



MINISTRY OF INFRASTRUCTURE
STATE COMMISSION ON AIRCRAFT ACCIDENT INVESTIGATION

FINAL REPORT

Serious Incident No: 450/07

**Approach abandoned by the flight crew of
Embraer 145 airplane, registration marks: SP-LGG
resulting from runway incursion by the flight crew of
Boeing 737-400 airplane, registration marks: TC-SKF
10 October 2007
Warszawa-Okęcie Aerodrome (EPWA)**

*This report is a document presenting
the position of the State Commission on Aircraft Accident Investigation concerning circumstances of
the air occurrence, its causes and safety recommendations.*

*The report is the result of the investigation carried out in accordance with the applicable domestic and
international legal provisions for prevention purposes only. The investigation was conducted without
the need of application of legal evidential procedure.*

*In connection with the Article 134 of the "Aviation Law" Act (Journal of Laws 2006, No. 100, item.
696 with amendments), the wording used in this report may not be considered as an indication of the
person guilty or responsible for the occurrence.*

The Commission makes no judgments about fault and responsibility.

*In connection with the above, any form of use of this report for any purpose other than air accidents
and serious incidents prevention, can lead to wrong conclusions and interpretations.*

*This report was drawn up in Polish. Other language versions may be drawn up for information
purposes only.*

Warsaw 2011

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GENERAL INFORMATION

Type and model of aircraft No.1 : **Boeing 737-400 airplane**

Aircraft registration marks: **TC-SKF**

Aircraft commander : **Airline Transport Pilot (ATPL)**

Flight organizer : **Sky Airlines**

Aircraft user : **Sky Airlines**

Aircraft owner : **MSA I**

Type and model of aircraft No.2 : **Embraer 145 airplane**

Aircraft registration marks: **SP-LGG**

Aircraft commander : **Airline Transport Pilot (ATPL)**

Flight organizer : **“LOT” Polish Airlines**

Aircraft user : **“LOT” Polish Airlines**

Aircraft owner : **ACG Acquisition**

Place of the incident : **Warszawa – Okęcie Aerodrome (EPWA)**

Date and time of the incident : **10 October 2007, 07:49hrs UTC**

Damage to the aircraft : **No damage**

Injuries to persons : **No injuries**

SYNOPSIS

Note: all times in the report are expressed in UTC (local time (LMT) = UTC + 2hrs)

On 10 October 2007, the flight crew of a Boeing 737-400, registration marks TC-SKF (call sign: SHY338), taxiing for flight to Antalya (LTAI) was ordered by Warszawa-Okęcie (EPWA) TWR to stop short of RWY 11. The SHY338 flight crew acknowledged the instruction but failed to stop, and, despite of repeated order from the TWR controller to stop, entered active RWY 11. At the same time Embraer 145, registration marks SP-LGG (call sign: LOT270), arriving from Schiphol (EHAM), was approaching the same runway. As a result of the situation the flight crew of Embraer 145 was instructed to go-around.

Investigation of the occurrence was conducted by the SCAAI Investigating Team in the following composition:

MSc. Eng. Bogdan Fydrych - Investigator-in-Charge - SCAAI Member;

MSc Wiesław Jedynak - Member of the Team - SCAAI Member;

D. (Eng.) Tomasz Smolicz – Member of the Team - SCAAI Expert.

Based on analysis of radio communication, aircraft positions recorded from Approach (APP) and Surface Movement Radar (SMR) displays, the involved persons statements and evidence gathered during the investigation, the SCAAI Investigating Team determined the following causes of the serious air incident:

