

AI2018-3

**AIRCRAFT SERIOUS INCIDENT  
INVESTIGATION REPORT**

**NAKANIHON AIR SERVICE CO., LTD.  
JA9743**

May 31, 2018

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

**DROPPING OF OBJECTS  
DURING EXTERNAL CARGO SLING OPERATION  
TOUBETSU, TESIKAGA TOWN, KAWAKAMI-GUN  
HOKKAIDO, JAPAN  
AT AROUND 11:58, APRIL 27, 2017**

**NAKANIHON AIR SERVICE CO., LTD.  
AEROSPATIALE AS350B1(ROTORCRAFT), JA9743**

April 20, 2018

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

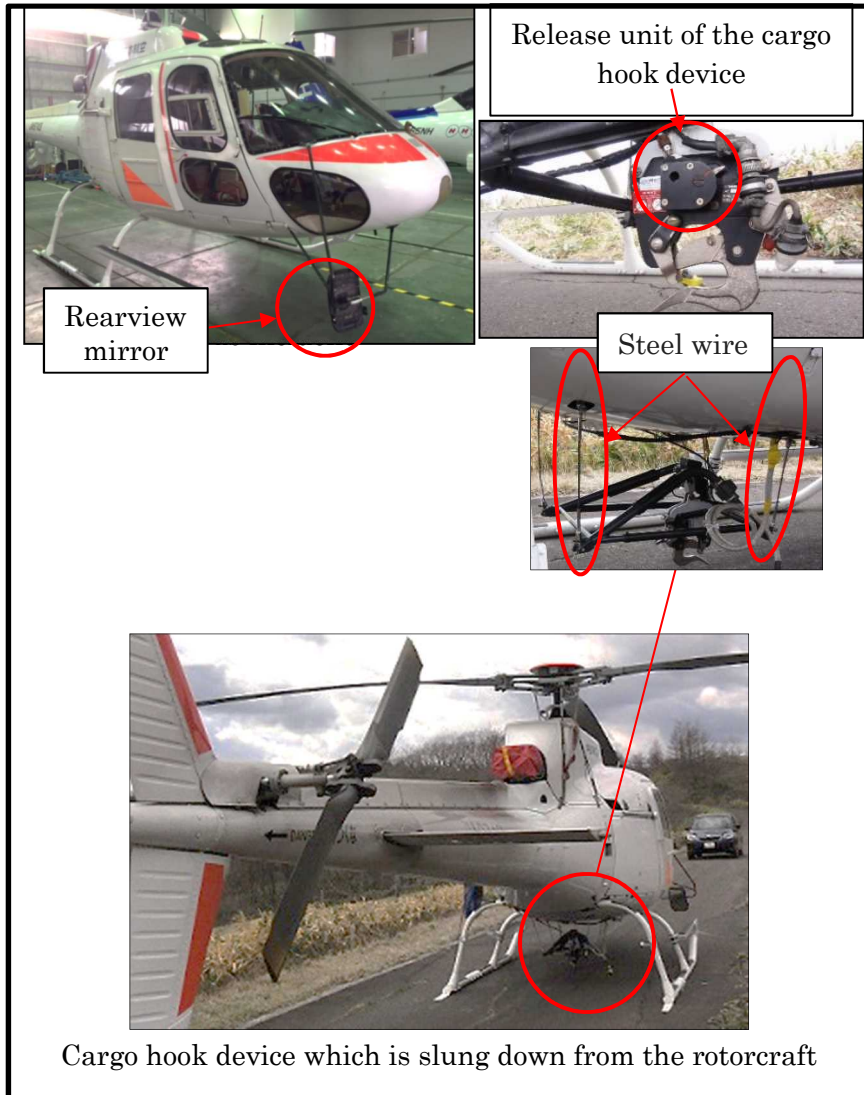
## 1. PROCESS AND PROGRESS OF INVESTIGATION

