AI2023-6

AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT

Japan Coast Guard
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September 28, 2023

Japan Transport Safety Board

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.

TAKEDA Nobuo
Chairperson
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.

《Reference》

The terms used to describe the results of the analysis in "3. ANALYSIS" of this report are as follows.

i) In case of being able to determine, the term "certain" or "certainly" is used.
ii) In case of being unable to determine but being almost certain, the term "highly probable" or "most likely" is used.
iii) In case of higher possibility, the term "probable" or "more likely" is used.
iv) In a case that there is a possibility, the term "likely" or "possible" is used.

AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT

CASE EQUIVALENT TO "AN ATTEMPT OF LANDING ON A RUNWAY BEING USED BY OTHER AIRCRAFT"

JAPAN COAST GUARD

EUROCOPTER EC225LP (ROTORCRAFT), JA687A

AT KANSAI INTERNATIONAL AIRPORT

AT ABOUT 12:13 JST, APRIL 22, 2022

August 25, 2023
Adopted by the Japan Transport Safety Board

Chairperson	TAKEDA Nobuo
Member	SHIMAMURA Atsushi
Member	MARUI Yuichi
Member	SODA Hisako
Member	NAKANISHI Miwa
Member	TSUDA Hiroka

1. PROCESS AND PROGRESS OF THE AIRCRAFT SERIOUS INCIDENT INVESTIGATION

1.1 Summary of the Serious Incident	On April 22 (Friday), 2022, at Kansai International Airport, when a Eurocopter EC225LP, JA687A, operated by Japan Coast Guard, was on an approach to the take-off/landing field for helicopters (helipad) with landing clearance from an air traffic controller, an inspection vehicle cleared for entering from another air traffic controller entered the helipad.
1.2 Outline of the Serious Incident Investigation	This occurrence covered by this report falls under the category of item (xviii), 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 "An attempt of landing on a runway being used by other aircraft" as stipulated in item (ii) of same Article, and is classified as a serious incident. On April 22, 2022, the Japan Transport Safety Board (JTSB) designated an investigator-in-charge and an investigator to investigate this serious incident. And on April 26, 2022, JTSB designated one additional investigator for this serious incident. The French Republic as the State of Design and Manufacture of the

	aircraft involved in this serious incident designated its accredited representative and advisors. Comments on the draft Final Report from parties relevant to the cause of the serious incident and the relevant States were invited.

2. FACTUAL INFORMATION

2.1 History of the Serious Incident

According to the statements of the captain and the co-pilot of Eurocopter EC225LP, JA687A (hereinafter referred to as "Aircraft A"), operated by Japan Coast Guard, the driver and the radio operator of the inspection vehicle belonging to Kansai Airports (hereinafter referred to as "Vehicle B"), the air traffic controller in charge of the tower control position (hereinafter referred to as "the Tower"), and the air traffic controller in charge of the ground control position of the Kansai Airport Traffic Control Tower at the time of the serious incident (hereinafter referred to as "the Ground"), as well as the records on the cockpit voice recorder and the flight data recorder of Aircraft A, records of the drive recorder installed in Vehicle B, and ATC communication records and radar track records, the history of the serious incident is summarized as follows.(See Figure 4).

Figure 1: Aircraft A

Figure 2: Vehicle B

(1) On the day when the serious incident occurred, the Tower and the Ground started to work at 06:45 (JST: UTC+9 hours; unless otherwise noted, all times are indicated in JST in this report on a 24-hour clock) engaging in aerodrome air traffic control services while changing the control positions or taking breaks about every 50 minutes.

As for Vehicle B, the driver was seated in the driver seat, the radio operator in the passenger seat, and other one staff in the back seat in Vehicle B, and an afternoon scheduled inspection of runways etc. (conducted in principle between 12:00 and 16:00 every day) was being conducted. Cleared by the Ground at 12:02, Vehicle B entered Runway 24L from the taxiway at the southern end of the Airport, Vehicle B vacated from the runway once as instructed by the Ground as there was an aircraft to take off on its way, and entered the runway again at 12:07 with clearance from the Ground to continue the runway inspection northeastward.

