**  
**Zenair Zodiac CH-601A – Risk of structural failure of the horizontal stabilizer**

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Dear Mr. McCrorie,

On 24 September 2016, C-FSDN, a privately registered Zenair Zodiac CH-601A advanced ultra-light aeroplane, was on a VFR flight from Pembroke (CYTA), Ontario, to Kitchener/Waterloo (CYKF), Ontario. Approaching destination, the pilot reported radio problems to the CYKF Control Tower and advised of a diversion to Guelph (CNC4), Ontario. While on final approach for landing on Runway 32 at CNC4, the aircraft rapidly pitched down from approximately 500 feet and crashed into a wooded area 1 nautical mile from the runway. The aircraft was destroyed and the pilot, who was the sole occupant, was fatally injured.

In accordance with the TSB Occurrence Classification Policy, the circumstances of this occurrence were assessed, and the occurrence was deemed to be a Class 5. Consequently, TSB activity was limited to the collection of data, which have been recorded for safety analysis, statistical reporting, and archival purposes. The following paragraphs contain safety-related information derived from the assessment of this occurrence.

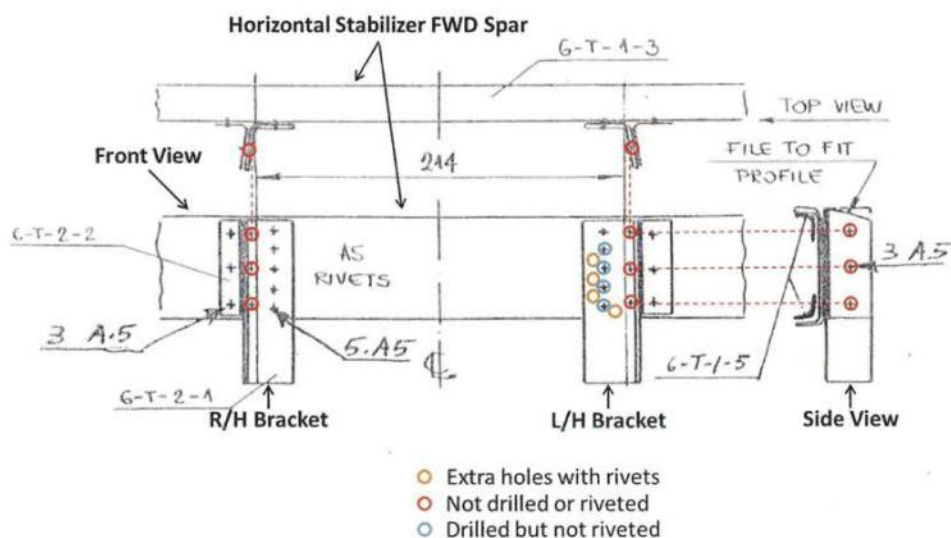
A structural inspection of the aircraft's tail section revealed inconsistencies between the actual assembly and the applicable drawing set. Inconsistencies with acceptable methods, techniques, and practices for inspection, repair or alteration, as outlined in Federal Aviation Administration Advisory Circulars 43.13 1B and 2B, were also identified. The complete tail assembly was sent to the TSB Laboratory in Ottawa for further analysis.

The exact drawing set and construction manual used to build the aircraft could not be obtained; however, a similar set that was published two years following the construction of the occurrence aircraft was located. The drawings are believed to be similar.



As per the drawing (Figure 1), the horizontal stabilizer forward structural attachment is designed to be constructed by riveting two aluminium angles (attachment bracket 6-T-2-1 and attachment doubler 6-T-2-2) with three rivets back-to-back and connecting the attachment bracket to the front surface of the forward spar (6-T-1-3) with five rivets.

In the actual installation, the three rivets connecting each attachment bracket to the associated attachment doubler were missing and the required holes were not drilled. Four additional holes were drilled through the left attachment bracket and continued through the forward spar. Rivets were installed in all of these additional holes; however, they were only installed in one of the five holes specified in the drawing.



**Figure 1.** Horizontal stabilizer forward structural attachment—aircraft drawing. (source: Zenair, with digital annotations by the TSB)

Structural integrity of the horizontal stabilizer forward attachment point was compromised on both sides because of the missing rivets, and the strength of the forward spar itself was reduced because of the extra holes.

The occurrence aircraft was built by an individual in 1994, and was based on a kit manufactured by Zenair. It was registered with Transport Canada as an advanced ultra-light aeroplane (AULA). To apply for registration of an AULA, a Statement of Conformity (SOC) issued by the manufacturer is required.

Prior to issuance of a SOC, Zenair currently requires that two independent inspections be completed: a pre-closing inspection by a Minister's Delegate—Recreational Aviation, and a pre-flight inspection by a Transport Canada certified aircraft maintenance engineer.

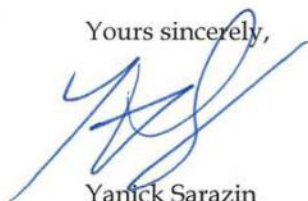
The manufacturer introduced these requirements approximately five years ago therefore, at the time of construction and initial registration of the occurrence aircraft, neither of these independent inspections was completed. Numerous other Zenair aircraft were built and

registered before this requirement was in place and it is likely that these aircraft were not inspected either.

As shown in this occurrence, if adequate independent inspections are not conducted during the manufacturing of an aircraft, non-conformance with the intent of the drawing, and/or construction manual, and/or acceptable methods, techniques and practices could go undetected, thus increasing the risk of a structural failure and complete loss of control during any phase of flight.

The foregoing is provided for follow-up action as deemed appropriate. The TSB would appreciate being advised of any action taken.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'Y. Sarazin', is written over the typed name.

Yanick Sarazin  
A/Director of Air Investigations  
Transportation Safety Board of Canada

cc:

Mr. Michael Heintz, Zenair Ltd.  
Mr. Bernard Gervais, President & CEO, Canadian Owners and Pilots Association  
Mr. Gary Wolf, President, The Recreational Aircraft Association Canada  
Ms Kathy Lubitz, Ultralight Pilots Association of Canada  
Mr. David Gascoine, President & CEO, Light Aircraft Manufacturers Association of Canada  
Mr Allan Mahon, Minister's Delegate – Recreational Aviation  
Mr. Sean Elliott, Vice President of Advocacy and Safety, Experimental Aircraft Association