<b>1.1 Summary of the Serious Incident</b>	On Thursday, April 27, 2017, when an Aerospatiale AS350B1 registered JA9743 and operated by Nakanihon Air Service CO., LTD. was flying toward a cargo sling point after spraying fertilizer to a pasture at Toubetsu, Teshikaga Town, Kawakami-gun, Hokkaido by a spraying device slung outside of the rotorcraft to a temporary helipad, the spraying device was dropped.
<b>1.2 Outline of the Serious Incident</b>	This event fell under the category of “Case where a slung load, any other load carried external to an aircraft, was released

<b>Incident Investigation</b>	<p>unintentionally” as stipulated Item (XV), Article 166-4 of Ordinance for Enforcement of the Civil Aeronautics Act (Ministry of Transport Ordinance, 1952), which was classified as an aircraft serious incident.</p> <p>The Japan Transport Safety Board (JTSB) designated an investigator-in-charge and an investigator on April 27, 2017 to investigate this serious incident.</p> <p>An accredited representative and an adviser of French Republic, as the State of Design and Manufacture of the rotorcraft involved in the serious incident, participated in this investigation.</p> <p>Comments were invited from parties relevant to the cause of the serious incident and the relevant State.</p>
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**2. FACTUAL INFORMATION**

<b>2.1 History of the Flight</b>	<p>According to the statements of the Captain, the Trainee, the Engineer and the ground worker, the history up to the incident was summarized as below;</p> <p>At around 08:00 Japan Standard Time (JST ; UTC+9hr, unless otherwise stated all times are indicated in JST based on a 24-hour clock) on April 27, 2017, an Aerospatiale AS350B1 took off from the No. 2 Temporary Helipad at Toubetsu in Teshikaga Town, Kawakami-gun, Hokkaido (hereinafter referred to as “the Helipad”) with The Captain sat in the left seat and the Trainee in the right seat. The Trainee flew the rotorcraft from the Helipad to repeat the spraying fertilizer with spraying device sling external, along with flying as a training.</p> <p>At around 11:58, as returning to the loading site in order to load the fertilizer to the empty spraying device, the rotorcraft accelerated from the speed at about 25 kt for spraying to the speed at about 60 kt, then turned to right at the altitude at about 50 m. The Trainee who was piloting noticed something dropped in the rearview mirror of the rotorcraft during this right turn. When he took a closer look at the ground of the pastures, there was a spraying device which had been slung from the rotorcraft.</p> <p>The Captain and the Engineer had confirmed the normal operation of the release unit (rock release device) of the cargo hook device by actuating the mechanical release handle (hereinafter referred to as “the Handle”) equipped on the collective pitch lever prior to the first flight of this day to spray the fertilizers.</p>
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**Photo 1.** The rotorcraft involved in the serious incident



**Photo 2.** The fallen spraying device (Site of fall point)

	<p>Based on the digital map published by Geospatial Information Authority of Japan</p> <p><b>Figure 1.</b> Estimated flight route map</p> <p>The serious incident occurred within a grazed pasture at Kyu-maru-maru Sougen (900 Pasture) (N43°25'32", E144°27'44") of a ranch managed by the town at Toubetsu in Teshikaga Town, Kawakami-gun, Hokkaido, Japan, at around 11:58 on April 27, 2017.</p>
<b>2.2 Injuries to persons</b>	None
<b>2.3 Damage to Aircraft</b>	None
<b>2.4 Personnel information</b>	<p>(1) Captain <span style="float: right;">Male, Age 50</span>  Commercial pilot certificate (rotorcraft) <span style="float: right;">February 19, 1990</span>  Specific pilot competence  Expiry of practicable period for flight: <span style="float: right;">December 19, 2018</span>  Type rating for a single turbine engine (land)  <span style="float: right;">February 19, 1990</span>  Class 1 aviation medical certificate  <span style="float: right;">Validity; February 12, 2018</span>  Total flight time <span style="float: right;">6,619 hours 49 minutes</span>  Flight time in the last 30 days <span style="float: right;">49 hours 45 minutes</span>  Total flight time on the type of aircraft <span style="float: right;">1,946 hours 05 minutes</span>  Flight time in the last 30 days <span style="float: right;">49 hours 45 minutes</span></p> <p>(2) Trainee <span style="float: right;">Male, Age 43</span></p>