With the captain in charge of the pilotage seated in the right pilot seat, the co-pilot in charge of the ATC communications in the left pilot seat, and other seven crewmembers, Aircraft A was planned to approach the Airport from the east side after completing the flight operations over Osaka Bay. At

12:06, Aircraft A established communication with the Tower about 8 nm (about 14.8 km) west of the Airport, and received the instruction from the Tower to head for the Visual Reporting Point*1, "RINKU" (3.6 nm (about 6.7 km) east of the Airport) via the southern side of the Airport.

(2) The arriving aircraft to Runway 24L (hereinafter referred to as "Aircraft C") was getting closer, thus the Tower was wondering about the approach sequence related to Aircraft A, which would be going to cross the final approach path to Runway 24L, when having received a call from the Ground, who had noticed both Aircraft A and Aircraft C were approaching, asking, "The approach sequence around the runway and the helipad is Vehicle B, Aircraft C and Aircraft A?", the Tower replied "I think so." Besides, there was an inquiry from the Ground weather there would be any problem if Vehicle B continued the runway check to the northeast end of the runway, therefore the Tower instructed the Ground to let Vehicle B complete the runway inspection. Furthermore, the Ground also asked about Vehicle B saying, "After that, it is going to the helipad and heli-spot, isn't it?", and the Tower replied, "I think so."

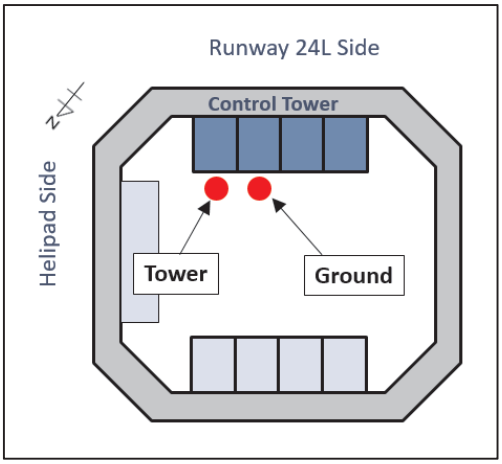

Figure 3: Layout of the Control Tower

From a series of these conversations with the Tower, with the common understanding that according to Vehicle B's standard route for the scheduled inspection (described later in 2.7 (1)), next to the runway inspection would be the inspection of the helipad and heli-spot, the Tower's reply was affirmative and the approach sequence around the runway and the helipad also matched the Ground's plan, therefore the Ground assumed that the Tower had approved of Vehicle B entering the helipad for the scheduled inspection. On the other hand, in a series of those conversations with the Ground, the Tower responded in affirmative about the approach sequence around the runway and the helipad and the inspection route that Vehicle B would follow heading to the helipad after the runway inspection, however the Tower did not intend to have approved of Vehicle B entering the helipad for the scheduled inspection.

The Tower finally decided to have Aircraft A land before Aircraft C, however, the Tower did not inform the Ground of the decision because the Ground seemed busy due to increase in communication volume on the Ground side.

*1 The "Visual Reporting Points" refers to the points that are established for each airport and used for VFR aircraft entering the air traffic control zone for landing or other purposes to report its position to receive a clearance or instruction from an air traffic controller.

