COMMAND OF AERONAUTICS

AERONAUTICAL ACCIDENT INVESTIGATION AND PREVENTION CENTER

FINAL REPORT
I - 235/CENIPA/2013

OCCURRENCE: INCIDENT

AIRCRAFT: A6-EWI

MODEL: B-777-21HLR

DATE: 4 SEPTEMBER 2013

NOTICE

According to the Law nº 7565, dated 19 December 1986, the Aeronautical Accident Investigation and Prevention System – SIPAER – is responsible for the planning, guidance, coordination and execution of the activities of investigation and prevention of aeronautical accidents.

The elaboration of this Final Report was conducted taking into account the contributing factors and hypotheses raised. The report is, therefore, a technical document which reflects the result obtained by SIPAER regarding the circumstances that contributed or may have contributed to triggering this occurrence.

The document does not focus on quantifying the degree of contribution of the different factors, including the individual, psychosocial or organizational variables that conditioned the human performance and interacted to create a scenario favorable to the incident.

The exclusive objective of this work is to recommend the study and the adoption of provisions of preventative nature, and the decision as to whether they should be applied belongs to the President, Director, Chief or the one corresponding to the highest level in the hierarchy of the organization to which they are being forwarded.

This Report does not resort to any proof production procedure for the determination of civil or criminal liability, and is in accordance with item 3.1, Annex 13 to the 1944 Chicago Convention, which was incorporated in the Brazilian legal system by virtue of the Decree nº 21713, dated 27 August 1946.

Thus, it is worth highlighting the importance of protecting the persons who provide information regarding an aeronautical accident. The utilization of this report for punitive purposes maculates the principle of "non-self-incrimination" derived from the "right to remain silent" sheltered by the Federal Constitution.

Consequently, the use of this report for any purpose other than that of preventing future accidents, may induce to erroneous interpretations and conclusions.

N.B.: This English version of the report has been written and published by the CENIPA with the intention of making it easier to be read by English speaking people. Taking into account the nuances of a foreign language, no matter how accurate this translation may be, readers are advised that the original Portuguese version is the work of reference.

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SYNOPSIS

This is the Final Report of the aeronautical incident involving the B-777-21HLR aircraft, registration A6-EWI on 4 September 2013. The incident was classified as collision with obstacle on the ground.

The aircraft was taxiing, and after it entered the apron number 2 of Galeão International Airport (SBGL), its right hand side wing tip hit the vertical stabilizer of a B737-800 aircraft that was parked in the same apron.

The passengers and crew were not hurt.

The B777 aircraft sustained damage to the right wing tip, and the parked B737 aircraft sustained substantial damage to the vertical stabilizer.

An Accredited Representative of the United Arab Emirates - General Civil Aviation Authority (GCAA) was designated for participation in the investigation.

GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

ANAC	(Brazil's) National Civil Aviation Agency
AIP	Aeronautical Information Publication
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATPL	Airline Transports Pilot License
ATS	Air Traffic Services
CMA	Aeronautical Medical Certificate
CENIPA	Aeronautical Accident Investigation and Prevention Center
DECEA	Airspace Control Department
DTCEA	Airspace Control Department Detachment
DXB	IATA Location Designator – Dubai International Airport
GCAA	General Civil Aviation Authority of the United Arab Emirates
GND	Ground Control
GIG	IATA Location Designator– Rio de Janeiro International Airport
IATA	International Air Transport Association
ICA	Instruction of the Command of Aeronautics
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
Lat	Latitude
Long	Longitude
NOTAM	Notice to Airmen
OMDB	ICAO Location Designator - Dubai International Airport
PDC	Parking Display Chart
PIC	Pilot in command
RBAC	Brazilian Civil Aviation Regulation
RBHA	Brazilian Aeronautical Homologation Regulation
ROTAER	Auxiliary Air-Route Manual
SBGL	ICAO Location Indicator – Rio de Janeiro International Airport
SBGR	ICAO Location Indicator – São Paulo International Airport
SBRJ	ICAO Location Indicator – Santos Dumont Airport/Rio de Janeiro
TMA	Terminal Maneuvering Area
TWR	Control Tower
TWY	Taxiway

