

AI2019-2

**AIRCRAFT SERIOUS INCIDENT
INVESTIGATION REPORT**

**AERO ASAHI CORPORATION
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March 28, 2019



The objective of the investigation conducted by the Japan Transport Safety Board in accordance with the Act for Establishment of the Japan Transport Safety Board and with Annex 13 to the Convention on International Civil Aviation is to prevent future accidents and incidents. It is not the purpose of the investigation to apportion blame or liability.

Kazuhiro Nakahashi
Chairman
Japan Transport Safety Board

Note:

This report is a translation of the Japanese original investigation report. The text in Japanese shall prevail in the interpretation of the report.

AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT

CASE EQUIVALENT TO LANDING ON A RUNWAY
BEING USED BY OTHER AIRCRAFT
ON RUNWAY AT TOYAMA AIRPORT, JAPAN
AT ABOUT 14:05 JST, JULY 9, 2018
AERO ASAHI CORPORATION
AEROSPATIALE AS332L (ROTORCRAFT), JA9690

February 22, 2019

Adopted by the Japan Transport Safety Board

Chairman	Kazuhiro Nakahashi
Member	Toru Miyashita
Member	Toshiyuki Ishikawa
Member	Yuichi Marui
Member	Keiji Tanaka
Member	Miwa Nakanishi

1. PROCESS AND PROGRESS OF THE INVESTIGATION

1.1 Summary of the Serious Incident	<p>On Monday, July 9, 2018, an Aerospatiale AS332L, registered JA9690, owned by Aero Asahi Corporation, landed on a runway being used by a vehicle for a runway inspection at Toyama Airport.</p>
1.2 Outline of the Serious Incident Investigation	<p>The occurrence covered by this report falls under the category of Item 17, Article 166-4 of the Ordinance for Enforcement of Civil Aeronautics Act (Ordinance of Ministry of Transport No. 56 of 1952), as the case equivalent to “Landing on a runway being used by other aircraft” as stipulated in Item 2 of same Article, and is classified as a serious incident.</p> <p>On July 10, 2018, the Japan Transport Safety Board (JTSB) designated an investigator-in-charge and an investigator to investigate this serious incident.</p> <p>An accredited representative of the French Republic, as the State of Design and Manufacture of the aircraft involved in this serious incident, participated in the investigation.</p> <p>Comments were invited from parties relevant to the cause of the serious incident and the Relevant State.</p>

2. FACTUAL INFORMATION

2.1 History of the Flight	<p>The history of the flight is summarized as below based on the statements of the Pilot of the Aerospatiale AS332L (Rotorcraft), registered JA9690 (hereinafter referred to as “the Aircraft A”), owned by Aero Asahi Corporation (hereinafter referred to as “the Company”), and the workers in a runway inspection vehicle (hereinafter referred to as “the Vehicle B”) owned by the</p>
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Toyama Prefecture Toyama airport management office (hereinafter referred to as “the Toyama airport office”), the air traffic controller at Tower control position of Toyama aerodrome control tower (hereinafter referred to as “the Tower Controller”), the air traffic controller at Tower control coordinator position of Toyama aerodrome control tower (hereinafter referred to as “the Coordinator Position Controller”), video-recording data from airport surveillance cameras and air traffic control communication records.

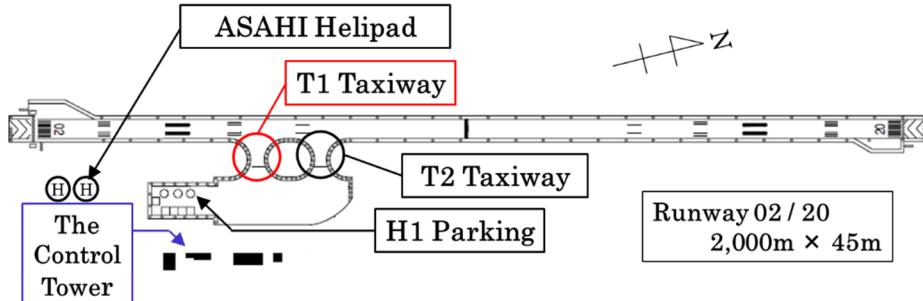


Figure 1: Toyama Airport plan view

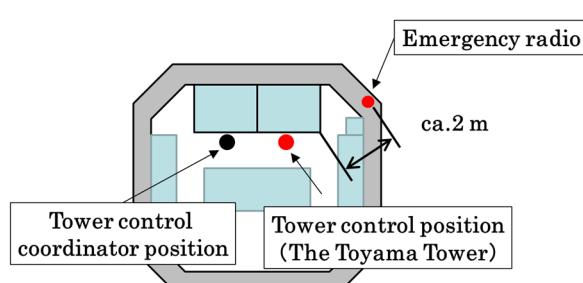
On the day of the serious incident, it was fine at Toyama Airport with good visibility.