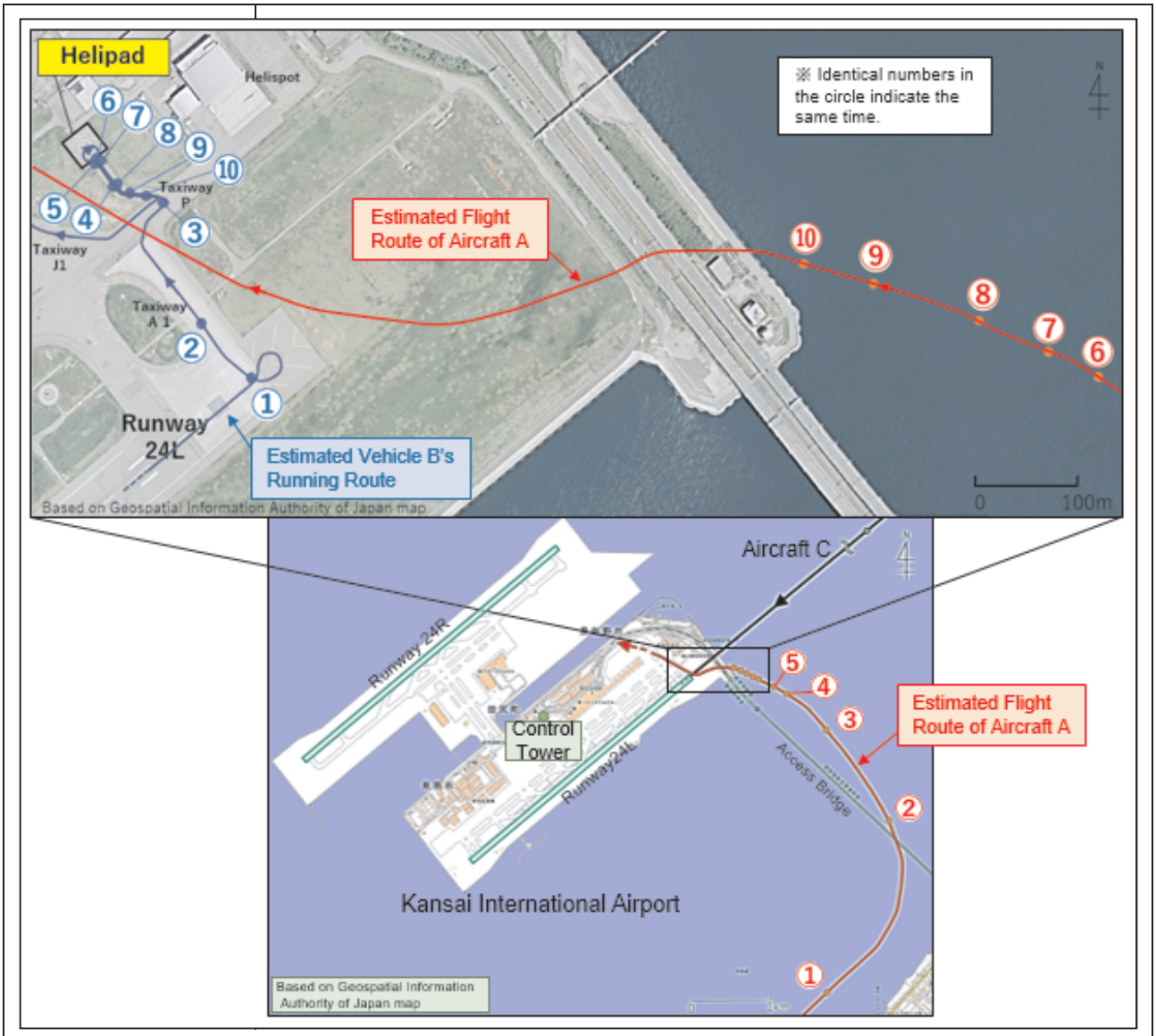

Figure 4: Situation at the Time of Occurrence of the Serious Incident

(3) At 12:11:57, Aircraft A made a position report over "RINKU". At 12:12:01, the Tower issued a clearance for Aircraft A to land at the Helipad via the "BRIDGE ARRIVAL" (Approach course of flying along the Kansai International Airport Access Bridge (Position ① in the bottom figure of Figure 4). At the almost same time, the Ground provided Vehicle B with the reference information that the arriving aircraft (Aircraft C) was going to land in about two minutes, and did not notice that the Tower had issued a landing clearance to Aircraft A.