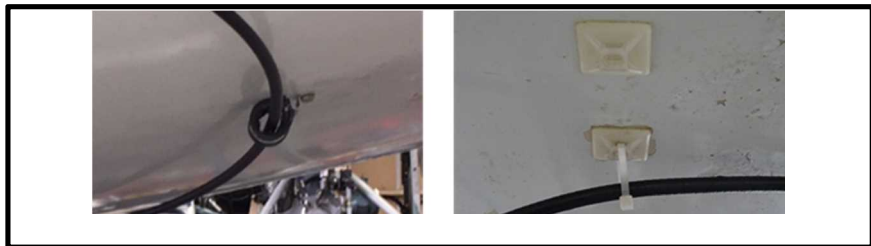


**Figure 2.** The cable structure of the rotorcraft

(2) The Cable Routing

The cargo swing is hung from the bottom of the fuselage (See Photo 1) by four steel wires, utilizing the rotorcraft structure. The Handle installed in the collective pitch lever is connecting to the Cable in order to actuate mechanically the release unit of the cargo hook device. The cable which is placed based on the maintenance manual (hereinafter referred to as “ the regular cable”), were fastened to secure the route from the Handle to the release unit with two clamps at two locations to set as short as possible with enough margin provided at the cable length at the release unit side.

On the other hand, the cable of the rotorcraft was fastened at three locations, one of these was at the regular routing position but two of the rest were fastened at the irregular routing position. One location of these was at the far rear than the regular routing position (Photo 4) and in addition these were a nylon tie used instead of a clamp (Photo 3). The use of a nylon tie instead of clamp generates bigger friction, and when the cargo swing shakes due to flight or others, it was confirmed that the Cable could not follow the movement, smoothly.

