



Accident to the DE HAVILLAND – DHC-6 – 300
registered **PJ-WII**
on 13 February 2019
at Saint-Barthélemy

Time	14:52 ¹
Operator	Windward Island Airways International
Type of flight	Passenger commercial air transport
Persons on board	Captain, co-pilot, four passengers
Consequences and damage	Ramp agent seriously injured

This is a courtesy translation by the BEA of the Final Report on the Safety Investigation published in December 2022. As accurate as the translation may be, the original text in French is the work of reference.

**Ramp agent injured by rotating propeller,
at apron position**

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on statements and video recordings.

The crew took off from Saint Martin Princess Juliana airport (Sint Maarten) for a flight bound for Saint-Barthélemy with four passengers on board.

They landed on runway 10 at around 14:45 and taxied to the apron position P2 situated in front of the terminal. At this time, there was no other aircraft manoeuvring in the movement area and the day's aerodrome activity was in a lull.

While the aircraft was taxiing, the marshaller took up her position on the apron to guide the crew. The latter, following the marshaller's signed instructions, taxied to their apron position, stopped and applied the parking brake.

¹ Except where otherwise indicated, the times in this report are in local time. Five hours should be added to obtain the legal time applicable in Metropolitan France on the day of the event.



**Figure 1: marshaller guiding PJ-WII on its arrival at apron position
(source: surveillance video)**

The crew feathered the propeller blades of the two engines and the marshaller, standing on the left side of the aeroplane's nose, positioned the chocks around the nose gear wheel. She then walked around the front of the Twin Otter and turned to make a sign with her arms to someone she knew in the terminal building. She walked backwards down the right side of the airframe. The anti-collision light was still operating.

As she passed the right engine propeller which was still rotating, she was struck on the head by a blade which seriously injured her.

2 ADDITIONAL INFORMATION

2.1 Aerodrome information

Saint-Barthélemy airport is equipped with paved runway 10/28 measuring 646 m long.

The apron is composed of a general aviation area north of the runway and a southern area leading to the passenger terminal. The apron positions situated directly in front of this terminal (P1, P2, P3 and P4) are reserved for passenger commercial air transport.

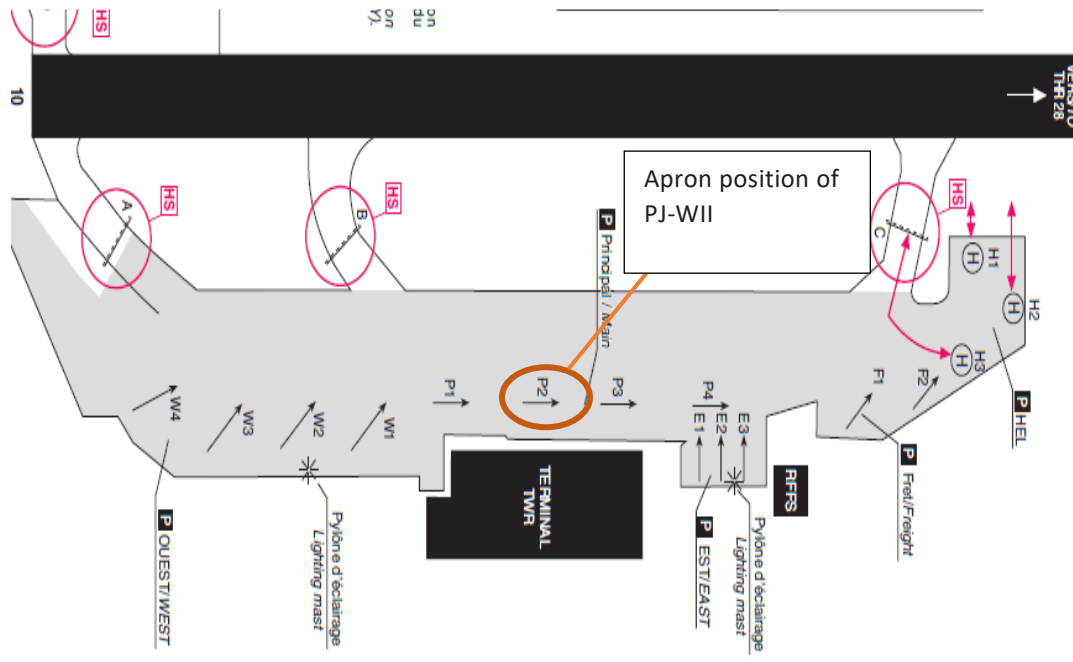


Figure 2: layout of apron positions (source: VAC chart)

