

AA2016-7

**AIRCRAFT ACCIDENT
INVESTIGATION REPORT**

**PRIVATELY OWNED
J A 2 5 2 8**

August 25, 2016



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.

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 ACCIDENT INVESTIGATION REPORT

FUSELAGE DAMAGE FOLLOWING THE RUNWAY EXCURSION

DURING LANDING

PRIVATELY OWNED, HOFFMANN H-36 DIMONA

(MOTOR GLIDER, TWO-SEATER), JA2528

AT KITAMI DISTRICT TEMPORARY OPERATION SITE

(FOR AGRICULTURAL USE),

KITAMI CITY, HOKKAIDO

AT AROUND 15:23 JST, SEPTEMBER 9, 2015

July 22, 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 INVESTIGATION

1.1 Summary of the Accident	<p>On Wednesday, September 9, 2015, a privately owned Hoffmann H-36 Dimona, registered JA2528, took off from Kitami District Temporary Operation Site (for agricultural use) for a familiarization flight, but when landing there, it ran off the side of the runway and collided with trees, causing damage to it.</p> <p>The aircraft was substantially damaged, but no fire broke out and no one was injured.</p>
1.2 Outline of the Accident Investigation	<p>The Japan Transport Safety Board designated an investigator-in-charge and an investigator on September 9, 2015 to investigate this accident.</p> <p>An accredited representative of the Republic of Austria, as the State of Design and Manufacture of the aircraft involved in the accident, participated in the investigation. Comments were invited from parties relevant to the cause of the accident and the relevant State.</p>

2. FACTUAL INFORMATION

2.1 History of the Flight	<p>According to the statements of the captain, the passenger and the witnesses, the history of the flight is summarized as follows:</p> <p>At around 15:10 Japan Standard Time (JST, UTC+9 hours, unless otherwise stated all times are indicated in JST on a 24-hour clock) on September 9, 2015, a privately owned Hoffmann H-36 Dimona, registered JA2528 took off from Runway 10 of Kitami District Temporary Operation Site (for agricultural use; hereinafter referred to as “the site”) for a familiarization flight by the captain, with the captain sitting in the left seat and the passenger in the right seat in order to advise him.</p> <p>After practicing a touch-and-go once at the site, the aircraft passed the threshold of Runway 10 at about 100 km/h with the intention of landing. The aircraft aligned with the centerline of the runway while dealing with a weak crosswind from the left, and touched down slightly to the left of the centerline with its tailwheel first followed by the main wheels. During the after-landing roll without applying the wheel brakes, the captain stepped on the right rudder pedal because the aircraft was closer to the left side of the runway. The nose of the aircraft suddenly swung to the right, accompanied by frictional noise that occurred between the left tire and the runway, and then the aircraft banked to the left around the left main wingtip, which was almost brought into contact with the runway.</p> <p>The passenger had also flown together with the captain in the morning, and thinking that there was no need to take over maneuvering in view of the captain’s level of flying experience, he had removed his hands and feet from the control devices during flight. When the nose of the aircraft suddenly swung to the right, in this situation the passenger felt that it would go into a ground loop^{*1}; therefore, the captain maximized the engine output soon after the passenger advised him to “Go around.”</p> <p>After that, the aircraft made a ground roll toward the right side of the runway and continued to roll following the runway excursion. Although the captain pulled up the control column just before the down slope outside the boundary of the site, the aircraft did not lift off; consequently, it was stopped by colliding with the top of trees positioned under the slope.</p> <p>This accident occurred at around 15:23 on September 9, 2015, near trees (Latitude 43° 46' 46" N, Longitude 143° 43' 48" E) outside the site.</p>
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^{*1} A “ground loop” is a phenomenon whereby an airplane rotates to right or to left when making a ground roll or taxiing during take-off or landing. It occurs particularly frequently with tailwheel-type airplanes.

