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Air traffic control procedural errors at Perth Airport

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Addendum

Page	Change	Date

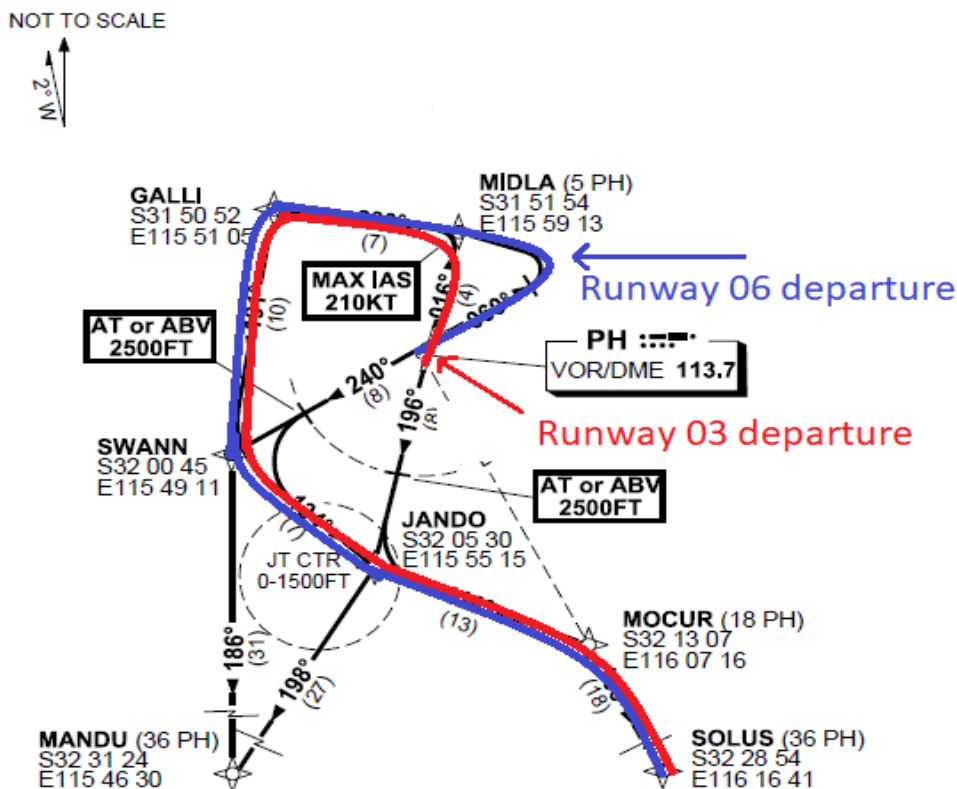
Air traffic control procedural errors at Perth Airport

What happened

On the morning of 9 May 2018, there were five controllers on duty in the Air Traffic Control (ATC) tower operated by Airservices Australia (Airservices) at Perth Airport, Western Australia (WA). One controller was acting as the surface movement controller (SMC)¹. One controller, who was being trained in air traffic control, was acting as the aerodrome controller (ADC)² under the supervision of another controller. The other controllers on duty were in airways clearance delivery and tower supervisor roles.

At 0841 local time, the crew of a Regional Express SAAB 340 aircraft operating a passenger service, call-sign RXA2113, were at their departure bay. The crew contacted the airways clearance delivery controller who issued an airways clearance for the planned flight from Perth to Albany, WA. This clearance authorised the crew to track to Albany via SOLUS and flight-planned route. The crew was cleared to depart Perth in accordance with the SOLUS THREE standard instrument departure (SID) and climb to 5,000 ft. Figure 1 shows SOLUS THREE SIDs from runway 03 and runway 06.

Figure 1: Perth Airport SOLUS THREE SIDs from runway 03 (red highlight) and runway 06 (blue highlight)



Source: Adapted from Airservices Australia

¹ The surface movement controller (SMC) is responsible for controlling the movement of aircraft around the Aerodrome movement area. The SMC issues taxi instructions to aircraft to route them across the aerodrome surface.

² The aerodrome controller (ADC) issues line up and take off clearances to the crew of departing aircraft, and landing clearances to the crew of arriving aircraft. The purpose of these instructions is to ensure that aircraft depart from and arrive on runways clear of obstructions, and that prescribed separation standards exist once aircraft take off.

