

Proposed Equivalent Safety Finding on CS 25.745[d(1)] at Amdt 20

Applicable to Dornier 328-100 and Dornier 328-300

Introductory Note:

The hereby presented Equivalent Safety Finding has been classified as an important Equivalent Safety Finding and as such shall be subject to public consultation, in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) of which states:

"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

Statement of Issue:

The Dornier 328 airplane was certified in accordance with JAR25 Change 12 and Change 14. The aircraft is presently out of production.

Towing is certified with towbar protected by shear pin installed on the towing adapter on the nose landing gear in compliance with AMC 25.745(d) §2.(b). Towing with towbar is permitted up to 100 degrees steering angle to the left and right.

Operators have requested the use of towbarless towing vehicles of the Dornier 328 aircraft. This request pertains to both 328-100 and 328-300 aeroplanes.

328 Design Organization elects to comply with CS 25.745 at Amendment 20 for towbarless towing.

The Dornier 328 airplane (and proposed towing vehicles) do not have an oversteering protection system or flight crew alerting system as required for towbarless towing.

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Applicant Proposal:

The equivalence justification below details the means and provisions (i.e. the compensating factors) that the Applicant intends to use to demonstrate that an equivalent level of safety, compared with the applicable requirements for towbarless towing, will be reached for the proposed design.

Design proposal

- In order to preclude a damage to the Nose Wheel Steering system, a conservative margin of safety is introduced by limiting the steering angle to 60 degrees instead of 100 degrees (design limit angle precluding damage). Any operation beyond 60 degrees and up to 100 degrees does not introduce any additional loads which may effect either static or fatigue aspects.
- The limitation is introduced by external markings of the maximum angle on the lower section of the fuselage to provide an indication to the towing vehicle operator for the permitted operational steering range.
- The vehicles accepted for the Dornier 328 and the related operating procedure will be listed in the AFM limitation Section.
- The Aeroplane Flight Manual, in the Section Limitations, will include the following statement:
- 'Towbarless towing is prohibited unless the towbarless towing operations are performed in compliance with the appropriate operational regulation using the Dornier 328 certified towbarless towing vehicles and the related vehicle operation procedure to preclude damage to the aeroplane nose wheel steering system.'

Conditions for acceptance of the ESF

The following conditions shall be demonstrated by the applicant:

- The towbarless towing Safety Assessment shall include the qualitative effects of possible damage caused by towbarless towing operations. This System Safety Assessment will consider all failure conditions including an inadvertent exceedance of the towing angle beyond 60 degrees up to 100 degrees.
- Load cases not connected to the risk of oversteer are considered within the loads analysis. If any additional failure mode will be identified during the load analysis, this will be considered in the Safety Assessment. A typical example (but not necessarily the only one) would be an "overrate" as opposed to oversteer. This is where a sudden and rapid steering input is given (e.g. slipping on ice), not necessarily exceeding the oversteer angle.
- Compliance to CS 25.509 and CS 25.571 at Amendment 20 (as elected by the Applicant) shall be shown by static and dynamic loads analysis supported by operational aircraft trials using the corresponding limiting loads as certified by towing with towbar with shear pin protection as a reference, considering additional influence on the pitch attitude on ground introduced by towing vehicle and considering the conditions addressed in AMC 25.509.
- The specifically accepted towbarless towing vehicles and the towing procedure shall be also listed in the Aircraft Maintenance Manual (AMM) and the Ground Handling and Servicing Information Manual (GHSIM) in accordance with CS-25 Appendix H, paragraph H25.3[a(4)]. A future change of the aforementioned TC Holder Manuals shall require a new type investigation and must not be changed without certification approval.