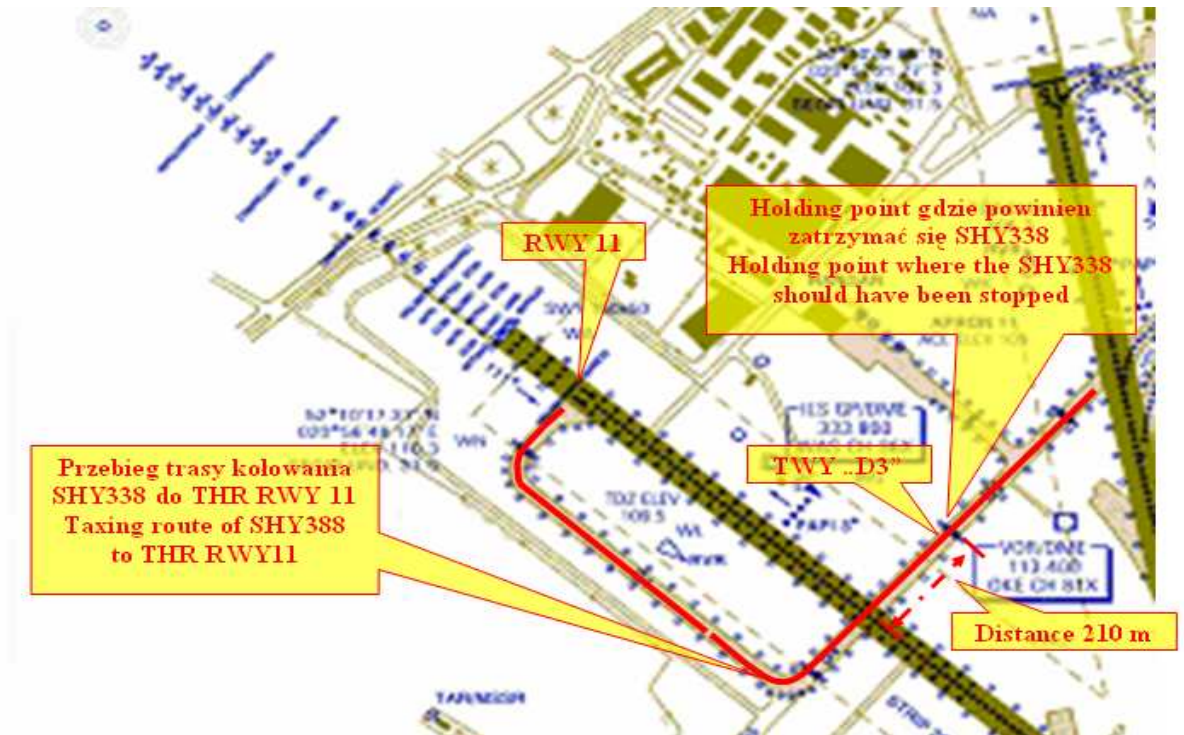
1. Improper monitoring of radio communication by Boeing 737 Captain.
2. Loss of full awareness or misunderstanding of the current traffic situation in the area of active runway by Boeing 737 Captain.
3. Lack of effective reaction of Boeing 737 Co-pilot to the active runway incursion without required clearance.
4. Improper CRM of Boeing 737 (SHY338) which resulted in the situation that Captain failed to comply with the information received from Co-pilot instructing to stop short of active RWY 11 and lack of decisive reaction of Co-pilot to failure to comply with the received traffic instruction.

One safety recommendation has been made by SCAAI after closing the investigation.

