Australian Government
Australian Transport Safety Bureau

Pilot incapacitation involving Piper PA-31, VH-TWU

near King Island, Tasmania, on 8 November 2018

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2018-075
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Addendum

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1, 3, 4	ATSB fatigue analysis showed it was very likely the pilot was acutely fatigued	26 June 2019

Safety summary

What happened

On the morning of 08 November 2018, a Piper PA-31-350, registered VH-TWU, was being used for a freight flight from Devonport to King Island, Tasmania. During this flight, the pilot fell asleep and overflew their destination with the autopilot engaged. About 78 km past the intended destination of King Island Airport the pilot awoke and manoeuvred the aircraft back to King Island.

What the ATSB found

A fatigue analysis was conducted and determined that at the time of the occurrence, the pilot was very likely acutely fatigued to a level affecting performance predominately due to the lack of recent sleep and hours awake. Although there was opportunity, the pilot did not plan or obtain sleep prior to commencing the night shift.

After landing at King Island, the pilot continued with their shift flying to Moorabbin without obtaining additional rest.

Safety message

This occurrence highlights the importance of pilots assessing their fitness (a condition which permits a generally high level of physical and mental performance) to fly prior to commencing their shift and continuing to monitor their fitness to fly throughout the shift, specifically their level of fatigue. Pilots should modify their usual routines where necessary to prepare for a night shift to ensure they are adequately rested before thesy commence duty. Organisations should consider the risks of allowing a worker to continue operating in their role directly after a fatigue related incident without corrective management.

Information from the Civil Aviation Safety Authority (CASA) on fatigue management is available on their website.

The ATSB SafetyWatch information on Fatigue provides more resources and information.

The occurrence

What happened

At about 2300 Eastern Daylight-savings Time (EDT)[1] on 07 November 2018, a Piper PA-31-350, registered VH-TWU (TWU), operated by Vortex Air, departed Moorabbin, Victoria, for a scheduled freight flight to Devonport, Tasmania. The aircraft landed at about 0030 and the pilot assisted with unloading the freight. At around 0200 on 08 November 2018, the pilot commenced a three-hour break until 0500 when preparation for the next flight was required. During this break there was access to a rest facility within the Devonport Airport Terminal.

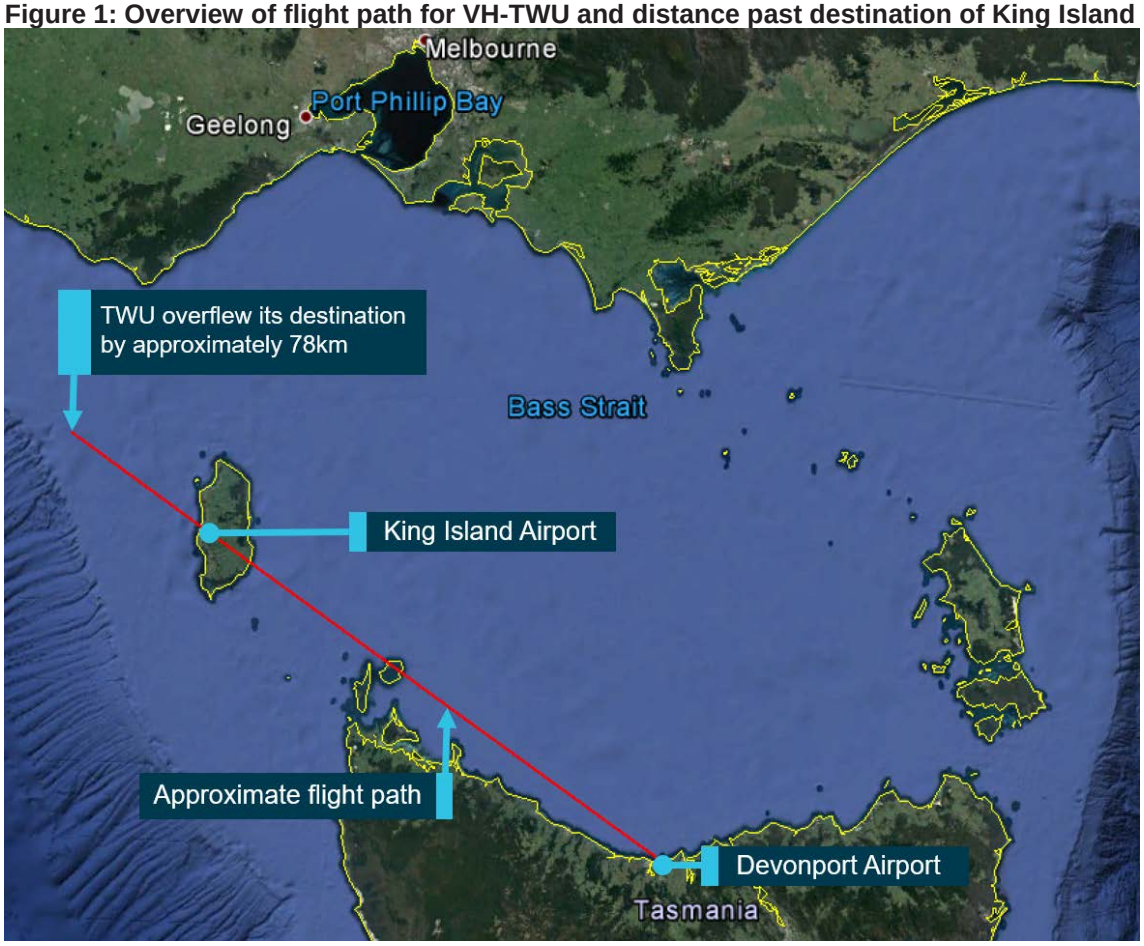
At about 0620 the aircraft departed Devonport for a scheduled freight flight to King Island, Tasmania. Air traffic control data showed that during the cruise the pilot maintained an altitude of approximately 6,000 ft and the pilot reported the autopilot was engaged. The autopilot maintained the aircraft's track and altitude, while the pilot listened to music through the radio and continued to monitor the flight. As the aircraft reached the top of descent into King Island, the pilot started to feel tired and rapidly fell asleep.

