RUNWAY INCURSION

The crew of the Shorts 3-30 aircraft believed they had been cleared to line up for take-off from an intermediate point on Runway 27 at Paris-Charles de Gaulle Airport. As they entered the runway the aircraft was struck by the wing of an MD 83 aircraft which was taking off, using the full runway length. A recent survey of pilots involved in Runway Incursion incidents revealed that 50% believed they had permission to be on the runway when the incident took place.

Important Notice

The complex factors relating to this accident are difficult to summarise in the space available. The Probable Causes, and Recommendations listed below use the precise wording employed in the English language version of the final report.
In some cases, the precise meaning is not clear without reference to the full text. It is therefore recommended that readers refer to the full text of the report, published in French and in English translation at the web-site of the Bureau Enquêtes-Accidents (BEA) www.bea-fr.org

Factual Information

Ilt was dark and rain was falling when Air Liberté MD 83, "IJ8807" began to taxi from Terminal 1 to the holding point of RWY 27 at 02:12:40 local time. The aircraft stopped on the way to the runway to deal with a technical problem.

At 02:38:25, Streamline Shorts 330, "SSW200", was cleared to taxi from the cargo ramp to RWY 27. At this point both aircraft were under control of the Ground Controller (GRD).

At 02:44:25 SSW200 was offered departure from an intermediate point on RWY 27 and proceeded towards this point via Taxiway 16. Shortly afterwards, IJ8807 resumed taxiing for RWY 27 and then changed frequency to the Local Controller (TWR).

At 02:48:37 IJ8807 was told to line-up and wait on RWY 27 after a landing B737.

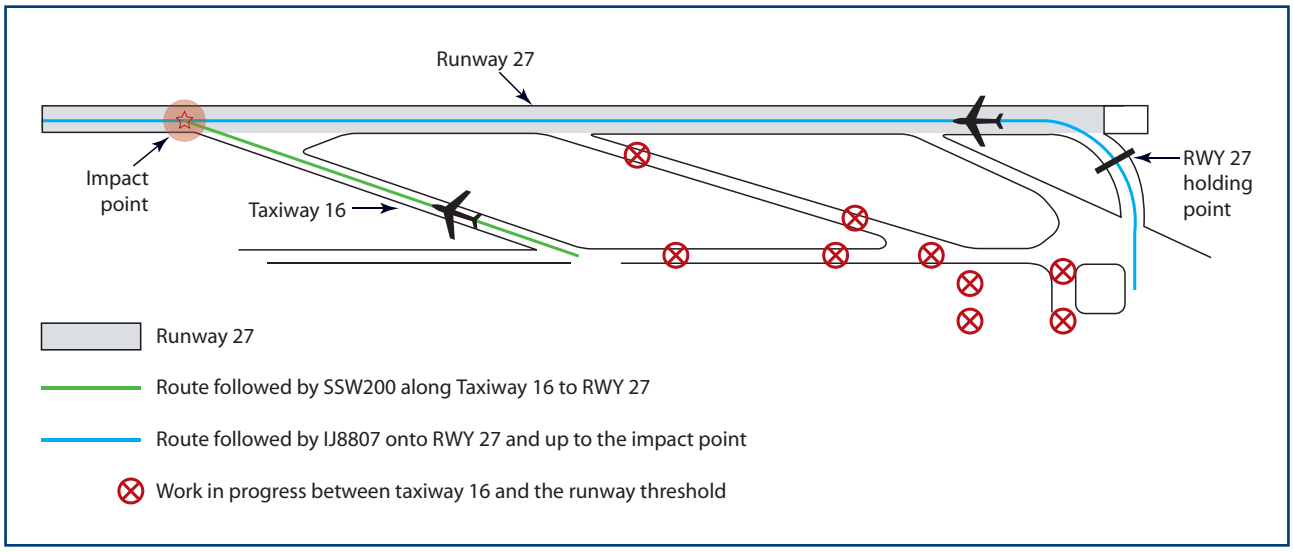
Three seconds later, SSW200 was instructed to go to Local frequency.

At 02:50:45 the B737 vacated RWY 27, having passed in front of SSW200. IJ8807 was then cleared for take off.

Five seconds later at 02:50:50 SSW200 was cleared to "line up runway 27 and wait, number two." SSW200 taxied forward and entered the runway, all the time looking for the No 1.

Shortly before impact, the Shorts 330 Captain noticed the MD 83 beacon lights and braked. About the same time, the MD 83 crew noticed the Shorts 330 on the edge of the runway. The aircraft had by then passed V1.

At 02:52:01 the left wing of the MD 83 collided with the right propeller and cut through the Shorts 330 cockpit.



Analysis

All the exchanges between ATC and IJ8807 were conducted in French while all communication with SSW200 were in English.

There was work in progress at various points between taxiway 16 and the runway threshold involving some 10 vehicles equipped with orange flashing lights, while the work itself was illuminated by halogen lamps (see diagram).

There were no fixed obstacles blocking the view of the runway threshold from the cockpit of SSW200. The field of view from the Shorts 330 right hand pilots seat extended 120° to the right of the aircraft axis; however, the pilot was unable to see the threshold of RWY 27 while the aircraft was on taxiway 16 because of the extremely acute angle between taxiway and runway.