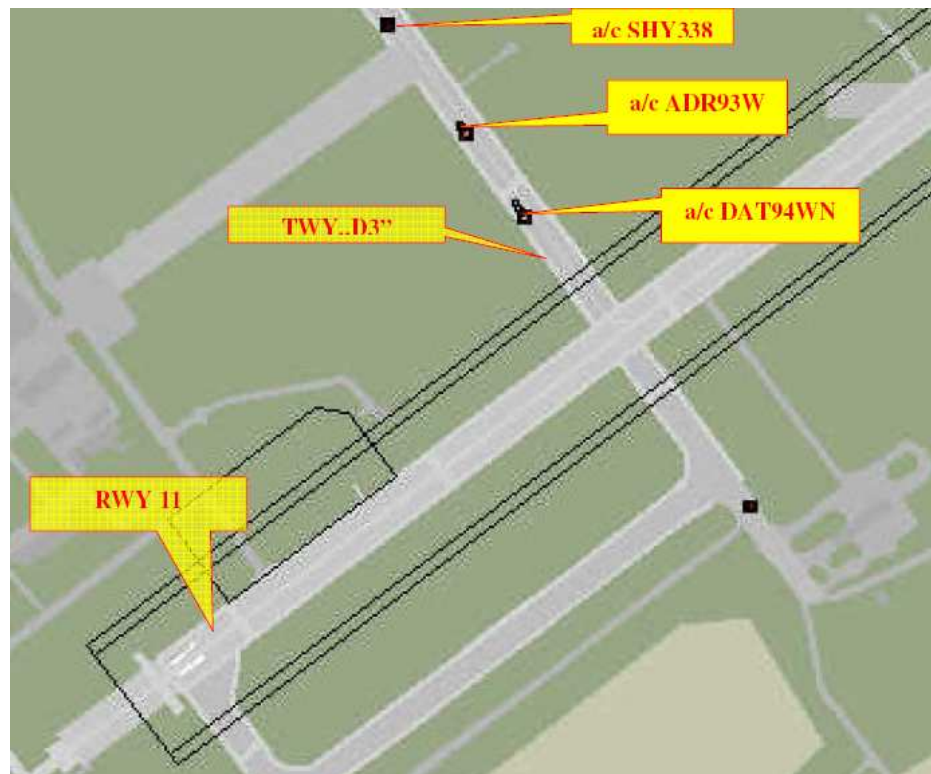
1. FACTUAL INFORMATION

1.1. History of the flight.

On 10 October 2007, 3 aircraft were holding at the EPWA aerodrome on taxiway D3 short of RWY11: DAT 94WN, ADR93W and SHY338.

