



U.S. Department
of Transportation
Federal Aviation
Administration

SAFO

Safety Alert for Operators

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Flight Standards Service
Washington, DC

http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo

A SAFO contains important safety information and may include recommended action. SAFO content should be especially valuable to air carriers in meeting their statutory duty to provide service with the highest possible degree of safety in the public interest. Besides the specific action recommended in a SAFO, an alternative action may be as effective in addressing the safety issue named in the SAFO.

Subject: Attitude Indicator Pitch Indication Limitations

Purpose: This SAFO serves to notify aircraft operators of potential operational limitations of some attitude indicators in the event of unusual attitude recovery as recommended by National Transportation Safety Board (NTSB) Safety Recommendation A-14-108.

Background: The NTSB noted in aircraft accident report NTSB/AAR-14/03 that a Eurocopter AS350 operating in Alaska had an attitude indicator installed that only met the minimum certification standards of Federal Aviation Administration (FAA) Technical Standard Order (TSO) C4C. The range of indication according to TSO C4C in pitch shall be at least plus or minus 25°. The range of indication in bank shall be at least plus or minus 100°. The attitude indicator installed on the Eurocopter AS350 only displayed the minimum $\pm 25^\circ$ pitch indication.

Discussion: The FAA states on page 8-19 of the Pilot's Handbook of Aeronautical Knowledge (PHAK): "The pitch and bank limits (of an attitude indicator) depend upon the make and model of the instrument. Limits in the banking plane are usually from 100° to 110°, and the pitch limits are usually from 60° to 70°." The PHAK does not reference the minimum TSO design limitations.



Figure 1. AIM-1200 Attitude Indicator. Note the apparent edges of the pitch indication areas of this instrument.

Recommended Action: Operators should be aware of design limitations of the make and model of the attitude indicator installed in their aircraft. The design of the instrument, if displaying only a minimum pitch indication of $\pm 25^\circ$ vertically, could “peg” at this maximum or minimum pitch indication or “tumble” and provide erroneous pitch and bank indications when the aircraft exceeds these limits. This may be extremely hazardous when the aircraft is operating in instrument meteorological conditions or confuse a pilot during an unusual attitude recovery.

Contact: Questions or comments regarding this SAFO should be directed to the General Aviation and Commercial Division, AFS-800, at (202) 267-1100.