The Automated Terminal Information Service (ATIS) that was available to pilots between 0852 and 0908 included the following information:

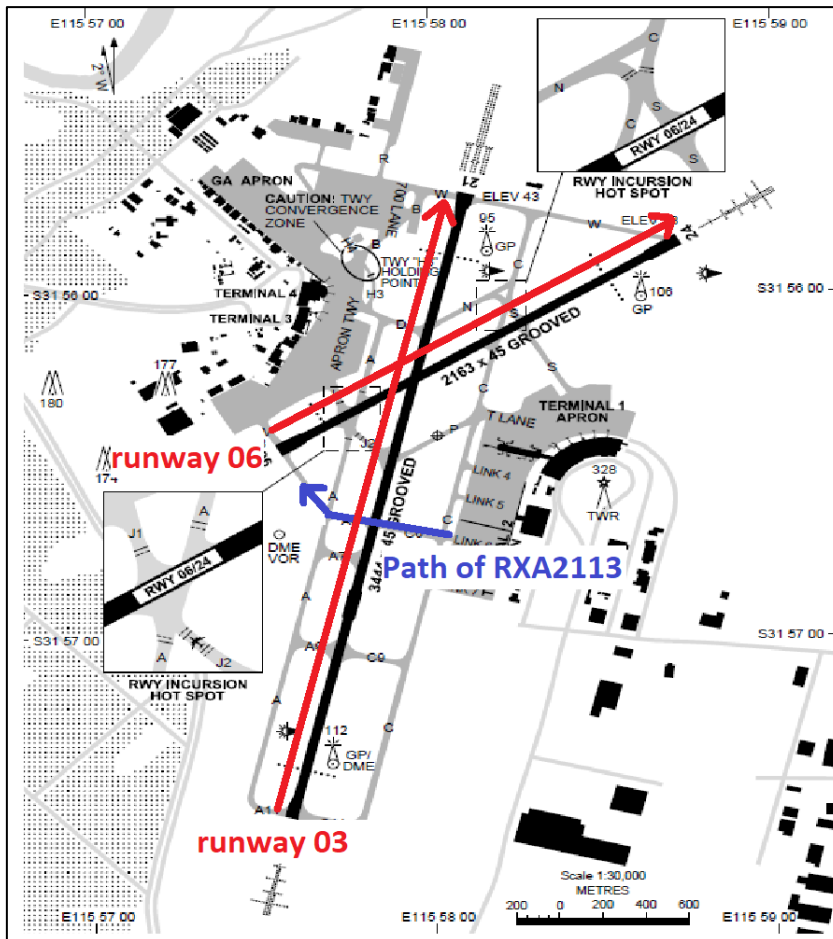
Runway 03 for all arrivals and for departures via [various waypoints including] SOLUS.
Runway 06 for all other departures.

Based on the airways clearance and ATIS, the RXA2113 crew programmed the aircraft flight management system (FMS) for a departure from runway 03 direct to MIDLA followed by a left turn to track as specified by the SID to SOLUS, followed by the flight-planned route (Figure 1: red highlight).

The controller acting as SMC took control of this position at 0830. Between 0847 and 0901, the SMC had managed the taxi transit of five aircraft that all departed from runway 06.

At 0905, the RXA2113 crew contacted the SMC to request taxi clearance. The SMC recalled that he referred to the flight data record on his display and perceived that the aircraft was departing off runway 06. Accordingly, the SMC issued instructions for RXA2113 to taxi via taxiway 'Charlie Six' (C6) and hold short of runway 03 (Figure 2). At the same time, the SMC selected the intermediate hold point as the clearance limit on the ATS graphical display.

Figure 2: Perth Airport taxiway map with RXA2113 route highlighted in blue



Source: Adapted from Airservices Australia, annotated by ATSB.

As required to ensure there was no conflicting traffic, the SMC coordinated a runway crossing for RXA2113 with the ADC. The SMC then issued onwards clearance for RXA2113 to 'cross runway 03, taxi hold point Victor (V), runway 06' and selected the hold point on the graphical display. Once the SMC was satisfied that the crew was complying with the instruction, he transferred the flight data record to the ADC screen as per standard procedure.

By now it was apparent to the RXA2113 crew that ATC intended for them to depart from runway 06 rather than runway 03 as nominated on the ATIS for SOLUS departures. At the time, the captain considered this and determined that they would still be compliant with the airways clearance as the runway was not part of the clearance and the SID was applicable to both runways. Given that key aspect and crew member experience of similar departures, the crew did not query ATC about the variation to the expected departure runway.