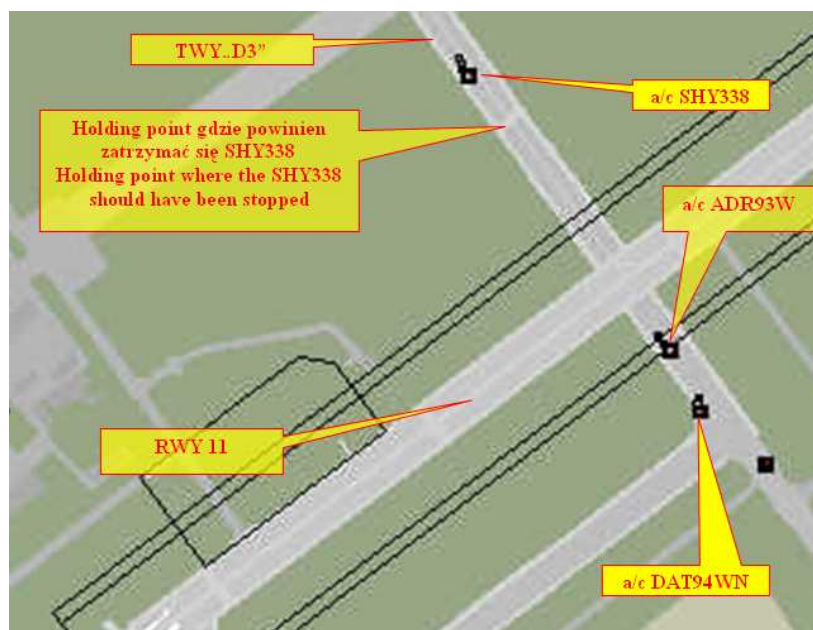


Taxi route of SHY338 leading to RWY11 threshold



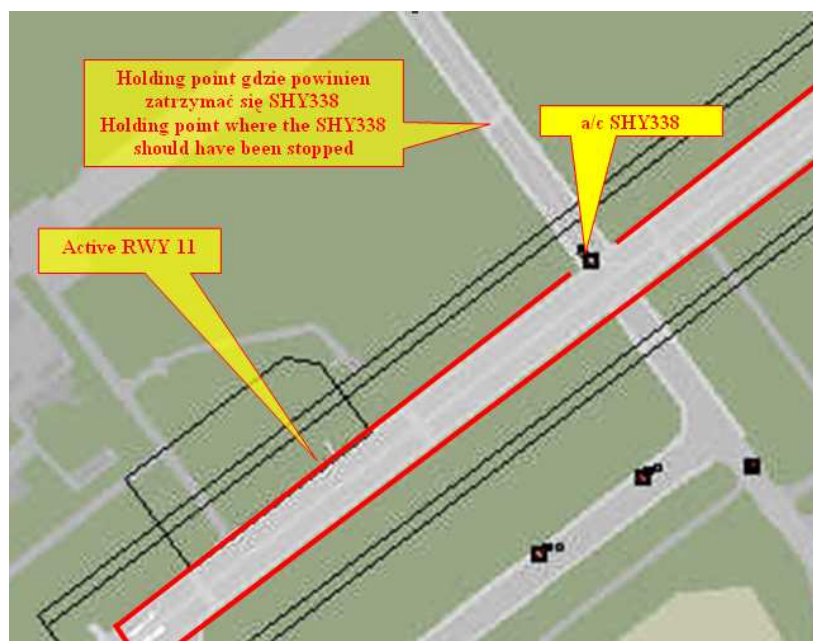
SMR display record: 3 aircraft short of RWY11

The flight crews of the two airplanes were cleared by the TWR controller to cross the active RWY 11 while the crew of SHY338 were ordered to stop short of the runway. After ADR93W vacated runway 11, the TWR controller cleared the crew of LOT270 (approaching by ILS) to land on the runway.

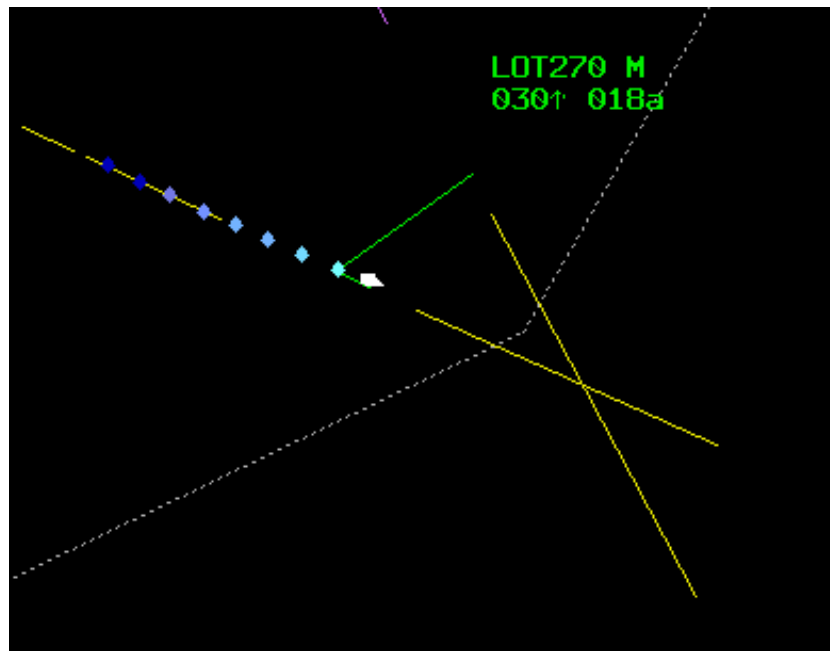


SMR display record: 2 aircraft after crossing RWY11 and SHY338 still on TWY D3 short of RWY11

TWR controller noticed SHY338 coming fast to runway 11 and again ordered the flight crew to stop short of the runway. The SHY338 flight crew again failed to comply with the TWR controller order and taxied onto the active RWY 11, which was approached by LOT 270, located at that time approximately 1,5 NM (2,8 km) from the runway threshold.



SMR display record: SHY338 taxiing onto active RWY11



APP display record: beginning of go-around procedure by LOT270

As a result of the situation, the TWR controller instructed the flight crew of LOT270 to go-around. After the incident SHY338 vacated RWY 11, the flight crew apologized for incursion on the active runway and continued taxiing to take off for the destination.