At about 13:38 (JST: UTC + 9hrs, unless otherwise stated all times are indicated in JST on a 24-hour clock), on July 9, 2018, the Aircraft A took off from a temporary airfield in Fukui Prefecture, under the flight plan of taking one hour as the total estimated elapsed time to Toyama Airport with a total of four people onboard, consisting of a pilot and other three passengers.



Figure 2: The Aircraft A

At 13:59:28, the Aircraft A called the Toyama Tower (hereinafter referred to as “the Tower”) about 10 nm west of Toyama Airport to obtain the landing information, and confirmed that its landing runway would be Runway 02.



At Toyama aerodrome control tower, the time for shift rotation is 14:00 every day. Therefore, after the Tower Controller took over the duty from the early shift controllers together with the Coordinator Position Controller, two of them were checking ATC equipment that was supposed to do at the time of the shift rotation.

When the Aircraft A called the Tower, the Tower Controller was inspecting an emergency radio (Figure 4) located about 2 m away from the tower control position. At this time, the voice messages on the radio call from the Aircraft A was difficult to listen because it was coming simultaneously from both speakers of the emergency radio and the tower control position, therefore, the Tower Controller returned to the tower control position in order to communicate with the Aircraft A.

At 14:00:00, when the Tower Controller was again moving to the emergency radio in order to return from the Tower frequency that had been changed for the equipment check to the original emergency frequency, another call came on the specified frequency from the Vehicle B to request permission to enter the runway this time. The Tower Controller hurried to return to the tower control position and answered to the Vehicle B saying "It is cleared to enter the runway".

The two workers got on the Vehicle B to perform a runway inspection on time (14:00 every day). The worker called the Tower after confirming on Airband (aeronautical radio) at the apron short of the runway that the Tower finished to communicate about the landing information with the Aircraft A. And as the worker received the clearance to enter the runway from the Tower,



Figure 4:
Emergency Radio



Figure 5: The Vehicle B

the Vehicle B entered the runway via Taxiway T1 (hereinafter referred to as "T1"), while turning on its blue flash light.

At this time, the Tower Controller again moved to the emergency radio in order to return its frequency to the original one without attaching the reminder (Figure 6) indicating "Runway Closed" on the wind indicator. And then, after returning to the tower



Figure 6: Reminder

control position and carrying out the remaining equipment check, the Tower Controller had a talk with the Coordinator Position Controller about the effects of the Western Japan torrential rain and the actions and measures taken to respond to the damage to the airport facilities caused by the flood that they

	<p>SA330</p> <p>Class 1 aviation medical certificate</p> <p>Total flight time</p> <p>(2) Tower Controller Female, Age 45</p> <p>Air traffic controller certificate</p> <p>Aerodrome control services</p> <p>Type rating for Toyama aerodrome control tower</p> <p>Medical Certificate</p> <p>Validity</p> <p>(3) Coordinator Position Controller Male, Age 55</p> <p>Air traffic controller certificate</p> <p>Aerodrome control services</p> <p>Type rating for Toyama aerodrome control tower</p> <p>Medical Certificate</p> <p>Validity</p>	<p>April 9, 2015</p> <p>Validity date: June 19, 2019</p> <p>5,200 hours 17 minutes</p> <p>October 1, 1993</p> <p>October 1, 1993</p> <p>June 1, 2016</p> <p>June 30, 2019</p> <p>May 17, 2017</p> <p>April 1, 1984</p> <p>June 5, 2017</p> <p>June 4, 2019</p>
2.5 Aircraft Information	<p>(1) Aircraft A Type: Aerospatiale AS332L; Serial number: 2089; Date of manufacture: November 7, 1984 Certificate of airworthiness: No. TO-29-466 Validity</p> <p>(2) Vehicle B owned by Toyama Prefecture; Type: Mitsubishi Pajero; Color: Greenish yellow</p>	January 22, 2019
2.6 Meteorological Information	<p>Aeronautical weather regular observations for Toyama Airport about the time of this serious incident were as follows:</p> <p>14:00 Wind direction: 010°, Wind velocity: 9 kt, Visibility: 35 km, Clouds: FEW 3,000 ft, BKN Height Unknown, Temperature: 32 °C, Dew point: 21 °C, Altimeter setting (QNH): 30.03 inHg</p>	
2.7 Additional Information	<p>(1) Position relationship of the Aircraft A and the Vehicle B According to the video-recording data from airport surveillance cameras, the position relationship of the Aircraft A and the Vehicle B on the runway was as follows:</p> <p>The diagram illustrates the relative positions of the Aircraft A and the Vehicle B on Runway 02/20. The runway is 2,000m long and 45m wide. The Aircraft A is at the start of the runway, indicated by a red rectangle. The Vehicle B is further down the runway, indicated by a green rectangle. A horizontal arrow between them indicates a distance of approximately 1,080 meters. A coordinate system is shown at the top right, with the X-axis pointing right and the Z-axis pointing up. The text "Runway 02 / 20" and "2,000m x 45m" is also present.</p>	