	<p>Based on simple aerial photograph taken by the Geospatial Information Authority of Japan (2004)</p>																										
<p>2.2 Injuries to Persons</p>	<p>None</p>																										
<p>2.3 Damage to Aircraft</p>	<p>(1) Extent of damage: Substantially damaged</p> <p>(2) Damage to the aircraft components</p> <ul style="list-style-type: none"> - Propeller: Spiral-shaped dent on spinner and two wooden blades broken - Main wings: Skin of leading edges and near both wings mounting portions damaged - Fuselage: Tail broken - Empennage: Mounting portion of horizontal stabilizer broken <p>There was no outbreak of fire.</p> <p>(3) Trees outside the site</p> <p>Branches at the top of trees outside the site facing the runway (ground height about 10m, about the same elevation as the site) were broken.</p>																										
<p>2.4 Personnel Information</p>	<p>Captain: Male, age 62</p> <table border="0"> <tr> <td>Airline transport pilot certificate (airplane)</td> <td>July 28, 1998</td> </tr> <tr> <td>Private pilot certificate (Glider)</td> <td>May 17, 2007</td> </tr> <tr> <td colspan="2">Pilot Competency Assessment</td> </tr> <tr> <td colspan="2">Expiration date of piloting capable period: September 30, 2015</td> </tr> <tr> <td>Type rating for Motor Glider</td> <td>June 28, 2007</td> </tr> <tr> <td>Class 1 aviation medical certificate</td> <td>Validity: April 15, 2016</td> </tr> <tr> <td>Total flight time</td> <td>19,714 hr 52 min</td> </tr> <tr> <td style="padding-left: 100px;">Glider</td> <td>48 hr 08 min</td> </tr> <tr> <td></td> <td>(Number of flights: 127)</td> </tr> <tr> <td style="padding-left: 100px;">Motor glider</td> <td>114 hr 05 min</td> </tr> <tr> <td>Flight time in the last 30 days</td> <td>61 hr 42 min</td> </tr> <tr> <td></td> <td>(Number of flights: 0)</td> </tr> <tr> <td>Total flight time on the type of aircraft</td> <td>112 hr 03 min</td> </tr> </table>	Airline transport pilot certificate (airplane)	July 28, 1998	Private pilot certificate (Glider)	May 17, 2007	Pilot Competency Assessment		Expiration date of piloting capable period: September 30, 2015		Type rating for Motor Glider	June 28, 2007	Class 1 aviation medical certificate	Validity: April 15, 2016	Total flight time	19,714 hr 52 min	Glider	48 hr 08 min		(Number of flights: 127)	Motor glider	114 hr 05 min	Flight time in the last 30 days	61 hr 42 min		(Number of flights: 0)	Total flight time on the type of aircraft	112 hr 03 min
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	<p>Flight time in the last 30 days 0 hr 0 min</p> <p>The majority of the captain's total flight time has been in large airplanes. His flying experience in this type of aircraft has been about three hours in the last two years, and the flight on the day of the accident was his first time since October 31 of the previous year.</p> <p>Passenger: Male, age 67</p> <p>Private pilot certificate (Glider) September 24, 2003</p> <p>Pilot competency Assessment</p> <p>Expiration date of piloting capable period: September 30, 2015</p> <p>Type rating for motor glider September 24, 2003</p> <p>Class 2 aviation medical certificate Validity: October 5, 2015</p> <p>Total flight time 467 hr 06 min</p> <p>Flight time in the last 30 days 9 hr 03 min</p> <p>Total flight time on the type of aircraft 459 hr 38 min</p> <p>Flight time in the last 30 days 9 hr 03 min</p>
2.5 Aircraft Information	<p>(1) Aircraft type: Hoffmann H-36 Dimona</p> <p>Serial number: 3528</p> <p>Date of manufacture: April 24, 1984</p> <p>Certificate of airworthiness No. 2015-38-04</p> <p>Validity: July 17, 2016</p> <p>Category of airworthiness Motor Glider Utility U</p> <p>Total flight time 837 hr 34 min</p> <p>Flight time since last periodical check (100-hr check, 7/10/2015) 16 hr 56 min</p> <p>Recommended minimum approach speed 95km/h</p> <p>Direction of propeller rotation To the left (counterclockwise) when viewed from the cockpit</p> <p>Landing gear Tailwheel-type (operating the rudder pedal moves the rudder and tailwheel for steering)</p> <p>(2) The weight of the aircraft and its center of gravity are estimated to have been within the allowable range at the time of the accident.</p>
2.6 Meteorological Information	<p>(1) Wind direction and wind velocity notified to the aircraft on the final approach were as follows:</p> <p>Wind direction: 060 °, Wind velocity: 6 kt</p> <p>(2) Meteorological observations in the site were as follows:</p> <p>15:00 Wind direction: NE, Wind velocity: 7 kt, Maximum instantaneous wind speed: 8 kt, Temperature: 18.6°C, Altimeter setting (QNH): 1,026 hPa</p> <p>16:00 Wind direction: NE, Wind velocity: 7 kt, Maximum instantaneous wind speed: 7 kt, Temperature: 17.7°C, Altimeter setting (QNH): 1,026 hPa</p>
2.7 Additional Information	<p>(1) Aircraft condition</p> <p>The captain stated that there was no abnormality in the engine or control system in pre-flight inspections and during flight. Moreover, no malfunction of the aircraft was found in the records of inspection and</p>