At hold point V the RXA2113 crew reprogrammed the FMS for the SOLUS THREE SID for runway 06. The captain recalled that this process did not present any problems to the crew and they were not aware of any safety implications.

In the tower, the trainee ADC was in the controlling position and the supervising ADC was seated behind and adjacent to the trainee. The trainee had full vision and control of the monitors and controls. The supervising ADC reported that although his view of the display was incomplete he remained vigilant of arriving and departing aircraft.

When the opportunity arose, the supervisor was asking the trainee questions about ATS policy and procedure as an ad hoc training activity. This was taking place while the RXA2113 crew prepared for take-off at the hold point. Although the flight data record for RXA2113 was displayed on the ADC display after the SMC had transferred it, there was no requirement for the ADC to pay attention to RXA2113 until the crew was ready for take-off.

At 0910, the RXA2113 crew contacted the ADC to advise they were ready to depart.

The supervising ADC recalled that the trainee ADC followed standard procedure to ensure that the runways and initial departure track were free of conflicting traffic. The supervisor did not have a clear view of the flight data record on the ATS display and it was unclear if the trainee ADC referred to it. Departures³ were being conducted in accordance with auto-release procedures so no coordination was required with the departures controller.

The supervising ADC related that during departures, the focus of both his and the trainee ADC's attention was on monitoring for incoming and outgoing traffic, and checking that the runways were clear. At Perth Airport, the ADC controls arrivals and departures off all runways. This means that when an ADC issues a take-off clearance from one runway, he or she will also be aware of any aircraft arriving or departing from other runways.

The presence of the aircraft at hold point V indicated to the ADC that RXA2113 was scheduled to depart from runway 06, and the ADC issued a take-off clearance from that runway. The trainee ADC instructed the RXA2113 crew to line up, then at 0911 cleared the crew to take-off from runway 06 with instructions to contact 'departures' when airborne.

From the perspective of the crew and controllers in the tower, the take-off and departure was uneventful. However, the departures controller was expecting the aircraft to be on a northward track to MIDLA rather than tracking initially to the north-east before turning left to MIDLA (runway 03 departure, Figure 1). The aircraft was soon on the flight planned track and there was no reported loss of separation with any other aircraft.

The controllers in the tower were unaware of the discrepancy between the clearances issued to the crew of RXA2113 and the flight data record until advised by the departure controller.

Contextual information

The controllers described the traffic situation as quiet by 0840 because the number of aircraft movements had decreased from the earlier morning period. The weather at Perth Airport was not operationally significant, the visibility was good, and the wind was light and variable.

³ The departures controller works in a separate location to the control tower at Perth airport.

Personnel information

Surface movement controller

The controller who was performing the role of SMC held ATC certification and had about three years’ experience with Airservices. Prior to that, the controller had been trained by, and operated for, another ATC agency.

Prior to the day of the occurrence, the controller had three rostered days off. He reported having slept well the night before. Although the controller was concerned about the health of a close family member, he did not consider that his performance would be affected. There was no evidence to indicate that stress affected the actions of the SMC on the day of the occurrence.

Aerodrome controllers

The trainee controller who was performing the role of ADC under supervision had previous experience with another ATC agency. It was reported that the trainee controller had demonstrated competence at the console but needed further familiarity with Airservices’ policy and procedures.

On the day of the occurrence, both controllers in the ADC position started work at 0530, and had been working for approximately three and a half hours. They were in the second shift of their rotation, having come off rostered days off the day prior to the occurrence. It is not known what sleep either controller had prior to the occurrence.

Consideration of controller rostering and fatigue

The ATSB reviewed the actual hours worked and known sleep history of the SMC and ADCs for indications of fatigue on the day of the occurrence. Based on the available evidence, there is no indication that fatigue contributed to this occurrence.

ATC systems

Flight Data Record

The air traffic system automatically generated the departure runway for RXA2113 into the flight data record. This displayed the departure runway as 03 in the fourth column of the top row (Figure 3). The ATC system allowed the controllers to change the departure runway recorded for each flight. The system would notify other users that this change had occurred.

