



International Civil Aviation Organization

**Second Meeting of the Asia Pacific Accident Investigation Group
(APAC-AIG/2)**

(Hong Kong, China, 27-28 May 2014)

Agenda Item 2: Report on recent accident/incident investigation related developments and activities

UNEXPECTED AUTOPILOT BEHAVIOUR ON ILS APPROACH

(Presented by Singapore)

SUMMARY

This paper highlights the potential severe pitch up upset when intercepting the Instrument Landing System (ILS) glideslope signal.

1. INTRODUCTION

1.1 The Dutch Safety Board issued a safety alert on 18 November 2013 on the potential unexpected autopilot behaviour on ILS approach.

1.2 Two other similar events had occurred previously.

2. DISCUSSION

2.1 The M-array (Capture effect) ILS antenna, which is used around the world, exhibits signal reversal above the 3 degree glide path. The Dutch Safety Board identified that the signal reversal at the 9 degree glide path is always present. The signal reversal occurs occasionally at 6 degree, depending on the glideslope field. (See Figure 1)

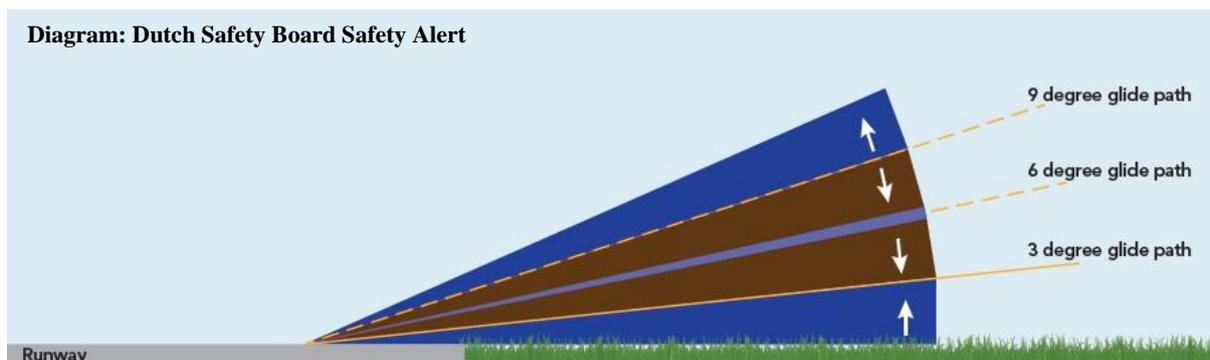


Figure 1: Cross section view of the M-array ILS antenna glideslope signal. Blue indicates “Fly up” and brown indicates “Fly down”

2.2 Depending on the descent profile of the aircraft, it may capture the ILS signal reversal above the 9 degree glide path. With the autopilot system engaged, an unexpected rapid pitch up command will be generated. The airspeed may drop rapidly to a near stall situation. (See Figure 2)

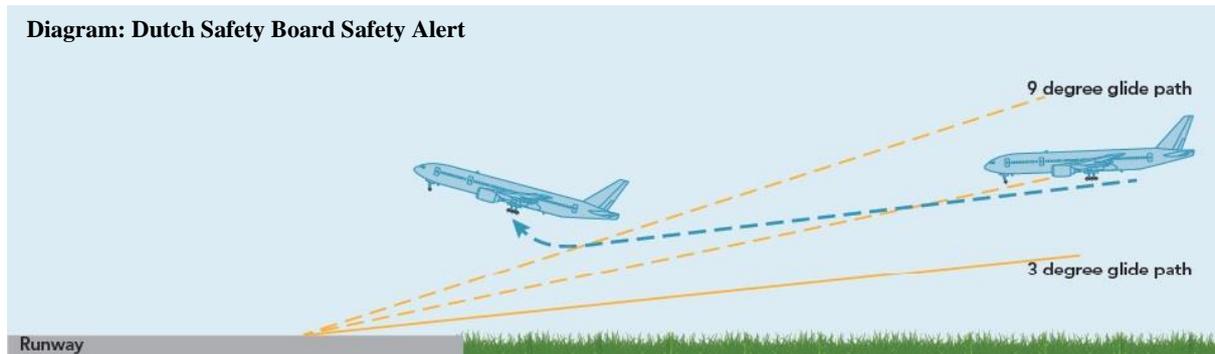


Figure 2: Sudden pitch up commanded by the autopilot system due to the signal reversal above the 9 degree glide path

2.3 Similar glide slope capture logic in autopilot systems is used for the majority of aircraft types currently in service worldwide. In its investigation, the Dutch Safety Board has found that aircraft from four different manufacturers operated by different airlines have experienced similar behaviour caused by a false glideslope either under test conditions or during operation.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- 1) Note the safety alert “Unexpected Autopilot Behaviour on ILS Approach” issued by Dutch Safety Board¹; and
- 2) Disseminate the information to individual State or Administration’s aviation authority and industry.

— END —

¹ The soft copy of the safety alert is available on the Dutch Safety Board’s website at:
<http://www.onderzoekraad.nl/uploads/phase-docs/336/a032006d4578veiligheidswaarschuwing-en-def-181113.pdf>