At 0725:12 air traffic control (ATC) attempted to make contact with the pilot regarding his approach into King Island. No response was received. For approximately 8 minutes (between 0725 and 0733), ATC, with assistance from nearby aircraft, attempted contact with the pilot of TWU. At 0733:16 ATC received a transmission from the pilot of TWU who advised that operations were normal. The furthest point reached from the intended destination was approximately 78 km north-west of King Island (Figure 1).

The pilot advised ATC that they were turning back to King Island. The aircraft landed at about 0755. The pilot contacted his supervisor and ATC Melbourne Centre via telephone to discuss what had happened. The pilot then completed the shift, flying from King Island back to Moorabbin.

[1] Eastern Daylight-savings Time (EDT) was Coordinated Universal Time (UTC) + 11 hours.

Figure 1: Overview of flight path for VH-TWU and distance past destination of King Island



Source: Google Earth, modified by ATSB

Fatigue

The pilot recalled not feeling unusually fatigued prior to the morning flight, and as a result did not identify fatigue as a potential hazard for the operation. He stated this overnight shift of Moorabbin to Devonport, Devonport to King Island and King Island back to Moorabbin was not uncommon. He explained that he had completed this pattern of flights many times before without any fatigue related issues.

The pilot reported that during the three-hour rest period at Devonport for these scheduled flights, he could normally obtain sleep, however, on this occasion he rested but was unable to sleep. At the time the pilot fell asleep, he was in a period of reduced workload for the flight.

This was the pilot's first shift after five days of planned leave. The pilot reported that he did not modify his normal sleep patterns prior to commencing nightshift. From the information reported by the pilot, it was determined that at the time of the occurrence the pilot had been awake for about 24 hours.

Using the information obtained at interview and the pilot's roster, fatigue analysis was conducted. From the fatigue analysis, including using fatigue biomathematical analysis software [2], the ATSB estimated the pilot's level of fatigue at the time of the incident. The analysis identified it was very likely that the pilot was acutely fatigued to a level known to affect performance, predominantly due to lack of recent sleep and total hours awake.

[2] Fatigue Avoidance Scheduling Tool (FAST®) and System for Aircraft Fatigue Evaluation (SAFE).