During the day, the use of these positions is limited to 20 min. At peak times of the day, the airport's handling capabilities are frequently saturated and commercial air transport operators are expected to reduce their turnaround time as much as possible in order to keep the traffic on the ground moving more freely. During these traffic peaks, the parking time can sometimes be less than ten minutes which puts the handling personnel under a lot of time pressure.

The crews concerned and the ground handling personnel had become accustomed to these conditions and had developed working habits to meet these constraints.

2.2 Aircraft operator information

Windward Islands Airways International N.V. (Winair) is a passenger commercial air transport operator based in Saint Martin Juliana (Sint Maarten). It operates various aircraft including a fleet of three De Havilland Twin Otter DHC-6 and flies to several Caribbean islands.

During Safety Assessment of Foreign Aircraft (SAFA)² inspections, remarks were addressed to this operator on several occasions with respect to ground agents walking around aeroplanes while the propellers were still moving or the anti-collision lights were on. According to the SAFA inspectors who carried out these checks, the reason given by the personnel concerned was "to save time".

2.3 Ramp agent information

The ramp agent had been recruited approximately nine months previously by a ground handling company and was up to date with her compulsory training.

At the time of the occurrence she was not wearing any head protection. The regulations do not require this type of equipment to be worn.

² In-operation spot checks carried out by the civil aviation authority. In this context, the remarks are not considered as deviations from the regulations in force and do not require a mandatory response from the operator.

She had come on duty in the morning between 07:00 and 08:00.

Blood samples were taken on her arrival at the hospital and toxicological examinations were performed. Although the judicial services did not transmit to the BEA the figures of these examination results, it appears that she had consumed alcohol as well as other psychotropic substances the night before the accident. Several statements confirm this point and also mention that the ramp agent had gone to bed late.

2.4 Aircraft information

The De Havilland Twin Otter DHC-6 is a high-wing aeroplane equipped with two Pratt and Whitney PT6 turboprop engines.

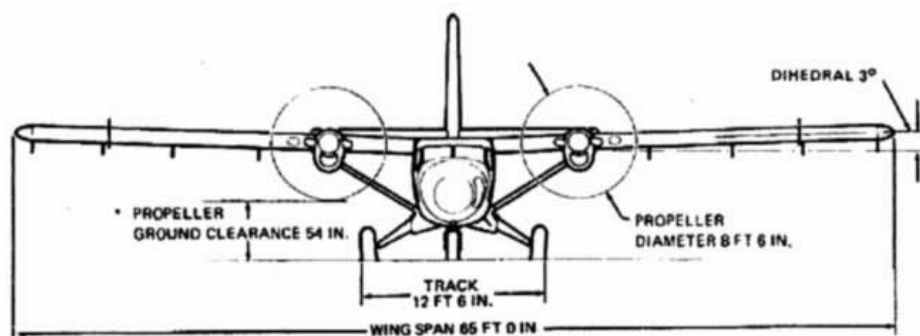


Figure 3: description of DHC-6 Twin Otter (source: Pilot Operating Handbook)

Note: 8 ft 6 in = 2.5908 m / 54 in = 1.37 m

The lowest point of the propeller disk is at 1.37 m from the ground.

2.5 Ground operational procedures

2.5.1 Company procedures

The Winair Ground Handling Manual indicates in the chapter concerning the arrival procedures, that the engine will continue to operate for approximately 10 to 20 s after the captain has feathered the propellers.