UAE	United Arab Emirates
UTC	Coordinated Universal Time
VFR	Visual Flight Rules

AIRCRAFT	**Model:** 777-21HLR **Registration:** A6-EWI **Manufacturer:** BOEING	**Operator:** *Emirates Airline*
OCCURRENCE	**Date/time:** 04SEPT2013 / 17:44 UTC **Location:** Galeão Aerodrome (SBGL) **Lat.** 22º48'36"S – **Long.** 043º15'02"W **Municipality – State:** Rio de Janeiro – RJ	**Type:** Collision with obstacle on the ground

1 FACTUAL INFORMATION

1.1 History of the occurrence

The B777 aircraft (EK247), on a flight from Dubai, United Arab Emirates (DXB, OMDB), landed on runway 15 of Antonio Carlos Jobim Airport (GIG, SBGL) in Rio de Janeiro, Brazil. While taxiing in, the aircraft received instructions from the Ground Control (GND-GL) to proceed to apron number 2 via taxiways F, B, I, K, and L3.

After the aircraft entered apron number 2 via taxiway L3, its right hand side wing tip collided with the vertical stabilizer of a parked aircraft (B737-800, registration PR-GUD, operated by Gol Airlines).

1.2 Injuries to persons

Injuries	Crew	Passengers	Third
Fatal	-	-	-
Serious	-	-	-
Minor	-	-	-
Uninjured	18	159	-

1.3 Damage to the aircraft

The B777 aircraft sustained damage to the tip of the right wing, while the B737 aircraft sustained substantial damage to the vertical stabilizer.

1.4 Other damage

Nil.

1.5 Personnel information

1.5.1 Information on the crew

HOURS FLOWN		
	PILOT	COPILOT
Total	14,110:00	8,384:00
Total in the last 28 days	NIL	NIL
Total in the last 24 hours	14:20	14:20
In this type of aircraft	4,109:01	2,170:55
In this type in the last 30 days	NIL	NIL
In this type in the last 24 hours	14:20	14:20

NB.: Information provided by the operator.

1.5.1.1 Professional formation

All the courses done by the pilots concerning the B777 operation were sponsored by the aircraft operator.

As for the ATCO´s, all of them had done the required professional courses.

1.5.1.2 Validity and category of licenses and certificates

The pilots had the proper licenses, and their technical certificates were valid, as required for Airline Transport Pilots by the ICAO Annexes.

The ATCO´s had all the required licenses and certificates.

1.5.1.3 Qualification and flight experience

The pilots had qualification and enough experience for the type of flight in question.

1.5.1.4 Validity of the medical certificate

The pilots had valid Aeronautical Medical Certificates (CMA).

1.6 Aircraft information

The B777 aircraft (SN 35589) was manufactured by the Boeing Company in 2009, and all of its documents and maintenance inspections were up to date.

The B737 aircraft (SN 35836) was manufactured by the Boeing Company in 2010, and all of its documents and maintenance inspections were up to date.

1.7 Meteorological information

Not applicable.

1.8 Navigational aids

Nil.

1.9 Communications

According to the transcript, the communications between the Control Tower (TWR-GL), Ground Control (GND-GL), the aircraft, and the Apron Supervisor at the moment of the occurrence were the following:

At 10:49:20 UTC, the Apron Supervisor requested GND-GL to not authorize either entry or exit of large aircraft via Taxiway L3.

At 12:05:12 UTC, the Apron Supervisor stressed to GND-GL that it must restrict entry and exit of “large aircraft” via Taxiway L3.

At 16:34:52 UTC, the Apron supervisor ratified his request for GND-GL to not authorize “large aircraft” entry and exit via Taxiway L3.

This last request was made on account of the Apron Supervisor’s concern with the shift of the controllers on duty at TWR-GL.

At 17:14:23 UTC, the Apron Supervisor requested again from GND-GL to not authorize entry and exit of “any” aircraft via Taxiway L3.

At 17:41:50 UTC, the B777 called GND-GL, informing runway 15 vacated via taxiway E.

At 17:41:53 UTC, GND-GL instructed the B777 to taxi via taxiways I, K, and L3 towards the gate 45 of apron number 2.

At 17:41:58 UTC, the B777 read back the entire instruction received from GND-GL.

At 17:44:27 UTC, the right hand side wing tip of the B777 collided with the vertical stabilizer of a B737 parked near the position 40 of a remote area of apron number 2.