Figure 3: The Flight Data Record for RXA2113

214	C	SF34 M	RXA2113	03		SOLUS3	50	
YABA	S I *	4070						118.7
SOLUS W172 ABA DCT								0039

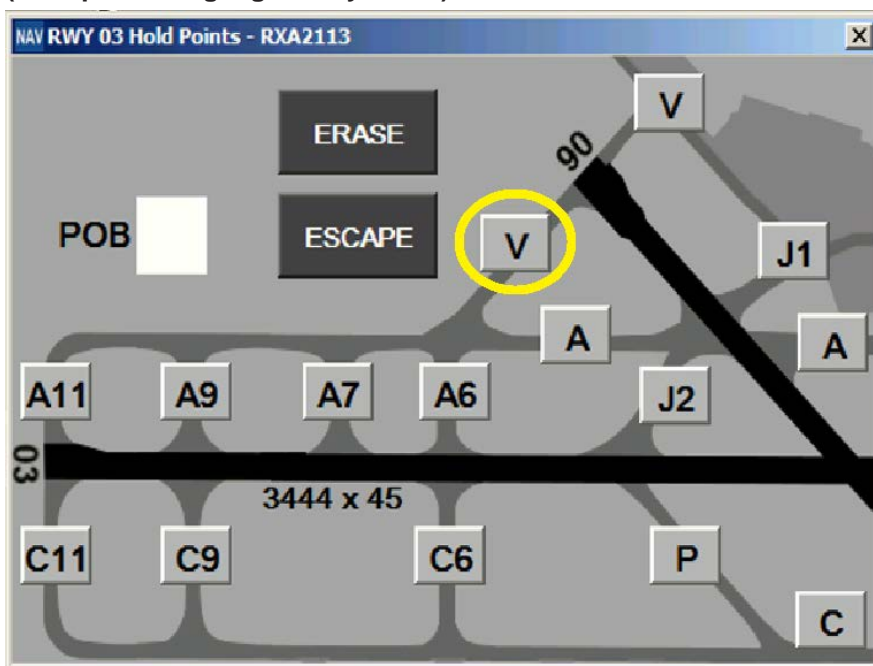
Source: Adapted from Airservices Australia

Hold point selection panel

Immediately after the SMC instructed the RXA2113 crew to taxi to hold point V, he recorded that hold point in the ATC system. The SMC called up the ‘RWY03 Hold Points’ selection panel within the ATC system. The SMC used this panel to record the taxi clearance for RXA2113 to hold point V (Figure 4).

This panel presented all valid hold points for runway 03 departures. Although the hold point options on the graphical display were delimited to those associated with the system-assigned runway, hold point V was available to facilitate traffic flow from terminals 3 and 4.

Figure 4: Hold point selection panel in ATC system for runway 03 departures (Hold point V highlighted by ATSB)



Source: Adapted from Airservices Australia, annotated by ATSB

The ATSB noted that the ATS system did not provide any specific inhibitions to prevent or alert the controllers to the taxi of aircraft to non-conforming hold-points.

Safety analysis

Taxi clearance RXA2113

The surface movement controller issued taxi instructions to the crew of RXA2113 which directed them to runway 06. This was contrary to the departure runway (runway 03) recorded by the air traffic system and shown on the ATC flight data record.

When an aircraft crew requests a taxi clearance, the SMC would normally provide instructions based on the flight data record.

The ATSB considered the factors that might have adversely influenced the SMC's attention and perception at the time. Based on the available information, there were no indications that fatigue, workload, expectancy, or stress from personal circumstances were contributory.

The ATSB also considered the presentation of the departure runway information on the flight data record. That information was presented clearly and saliently and there was a high level of contrast between the text and the background. No one reported that the flight data record was difficult to read or interpret. Therefore the runway information was readily accessible.

Therefore, as the SMC issued taxi instructions that were inconsistent with the flight data record, it is likely that he did not attend to the flight data record.

After the SMC issued the taxi instructions to hold point V, runway 06, there were no prompts for a reassessment of those instructions. Although they were not required to, if the crew of RXA2113 had requested confirmation that the departure runway was different to that expected, this would have prompted the SMC to check the flight data record. In this occurrence, the flight crew had identified the instructions were inconsistent with the information provided by the ATIS, as such this was a missed opportunity to identify and resolve this inconsistency. Although the ATC system limited the taxiway selections to those associated with the assigned departure runway, hold point V was necessarily available for use in conjunction with both runways 03 and 06.

Although the SMC instructed the crew of RXA2113 to taxi to a runway contrary to the flight data record, the ATSB did not identify any broader risk to safety posed by this action. There is no evidence that the taxi instructions issued to the crew reduced the safety of the aircraft or other traffic while it was taxiing and holding. The arrival of the aircraft at the hold point of runway 06 did have an effect on the ADC function.