1.2. Injuries to persons

No injuries.

1.3. Damage to aircraft

No damage

1.4. Other damage

None

1.5. Personnel information

Flight crew of Boeing 737-400, registration marks: TC-SKF

1.5.1. Captain

- Male, aged 60 ;
- Total flight time on airplanes: 14 710 hrs;
- Flight time on B737: 7 210 hrs;
- Flight time over the last 24 hrs: 5 hrs 10 min;
- Flight time over the last 28 days: 86 hrs;
- Medical examinations valid until: 07.12.2007.

1.5.2. Co-pilot

- Male, aged 28;
- Total flight time on airplanes: 2450 hrs;
- Flight time on B737: 2030 hrs;
- Flight time over the last 24 hrs: 6 hrs;
- Flight time over the last 28 days: 80hrs;
- Medical examinations valid until: 28.12.2007.

1.6. Aircraft information.

Type: Boeing 737 – 400

- Serial number : 2513/PW278;
- Registration marks: TC-SKF;
- Maximum Take off Weight (MTOW): 68038 kg;
- Year of manufacture: 1993.

1.7. Meteorological information.

- Wind speed: 4 knots (2 m/s);
- Wind direction: 130 deg; alternating: 110-170 deg;
- Visibility: 7 km;
- Temperature: 7 C°;
- Dew point: 6 C°;
- QNH: 1028 hPa.

1.8. Aids to navigation.

No objections concerning aids to navigation were raised.

1.9. Communications

No objections concerning communications were raised.

1.10. Aerodrome information

Warszawa - Okęcie (EPWA) aerodrome has 2 intersecting runways identified as RWY 15/33 and RWY 11/29.

On the day of the incident RWY 15/33 was closed due to technical reasons.

RWY 11 was used for both departures and arrivals. Taxiing up to RWY 11 threshold was possible only via “D” taxiway, across RWY 29/11 or via the runway. Holding point on TWY „D3” is located 210 m from RWY 11/29 centre line.

GEOGRAPHICAL DATA:

1. ARP – WGS-84 coordinates and location: 52°09.56.70.N; 020°58.01.64.E – runways axes intersection;
2. Distance, direction from the city: 10 km (5,4 NM), BRG 205° GEO;
3. Airport elevation/Reference temperature: 110,3 m; 27°C (JUL);
4. Runway 15/33 dimensions: 3690 x 60 meters;
5. Runway 11/29 dimensions: 2880 x 50 meters;
6. Strength of runway surface: PCN 57/R/B/W/T asphalt/concrete;
7. Stop way of RWY29: PCN 57/R/B/W/T asphalt.

1.11. Flight recorders

Boeing 737-400

Data recorded by flight recorders were not analyzed. SCAAI was notified about the occurrence by the Polish Air Navigation Services Agency via e-mail on 11.10.2007 at 09:03 LMT. **SCAAI was not able to secure the cockpit voice recorder (CVR) data of Boeing 737 (SHY338)** immediately after the incident, because the airplane took off again. The audio record of the incident circumstances was “overwritten” by a new soundtrack. Therefore, the Commission was not able to determine whether or not the co-pilot had really informed the Captain about lack of clearance to cross the active runway (as he had stated in writing) and whether or not such information had been clear enough to the Captain. Moreover, it was also impossible to analyze the crew cooperation (CRM) during taxiing procedure.

1.12. Wreckage and impact information

Not applicable.

1.13. Medical and pathological information

Not applicable.

1.14. Fire

Not occurred.

1.15. Survival aspects

Not applicable.

1.16. Tests and research.

SCAAI Investigation Team analyzed radio communication between flight crews and EPWA TWR controller, aircraft positions recorded from radar displays, statements of the controller and involved pilots and evidence gathered during the investigation.