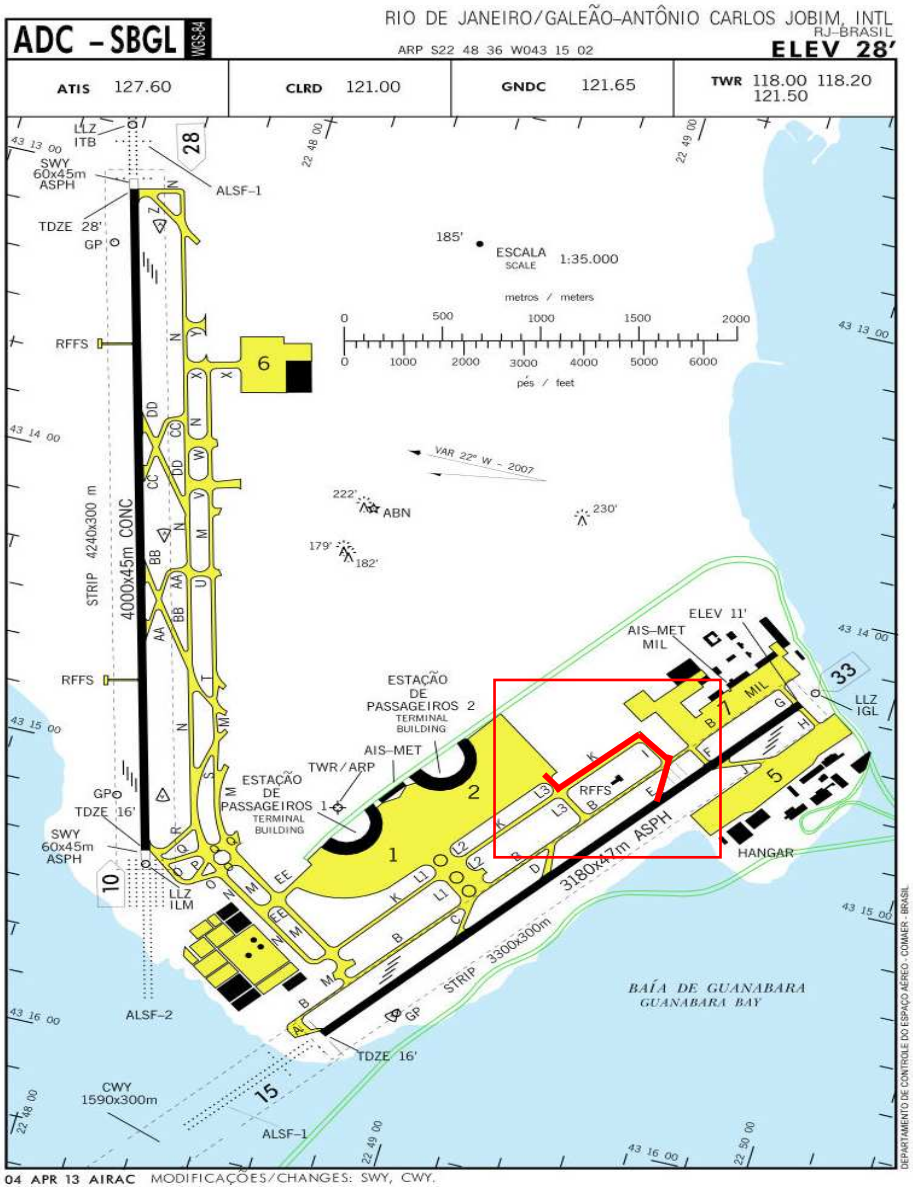


Figure 1 – The red line shows the path followed by the B777 aircraft (EK247) after vacating the runway, complying with the instruction given by GND-GL.

At 17:45:31 UTC, the B737 captain called GND-GL to inform that the B777 right hand side wing had hit the vertical stabilizer of his aircraft.

At 17:53:42 UTC, the captain of an E190 aircraft (callsign AZU9150), which was parked on stand 37, informed that his aircraft had almost been hit by the B777, and that the Apron Supervisor had instructed his aircraft and the other ones to stop approximately three meters short of the parking position marked on the ground.

1.10 Aerodrome information

SBGL is a public/military aerodrome, operating VFR/IFR during day- and night-time.