Figure 7: The Position of the Vehicle B when the Aircraft A landed

(2) Use of the reminder

On July 13, 2015, the Air Traffic Control Division, Air Navigation Service Department, Civil Aviation Bureau Japan notified all the aerodrome control towers nationwide to mandate the use of the remainder and stipulate the rules

such as the attachment position and procedures in order to enhance grasping of the operational status of runways, after the serious incident of the attempted landing on runway occupied by vehicle, which occurred at Tokushima Airport on April 5, 2015. In response to this notice, Toyama aerodrome control tower stipulated the rules on the use of reminder, which include a clause that a “Runway Closed” indicating reminder made of magnet shall be attached on the wind indicator on the tower control position console at the time of a runway inspection before the work vehicle enters the landing strip¹ and after the vehicle vacates there.

(3) Air traffic control procedure concerning the use of Helipad

The ASAHI Helipad used mainly by the Company is one of temporary airfields for helicopters, set up in the small airplane hangar area, and managed by the Toyama airport office.

Toyama aerodrome control tower stipulates the air traffic control procedure stating that if Runway 02 is in use during daytime, and when a helicopter lands at the Helipad, the said helicopter can land at the Helipad by issuing traffic information, even though there are other aircraft or vehicle on the runway further north than T1. And in accordance with this air traffic control procedure, most of helicopters take off from and land at the Helipad during daytime.

(4) The Tower Controller

Toyama aerodrome control tower is the organization consisting of eight controllers including a chief controller as the top. According to the monthly working schedule, the Tower Controller usually did her desk work in charge of ATC operations at the controller's office, and sometimes undertook ATC at the Tower for about a few hours a day while the controller on duty was away from the position for break time or others.

On the day of the serious accident, the Tower Controller worked the late shift to cover for a controller on vacation, and there were only several occasions in a month for her to deal with an equipment check or a runway inspection at the time of the shift rotation.

(5) Tower control coordinator position

The Tower control coordinator position is in charge of assistance to the tower control position, various recordings, and liaison and coordination with relevant organizations.

When the serious incident occurred, the Coordinator Position Controller was aware that the runway inspection was initiated by the Vehicle B, and he was listening on the communication between the Tower and the Aircraft A. In addition, according to the records in the ATC radio logbook that was taken over from the early shift controllers, the parking spot for the Aircraft A was left blank, which meant that the Aircraft A would land at ASAHI Helipad, thus he expected that the Tower Controller would provide landing clearance to the Aircraft A for the Helipad in accordance with the air traffic control procedure

¹ The term “landing strip” means a rectangular area of an airport which is provided for the take-off or landing of aircraft in a definite direction

	<p>concerning the take-off and landing at the Helipad even when a runway inspection was being carried out.</p> <p>But a landing clearance on Runway 02 was issued to the Aircraft A, therefore, the Coordinator Position Controller thought that there might be another errors in the logbook taken over from the early shift controllers, and then started to reconfirm the records in the logbook.</p> <p>(6) Runway inspection</p> <p>Pursuant to the agreement on the management and operation at Toyama Airport, the daily inspection of runway and others was supposed to be performed from 14:00, since around this time period, there would be no airline's scheduled flights.</p> <p>Besides, the communications between the work vehicle and the Tower were made on the specified frequency that was different from the frequency used between the aircraft and the Tower, therefore, at the tower control position, the Tower Controller carried out operations by using different frequencies depending on the situation to deal with.</p>
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3. ANALYSIS

