AI2016-5

AIRCRAFT SERIOUS INCIDENT

INVESTIGATION REPORT

AERO ASAHI CORPORATION
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September 29, 2016

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.

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

AERO ASAHI CORPORATION

AÈROSPATIALE AS332L1 (ROTORCRAFT)

JA9678

DROPPING OF OBJECT

DURING EXTERNAL CARGO SLING OPERATION

ITOIGAWA CITY, NIIGATA PREFECTURE, JAPAN

AT AROUND 11:13 JST, OCTOBER 2, 2015

August 26, 2016

Adopted by the Japan Transport Safety Board

Chairman	Kazuhiro Nakahashi
Member	Toru Miyashita
Member	Toshiyuki Ishikawa
Member	Sadao Tamura
Member	Keiji Tanaka
Member	Miwa Nakanishi

1. PROCESS AND PROGRESS OF THE INVESTIGATION

1.1 Summary of the Serious Incident	At around 11:13 JST (Japan Standard Time: UTC+09 hrs.) on Friday, October 2, 2015, while an Aérospatiale AS332L1 registered JA9678 and operated by Aero Asahi Corporation was flying toward the cargo sling point after taking off from the temporary helipad at Itoigawa City, Niigata Prefecture, and transporting ready-mixed concrete to the works site, a bucket for ready-mixed concrete was dropped.
1.2 Outline of the Serious Incident Investigation	This event fell under the category of "Case where a slung load, any other load carried external to an aircraft or an object being towed by an aircraft was released unintentionally or intentionally as an emergency measure" as stipulated in Item (xv), Article 166-4 of the Ordinance for Enforcement of the Civil Aeronautics Act, which is classified as an aircraft serious incident.

	The Japan Transport Safety Board designated an investigator-in-charge and an investigator on October 2, 2015 to investigate this serious incident. An accredited representative and an adviser of the French Republic, as the State of Design and Manufacture of the rotorcraft involved in the serious incident, participated in this investigation. Comments were invited from parties relevant to the cause of the serious incident. Comments were invited from the relevant State.

2. FACTUAL INFORMATION

2.1 History of the Flight

The history of the flight is summarized as below based on the statements of the captain and the operator of the onboard system (hereinafter referred to as "the operator").

Photo 1 Cargo hook and bucket

On October 2, 2015, Aérospatiale AS332L1, registered JA9678 and operated by Aero Asahi Corporation, took off from the temporary helipad at Oumi, Itoigawa City, Niigata Prefecture, with two persons consisting of the captain and the operator on board, in order to transport cargoes to be used for the construction of a new transmission tower by external cargo sling operation.

After performing a flight to check the route for cargo transport, the rotorcraft started transporting cargoes from the cargo sling point adjacent to the temporary helipad.

The rotorcraft was equipped with two cargo hooks painted red and yellow, respectively (the red hook and the yellow hook).

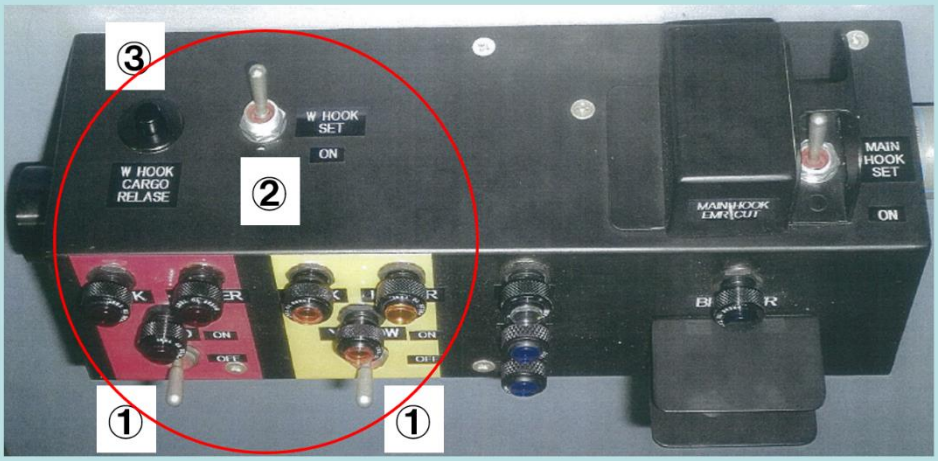
The rotorcraft was scheduled to perform 27 cargo transport operations on the day, and on the second flight, it transported a bucket filled with ready-mixed concrete, slung on the red hook, from the cargo sling point to the cargo unloading point at the new transmission tower construction site (hereinafter referred to as "concrete unloading point"). When doing so, the captain and the operator visually confirmed that the bucket was slung on the red hook.

