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Safety recommendation: AIC 19-R18/18-1004

Addressed to: Jeppesen

Date issued: 5 June 2019

Investigation link: AIC 18-1004

Action status: Issued

Introduction

On 28 September 2018, the Federated States of Micronesia, Department of Transportation, Communications and Infrastructure (DTC&I) was notified of the aircraft accident referenced in this safety recommendation. DTC&I commenced an investigation and deployed investigators to Chuuk and invited the Papua New Guinea Accident Investigation Commission (AIC) to join the investigation in the capacity of the State of Registry and also a State providing experts and facilities for the investigation. The AIC team is comprised of an Accredited Representative and Technical Advisers. The US National Transportation Safety Board (NTSB) as the State of Manufacture of the aircraft and in response to FSM National Government's request for assistance also sent a team comprised of an Accredited Representative and Technical Advisers from the Federal Aviation Administration (FAA) and Boeing. Technical Advisers from the US National Weather Service are assisting the US Accredited Representative.

The Transportation Safety Board of Canada (TSBC) as the State of Manufacture of specific components appointed an Accredited Representative and Technical Advisers to download the data from the AFIRS.

The PNG AIC has identified a safety deficiency, which if not rectified could result in an inadvertent ditching accident, resulting in injury or loss of life. The FSM investigator in charge supports the PNG AIC issuing this safety recommendation.

Occurrence

On Friday 28 September 2018, a Boeing 737-8BK aircraft, registered P2-PXE, was being operated by Air Niugini Limited, on a scheduled passenger flight from Pohnpei to Chuuk, Federated States of Micronesia.

At 23:17:19 UTC1 (09:17:19 local time) the aircraft impacted the water of Chuuk Lagoon about 1,443 ft (440 m) short of the runway 04 threshold, during its approach to runway 04 at Chuuk International Airport. As the aircraft settled in the water, it turned clockwise through 210º and drifted 460 ft (140 m) south east of the runway 04 extended centreline, with the nose of the aircraft pointing about 265º.

1 The 24-hour clock, in Coordinated Universal Time (UTC), is used in this report to describe the local time as specific events occurred. Local time in the area of the accident, Pacific/Chuuk Time is UTC + 10 hours.

There were 12 crew members and 35 passengers on board. Six passengers were seriously injured, and one passenger was fatally injured.

The 12 crew members and 34 passengers exited the aircraft and were promptly rescued and brought to shore by U.S. Navy divers (who were the first on scene), Chuuk State Government boats, Red Cross, Transco, and more than twenty privately-owned boats. Local divers located the fatally injured passenger in the aircraft 3 days after the accident.

The aircraft was being flown on a RNAV (GPS)[2] approach to runway 04. The aircraft flew a stabilised approach on auto-pilot, tracking 041º from FIGBI 2,500 ft, passing FASPO at 1,700 ft. The PIC disconnected the auto-pilot at 627 ft and flew the aircraft manually.

During the approach at 23:23:53, when the EGPWS Advisory alert (altitude callout) *"Minimums"* sounded, the aircraft was passing through 470 ft with a vertical speed (rate of descent) of 1,344 ft per minute. The MDA(H)[3] was 420 ft.

The missed approach required a left turn to track 306º with a minimum climb of 375 ft / NM to 960 ft to the Missed approach fix DAMAY.

The aircraft was progressively flown below the glideslope, and from 23:24:00 to the time of impact at 23:24:19 the EGPWS issued eight *Glideslope*[4] Alerts (aural alert), and nine *Sink rate*[5] Alerts (aural alert). The first *Sink rate* Alert was issued at 23:24:00 when the aircraft was at a Radio Altitude of 367 ft with a vertical speed (rate of descent) of 1,616 ft per minute. The last *Sink rate* Alert occurred 2 seconds before impact at a Radio Altitude of 13 ft and a vertical speed (rate of descent) of 848 ft per minute. The Caution alerts (aural alerts) were ignored by the crew.

A storm cell situated immediately after the missed approach point was "painting[6]" on the weather radar on the PIC's Navigation Display. The crew continued past the missed approach point and flew into the heavy rain. The aircraft immediately entered instrument meteorological conditions (IMC).

Safety deficiency description

Instrument approach charts provide navigational assistance to pilots for arrivals and approach to land at an airport. The chart enables a pilot to fly a specific approach profile with most risk factors considered.

Prior to the accident, the crew of PXE did two instrument approaches. One instrument approach was flown into Pohnpei on 27 September (previous day) and the other was flown into Chuuk (day of the accident).