3.1 Involvement of Weather	None
3.2 Involvement of Pilots	Yes
3.3 Involvement of Aircraft	None
3.4 Analysis of Findings	<p>(1) Forgetting about the presence of the Vehicle B on the runway</p> <p>It is probable that the Tower Controller forgot about the presence the Vehicle B on the runway, after she gave permission to enter the runway to the Vehicle B and then the Vehicle B entered the runway.</p> <p>It is probable that this is due to the fact that the voice communication was coming from two places simultaneously because the Tower Controller's equipment check on the emergency radio was interrupted by the last-minute call and communication with the Aircraft A, and therefore, she hurried to return the frequency of the emergency radio to the original emergency frequency to solve the problem of duplicated voice communication, contributing to her forgetting about the presence of the Vehicle B on the runway</p> <p>It is probable that the Tower Controller was not able to remember the Vehicle B on the runway afterward, because she did not attach the reminder.</p> <p>The Tower Controller should have attached the reminder on the wind indicator in accordance with the prescribed procedures, but it is somewhat likely that entering the vehicle and attaching the reminder failed to be incorporated into a series of action patterns, since she did mainly desk work recently, and had few opportunities to deal with a runway inspection.</p> <p>In addition, it is somewhat likely that her attention on the runway was distracted, because after finishing the check on the emergency radio and returning to the tower control position, the Tower Controller had a talk with</p>

the Coordinator Position Controller about the actions and measures to response to the flood that she was interested in.

(2) Failure of visual scanning of the full length of the runway

It is probable that the Tower Controller could have recognized the Vehicle B by ensuring the basic operation of scanning the full length of the runway when issuing a landing clearance.

It is probable that when issuing a landing clearance to the Aircraft A on the runway, the Tower Controller visually scanned carefully from the threshold of Runway 02 to around T2, but did not check carefully further north than that.

It is somewhat likely that this is because when Runway 02 is in use during daytime at Toyama Airport, most of arrival helicopters land at the Helipad in accordance with the air traffic control procedure concerning the take-off and landing at the Helipad, the attention of the Tower Controller tended to concentrate on the range from the threshold of Runway 02 to around T1 to T2.

(3) Overlapping several tasks

At Toyama Airport, they made it a rule to perform a daily runway inspection from 14:00, when there would be no airline's scheduled flights, but during this period of time, the shift rotation of the air traffic controllers and the equipment check were supposed to also be performed, resulting in the overlapping tasks.

This serious incident occurred because the Tower Controller successively received the call from the Aircraft A about 40 minutes earlier than planned and the request from the Vehicle B for permission to enter the runway, when the Tower Controller was having several tasks to do almost simultaneously after the shift rotation.

Generally, as a runway inspection during airport operation hours can be a factor contributing to the increase in work volume of air traffic controllers, it is desirable to plan the schedule for a runway inspection by considering not only the operation time for scheduled flights but also the shift rotation of air traffic controllers.

On the other hand, it is probable that air traffic controllers are required to carry out TEM (Threat and Error Management) to well manage their tasks, assuming that there would be possible calls from aircraft and others in any time, even if they are taking over the duty after their shift rotation, and carrying out an equipment check, or responding to a runway inspection vehicle.

(4) Collaboration of air traffic controllers in the Tower

According to the flight progress strip that the Tower Controller had, the parking spot for the Aircraft A was H1, and the Aircraft A was supposed to land on the runway, however, according to the records in the ATC radio logbook which the Coordinator Position Controller took over from the early shift controllers, the Aircraft A was supposed to land at the Helipad, thus, the prior information on the Aircraft A was different between the two controllers.

The Coordinator Position Controller noticed the difference when the Tower Controller issued the landing clearance to the Aircraft A on the runway;

but it is somewhat likely that he did not make an assertion about the Vehicle B on the runway to the Tower Controller, because the Coordinator Position Controller himself forgot about the Vehicle B.

It is probable that under the circumstances the tasks at the tower control position are rapidly increasing, a controller at the tower control coordinator position shall be required to play a followership role by making an assertion, if necessary, grasping the traffic conditions and the contents of communications available at the tower control position as much as possible, even though he or she does not have a function to order directly to the controller at the tower control position.

In addition, it is desirable that air traffic controllers in the control tower should collaboratively work on as a team in order to confirm the situation of the runway by using the reminder, by sight, pointing and calling the confirmation, and by commenting out loud the information which could be a "Threat" (a factor that induces errors).

(5) Landing of the Aircraft A

The Pilot of the Aircraft A thought that he had confirmed the full length of the runway when receiving the landing clearance and making a turn into the final approach; but he was not able to recognize the Vehicle B; and It is probable that this is because the Vehicle B communicated with the Tower on another frequency, and therefore, the Pilot could not listen to the other aircraft communications with the Tower except its own, when he thought that there would no other related aircraft and others on the runway; and he would be able to vacate the runway before T2; and thus, the visual scanning of the Pilot tended to concentrate on the range from the runway threshold to around the landing point.