Fig. 1 Cargo hook with slung cargo, opening and closing (conceptual diagram)

To enable operations for opening and closing the two hooks to be performed not only on the ground but also on board, the

pilot's seat and the operator's seat on the left of the passenger cabin were equipped with operating switches and caution lights showing the locking status. The operator's seat was equipped with a switch box in which these operating switches and caution lights were integrated, and it had been decided that the operator would operate these.

After the rotorcraft had arrived at the concrete unloading point, the ready-mixed concrete was unloaded from the bucket via remote-control operation by the operator, then, with the empty bucket being slung, the rotorcraft flew lock toward the cargo sling point to carry out the next cargo transport operation. During the flight, the operator saw the caution lights illuminating on the switch box, and noticed that the yellow hook, from which the bucket was not slung, was also locked. The operator then decided that the bucket would be slung from the yellow hook for the next cargo transport operation, by way of alternating between the hooks and thus preventing deterioration of the hooks. Although in flight, The operator decided to operate the switch box and release the lock on the yellow hook, with the intention of reducing lock release work by the ground staff. The operator notified the captain only that he was going to release the lock on a hook, but did not specify which hook, and on operating the switch, mistakenly released the lock on the red hook from which the bucket was slung, causing the bucket to be dropped.



1. Switches ① are used to select the red or yellow hook to release the lock.
2. Switch ② is used to set the hooks.
3. Button ③ is pressed to release the lock.

Fig. 2 Operation of the switch box

This serious incident occurred at around 11:13 on October 2, 2015, in a mountain forest on the return route from the concrete unloading point to the cargo sling point at Oumi, Itoigawa City (36°58'13″N, 137°45'31″E).

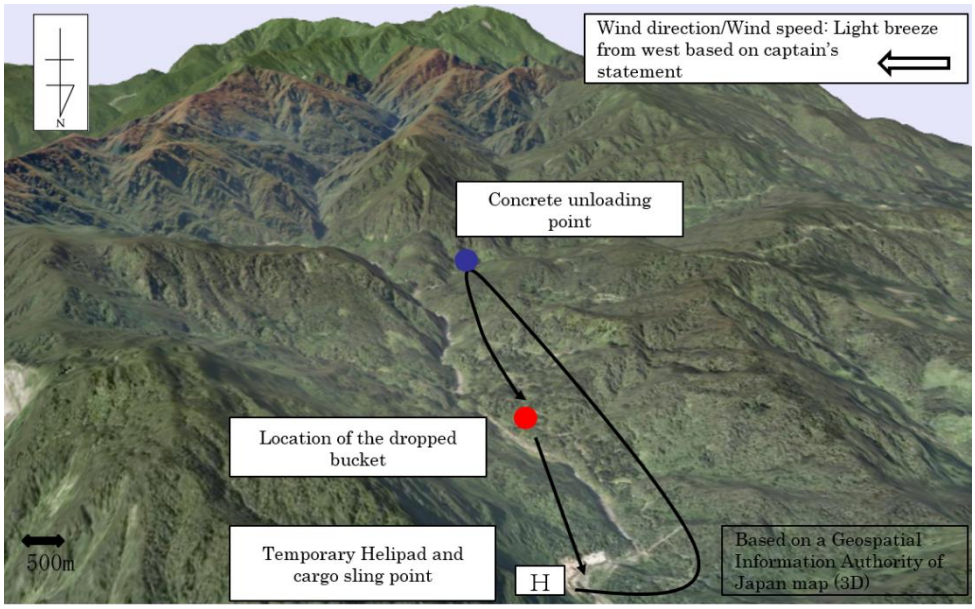


Fig. 3 Estimated flight route

2.2 Injuries to Persons	None
2.3 Damage to the Aircraft	Extent of damage of the rotorcraft: None
2.4 Personnel Information	Captain: Male, age 38 Commercial pilot certificate (Rotorcraft) June 2, 1998 Type rating for Aérospatiale SA330 May 17, 2007 Class 1 aviation medical certificate Validity: November 25, 2015 Specific pilot competence Expiry of practicable period for flight: October 28, 2016 Total flight time 5,293 hrs 37 min Total flight time on the type of aircraft: 840 hrs 23 min Operator: Male, age 51 Started work in cargo transport for the company July 1992
2.5 Aircraft Information	Aircraft type: Aérospatiale AS332L1 Serial number: 2231, Date of manufacture: February 18, 1988 Certificate of airworthiness: No. Tou-27-282 Validity: October 2, 2016 When the serious incident occurred, the weight of the Rotorcraft and the position of its center gravity were estimated to have been within the allowable range.
2.6 Meteorological Information	According to the statement of the captain, the weather during the cargo transport was cloudy, visibility was about 10 km, and there was a weak westerly wind.
2.7 Additional Information	(1) Operation of cargo hooks and switch box The cargo hooks and switch box were developed jointly by other transport companies that undertake domestic cargo transport, and had been used by the company since February 2015.