Both approaches were flown using the Jeppesen instrument approach charts, *WENO I, FEDERATED STATES OF MICRONESIA RNAV (GPS) Rwy 4* and *POHNPEI I, FEDERATED STATES OF MICRONESIA RNAV (GPS) X Rwy 9* approach charts for Chuuk International and Pohnpei International airports respectively.

The investigation found that the terminology used to indicate the *Transition Level*[7] on the approach chart as shown in Figure 1 was not consistent.

On the Chuuk RNAV (GPS) Rwy 04 chart, Jeppesen indicates the Transition Level as **Trans: FL 055** and as **Trans: FL 55** on the Pohnpei RNAV (GPS) X Rwy 09 as depicted in Figure 1, although both are referring to the same thing (Trans alt: 5500', *see Figure 1*).

2 WENO 1, Federated States of Micronesia RNAV (GPS) Rwy 4 Jeppesen chart dated 26 January 2018 and current at the time of the accident. 3 MDA(H): Minimum descent altitude; sometimes termed minimum decision altitude. (Source Cambridge Aerospace Dictionary.)

4 Glideslope Caution Alert is issued by the EGPWS when the aircraft deviates below the 3º Glideslope.

5 Sink rate Caution Alert is issued when the aircraft penetrates the zone shown on the Honeywell EGPWS MK V Mode 1 Graph (See Figure 2)

6 To create blip on radar display, esp. one giving position of aircraft or other object. (Source Cambridge Aerospace Dictionary.)

7 QNE, lowest flight level available for use above transition altitude and is the **altitude at which the altimeter will be switched from standard pressure or QNE to the local pressure QNH**.

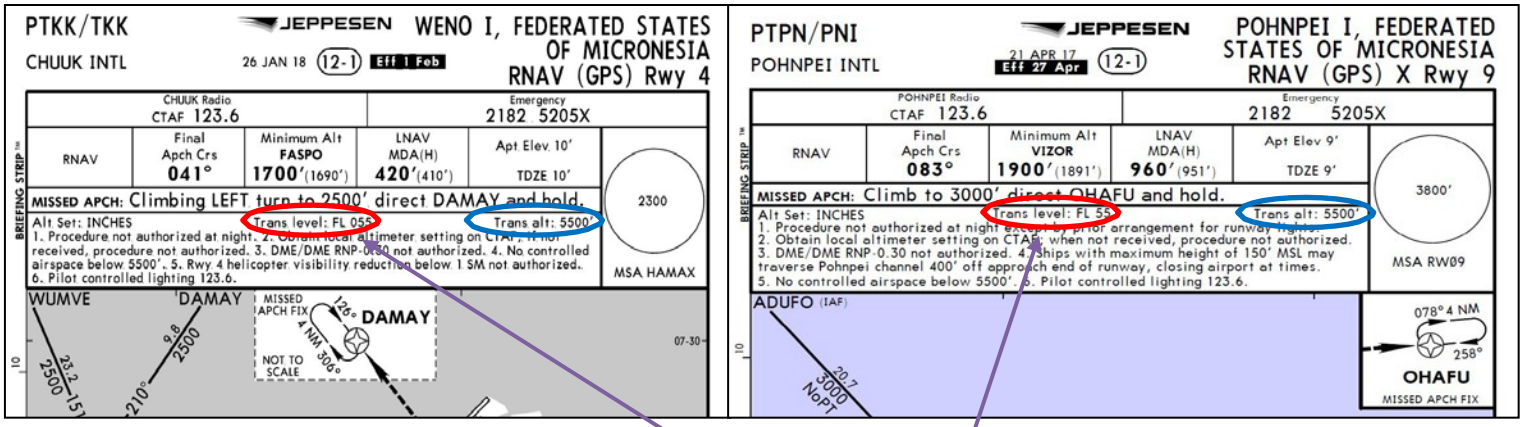


Figure 1: Jeppesen (Chuuk International & Pohnpei International) charts showing the inconsistent terminology used to indicate *Trans level: FL 055* and *Trans level: FL 55*.

The transition level is the altitude at which the altimeter will be switched from standard pressure (QNE[8]) to the local pressure (QNH[9]). It is at this altitude that the altimeter reading gives the altitude above the landing airport elevation when switched from QNE to QNH by the pilot.

Furthermore, the inconsistent use of terminology(s) can bring confusion and risk of comprehension errors when briefing the instrument approach plate, thus inducing the risks of pilot input errors.

