U.S. Department
of Transportation
**Federal Aviation
Administration**

Small Airplane Directorate
901 Locust , Room 301
Kansas City, MO 64106

March 5, 2010

Mr. Mathieu Heintz
Zenair Ltd
10 Ed Connelly Drive
Huronia Airport
Midland ON
L4R 4K8

Dear Mr. Heintz:

At your request, this letter serves to clarify our expectations and intent for a few of the recommendations in our recent report that you have identified as being a source of confusion within the CH 601XL Zodiac community. They specifically deal with required structural testing and flutter analysis for the revised design.

The changes to the 601XL design discussed in the Federal Aviation Administration (FAA) Special Airworthiness Information Bulletin (SAIB) CE-10-08 and Aircraft Manufacturing and Design (AMD) LLC Safety Directive/Safety Alert, release date November 7, 2009, (revision 1), are considered major alterations that invalidate some of the original proof of compliance and proof of structure requirements in ASTM standard F2245.

Regarding flutter: Based on the service history of the aircraft, the original aircraft design did not meet paragraph 4.6 Vibrations, which states:

> 4.6 Vibrations—Flight testing shall not reveal, by pilot observation, heavy buffeting (except as associated with a stall), excessive airframe or control vibrations, flutter (with proper attempts to induce it), or control divergence, at any speed from VSO to VDF.

To show compliance with the standard, the tests in paragraph 4.6 must be accomplished on the modified design. We recommended in our report that you go beyond the basic ASTM flutter requirements and perform a complete flutter investigation (GVT, flutter analysis, and flight test) accomplished by a noted flutter expert. Given the service difficulties for the aircraft, it would not be unusual for the company to go beyond the testing requirements and expectations of the applicable ASTM standards to satisfy the concerns of your customers. The FAA cannot require these additional tests, or any upgrades to the amateur built aircraft, but we believe the service history warrants additional consideration. In our SAIB we encouraged amateur builders to consider their safety when reviewing the common design features their airplanes may share with the AMD S-LSA when deciding whether modifications are needed on a homebuilt.

Regarding Structural Strength: Based on the aircraft history, the original design also did not meet paragraph 5.1.3 Strength and Deformation. Specifically 5.1.4 states:

> 5.1.4 Proof of Structure—each design requirement must be verified by means of conservative analysis or test (static, component, or flight), or both.
> 5.1.4.1 Compliance with the strength and deformation requirements of 5.1.3 must be shown for each critical load condition. Structural analysis may be used only if the structure conforms to those for which experience has shown this method to be reliable. In other cases, substantiating load tests must be made. Dynamic tests, including structural flight tests, are acceptable if the design load conditions have been simulated. Substantiating load tests should normally be taken to ultimate design load.

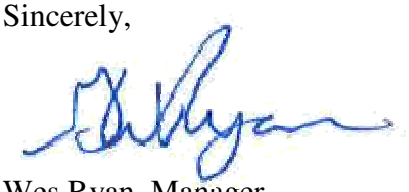
Our report documented our finding that the original structural analysis and testing was inadequate. Accordingly, substantiating load tests were needed on the modified design to show compliance to the ASTM standard. We recognize the company's September 2009 static test came within five percent of the FAA's estimates of the maximum load. The FAA also recognizes that the company made additional structural changes after the September 2009 static load test, and that these changes are likely adequate to sustain the FAA estimated maximum load levels. Therefore, it is acceptable for AMD to use stress analysis to resolve the five percent difference between the maximum loads sustained in the company's September 2009 static test and FAA estimates of the maximum loads.

In addition, you asked us to clarify the use of the word "estimate" in the report and to explain why detailed data was removed from the FAA figures in the report. Our use of the word "estimate" does not imply that the FAA guessed what would constitute a complete load analysis. Instead, our analysis was based directly on data received from the company and was performed using well proven engineering techniques utilized for decades by part 23 aircraft manufacturers. Using the word "estimate" was our means to communicate a commonly understood fact for any engineering analysis: that our analysis represents an educated estimate or prediction of actual in-flight load values. Validation of actual flight loads would require flight tests using a properly instrumented and calibrated airframe.

Regarding the removal of proprietary data from the report, and the use of labels like, 'Do Not Use for Design' in the Figures in the report, we took this approach to protect company proprietary data in the report. We also took this approach to discourage reverse engineering of proprietary design details of the CH 601XL from those Figures.

If we can provide any other assistance to you in the future, please do not hesitate to contact Mr. Wes Ryan, Manager, Programs & Procedures, at the address shown above, by phone at 816-329-4111, or by e-mail at wes.ryan@faa.gov.

Sincerely,



Wes Ryan, Manager
ACE-114, Programs & Procedures

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