AA2015-4

# AIRCRAFT ACCIDENT
# INVESTIGATION REPORT

**NARA DISASTER PREVENTION AIR CORPS**
**J A 2 0 N A**

**April 23, 2015**

JTSB 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 determine the causes of an accident and damage incidental to such an accident, thereby preventing future accidents and reducing damage. It is not the purpose of the investigation to apportion blame or liability.

Norihiro Goto
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 ACCIDENT INVESTIGATION REPORT

## INJURY TO A RESCUEE DURING HOIST OPERATION
## NARA DISASTER PREVENTION AIR CORPS
## BELL 412EP (ROTORCRAFT), JA20NA
## NISHIYOSHINO TOWN, GOJO CITY, NARA PREFECTURE, JAPAN
## AROUND 13:48 JST, SEPTEMBER 16, 2013

March 27, 2015
Adopted by the Japan Transport Safety Board

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| Chairman | Norihiro Goto |
| Member | Shinsuke Endoh |
| Member | Toshiyuki Ishikawa |
| Member | Sadao Tamura |
| Member | Yuki Shuto |
| Member | Keiji Tanaka |

## 1 PROCESS AND PROGRESS OF THE INVESTIGATION

The Japan Transport Safety Board (JTSB) designated an investigator-in-charge and investigator on September 17, 2013. The JTSB notified the United States of America of the accident, as the State of Design and Manufacture of the aircraft involved in the accident; however, the State did not designate its accredited representative.

Comments were invited from the parties relevant to the cause of the accident and from the relevant State.

## 2. FACTUAL INFORMATION

### 2.1 History of the Flight

(1) Statements from pilots and rescuers

According to the statements of the pilots and rescuers on board, the history of the flight is summarized below.

On September 16, 2013, at 13:09 Japan Standard Time (JST, UTC+ 9 hours), a Bell 412EP, registered JA20NA, operated by the Nara Disaster Prevention Air Corps, took off from the Nara Prefecture Heliport to rescue two people from a village in Nishiyoshino Town, Gojo City, Nara Prefecture, which had been isolated due to the heavy rain caused by a typhoon lasting until the previous day.

The following persons were on board the aircraft: the Pilot in Command (PIC), who was in the right seat of the cockpit, a Pilot, who was in the left seat of the cockpit, and a mechanic and four rescuers, who were in the rear seats.

After arriving over the vicinity of the rescue site, the PIC was looking for a landing site but since there was no suitable location for landing, he decided to rescue the rescuee using the hoist.

The roles of the rescuers were: Rescuer A (R1) and B (R2) were to rescue the rescuee on the ground, Rescuer C (OP) was to operate the hoist device, and Rescuer D was to assist rescue operation in the aircraft.

