



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

Memorandum

TRANSPORT AIRPLANE DIRECTORATE
AIRCRAFT CERTIFICATION SERVICE
LOS ANGELES AIRCRAFT CERTIFICATION OFFICE
3229 EAST SPRING STREET
LONG BEACH, CALIFORNIA 90806-2425

Subject: ACTION: Equivalent Level of Safety of
Damage Tolerance Analysis; Finding
No. ACE-94-2

Date: DEC 27 1993

From: Manager, Los Angeles Aircraft Certification
Office, ANM-100L

Reply to
Attn. of:

To: Manager, Small Airplane directorate, ACE-100

Background

The AASI has designed and built JetCruzer 450 airplane which is a fiveplace, pusher configuration, general aviation aircraft, with a gross weight of 4500 lbs., powered by a 450 SHP P&W PT6 Series turboprop engine. It uses advanced composite materials for the non-pressurized fuselage and conventional metal for the main wing, wing carry through, verticals and the forward wing.

For the metal structures, AASI have elected to establish the fatigue strength by Durability and Damage Tolerance Assessment (DADTA) methods, which includes supplemental coupon and component fatigue testing to substantiate certain design details, if necessary. AASI has proposed a two-phase program. Phase I consists of development, verification, and presentation of the technical approach and Phase II consists of preparation and submittal of the associated DADTA Substantiation Analysis Report and the Structural Inspection Document.

Applicable Regulations:

The applicable Federal Aviation Regulations (FAR) paragraph 23.572(a) states that the strength, detail design, and fabrication of those parts of the wings (including canards, tandem wings, and winglets/tip fins), empennage, their carry-through and attaching structures, whose failure would be catastrophic, must be evaluated under either of the following unless it is shown that the structure, operating stress level, materials, and expected uses are comparable, from a fatigue standpoint, to a similar design that has had extensive satisfactory service experience:

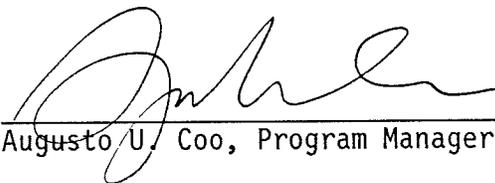
(1) A fatigue strength investigation in which the structure is shown by analysis, tests, or both to be able to withstand the repeated loads of variable magnitude expected in service. Analysis alone is acceptable only when it is conservative and applied to simple structures; or

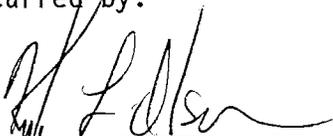
(2) A fail-safe strength investigation in which it is shown by analysis, tests, or both, that catastrophic failure of the structure is not probable after fatigue failure, or obvious partial failure, of a principal

structural element, and that the remaining structure is able to withstand a static ultimate load factor of 75 percent of the critical limit load factor at V_C . These loads must be multiplied by a factor of 1.15 unless the dynamic effects of failure under static load are otherwise considered.

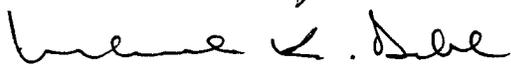
Recommendation

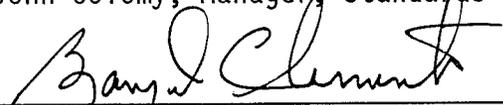
We concur with the proposal that the alternative damage tolerance analysis for the metal structure provides an equivalent level of safety as envisioned in the regulations and thus meets the requirements of 23.572(a)(1) of the FAR.

Prepared by:  12/22/93
Augusto U. Co, Program Manager

Concurred by:  12/27/93
Gilbert L. Thompson, Manager, Los Angeles Aircraft Certification Office, ANM-100L
Date

 1/3/94
Robert W. Alpiser, Project Officer, ACE-107
Date

 1/3/94
John Colomy, Manager, Standards Office, ACE-110
Date

 1/4/94
Barry D. Clements, Small Airplane Directorate Aircraft Certification Service, ACE-100
Date