1.17 Organizational and management information

SCAAI was notified about the incident by the Polish Air Navigation Services Agency via e-mail on 11 October 2007. On 16 October SCAAI notified about the occurrence the Turkish Aviation Authorities, International Civil Aviation Organization (ICAO) and the interested parties, in accordance with the recommendations of Annex 13 (Aircraft Accident and Incident Investigations) to the Convention on International Civil Aviation.

1.18 Additional information

1. The flight crew of Boeing 737 did not report the investigated incident.
2. On 27 February 2008, the Commission received from the Turkish side a response with attachments to their letter of 24 October 2007 but without any statement of the Boeing 737 Captain.
3. On 27 February 2008, the Commission again requested the DGCA to supplement their response with Captain statement, however it has not been received until closing of the investigation.
4. On 28 March 2011 the Draft Final Report was sent to the Turkish Aviation Authorities in order to acquaint them with the Report and to give them opportunity to make comments. Until closing the investigation the Commission has not received comments to the Draft Final Report.

1.19. Useful or effective investigation techniques

Not applied.

2. ANALYSIS

2.1. Occurrence analysis

Boeing 737 (SHY338) was the last of the three airplanes holding on taxiway “D3” short of the active RWY 11. The two airplanes preceding SHY338 were cleared to taxi across RWY 11. SHY338 flight crew were ordered by the TWR controller to hold short of RWY 11 and they acknowledged the order. After the cleared airplanes vacated RWY 11, the TWR controller cleared LOT270 for landing on that runway. At that time SHY338 was still on the TW “D3” short of RWY 11.

Meteorological conditions on the aerodrome had a significant influence on the course of the incident. They allowed the TWR controller to notice the conflict situation on time. As stated by the Embraer 145 (LOT270) crew, the slant perspective visibility from the cockpit was much worse than received from ATIS: *“...in its final phase the approach was being performed against the sun, in a thick fog. At the moment when the clearance for landing came, the only things visible from the cockpit were approach lights on runway 11. After crossing the altitude of 1 000 feet, an outline of the runway became visible and at that*

moment we were instructed by TWR to abandon approach and go-around... when we were receiving the instruction to go-around, I spotted outline of an airplane with its front part on runway 11”.

The presented incident provides a very good example of how important is, for air operations safety, proper visual observation and monitoring the traffic situation in the active runway area. Lack or delay of a controller’s decision in a conflict situation, when visibility from the approaching airplane was limited, might easily have resulted in a serious air accident.

Analysis of SHY338 flight crew actions

The Captain of SHY338 (aged 60) was the pilot executing taxiing, and the Co-pilot (aged 28) was the pilot monitoring and handling radio communication. According to the written statement of the Co-pilot¹, he was completely aware of the traffic situation in the RWY 11 area. He was aware that they were to hold short of RWY 11 because another airplane, (LOT270) was approaching to landing on the same runway. At the moment when SHY338 got close to the holding point short of runway 11 and the Captain did not stop the airplane, the Co-pilot informed him: “***we should stop here***”². Due to the lack of both CVR record and Captain’s statement, the Commission has not been able to determine whether the Captain could not hear or just ignored the Co-pilot remark.

Notwithstanding the above, the fact is that despite of two orders from air traffic service to stop short of runway 11, the airplane was continuing taxiing by which he violated safety of the active runway. Due to lack of the CVR recording, the Commission can only suppose that in the course of this incident the flight crew actions were contrary to the CRM rules.

The flight crew works in a specific environment, which is the aircraft cockpit. Being in a specific relation with each other (Captain and First Officer (Co-pilot)), they must jointly implement the priority actions that allow safe execution of air operations. Performing of this task can not be done in isolation in such a dynamically changing environment. Both pilots should be in constant interaction, which means that behavior and actions of one of them in some way affect the operations of the other. Pilots, by the proper cooperation, exchange of information on their actions, coordination of these actions, are shaping their activities, for which they assume common responsibility. Understanding interdependence and shared

¹ *The Commission adopted for the incident analysis the statement of the Co-pilot , as truly reflecting the situation at the time of the incident.*

² *Due to the lack of both CVR record and Captain’s statement, the Commission has not been able to determine whether the Captain could not hear or just ignored the Co-pilot remark. The Commission have requested twice the Turkish Aviation Authorities to provide a statement of the Captain, but has not received an answer until the day of finalizing the Draft Final Report.*

responsibility for the task is crucial not only for the quality of an action, but above all for flight safety.