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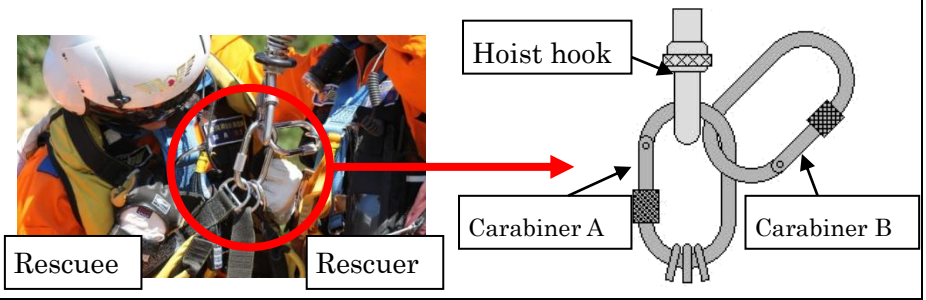
| | Rescuer A and B descended according to the PIC's instruction.<br>Rescuer B helped the rescuee A put on an evacuation harness, and explained precautions for being lifted up by the hoist, such as that she must not hold onto the carabiner. At that time, since there was a reply of "OK" from the rescuee A, Rescuer B recognized that she had been understood.<br>Since the ground was wet and the rescuee A was an elderly person with a stooped back, Rescuer B decided to lift the rescuee A not from a sitting position, but from a kneeling position. As per usual procedures, after Rescuer B attached carabiner B of his own harness, to carabiner A of the rescuee A's evacuation harness, he instructed Rescuer C to lower the hoist hook. Rescuer A passed the lowered hoist hook to Rescuer B, and was monitoring the rescue operations underway by Rescuer B.<br>Before lifting, since the rescuee A was holding onto carabiner A, Rescuer B advised the rescuee A once more not to hold onto the carabiner. After Rescuer B confirmed the condition of the lock on the hoist hook and the condition of the rescuee A, he instructed Rescuer C to start lifting.<br>Just after lifting was started, the rescuee A suddenly complained of pain; therefore, Rescuer B immediately instructed Rescuer C to lower the hoist. When Rescuer B descended to the ground, he confirmed that a finger of the rescuee A's left hand was injured. After this, lifting was once again conducted, and while first aid treatment was being applied inside the aircraft, an ambulance was requested to come to a temporary helipad in Gojo City. After Rescuer A had rescued the rescuee B using the hoist, the PIC flew toward the temporary helipad. The rescuee A was transported to a hospital by ambulance from the temporary helipad.<br>(2) Statements of the rescuee A<br>The rescuee A had never been lifted by a helicopter before.<br>Although the rescuee A understood that the rescuer was explaining something to her before the rescue, due to the loud noise of the helicopter and her difficulty in hearing, she could not hear the content of the explanation. The rescuee A complained of pain because while she was being lifted, she felt pain so intense that it was as though her finger was being torn off.<br>Although she was still in considerable pain even after being lowered to the ground, she endured the pain since she was frightened of being lifted by the helicopter and wanted it to be completed quickly. She does not remember where or how she was holding on.<br>  <br> |
| 2.2 Injuries to Persons | One rescuee sustained serious injury to a finger of her left hand. |
| 2.3 Damage to Aircraft | None |
| 2.4 Personnel Information | Pilot in Command Male, Age 61<br>Commercial Pilot Certificate (Rotorcraft) May 19, 1978<br>Type Rating for Bell 212 March 28, 1997 |

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| | Class 1 Aviation Medical Certificate Validity: May 15, 2014<br>Total flight time 9,974 hr 02 min<br>Total flight time on the type of aircraft 1,500 hr 30 min<br><br>Rescuer B Male, Age 38<br>Number of times dispatched for rescue 15 times |
| 2.5 Aircraft Information | Aircraft type: Bell 412EP<br>Serial number: 36243<br>Date of manufacture: January 1, 2000<br>Certificate of airworthiness: No. TO-24-541<br>Validity: February 12, 2014<br>  <br>Accident Aircraft |
| 2.6 Meteorological Information | Weather: fair, Wind: virtually calm, Visibility: good (according to statements of the PIC and rescuers) |
| 2.7 Other Necessary Issues | (1) Rescue equipment<br>When the equipment was checked after the accident, no abnormalities could be revealed with the evacuation harness and carabiners used at the time of rescue.<br>  <br>Evacuation harness<br>  <br>Carabiner<br>(2) Regulations of the Nara Disaster Prevention Air Corps regarding rescue using a hoist<br>The Nara Disaster Prevention Air Corps provides the regulation of "Operation Procedures" to be used for the standardization of rescue operations. In the "Operation Procedures", the operations of rescuers on the ground, up until the rescuees are lifted, were prescribed as below.<br>(Excerpt)<br>*Procedures on the ground*<br>*After arriving on the ground, put on the carried evacuation harness to the rescuee, and attach the carabiner on the chest area of your own harness to the carabiner of the evacuation harness. After this work is complete, ensure the subsequent protection of the rescuee, give a signal to the helicopter to approach, and then give a signal to lower the hoist hook.*<br>*Start of rescue work*<br>・*Give a signal to the helicopter to approach, and then give a signal for the hoist hook to be lowered.*<br>・*Be careful of downwash.*<br>・*Always keep a close watch on the helicopter.*<br>・*Keep a close watch on the hook and wait for it to reach the ground.*<br>*R1*<br>・*After catching the hook, pass it to R2.*<br>*R2*<br>・*Confirm the lock of the hook.*<br>・*After confirmation, give an OK sign to the OP.* |

