



International Civil Aviation Organization

**EIGHTH MEETING OF THE ASIA PACIFIC REGIONAL AVIATION SAFETY TEAM
(APRAST/8)**

(Bangkok, Thailand, 31 October to 4 November 2016)

Agenda Item 6: Presentations – State / Industry / ICAO

**CHALLENGES FACED BY NEPAL IN MITIGATING CFIT RISKS AT
REMOTE ALTIPOINTS**

(Presented by Nepal)

SUMMARY

Altiport operations in Nepal are the only viable means of serving most remote mountainous areas. The upslope landings necessary at such altiports result in susceptibility of flight crew to land short-of-the-runway owing to physiological and perception related human limitations, a sub-category of the CFIT. In the aftermath of many such human-factors caused accidents, CAA Nepal has attempted to install abbreviated-PAPI to mitigate the risks. However, the inability to procure flight inspection services for such facility, due to the challenging nature of flights is an impediment is discussed in this paper.

1. INTRODUCTION

1.1 Nepal straddles a major portion of the Himalayas and has about two-thirds of its area covered by mountains. For remote areas that remain unconnected by road network, air transport is the only viable solution for local populace as well as transporting tourists to such place.

1.2 Owing to geographical difficulties and financial considerations, only altiports are a realistic possibility at a majority of remote locations. The “altiport” has been referred in the ICAO Doc 9150 (STOLport Manual) as a small airport in a mountainous area with a steep gradient runway, used for landing up the slope and for take-off down the slope, thereby making use of only one approach/departure area.

1.3 Such altiports with their inherent upslope runway features result in visual illusions to flight crew providing cues that may result in landing short at the approach end of runways- a sub category of CFIT (Airbus/ FOBN Approach and Landing).

1.4 Plenty of information exist about the risks involved in landing on upslope runways and even ICAO material specifically Docs - 9157 Part IV (Aerodrome Design Manual –Visual Aids) and 9376 (Preparation of an Operations Manual) provide references to terrain related problems that apply to flights to such airports.

1.5 Attempts to mitigate the effects of visual illusions by installing visual glide slope indicators (VGS) like PAPI in the past have not been effective due to the unwillingness of commercial flight inspection services providers to perform commissioning flight inspection of such altiports PAPI installations.

2. DISCUSSION

2.1 Altiports were first constructed in the mountainous regions of Nepal in the early 1970s to employ DHC-6 Twin-otters (initially received under Canadian assistance) for providing air transport access to remote settlements and areas.

2.2 The Twin-otter and altiport combination over the years, did usher in a sea change in the quality of life of the remote inhabitants as well as allow tourists to explore the remote areas that otherwise would take weeks on foot. Later Dornier 228 aircraft were also introduced in the 90s to serve the altiports with remarkable success.

2.3 The flights operating to such altiports are based on visual flight rules and follow geographical features like rivers and valleys to the respective destinations. Sometimes a terrain-induced sharp turn is encountered just before the finals, precluding the proper usage of a VGSI.

2.4 In winters, besides, many altiports abutting rivers, are prone to orographic-lift-fogs in the finals, prior to touchdown, especially Lukla.

2.5 But, commercial air transport operations to such altiports have not, however, been accident free as many crashes, some fatal, were experienced while landing at Lukla, Simikot, Bajura among others. During the peak tourist season, Lukla witnesses close to a hundred flights per day!

2.6 There have been several instances of accident at Lukla, and in one, in 2008, the DHC-6/300 aircraft landed short of the runway, hitting rocks and was subsequently destroyed by fire in which the 18 occupants perished. Only the captain miraculously survived after being ejected out of the aircraft in his seat as the aircraft structure disintegrated. The investigation report, inter alia, alluded to the possibility of human factor-related aspects.

2.7 The ICAO standardized PAPI or A-PAPI is a logical choice for obviating the possibility of visual illusions by providing an unambiguous visual glide slope indication. However, Doc 9157-Part 4 requires an initial flight inspection by a competent authority to confirm the correct operation of the system (commissioning).

2.8 However, recent attempt at installing an abbreviated-PAPI at Lukla (under ADB assistance) was unsuccessful as CAAN has been unable to perform the needed commissioning flight inspection of the installation.

2.9 The process of clearing line pilots to such remote altiports takes nearly a year before a pilot is allowed to command flights. This training in over 100 flights is intended to ensure that the pilots not only grow familiar with the routes and weather tendencies apart from learning the mental perspective of the typical approach without succumbing to the temptations to “land short”. This practice has gradually evolved over decades drawing on the experience of senior pilots.

2.10 Besides, the pilots flying to such airports, now, have to maintain proficiency by flying in at regular intervals, and yet, it has not been fool proof, unfortunately.

2.11 The flight crew of commercial flight inspection services providers (CFISP), though experienced in flying to unknown airports served by radio navigation aids, cannot be expected to fly to such “difficult” visual airports with no navigation facilities on their own for performing commissioning flight inspections.

2.12 Perhaps, their SOPs do not allow for undertaking unacceptable risks at such airports with clear illusion related hazards.

2.13 In addition, the typical flight profiles for a PAPI inspection require executing several low-level go-around manoeuvres, which is not permitted by the steep terrain right ahead at airports like Lukla, Simikot, Rara etc.

3. ACTION BY THE MEETING

3.1 Member states are requested to share their experiences in the installation and operation of VGSI/PAPI, if they allow altiports operations with similar commercial operations.

3.2 Request the ICAO to refer the issues raised to the appropriate panel(s).

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