Take-off clearance RXA2113

The trainee ADC issued a take-off clearance to the crew of RXA2113, which cleared them to depart from runway 06. Like the taxi clearance, this was also contrary to the departure runway recorded by the air traffic system and displayed on the flight data record.

The ATSB considered whether the training activity the ADCs were engaged in prior to issuing the take-off clearance affected their attention to and perception of the departure runway on the flight data record. The ADC supervisor related that the focus of attention of both ADCs during the take-off clearance was on monitoring incoming and outgoing traffic, and checking that the runway was clear and that in these circumstances the ADC would not normally focus on the flight strip of a taxiing or departing aircraft.

The ATSB also identified that the position of RXA2113, at hold point V, was a strong indicator to the ADC that aircraft was scheduled to depart from runway 06. Given the position of the aircraft at the hold point to runway 06 and crew report that RXA2113 was ready at that position, it is likely that both controllers engaged in the ADC function had an expectation that RXA2113 should depart from runway 06.

In this context it is unlikely that the training activity affected the likelihood of the ADC detecting the departure. The focus of the ADCs on traffic, and the expectation associated with the presence of the aircraft at runway 06, meant that the controller was unlikely to detect that the aircraft had been taxied to the incorrect runway, whether they were engaged in training or not. This expectation likely resulted in the two ADCs either not attending to the flight data record or misperceiving the runway information on the record.

Safety considerations

The departure of RXA2113 from runway 06 meant that the initial track of the aircraft was different to that expected by the departures controller. The departures controller used the air traffic system to identify which runway aircraft would depart from, in order to predict their track after departure.

Based on the information current in the air traffic system, the departures controller had expected RXA2113 to depart from runway 03 and commence on a northward track to MIDLA. Because RXA2113 departed from runway 06 and initially tracked to the north-east, this may have affected the departures controller's understanding and awareness of the position of the aircraft.

The departure of RXA2113 from runway 06 was primarily the result of the taxi instructions provided by the SMC. After the SMC had issued these instructions, there were limited opportunities to identify the deviation in departure runway, or to update this information within the air traffic system.

The ATC system contains limited defences to prevent or identify deviations from the operational detail of the departure runway. The departure runway is recorded on the flight data record, and the system primarily relies on each controller attending to that record to ensure departures accord with the planned runway. In addition, aircraft separation relies on both controller and flight crew, and there is a role for flight crew to identify any perceived inconsistencies or errors to ATC.

The ATC system has comprehensive defences to ensure the separation of aircraft while taxiing, and during and after take-off. The ATSB did not identify any evidence that separation was affected at any stage during this occurrence.

Findings

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

- The Perth SMC issued taxi instructions to the flight crew of a departing aircraft that directed them to the holding point of runway 06 rather than runway 03, which was assigned by the air traffic system and shown in the flight strip details.
- The aerodrome controllers cleared the crew of the departing aircraft to take-off from runway 06, which was contrary to the runway assigned by the air traffic system and shown in the flight strip details. As a result, the initial track of the aircraft was different to that expected by the departures controller.
- There was no broader safety risk identified as a result of either the taxi or take-off clearances. The taxi clearance provided to the crew of the departing aircraft did not reduce the safety of the aircraft while it was taxiing and holding. The take-off clearance did not reduce the separation of the aircraft during take-off or departure from the airport.

Safety action

Airservices reported that as a result of this incident, they have conducted a check assessment with the SMC. Airservices have developed a training and performance improvement plan for the SMC, to address several performance issues identified in their review.

Safety message

This occurrence highlights how deviations from flight details, as presented in the air traffic system, affect the ability of controllers and flight crews to understand and predict the behaviour of aircraft. Furthermore, limited defences exist to identify when instructions have deviated from the information recorded in the system. Although in this occasion the ATSB has not identified any significant risk to the safety of taxiing or departing aircraft, controllers are reminded that they play an important role in remaining vigilant to the content of displayed data, and updating the system when deviations do occur.

General details

Occurrence details

Date and time:	9 May 2018 – 0911 WST	
Occurrence category:	Incident	
Primary occurrence type:	ANSP Procedural Error	
Location:	Perth Airport	
	Latitude: 31° 56.42' S	Longitude: 115° 58.02' E

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 Commonwealth 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.