	The captain and the operator had been engaged in cargo transport using the cargo hooks and switch box at the concerned site since September 27, 2015, and although they had previously released the locks on the hooks at the cargo sling point and cargo unloading point during that time, this was the first time they had done so during a flight. (2) Structure of cargo hooks and switch box Each cargo hook is fitted with a keeper to prevent the cargo from falling. The keeper has a locking function, and caution lights enabling the locking status to be confirmed are mounted by the pilot's seat and on the switch box by the operator's seat. The hooks and keepers are designed to lock automatically when a given load (about 34 kg or more) is applied to the hooks, while at the same time they are also locked as a result of external impact load. The locks are released by operating a switch on the switch box by the operator's seat. Additionally, when a cargo is being slung, the lock on the keeper is released when the hook is opened by operating the release lever on the cargo hook or the switch on the indication box by the pilot's seat. The switch box panel and caution lights are colored to correspond to the color of the hooks, to prevent mistake of the hooks. Moreover, the caution lights are illuminated not to indicate that cargo is slung but to indicate that the hook is locked. (3) Status of cargo hooks and switch box There was no abnormality in the functioning of the cargo hooks and switch box. (4) Operating procedure and education on cargo hooks and switch box The company had used manuals provided by the manufacturing company and others to educate the captain and the operator on how to operate the cargo hooks and switch box. (5) Location of the dropped bucket The bucket (diameter about 159 cm, height about 136 cm, weight about 210 kg) fell onto a mountain forest along the flight route. There was no damage or injury to persons or objects on the ground as a result of this fall. (6) Cargo transport flight route The Rotorcraft flew on the predetermined route over a mountainous area that would not cause safety issues to the ground, in line with the operational guidelines of the company. On that day, moreover, a confirmation flight was carried out before starting cargo transport.

3. ANALYSIS

3.1 Involvement of Weather	None
3.2 Involvement of Pilots	None

3.3 Involvement of Equipment	None
3.4 Analysis of Findings	(1) Process of dropping the bucket It is highly probable that the operator had visually confirmed that the bucket was hanging down from the red hook, both when the bucket was slung and when the ready-mixed concrete was unloaded, and that he was aware that the bucket was slung on the red hook en route after unloading the ready-mixed concrete. It is highly probable that the operator wanted to operate the switch box with the intention of releasing the lock on the yellow hook in flight, but mistakenly operated the lock release of the red hook. Incidentally, it is probable that the operator mistakenly released the wrong lock because, when operating the switch box, he did not visually confirm the color of the hook from which the cargo was slung, and operated it without mutually confirming with the captain. In addition, It is also probable that the fact that the operational procedure described in 3.4 (3) below had not been stipulated was a contributory factor. It is probable that the opening and closing operation was carried out in flight with the intention of reducing work for the ground staff as far as possible. (2) Preventing mistaken operation of the switch box To prevent mistaken operation of the switch box, the operating panel and caution lights are colored yellow and red, corresponding to the color of the hooks. In addition, It is probable that there was a function whereby the three switches are to be operated in a predetermined sequence to release the locks on both hooks, and that the measures were meant to prevent mistaken operation of the equipment. (3) Operational procedures The company had used the cargo hooks and switch box since February 2015, and had prescribed guidelines specifying operating procedures, including equipment properties, but had not stipulated specific procedures for deployment, such as the timing of each operation or mutual confirmation between the captain and the operator. It is probable that, in work of an unusual nature such as external cargo sling operation, risk assessment should be carried out, and with a view to preventing dropped cargoes, the cargo hooks and switch box should only be deployed after stipulating operational procedures for work using them, and furthermore that the work should be carried out after educating the personnel engaged in work with this content.

4 PROBABLE CAUSES

It is highly probable that this serious incident occurred when a bucket slung on a hook was dropped because the operator released the lock of the hook from which an object had been slung in flight.

It is probable that the operator released the lock of the hook in flight with the intention of reducing work for the ground staff as far as possible. In addition, It is also highly probable that he released the lock of the hook from which an object had been slung because he mistook it for the operation of releasing the lock of a hook from which no object was slung.

It is probable that the fact that the company had not stipulated 3.4(3) specific procedures for operation in order to use the cargo hooks and switch box such as mutual confirmation with the captain, was a contributory factor.

5 SAFETY ACTIONS

Immediately after the occurrence of this serious incident, the company stipulated guidelines on operational procedures including safety actions to prevent recurrence, and carried out education for its personnel. The main contents were as follows.

① Hooks shall not be operated while on in flight route and while cargoes are suspended.

② Captain and operator shall carry out mutual confirmation when operating hooks. In addition, the terminology used when making this confirmation shall be made uniform.

③ In pre-flight meetings, the operation of the hooks shall be confirmed together with the ground staff.