

ICAO's frangibility ruling, Annex 14 & Aerodrome Design Manual part 6

This is a summary of ICAO's ruling on frangibility, combined from the latest editions of Annex 14 and Aerodrome Design Manual Part 6.

1. Protection period for non-complying installations.

The protection period ended on the 1st of January 2005. Consequently all installations that today do not meet frangibility ruling are outdated and non-complying.

2. Items to be made frangible.

Any structure which is located within 60 m to either side of the centre line of the runway and approach line(s) must be of low mass and frangible. The same frangibility criteria is applied to:

- Approach light masts
- Wind direction indicators (Wind cones)
- Anemometers (Automatic weather stations)
- Localiser supports (if located within 300 m from the threshold)
- Transmissometers (RVR)
- Forward-scatter meters (RVR)

Fencing that is located in the above defined area must be lightweight and frangible.

3. Verification of frangibility.

Static tests for verification of the maximum breaking force performed in a laboratory (breakable coupling) are allowed for installations with overall height not exceeding 1.2 m.

- The yield device must withstand a bending moment of 204 Nm but should separate before the bending moment reaches 678 Nm

For installations with overall height above 1.2 m the frangibility must be verified through a full-scale dynamic impact test or computer analysis supported by a representative field test.

- The support structure should not impose on the colliding aircraft a force in excess of 45 kN.
- The maximum energy needed to break the mast at the collision should not exceed 55 kJ.
- To allow the aircraft to pass, the failure mode of the support structure should be fracture, windowing or bending.
- Upon impact, the support structure may fragment into several components. The mass of these components should be as low as possible, and their manner of release should not cause a secondary hazard to the aircraft (e.g. to enter through the wind screen, fuselage, tail surfaces etc.).

4. Acceptability of designs for installation.

Aerodrome Design Manual Part 6 presents uniform procedures of testing by which the concerned Aviation Authority may determine the acceptability of designs as being in conformance with frangibility requirements.

The frangibility of any aid should always be proven before the aid is considered for installation.

5. Cabling.

- The light fitting, cabling and the mast should be considered as a whole for establishing frangibility
- With regard to cabling, it should be ensured that there are points of disconnection (connectors) so that segmentation is not hindered, if this is the intended mode of failure.