Vehicle B informed the Ground that it was going to finish the runway inspection shortly and vacate via Taxiway A1. Responding to this, the Ground confirmed with Vehicle B whether the helipad and heli-spot were to be inspected after it vacated the runway, and Vehicle B replied that it was correct. At 12:12:27, on Taxiway A1, Vehicle B informed the Ground of the fact that Vehicle B vacated the runway and the inspection result. In reply, the Ground cleared Vehicle B to enter the helipad and heli-spot. At 12:12:40, Vehicle B read back the clearance of entering the helipad and heli-spot

	(Position ② in the left of the top figure of Figure 4). At this time, the Tower did not notice that Vehicle B was cleared to enter the Helipad. Since the runway inspection was over, the Tower and the Ground removed their reminders which had been respectively set (described later in 2.7 (2)) at the same time. (4) The Ground became busy for handling of departure aircraft and others, therefore, although having confirmed several times the position of Aircraft C supposed to arrive first, the Ground did not confirm the position of Aircraft A which had started the approach. Before long, another air traffic controller who was behind the Tower and the Ground noticed the duplicated clearances related to the helipad, and asserted "Helicopter is coming." toward the Ground. Hearing it, the Tower informed the Ground, saying "Letting down.", that the landing clearance had been already issued. The Ground did not immediately recognize which aircraft was cleared to land, but judged according to the assertion that Aircraft A would be approaching. The Ground did not understand why Aircraft A, which was supposed to arrive after Aircraft C, was approaching first, and neither was able to visually recognize Aircraft A at that point. However, thinking that Vehicle B had to be evacuated from the vicinity of the helipad anyhow, at 12:13:03, the Ground started to inform Vehicle B that a helicopter was approaching for landing (Position ③ in the left of the top figure of Figure 4). However, not thinking of any idea where Vehicle B should be evacuated to, the Ground was unable to immediately issue the specific instructions meaning to evacuate from the helipad area other than that the helicopter was returning. (5) At 12:13:16, when Aircraft A turned to the direction of the Helipad for a final approach, the captain visually recognized Vehicle B which was entering the taxiway connected to the helipad from Taxiway P (hereinafter referred to as "Connected Taxiway") (Position ④ in the bottom figure of Figure 4). In a short time, Vehicle B entered the helipad, therefore, at 12:13:25, the co-pilot informed the Tower that a vehicle was present at the helipad (Position ⑥ in the right of the top figure of Figure 4). Being hearing the assertion to the Ground and also paying attention to Vehicle B, the Tower just had decided to instruct Aircraft A to execute a go-around because Vehicle B entered the helipad after that. At 12:13:30, the Tower instructed Aircraft A to execute a go-around (Position ⑧ in the right of the top figure of Figure 4), and at 12:13:37, Aircraft A followed the instruction from the Tower and executed a go-around (Position ⑩ in the right of the top figure of Figure 4). When receiving the information from the Ground that a helicopter was returning, Vehicle B had just entered Connected Taxiway (Position ③ in the left of the top figure of Figure 4). The driver and radio operator did not know where Aircraft A was, but judged that it was necessary to evacuate immediately. As taking into considering the risks of downwash*2, the driver did not stop there. In addition, as thinking that with the narrow Connected

*2 "Downwash" refers to the downward airstream by helicopter main rotor.