It has two runways (15/33, paved with asphalt, and 10/28, paved with concrete), measuring 31,180m x 47m and 4,000m x 45m respectively, at an elevation of 28ft.

The Aerodrome operator would sometimes utilize the remote area of apron number 2 (general aviation) for the parking of regular aviation aircraft diverted to SBGL due to closed operations in SBRJ, SBGR, and SBCF on account of meteorological conditions.

The parking stands of the remote area of apron number 2 were not compliant with the prescribed positions listed in the SBGL *Parking Display Chart* (PDC) published by the DECEA.

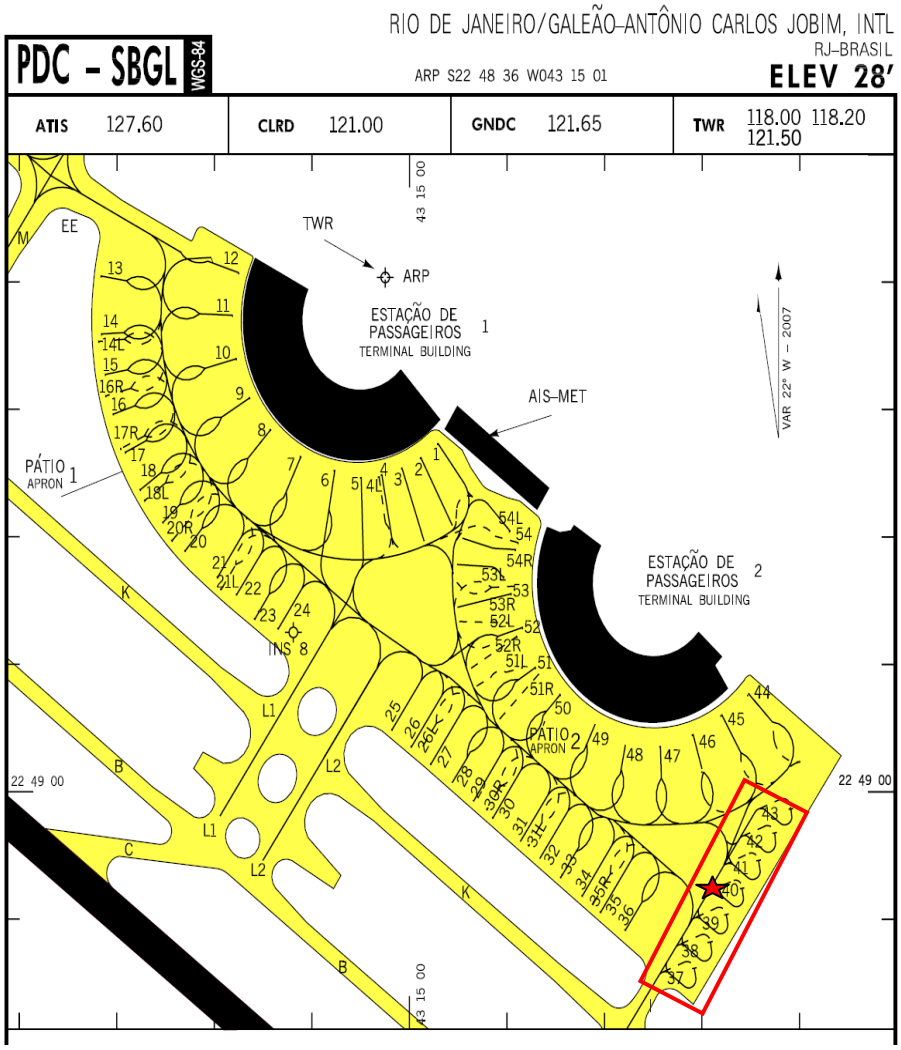


Figure 2 – DECEA publication, describing the positions of the parking stand of the remote area of apron number 2, and the location of the collision between the B777 and the B737.

There were “T” stop signs outside the taxi lines at 90º with the apron. Despite being used, they were not indicated in the PDC.

The B737 aircraft hit by the B777 was aligned with the “T” stop sign, close to the position 40, but 3.6 meters short of it.

According to information provided by INFRAERO, such displacement allowed the area in front of the parked aircraft to be used as a service track for fuel tankers, push-back tractors, and other ramp services.