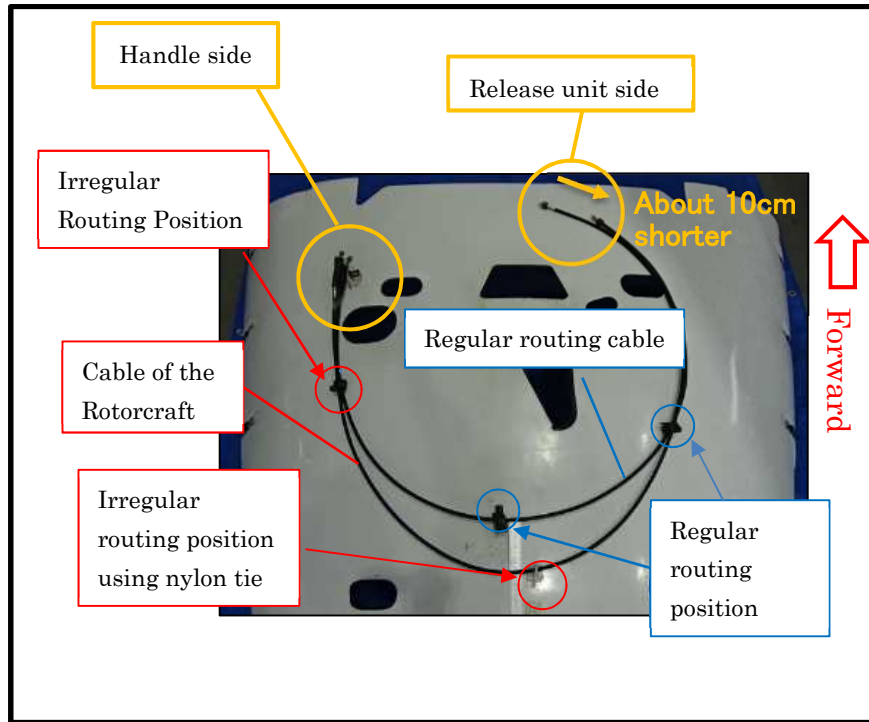


**Photo 3.** Clamp (left) and nylon tie (right)

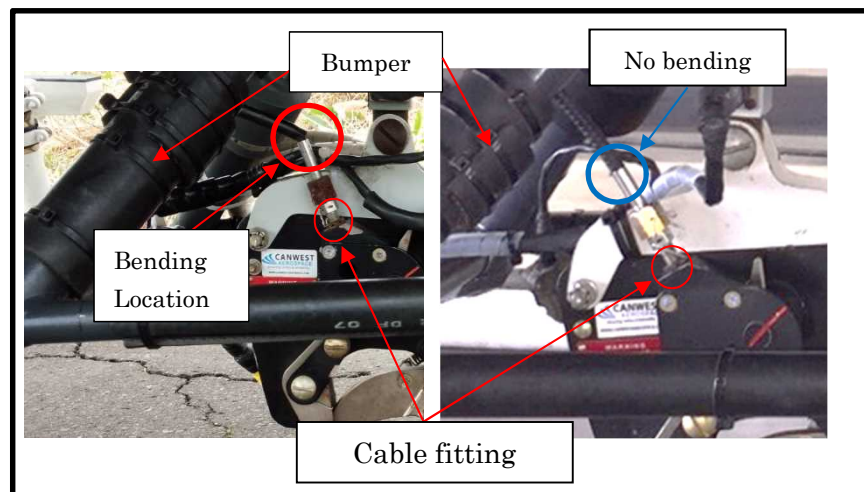
When comparing the cable of the rotorcraft with the regular routing cable, the Cable of the rotorcraft was short by about 10 cm (Photo 4) at the connecting side of the release unit. Because of this, it was confirmed that the cable was bended (Photo 5) due to application of the strong bending force to near the cable fitting at the release unit side.

Furthermore, according to the maintenance records of the Company and the interview of the relevant parties, it was not able to confirm the history of why it changed from the regular cable routing.





**Photo-4.** Bottom surface of the fuselage comparison of the cable of the rotorcraft and regular cable routing

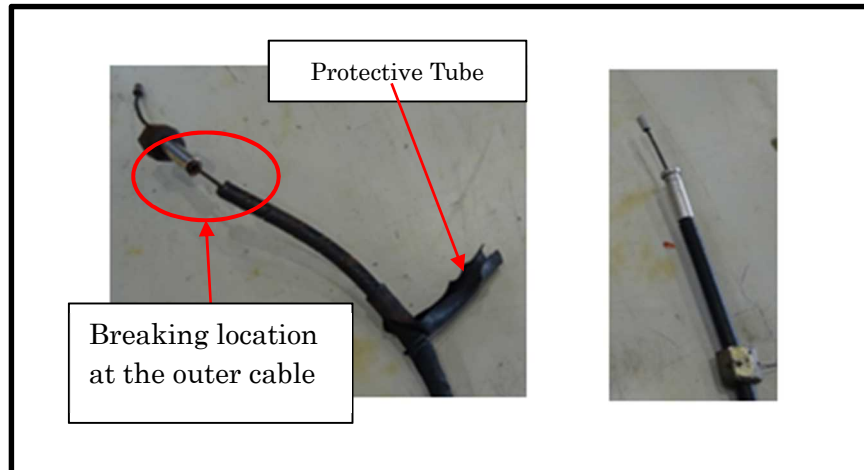


**Photo 5.** Cable fitting and the release unit (The cable of the rotorcraft(LH) and a regular routing cable(RH))

(3) Actuation of the Release Unit and Damages of the Cable Regarding a mechanism of the release unit, gripping handle

pulls an inner cable to activate its connecting release unit to open a cargo hook device by releasing a lock of the cargo hook device.