## 3. ANALYSIS

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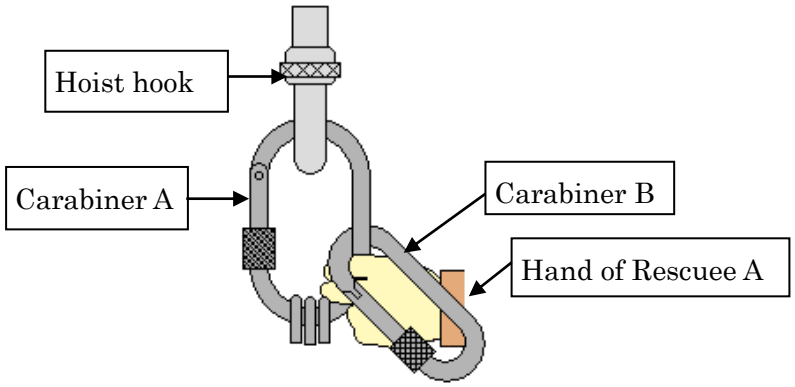
| 3.1 Involvement of Weather | None |
| 3.2 Involvement of Pilots | None |
| 3.3 Involvement of Aircraft | None |
| 3.4 Analysis of the Findings | (1) The explanation of precautions to the rescuee<br>As described in 2.1(1), Rescuer B states that he explained the precaution that the carabiner must not be held onto two times: while he helped the rescuee A put on the evacuation harness, and immediately before lifting was started. However, as described in 2.1(2), it is highly probable that, due to the loud noise of the helicopter and her difficulty in hearing, the rescuee A could not hear the precautions and she did not understand the danger of holding onto the carabiner.<br>(2) Rescue equipment<br>As described in 2.7(1), no abnormalities could be revealed with the rescue equipment when the equipment was checked after the accident; therefore, it is highly probable that there were no abnormalities with the rescue equipment at the time of the accident.<br>(3) Safety confirmation by the rescuers<br>As described in 2.7(2), although the confirmation of the lock on the hoist hook before lifting was prescribed in "Operation Procedures", confirmation of the condition of a the rescuee was not prescribed. As described in 2.1(1), Rescuers B stated that he had explained precautions to the rescuee A about holding onto carabiner A; therefore it is highly probable that before lifting was started, Rescuer B had confirmed the condition of the rescuee A. However, after lifting was started and until the rescuee A complain of pain, both Rescuer A, who was nearby monitoring the rescue situation, and Rescuer B, who was carrying out the rescue of the rescuee A, did not notice that the rescuee A was holding onto carabiner A. It is somewhat likely that if Rescuer A and B had considered the possibility of the rescuee A holding carabiner A again since she had held it once before being lifted, and the possibility of her holding carabiner A in order to support her body from falling backward when being lifted from a kneeling position, they could have noticed that she was holding onto carabiner A.<br>(4) The condition of the rescue equipment and injury to the rescuee during lifting<br>As described in 2.1(1), Rescuer B stated that he attached carabiner B of his own harness to carabiner A of the rescuee A's evacuation harness. It is highly probable that he was using the rescue equipment in accordance with "Operation Procedures" described in 2.7(2). When the rescue equipment is used in accordance with "Operation Procedures", carabiner B will move to the lower part of carabiner A at the moment that a rescuer and a rescuee are both lifted at the same time. It is highly probable that the rescuee A suffered injury to her finger because at the moment she was lifted, she was holding onto carabiner A as shown in the following figure, causing her finger to be caught in carabiner B.<br>It is somewhat likely that if Rescuer B had taken steps to kneel down and move carabiner B to the lower part of carabiner A in advance, and to cover the carabiner with his own hand so as to make it physically impossible for the rescuee A to hold carabiner A even if |

she attempted to do so, it would have been possible to prevent her finger from passing into carabiner A.