In the Commission opinion, there were three main factors which led to the active runway incursion (without air traffic service clearance).

Firstly - improper monitoring of the radio communication by Boeing 737 (SHY338) Captain - **he twice ignored the orders to stop short of the active runway 11.**

Secondly - flight crew cooperation was improper - **probably Captain could not hear or ignored information received from Co-pilot instructing to stop short of active RWY11.** Improper communication among flight crew members or other participants in the air activities may lead to the loss of situational awareness, collapse of cooperation between the flight crew and cabin crew which may lead to wrong decision or a series of them. Situational awareness in such a complex environment as manoeuvring area and particularly the area of active runway is the basis for planning actions by the flight crew. Loss of full awareness about the current traffic situation or its misunderstanding by the Captain (**failure to receive or to notice the clearance for landing of LOT270 on runway 11**) most often lead to the air occurrences with varied consequences.

Third factor was lack of Co-pilot reaction to failure by the Captain to comply with the Control Tower order. Co-pilot was aware that they had no clearance to cross the runway and even though he passed this information to the Captain, he did not take over the airplane control and did not stop it. Lack of reaction to the obvious Captain error was contrary to CRM rules which provide for mutual check of the flight crew members actions. Passive behaviour of Co-pilot was totally contrary to CRM rules.

Combination of those factors with restricted visibility from (LOT 270) cockpit within the approach area one more time made us aware, that the potential risk of tragic events not in the air, but on the ground (Tenerife, Milan – Linate) still exists. Fortunately, the weather conditions on that day enabled the controller to monitor active runway and allowed to prevent tragedy.

Proper crew cooperation is the basis for the air operations safety. Particularly important is effective communication among the flight crew members. In the case of any doubts when instructed by the air traffic services to hold short of a runway, cross the runway, take off or land it is essential **TO ASK!!!**

2.2. Evacuation action

Not applicable.

3. CONCLUSIONS

3.1. Commission findings:

1. Controller was certified to perform the air activities.
2. The airplanes pilots were certified to perform the air activities.
3. Two-way radio communication was maintained between the flight crews and air traffic controller on the same frequency.
4. The airplanes had a valid certificates of airworthiness.
5. The equipment used to secure the flow of air traffic during the event was turned on and functioning.
6. Boeing 737 (SHY338) Captain was not fully aware of current traffic situation in the area of active runway.
7. Boeing 737 (SHY338) Captain did not monitor the radio communication properly.
8. CRM of Boeing 737 (SHY338) was improper, which resulted in the situation that Captain failed to comply with the information received from Co-pilot instructing to stop short of active RWY11 and lack of decisive reaction of Co-pilot to failure to comply with the received traffic instruction.
9. The Commission has not received a statement by the Boeing 737 (SHY338) Captain, although the Turkish aviation authorities have twice been requested to provide such a statement.

3.2. Causes of serious incident

1. Improper monitoring of radio communication by Boeing 737 (SHY338) Captain.
2. Loss of full awareness or misunderstanding of the current traffic situation in the area of active runway by Boeing 737 (SHY338) Captain.
3. Lack of effective reaction of Boeing 737 Co-pilot to the active runway incursion without required clearance.
4. Improper CRM of Boeing 737 (SHY338) which resulted in the situation that Captain failed to comply with the information received from Co-pilot instructing to stop short of active RWY 11 and lack of decisive reaction of Co-pilot to failure to comply with the received traffic instruction.

4. Safety recommendations

1. The Turkish DGCA and the “Sky Airlines” air carrier - should verify their training procedures related to CRM.

THE END

SCAAI Investigator-in-Charge
MSc.Eng. Bogdan Fydrych

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