	Taxiway, it would not be appropriate to turn or go backward, the driver had Vehicle B continuously move forward, and at about 12:13:20, Vehicle B entered the helipad (Position ⑤ in the left of the top figure of Figure 4), promptly turned, and left (Position ⑦ in the left of the top figure of Figure 4) at about 12:13:26. At 12:13:33, the Ground instructed Vehicle B to evacuate to Taxiway J1 (Position ⑨ in the left of the top figure of Figure 4). Aircraft A flew toward the west side of the helipad after the go-around, then received a landing clearance from the Tower again and landed at the helipad at 12:18.
2.2 Injuries to Persons	None
2.3 Damage to the Aircraft	None
2.4 Personnel Information	(1) Tower Air Traffic Control Certificate — April 1, 2008 Aerodrome Control Service — April 1, 2008 Medical Examination Certificate — Validity: June 30, 2022 (2) Ground Air Traffic Control Certificate — April 1, 1993 Aerodrome Control Service — April 1, 1993 Medical Examination Certificate — Validity: June 30, 2022
2.5 Aircraft Information	(1) Aircraft A Aircraft type: Eurocopter EC225LP Serial number: 2663 Date of manufacture: August 21, 2007 Airworthiness certificate: Dai-2021-474 (2) Vehicle B Owner: Kansai Airports Operation Services Vehicle type: Nissan X-Trail Color: Yellow-green Others: Equipped with a blue flash light on the roof, the light was on.
2.6 Meteorological Information	The observation data in the aerodrome routine meteorological report at the Airport at around the time of the serious incident were as follows: 12:00 Wind direction: 260°, Wind velocity: 4 kt Wind direction fluctuation 220° to 290° Prevailing visibility: 10 km or more Clouds: Amount 1/8, Type Cumulus, Cloud base 2,500 ft Temperature: 18 °C, Dew point: 15 °C Altimeter setting (QNH): 29.95 inHg
2.7 Additional Information	(1) Vehicle B's Route for the Scheduled Inspection of Runways etc. The routes for the afternoon scheduled inspection of runways etc. at the Airport are specified according to the using runways. At the time of the occurrence of the serious incident, Runway 24L and 24R were in use at the Airport, and after finishing the inspection of Runway 24R and the taxiways Vehicle B was supposed to inspect Runway 24L from the southwest to the

northeast, and inspect the helipad and heli-spot at the end.

(2) Reminders

The Operation Processing Procedures established by the Airport Traffic Control Tower stipulates that in case where the runway is not available for take-off and landing of aircraft due to closure of the runway and others, the tower control position and ground control position shall cover the display screen of the anemometer with a special reminder and surely grasp the situation of runway and its surroundings in order to perform ATC services.

Figure 5: Example of How the Reminder is used (When a runway is closed)

In the Airport Traffic Control Tower, a special reminder is also used during the runway inspection in addition to when the runway is closed, however, any reminder has not been used for the helipad because aircraft use the helipad less frequently, thus the time when an helicopter uses for take-off and landing would not be overlapped with the time when an inspection vehicle enters and inspects which requires a short amount of time.

(3) Coordination between Control Positions related to the Helipad

Air traffic controllers form smooth air traffic flow of aircraft and others leaving or entering their jurisdiction area by directly issuing instructions to the aircraft and others in the jurisdiction area of their responsible control position as well as coordinating with other control positions in charge of adjacent areas.

As the helipad at the Airport is exclusive for take-off and landing, it is the jurisdiction area of the tower control position. Therefore, when the ground control position issues a clearance to an inspection vehicle to enter the helipad, in principle, the ground control position shall coordinate with the tower control position and obtain the approval in advance.

3. ANALYSIS

(1) Coordination between the Tower and the Ground

The JTSB concludes that it is certain that as cleared by the Ground, Vehicle B entered the helipad to which Aircraft A was on an approach with landing clearance from the Tower.

Despite Aircraft A approaching with landing clearance, the Ground issued a clearance to enter the helipad to Vehicle B, which is most likely because in the course of the conversation with the Tower, the Ground recognized that Vehicle B had been approved to enter the helipad as the result of the coordination. On the other hand, in this conversation, the Tower did not recognize as having approved of Vehicle B entering the helipad. The Ground recognized that Vehicle B had been approved to enter the helipad as the result of the coordination is most likely because the conversation between the Tower and the Ground was not explicit about whether it was a coordination for approval and whether it was about approval for that coordination.

As a background of this, it is possible that the helipad was such an area that aircraft use less frequently comparing to runways, where the time when an helicopter uses for take-off and landing would be rarely overlapped with the time when an inspection vehicle enters, therefore, there was little awareness of the coordination related to the vehicles entering this area as the Airport Traffic Control Tower. This possibly contributed to the conversation between the Tower and the Ground that was not explicit about the coordination.