maintenance.

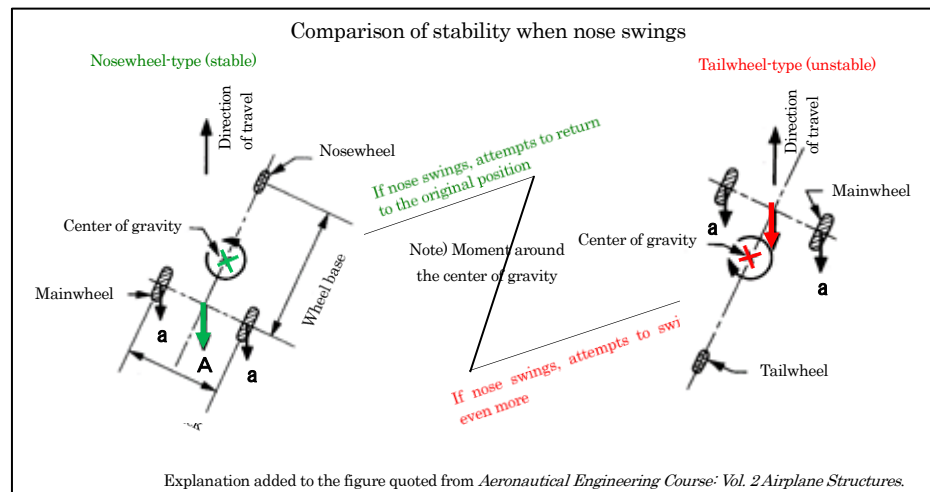
(2) Directional stability during ground roll

“Aeronautical Engineering Course, Vol.2, Airplane Structures” (2013, pp.51-52) edited by the Japan Aeronautical Engineers Association are described as follows. (Summary)

When the nose suddenly swings during ground roll, counter directional force a against inertial force is applied to the touchdown point between the tires and the ground. This is equal to the resultant A having actual force on the longitudinal axis of the airplane.

In nosewheel-type landing gear, the center of gravity is located ahead of the main landing gear, giving rise to moment around the center of gravity, which attempts to return the nose to its original position through composite force A , making the airplane dynamically stable.

On the other hand, in tailwheel type landing gear, the center of gravity is located behind the main landing gear, giving rise to moment around the center of gravity which attempts to swing the nose even more through composite force A , making the airplane dynamically unstable.



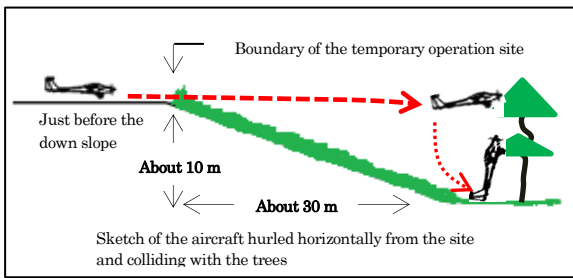
(3) Properties of left-rotating propeller

When engine output is increased at low speed, the airplane tends to roll to the right in the case of left-rotating propellers (reaction to propeller torque) and a tendency for the nose to swing to the right arises (the influence of the propeller slipstream).