It is also somewhat likely that if the Disaster Prevention Air Corps had thoroughly implemented the above procedures, or had selected rescue equipment for which it would not have been physically possible to hold carabiner A, it would have been possible to prevent the rescuee A from being caught in carabiner B.




(5) Posture of the rescuee

As described in 2.1(1), the rescuee A was lifted from a kneeling position; therefore it is highly probable that her body was in a position such that it would fall backward at the moment she was lifted, as the result of this, she held carabiner A, which was directly in front of her, in order to support her body.

It is somewhat likely that by lowering the rescuee's lower body to the ground in advance before lifting, changes to her posture could have been prevented, and it would have been able to prevent her hand from being extended into a dangerous place.

## 4. PROBABLE CAUSES

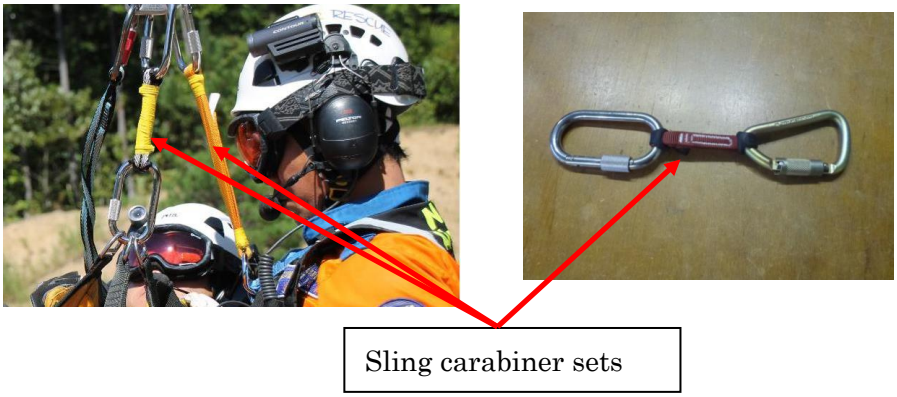
In this accident, it is highly probable that at the moment the aircraft lifted the rescuee and the rescuer at the same time, the rescuee held carabiner A, which was connecting herself to the rescuer, in order to support her body falling backward, causing her finger to be caught in the rescuer's carabiner B and injured.

It is somewhat likely that insufficient measures taken by the Disaster Prevention Air Corps regarding safety confirmation in accordance with the condition of the rescuee, rescue procedures, and selection of rescue equipment, may have contributed to the situation of the rescuee holding the carabiner.

## 5. SAFETY ACTIONS

(1) Safety actions taken by the Nara Disaster Prevention Air Corps

・The carabiners attached to the evacuation harness were changed to sling carabiner sets in order that the rescuee's hand cannot reach the connecting parts of the carabiners.



・In order to provide stability to the posture of the rescuee, he/she will be made to assume a sitting posture until being lifted, and in cases where it is not possible to assume a sitting posture due to terrain or other conditions, at least three points of his/her body will be placed in contact with the ground.
・The "Operation Procedures" was revised in order that they prescribed, as part of rescue procedures, that the hands positions of the rescuee are to be checked before lifting, and that the condition of the rescuee when lifting is to be closely observed. In addition, as points of attention for rescue operations, it is prescribed that there is a danger of the fingers being caught when lifting start, and that attention must be paid to the hands positions of the rescuee.
・To enhance the safety awareness of unit members, the 16th of each month has been designated as "Safety Management Enhancement Day", on which safety confirmation of all equipment and basic rescue training focusing on ensuring the safety of the rescuee (fundamental safety procedures, reconfirmation of basic operations) are implemented.

(2) Actions taken by the Fire and Disaster Management Agency

・The safety actions taken by the Nara Disaster Prevention Air Corps have been shared as a good lesson to fire-fighting and disaster prevention air corps, as well as relevant organizations carrying out similar rescue operations, across the entire country.