When coordinating about the approvals between control positions, it is important for the air traffic controller who seeks an approval to be always aware of the risks and influence incurred when the coordination is made in an ambiguous manner, and to state clearly that it is the coordination to "seek approval". In addition, the air traffic controller who is asked to coordinate with should also state clearly whether it is “approved” or “not approved” for the coordination.

(2) TRM*3 for Air Traffic Control Services

When deciding to have Aircraft A land in the situation where Vehicle B under the jurisdiction of the Ground was planned to enter the helipad, if the Tower had informed the Ground of the decision or Aircraft A’s position, the Ground could have more likely realized there was a contradiction between its own perception and the real situation. In addition, before issuing the clearance to enter the helipad to Vehicle B, if the Ground informed the Tower of it, the Tower could have probably noticed the discrepancies in each other's perceptions.

The air traffic control services are performed by a teamwork with several control positions to share their duties. In order to manage human errors in the coordination between control positions, it is important for air traffic controllers to enhance the TRM skills while supplementing each other through teamwork in mind. It is desirable for the Civil Aviation Bureau to continuously consider the specific measures to enhance and practice the TRM skills with this serious incident as a case study.

(3) Classification of Severity

The JTSB concludes that the closest distance between Vehicle B, which entered the helipad, and Aircraft A was most likely approximately 1,065 m (about 0.58 nm).

The serious incident certainly falls under the severity classification of Category C (An incident characterized by ample time and/or distance to avoid a collision) of "the Manual on the Prevention of Runway Incursions" of ICAO with classification tools provided by ICAO. (See Attachment “Severity Classifications of Runway Incursions”).

4. PROBABLE CAUSES

The JTSB concludes that the probable cause of this serious incident was certainly that when Aircraft A was on an approach to the helipad with landing clearance from the Tower, Vehicle B entered the helipad as cleared by the Ground.

The reason why the Ground issued a clearance to enter the helipad to Vehicle B is most likely because while the coordination including the approval related to the use of the helipad were not made in an explicit manner mutually between the Tower and the Ground, the Ground recognized that the Tower had approved of Vehicle B entering the helipad.

5. SAFETY ACTIONS

5.1 Safety Actions	As described in “3 ANALYSIS”, when coordinating about the approvals

*3 “TRM (Team Resource Management) refers to strategies for the best use of all available resources - information, equipment and people - to optimize the safety and efficiency of air traffic control services.

Required	between control positions, it is important that the air traffic controller who seeks an approval shall state clearly to that effect, and that the air traffic controller who is asked to coordinate with shall state clearly whether it is approved or not approved for the coordination.
5.2 Safety Actions Taken after the Serious Incident	Upon the occurrence of this serious incident, the Airport Traffic Control Tower has taken the following actions and stipulated in the Operation Processing Procedures as of August 22, 2022. ・In case where the helipad is not available for take-off and landing of aircraft, the tower control position and ground control position shall cover the display screen of anemometer with a special reminder and surely grasp the situation of the helipad to perform ATC services. ・When issuing the clearance to enter the helipad to a vehicle, the ground control position shall instruct the vehicle to hold short of Connected Taxiway and obtain an approval for the vehicle to enter from the tower control position in an explicit manner. In addition, the ground control position shall confirm the exit of the vehicle from the helipad by having the vehicle report its vacation from Connected Taxiway, and when the vehicle completes the exit, inform the tower control position of it.

Attachment

Severity Classifications of Runway Incursions

Severity classifications described in ICAO "the Manual on the Prevention of Runway Incursions" (Doc 9870) are as described in the table below

Table 6-1 Severity classification scheme

Severity classification	*Description*** [1]
A	*A serious incident in which a collision is narrowly avoided.*
B	*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.*
*C*** [2]	*An incident characterized by ample time and/or distance to avoid a collision.*
D	*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 take-off of aircraft but with no immediate safety consequences.*
E	*Insufficient information or inconclusive or conflicting evidence precludes a severity assessment.*

＊＊ 1 See the definition of "incident" of Annex 13.

＊＊ 2 Shaded to show the pertinent classification of the serious incident.