(4) Characteristics of this type of airplane during ground roll

A pilot with abundant experience of flying this type of airplane made the following statement: “Because the position of the center of gravity in this type of airplane is located behind the main landing gear, a ground loop is prone to occur and therefore adequate training is required. As the main landing gear is further forward and the reaction of tailwheel-type airplanes is more sensitive compared to other tailwheel-type airplanes, operation of the rudder pedals immediately after touchdown at high speed should only involve minor adjustments. It is difficult to return this type of airplane to its original attitude once it has been significantly disturbed.”

3. ANALYSIS

3.1 Involvement of Weather	None
3.2 Involvement of Pilots	Yes
3.3 Involvement of Equipment	None
3.4 Analysis of Findings	<p>(1) Runway excursion</p> <p>It is somewhat likely that the operation of the directional correction by the captain was delayed because the aircraft went closer to the left side of the runway during the after-landing roll. It is somewhat likely that the nose of the aircraft swung significantly to the right because it went closer to the left side of the runway and the captain stepped on the right rudder pedal to correct the direction, and that this was difficult to correct owing to the property stated in 2.7 (2). It is also somewhat likely that the captain stepped hard on the right rudder pedal without reducing the speed of the aircraft, because it banked so hard to the left that the left main wing tip almost contacted the runway owing to centrifugal force.</p> <p>After that, it is somewhat likely that the aircraft rolled to the right; thus, the main wings which had banked to the left returned to the original attitude due to the reaction effect of propeller torque, because the captain maximized engine power soon after hearing the passenger say “Go around”; moreover, the aircraft continued to roll following the runway excursion despite the nose of the aircraft swinging significantly to the right due to the influence of propeller slipstream.</p> <p>(2) Damage to the aircraft</p> <p>It is highly probable, judging from the breakage at the top of the trees at the same height as the site, and the state of damage to the leading edge of the main wings and the propeller spinner, that the aircraft continued to roll without stopping even after the runway excursion, and then it was hurled horizontally from the site, and accordingly, its nose and the leading edges of its main wings collided with the top of the trees.</p>  <p>(3) Captain’s recent experience, knowledge and proficiency</p> <p>The captain’s experience of flying this type of aircraft had been about three hours in the previous two years, and the flight on the day of the accident was his first time in about ten months, thus a fairly long time had passed since his previous maneuvering; moreover, the majority of his flight experience had been in large aircraft. Given the above, it is probable that the fact that the captain either did not have sufficient knowledge and/or</p>

proficiency concerning the maneuvering properties of the aircraft, which is unlike large airplanes (including the difference between the tailwheel-type and the nosewheel-type), or could not immediately remember all of its properties, contributed to his lateness in performing the directional correction and the fact that he stepped hard on the rudder pedal to perform this correction, as stated in (1) .

(4) Advice or assistance from the passenger

The passenger thought that, in view of the captain's level of flying experience, the captain could handle everything by himself, and even though the passenger was qualified to maneuver the aircraft and was sitting in the right seat for the purpose of giving advice to the captain, he neither quickly advised the captain to make minor adjustments with the rudder pedal when it began to come close to the left of the runway, nor assisted him in maneuvering the aircraft. It is probable that, if he had been sufficiently aware that the majority of the captain's recent flight experience had been in large airplanes that have different properties, and that it was possible that the captain could not immediately remember all of its properties, the passenger would have been able to give appropriate advice or maneuvering assistance.

4. PROBABLE CAUSES

It is highly probable that this accident occurred because the aircraft ran off the side of the runway on landing and then collided with trees, causing damage to it.

It is somewhat likely that the aircraft ran off the side of the runway, and then collided with the trees because the captain was late in performing the directional correction; besides, its nose swung significantly because he stepped hard on the rudder pedal in order to perform this correction, and in addition, it continued to roll without stopping because he had maximized engine output.

It is probable that the fact that the captain did not have sufficient knowledge and/or proficiency concerning the maneuvering properties of the aircraft, which is unlike large airplanes (including the difference between the tailwheel-type and the nose-wheel type), or could not immediately remember all of its properties because a fairly long time had passed since his previous maneuvering, contributed to his lateness in performing the directional correction and the fact that he stepped hard on the rudder pedal to perform this correction.