The parking procedure includes the following steps³:

- When the propellers are feathered, the ground personnel position chocks in front of and behind the nose gear.
- The marshaller signals to the captain that the chocks are in position.
- The captain shuts down the aircraft engines. He switches off the anti-collision lights indicating that all the engines have been shut down.
- When the propeller has come to a complete standstill, the ground personnel position cones at the tips of the two wings, and at the nose and tail of the aeroplane.

³ Certain steps concerning the installation of the Ground Power Unit (GPU) are not mentioned here as there was no GPU in the accident.

Furthermore, in the “Personal Safety” chapter, the manual mentions three factors identified as frequently contributing to accidents in the work environment:

- Complacency: defined as a person becoming used to and less alert to the dangers in the work environment. The propellers are one of the dangers given.
- Non-compliance with company rules and procedures.
- Environmental pressure: this is described as being the result of a substantial work load and shortage of time to prepare or carry out the required task. The manual indicates that this can lead to a lack of concentration and short-cuts being taken to finish the task.

2.5.2 Aerodrome operator instructions

The Saint-Barthélemy airport operator describes, in its safety booklet, the best practices and recommendations for operators using the airport. The best practices set out in it do not replace the operational directives defined by the operators in their operations manual.

The following three warnings are given in the booklet:

- Anti-collision lights on = engines operating or about to be started up.
- It is recommended to pay particular attention to the propellers as they cannot be easily seen when they are rotating and furthermore may be silent, especially after the shut-down of the engine. It is therefore recommended to wait for the propellers to come to a complete stop before moving around the aircraft and, even when stopped, to always maintain a distance with respect to the propellers.
- During the ground operations, it is advisable to mark out the aeroplane’s footprint on the ground using cones, tape, etc. at least at the wing tips, positioned at a distance of 1 m. Cones or tape can also be positioned under the tail and in front of the engines (see Figure 3).



Figure 3: position of cones around engines (source: safety booklet)

Furthermore, the booklet indicates that the only compulsory safety equipment is the high-visibility jacket (yellow with reflective strips). Other equipment such as gloves, protective footwear, ear protections and a safety hat are, however, recommended.

The ground handling company did not have specific instructions about wearing protective equipment, and safety rules. The company relied on the airport operator's safety booklet and the instructions of the aircraft operator provided with a handling service.

3 CONCLUSIONS

The conclusions are solely based on the information which came to the knowledge of the BEA during the investigation. They are not intended to apportion blame or liability.

Scenario

After positioning the chocks around the nose gear wheel, the marshaller started walking around the aircraft without waiting for the anti-collision lights to be switched off and without keeping a suitable distance from the propeller danger zone. Furthermore, she allowed herself to be distracted from her task, did not look in the direction in which she was walking and approached the right engine which was still rotating. The propeller blades struck the ramp agent's head and seriously injured her.

Contributing factors

The following factors may have contributed to the marshaller being injured by the propeller:

- The ramp agent not complying with the safety measures designed to protect personnel from the dangers inherent in moving around an aircraft in operation.
- The ramp agent's probable state of fatigue due to the late hours kept the night before and the probable consumption of psychoactive substances.
- The habit acquired, during short stops, by some of the ground handling personnel, to disregard certain safety measures in order to save time, which could have encouraged her to leave her position at the nose of the aircraft without waiting for the propellers to come to a complete stop.

Measures taken by airport operator

Shortly after the accident, the Saint-Barthélemy local authority, as operator of Saint-Barthélemy - Rémy de Haenen airport, issued a memo to all users of the airport reminding them of:

- The dangers inherent in moving around the apron and the safety rules associated with these dangers, in particular the wearing of personal protective equipment and the need to maintain a safe distance from the engines until the propellers have come to a complete stop.
- The need for flight operators to establish a clear internal policy regarding ground operations.
- The requirements for staff training and the responsibilities of employers in this respect.

These points were also addressed through dedicated presentations at regular meetings between the airport operator and users.

The BEA investigations are conducted with the sole objective of improving aviation safety and are not intended to apportion blame or liabilities.