It was normal practice for the Streamline aircraft to depart RWY 27 from a runway intersection; however on the night in question the TWR position was manned by an instructor who was re-familiarising himself with the airport and had formed the erroneous perception that all traffic departing RWY 27 did so via the runway threshold.

The aircraft strips were passed from GRD to TWR by a third party. In doing so, no mention was made of the position of the Shorts, although this was indicated on the strip. As he had not noticed the indication of the taxiway on the strip and nothing had drawn his attention to the peculiarities of the Shorts' situation, TWR believed that the aircraft was taxiing behind the MD 83.

A direct visual check was difficult to perform because of the works and the light pollution, and radar verification was difficult because of the screen's characteristics. In radio communication with SSW200, there was no reference to the aircraft's position.

The crew of the Shorts had not understood the clearance given to IJ 8807, which was in French. They could not see the MD83 on the runway, and assumed that the landing B737 which passed in front of them was the aircraft taking off before them. Therefore they taxied onto the runway, as they thought, in accordance with their clearance.

The MD83 crew understood the clearance given to the Shorts but were unaware that it was at the intersection. As they commenced their takeoff there were no obstacles visible ahead of them.

Probable Causes

The investigation determined that the accident was caused:

- Firstly, by the TWR controller's erroneous perception of the position of the aircraft, this being reinforced by the context and the working methods, which led him to clear the Shorts to line up,
- Secondly, by the inadequacy of systematic verification procedures in ATC which made it impossible for the error to be corrected,
- Finally, by the Shorts' crew not dispelling any doubts they had as to the position of the "number one" aircraft before entering the runway.

Contributory factors include:

- Light pollution in the area of RWY 27, which made a direct view difficult for the TWR controller.
- Difficulty for the TWR controller in accessing radar information: the ASTRE* image was difficult to read and the AVISO* image was not displayed at his control position.
- The use of two languages for radio communications, which meant that the Shorts crew were not conscious that the MD 83 was going to take off.
- The angle between access taxiway 16 and the runway which made it impossible for the Shorts crew to perform a visual check before entering the runway.
- The lack of co-ordination between the GRD and TWR controllers when managing the Shorts, exacerbated by the presence of a third party whose role was not defined.
- A feedback system which was recent and still underdeveloped.

The UK Representative to the investigation commented that the report would more accurately reflect the true position as represented by the evidence if the third causal factor was deleted because the Shorts 330 crew complied with their clearance which they read back to ATC.

**ASTRE and AVISO are radar systems used to identify the location of aircraft on the airfield .*

Recommendations

The investigation showed the importance for safety of great precision in runway usage and the grave risks created by any misunderstanding, especially when the aerodrome's procedures allow for the occasional presence of more than one aircraft on the runway. Accordingly the investigation made recommendations to guarantee in all circumstances the same level of safety when such procedures are in force.

Several recommendations were also made concerning the organisation of Air Traffic Control.

In addition, the investigation recommended in the light of the analysis of this accident and previously acquired experience, that the DGAC study the expediency and methods of implementation for the systematic use of the English language for air traffic control at Paris Charles de Gaulle aerodrome, as well as the extension of this measure to other aerodromes with significant international traffic. In making this recommendation, it was stressed that the investigation did not aim to evaluate the advantages and disadvantages of the systematic use of a single language.

Lessons Learned

RUNWAY INCURSION - From several safety occurrances we recommend:

Recommendations contained in this and other runway collision accident reports, and data obtained following the analysis of many runway incursions were fully taken into account when developing the recommendations for the European Action Plan for the Prevention of Runway Incursions*.

The recommendations appropriate to ATC are as follows:

- Use a clear and unambiguous method to indicate that a runway is temporarily obstructed;
- Do not instruct or imply that an aircraft should cross an illuminated red stop bar when entering or crossing a runway. For situations where the stop bars or controls are unserviceable contingency procedures should be used to guide the aircraft across the stop bars. Stop bars that protect the runway must be controllable by the runway controller;
- Ensure that ATC communication messages are not over long or complex;
- Ensure that ATC procedures contain a requirement for an explicit clearance to cross any runway. This includes non-active runways;
- Use standard taxi routes when practical to minimise the potential for pilot confusion and allow preplanning by aircrew;
- In situations where a long and complex taxi route is required, the use of progressive taxi instructions is recommended to reduce pilot workload and the potential for any confusion. Each element of the taxi clearance should contain a clearance limit;
- Assess any existing visibility restrictions from the tower which have a potential impact on the ability to see the runway, and disseminate this information as appropriate;
- Ensure that runway safety issues are included in training and briefing for ATC staff especially at shift hand over;
- When using multiple line-ups, do not use oblique or angled taxiways that limit the ability of the flight crew to see the runway threshold or the final approach area;
- To avoid the possibility of call sign confusion, use the full aircraft or vehicle call signs for all communictions associated with runway opertions;
- Use only standard ICAO RTF phraseology;
- Always use the ICAO read-back procedure (including Drivers and other personnel who operate on the manoeuvring area);
- Improve situational awareness by conducting all communications associated with runway operations on a common frequency;
  (note - aerodromes with multiple runways may use a different frequency for each runway.)

**A copy of the European Action Plan for the Prevention of Runway Incursions can be obtained from the following e-mail address: runway.safety@eurocontrol.int.*