In addition, further analysis showed even in the event of a three-hour sleep overnight in Devonport, the pilot would still have very likely been fatigued to a level known to affect performance.

Rosters

The operator generated a roster for the upcoming week and distributed this to the pilots. A review of the pilot's rosters showed that there was no consistent pattern from week to week. Although the operator reported the pilots usually do two to three night shifts per week, there was no set pattern. The pilot further reported that the roster for the week ahead was normally provided on the Friday before a week, but sometimes not until the Sunday, and that sometimes this roster could then change substantially. The operator reported that they provided pilots as much notice as possible of upcoming night shifts.

The rostered shift of the occurrence flight was known in advance by the pilot and was not a recent change.

Safety analysis

The International Civil Aviation Organization (2016)[3] defined fatigue as:

> A physiological state of reduced mental or physical performance capability resulting from sleep loss, extended wakefulness, circadian phase, and/or workload (mental and/or physical activity) that can impair a person's alertness and ability to perform safety related operational duties.

The ATSB recently released research report *Fatigue experiences and culture in Australian commercial air transport pilots* (AR-2015-095) which was conducted to provide the air transport industry, regulators and policy makers with further insights into industry perceptions of fatigue. The safety message from this research was that:

> The responsibility to manage the risk of fatigue lies with both the individual pilot and organisation. It is the individual pilot's responsibility to use rest periods to obtain adequate sleep and to remove themselves from duty if they feel fatigued. It is important for operators to implement policies to reduce the likelihood of fatigue-related issues through rostering practices and by providing an organisational culture where crew can report fatigue in a supportive environment.

The fatigue analysis conducted as part of the investigation found that the pilot was very likely to be acutely fatigued at the time when he fell asleep. The pilot was flying the aircraft as a solo pilot operation and did not identify fatigue as a potential hazard due to not recognising any signs of fatigue.

Pilots should modify their usual routines where necessary to prepare for a night shift to ensure they are adequately rested before they commence duty. In this case, the pilot did have an opportunity to plan for and obtain sleep prior to commencing the night shift as he was on a five-day leave period leading up to these flights. Although obtaining sleep in the afternoon following sleeping each night previously can be challenging for pilots as they are not usually tired at that time, it is vital to ensure they can operate the entire night in a non-fatigued state.

Despite knowing the circumstances of the incident, the operator did not put in place measures to ensure the pilot was fit to continue the shift. This resulted in the pilot continuing to fly the aircraft while still very likely being fatigued to a level known to affect performance.

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[3] International Civil Aviation Organization, 2016, *Manual for the oversight of fatigue management approaches,* 2nd Edition

The operator did not have a consistent roster pattern across weeks, and rosters were provided at relatively short notice and subject to change. As a result, it could be difficult to predict future shifts and effectively plan sleep in advance for preparation for night shift work. While this was not a factor in this occurrence due to the pilot knowing about the night shift in advance, it is important that rosters are maintained in a way that provide pilots the best opportunity to plan and obtain sleep to avoid flying while fatigued.

Findings

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

- The pilot was acutely fatigued to a level affecting performance predominantly due to the lack of recent sleep and hours awake. Although there was opportunity, the pilot did not plan or obtain sleep prior to commencing the night shift.
- After the occurrence, the pilot continued with their shift, flying from King Island to Moorabbin without obtaining additional rest.
- Although not a factor in this occurrence, the operator's roster pattern varied considerably from week to week, and sometimes changed at short notice, so did not provide the best opportunity for pilots to plan and obtain sleep to avoid flying while fatigued.

General details

Occurrence details

Date and time:	08 November 2018 07:15 EDT	
Occurrence category:	Serious Incident	
Primary occurrence type:	Flight crew Incapacitation	
Location:	Near King Island Aerodrome, Tasmania	
	Latitude: S 39° 52.65'	Longitude: E 143° 52.7'

Aircraft details

Manufacturer and model:	Piper Aircraft Corp PA-31-350	
Year of manufacture:	1975	
Registration:	VH-TWU	
Operator:	Vortex Air Pty. Ltd.	
Serial number:	31-7552110	
Type of operation:	Air Transport Low Capacity - Freight	
Persons on board:	Crew – 1	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; and fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within ATSB's jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to operations involving the travelling public.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.