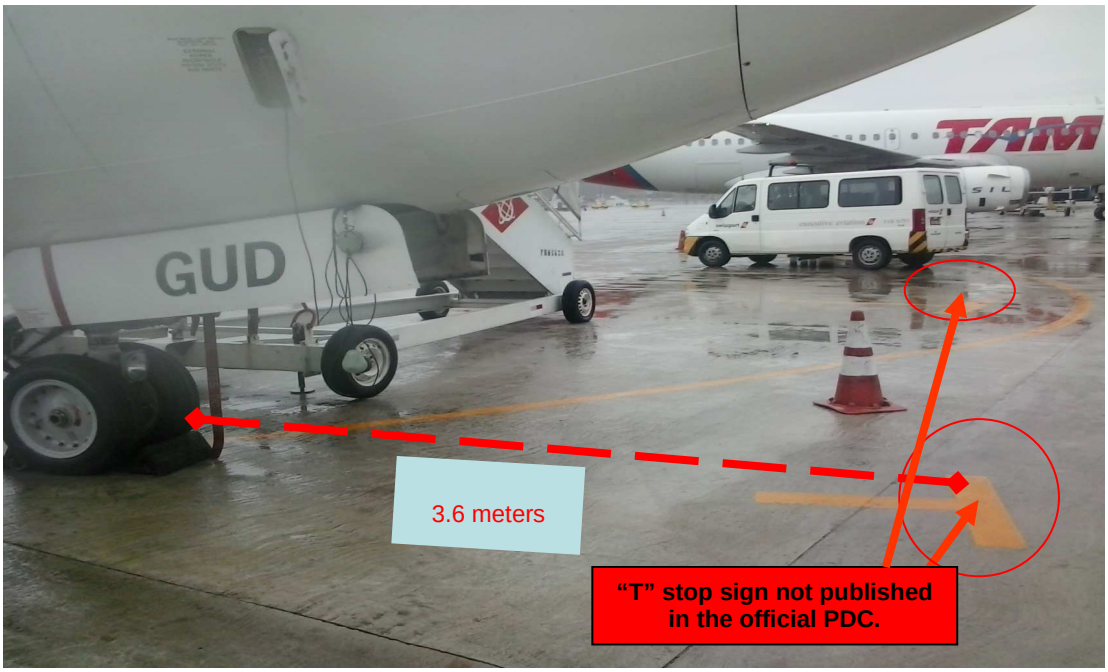


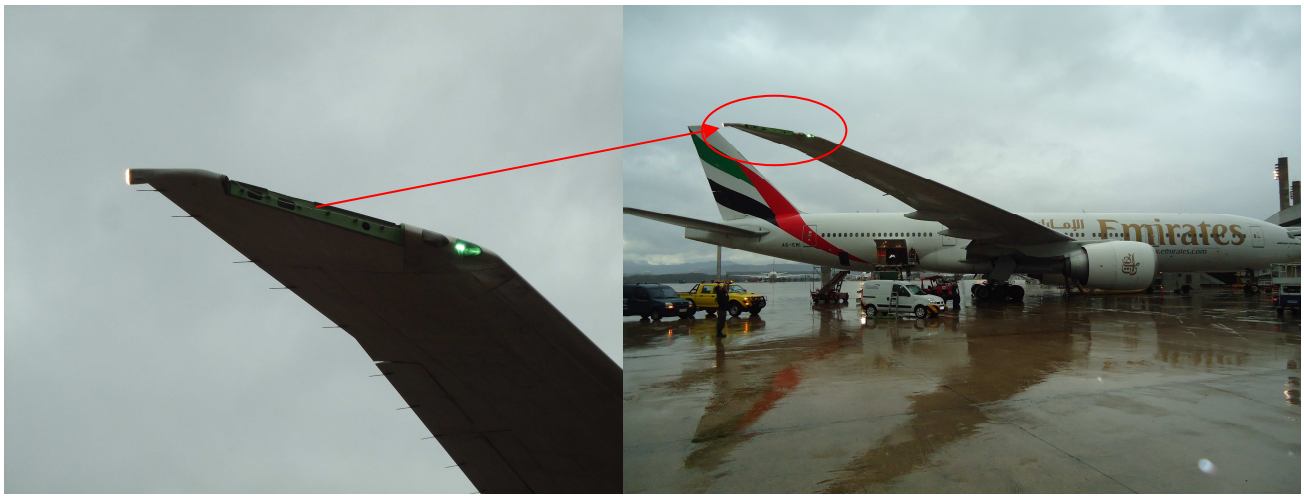
Figure 3 – Position of ground markings in discordance with the PDC published by the DECEA. In the foreground, position of the aircraft hit by the B777 (3.6 meters short of the "T" sign).