The aircraft pilots should not forget that the confirmation by both of air traffic controllers and pilots can ensure the safety on the runway, and even though they receive a landing clearance, when making the final judgment on landing, it is required for them to scan again the runway for obstacles and others, confirm with the air traffic controller, or execute a go-around without hesitation in case of doubt.

(6) Risk assessment

As shown in Figure 7, the separation between the Aircraft A and the Vehicle B at closest proximity was 1,080 m.

According to ICAO "Manual on the Prevention of Runway Incursions," it is certain that the severity of risk for this serious incident falls in the "Category C (an incident characterized by time and / or distance to avoid a collision). (See Attachment : Classification of the Severity of Runway Incursions)

4. PROBABLE CAUSES

It is highly probable that the serious incident occurred as the Aircraft A landed on the runway where there was the Vehicle B, because the Tower Controller issued a landing clearance to the Aircraft A on the runway, while forgetting about the presence the Vehicle B engaging in the runway inspection, in addition, the Pilot of the Aircraft A did not recognize the Vehicle B on the runway.

It is probable that the Tower Controller issued a landing clearance to the Aircraft A on the runway, while forgetting about the presence of the Vehicle B engaging in the runway inspection, because the Tower Controller did not scan the full length of the runway appropriately when issuing the landing clearance, and besides, it was related to the fact that she did not use the reminder that should be used when a work vehicle enter the runway for a runway inspection.

It is probable that the Pilot of the Aircraft A did not recognize the Vehicle B on the runway, because the visual scanning of the Pilot tended to concentrate on the range from the runway threshold to around the landing point.

5. SAFETY ACTIONS

- (1) Upon the occurrence of this serious incident, the Civil Aviation Bureau (CAB) circulated the contents of the serious incident and took the following measures to prevent its recurrence.
 - a. The CAB instructed all the aerodrome control towers nationwide to strive to use the remainder appropriately and notified that they should ensure to use the reminder by providing on-site specialized training courses.
 - b. The CAB raised awareness, creating a poster to prevent the incident around the runway by accurately grasping the presence of aircraft and work vehicles on the runway.
- (2) Toyama aerodrome control tower took the following measures to prevent its recurrence.
 - a. It changed the install position of the emergency radio so that the controllers are able to operate it without leaving his or her seat of the tower control position.
 - b. It changed the schedule to perform an equipment check so that the timing of a daily runway inspection and an equipment check would not be overlapped.
 - c. It decided to also use the reminder of the Runway Closed at the tower control coordinator position by mutually checking with the tower control position.
 - d. It decided that the tower control coordinator position shall make communications with vehicles, coordinating with the tower control position.
 - e. It decided to clearly write in the ATC radio logbook about the information on whether it is the Helipad or a runway where the aircraft take off or land.
 - f. It held an air traffic control expertise exchange meeting to exchange opinions about the air traffic control procedure for the helicopter, the sharing information among controllers, pilots and operators, and others.
- (3) The Company shared the contents of the serious incident within the Company and alerted the pilots to raise their awareness as follows:
 - a. Pilots shall ensure to confirm clearances on the runway, final approach course or the helipad at the time of take-off or landing of the airport.
 - b. Pilots shall pay a full attention to the movement of vehicle around the landing point (especially the approach direction) and should make the appropriate callout by themselves when approaching a landing area.
 - c. Pilot shall reconfirm without any hesitation whenever a question arises about ATC instructions and others.

Classification of the Severity of Runway Incursions

The classification related to the risk measurement described in the “Manual on the Prevention of Runway Incursions” (Doc 9870) published by ICAO are as shown in the table below.

Table 6-1. Severity classification scheme

<i>Severity classification</i>	<i>Description **1</i>
<i>A</i>	<i>A serious incident in which a collision is narrowly avoided.</i>
<i>B</i>	<i>An incident in which separation decreases and there is significant potential for collision, which may result in a time-critical corrective/evasive response to avoid a collision.</i>
<i>C **2</i>	<i>An incident characterized by ample time and/or distance to avoid a collision.</i>
<i>D</i>	<i>An incident that meets the definition of runway incursion such as the incorrect presence of a single vehicle, person or aircraft on the protected area of a surface designated for the landing and takeoff of aircraft but with no immediate safety consequences.</i>
<i>E</i>	<i>Insufficient information or inconclusive or conflicting evidence precludes a severity assessment.</i>

**1. Refer to Annex 13 for the definition of “incident.”

**2. Shading is added to indicate the applicable category in order to show the applicable category of this serious incident.