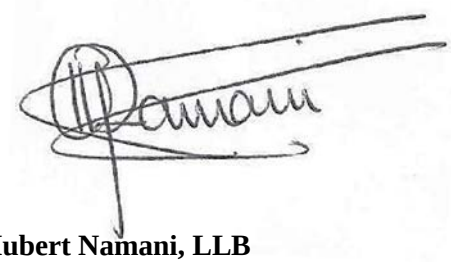
It is therefore, of the utmost importance for aviation safety that the terminology used by Jeppesen when publishing its charts is standardised.

Recommendation number AIC 19-R18/18-1004 to Jeppesen

The PNG Accident Investigation Commission recommends that Jeppesen should ensure that standard terminology is used on both (Chuuk RNAV (GPS) Rwy 04 and Pohnpei RNAV (GPS) X Rwy 09) instrument approach charts. Jeppesen should also ensure that terminologies and the layout used on all Jeppesen Instrument approach charts are consistent and standardised.

Action requested

The AIC requests that Jeppesen note recommendation *AIC 19-R19/18-1004*, and provide a response to the AIC no later than 25 July 2019 (within 60 days of the issue date), and explain (including with evidence) how Jeppesen has addressed the safety deficiency identified in the safety recommendation. Status **ACTIVE.**



Hubert Namani, LLB

Chief Commissioner

5 June 2019

[8] QNE: it is the pressure altitude at the landing runway threshold.

[9] QNH: indicating the atmospheric pressure adjusted to mean sea level. It is a pressure setting used by pilots, air traffic control (ATC), and low frequency weather beacons to refer to the barometric setting which, when set on an aircraft's altimeter, will cause the altimeter to read altitude above mean sea level within a certain defined region.

Jeppesen Safety Action

On 9 August 2019, Jeppesen informed the PNG Accident Investigation Commission of its safety actions to address the safety deficiencies identified in *Safety Recommendation AIC 19-R18/18-1004* and provided the following statement:

> *In reply to Section 4.2.17 Recommendation number AIC 19-R18/18-1004 Jeppesen has updated for consistency the charts for PTPN, PTRO, PTSA airports per the AIC finding so that all transition levels read FL055. The revised charts were released with this correction on 12 July 2019.*

Jeppesen also provided copies of the updated suite of charts as documentary evidence of the safety action taken.

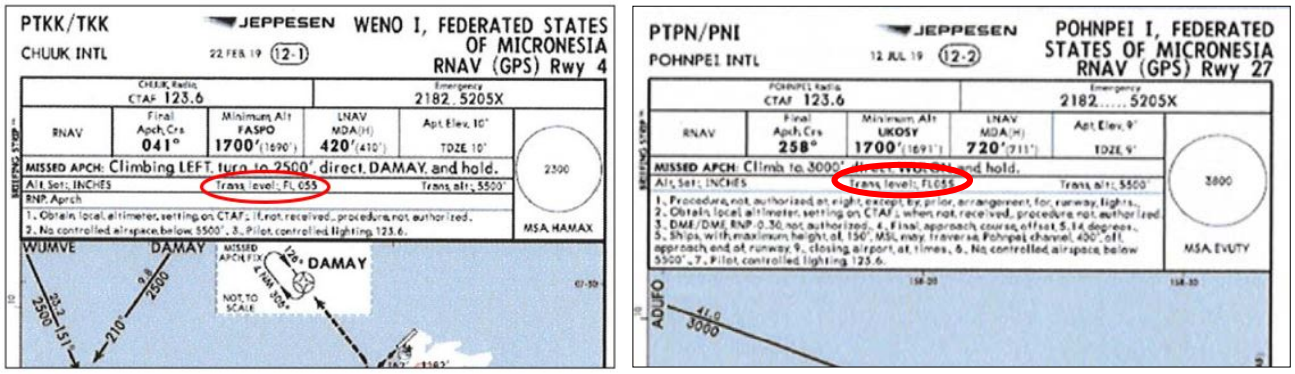


Figure 2: Jeppesen (Chuuk and Pohnpei Airport) charts showing the amended terminology used to indicate *Trans level: FL 055.* Example of change promulgated on the full suite of charts.

PNG Accident Investigation Commission (AIC) assessment of the Jeppesen response

The AIC has reviewed the Jeppesen documents providing evidence to the AIC of the safety action taken with respect to the listing of transition levels on the full suite of charts for Micronesia airports. The AIC is satisfied that the evidence addressed the safety deficiencies identified in the AIC *Safety Recommendation AIC 19-R18/18-1004.*

The AIC has assigned the Jeppesen response a fully ***satisfactory*** rating, and records the **Status of the AIC Recommendation: CLOSED RESPONSE ACCEPTED**

HUBERT NAMANI, LLB
Chief Commissioner

11 August 2019