Regarding the cable of the rotorcraft, the outer cables were bended near the cable fitting at release unit side and were broken, and it resulted in exposing the inner cable. (Photo 6)



**Photo 6.** Broken cable (LH) of the rotorcraft and normal cable (RH)

(4) Maintenance history

According to the maintenance records, from June 10, 2015, to 11, an inspection and a teardown inspection provided in the maintenance manual, were implemented. Based on the stored records, it could not be confirmed that whether the cable was replaced or not at the time of the inspection. On April 21, 2017, the stored cargo swing which was kept as it was removed, was installed onto the rotorcraft.

**3. ANALYSIS**

<b>3.1 Involvement of weather</b>	None
<b>3.2 Involvement Of pilot</b>	None
<b>3.3 Involvement of equipment</b>	Yes
<b>3.4 Analysis of known items</b>	<p>(1) Damages of the cable</p> <p>The Cable of the rotorcraft did not have a sufficient length at the release unit side in comparison with a regular cable routing. Consequently, it is highly probable that because the cargo swing was shaking during the flight up to then, severe forces was acting</p>

	<p>on the outer cable near the cable fitting and caused bending, deterioration and break of the cable at the spot during the turn when the serious incident occurred.</p> <p>When inspecting the cargo swing, it is highly probable that because the outer cable was covered by the protective tube, the deterioration of the outer cable could not be found.</p> <p>(2) Drop of the Spraying System</p> <p>The inner cable of the rotorcraft had been exposed because the outer cable was broken. Because of this, it is highly probable that when the cargo swing was shaken due to the right turn following an acceleration of the rotorcraft, because the outer cable which was constricted the movement by the nylon tie, broke, this caused the same tension as the gripping the handle to the inner cable, therefore, the release unit was activated, was opened the cargo hook system and let the slung spraying device dropped.</p> <p>(3) Configuration Management</p> <p>The Cable of the rotorcraft was differed from the normal routing configuration, the nylon tie instead of the clamp and the nylon tie was used to place at the irregular routing position, however, the reason could not be clarified. Maintaining the regular configuration is important for the safe operation, and it is necessary to reconfirm the method to maintain the appropriate configuration management like how to maintain the configuration or how to keep the records of the configuration changes.</p> <p>(4) Maintenance Works based on the Maintenance Manual</p> <p>On the premise of the configuration management described in (3), if the work was appropriately implemented as the procedure provided in the maintenance manual, it is probable that it could prevent to have unnecessary force applied on the cable.</p>
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#### 4. PROBABLE CAUSES

<p>It is highly probable that the serious incident occurred because when the cargo swing was shaken due to the right turn following the acceleration of the rotorcraft to cause the outer cable of the cargo swing broke, the tension was applied to the inner cable, the release unit was activated to open the hook and the spraying device slung was dropped.</p> <p>Regarding why the outer cable of the cargo swing broke and the tension was applied to the inner cable, it is highly probable that the cable routing configuration was differed from the regular routing configuration,</p>
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#### 5. SAFETY ACTION

<p>The company took the following safety action upon the occurrence of the serious incident;</p>
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- (1) The cables which were equipped for all rotorcraft with the same type cargo hook devices in the company were replaced. Furthermore, an exchange timing for a cable shall be set and the used cable shall be discarded after the installation for five years.
- (2) Regarding the following remarks, special training to the staff of working at the maintenance section and the flight operation section mainly was implemented.
  - ① Concerning the routing and the inspections of the mechanical control cable;
  - ② Concerning the setting of the time management of the control cable;
  - ③ Concerning the operation checks prior to its operation of cargo transportation of external cargo sling operation as a whole;
- (3) Have all personnel know the importance of the configuration management and when installing optional equipment, it must confirm to be a normal configuration including the accessories.