1.11 Flight recorders

Not applicable to the investigation.

1.12 Wreckage and impact information

There was structural damage to the right wing tip of the B777 on account of the impact against the B737.



Figures 4 and 5 – Damage to the right wing tip of the B777 aircraft after the collision.

There was damage to the vertical stabilizer of the B737 aircraft, as a result of being hit by the right wing tip of the B777.

Figure 6 – Damage to the vertical stabilizer of the B737 after the collision. In the foreground, the yellow line along which the B777 was taxiing in.

Figure 7 – Aspect of the damage to the vertical stabilizer of the B737 after the collision.

1.13 Medical and pathological information

1.13.1 Medical aspects

Not investigated.

1.13.2 Ergonomic information

Nil.

1.13.3 Psychological aspects

1.13.3.1 Individual information

Nil.

1.13.3.2 Psychosocial information

Nil.

1.13.3.3 Organizational information

Nil.

1.14 Fire

There was no fire.

1.15 Survival aspects

Nil.

1.16 Tests and research

Nil.

1.17 Organizational and management information

Galeão Aerodrome had a number of works in progress which resulted in operational restrictions for the utilization of runways and taxiways.

The restrictions would normally be determined by the Aerodrome Operator without full participation of the local air traffic control unit (DTCEA-GL).

The existence of works in the movement area of the aerodrome exacerbates the complexity of aircraft circulation, and demands special attention from the GND-GL ATCO, who receives frequent information about the opening and closing of taxiways.

The parking of aircraft on non-standard locations (called expansions) was necessary as a remedial action for the airport infrastructure problems and works in progress.

This type of conduct brought consequences for the ATC, by augmenting the complexity of operations, since some of those locations were not seen by GND-GL.

The Aerodrome Operator changed the layout of the parking stands in the remote area (from position 37 to position 43) without formal notification to DTCEA-GL. The aerodrome chart was not updated with the new positions, either.

The interdiction of the access to the apron via taxiway L3 was made verbally, and relayed to the supervisor of TWR-GL by the Apron Supervisor.

On the day of the incident, on account of marginal weather conditions, Santos Dumont Airport (SBRJ) was closed for landings, and most aircraft began to divert to SBGL as their alternate airport.

As a result, the capacity of parking area was soon reached and medium size regular aviation aircraft (E190, A319, A320, A321, and B737) were directed for parking in a remote area.

For this reason, the access to the apron number 2 via taxiway L3 was alternately opened and closed that morning and, eventually, definitively closed at 17:14:23 UTC upon request from the Apron Supervisor through the radio.

There was not a definition of the difference between “restriction” and “closing”, but a common understanding that “restriction” allowed the entry of aircraft up to category C, and that “closing” meant prohibition of either entry or exit of any aircraft.

From the physical position occupied by the GND-GL controller, it was not possible to have a direct visual contact with the site of the incident.

There was an Aerodrome Operator CCTV camera that could be directed to that part of the apron, but it was not being utilized at the moment of the incident.

Taxiway L3 was closed 10 minutes before the GND-GL controllers were replaced by the ones taking over the control positions.

The briefing for the ATCO team that was taking over was prepared by the Team Supervisor, who left the workplace 20 minutes before the briefing was delivered. The briefing contained no information about the closing of TWY L3 for any time of aircraft at that moment.

The handover ATCO team supervisor did not pass any information on the closing of the access to apron number 2 via TWY L3 to the takeover supervisor.

In an interview, when asked about the reason for not having passed the information, he said that it was a routine situation and, therefore, the information was not necessary.

The ATCO who took over the GND-GL control position said that the handover controller had not passed the information at the moment of handover/takeover. The handover controller affirmed the opposite.

The briefing for the takeover team was delivered without utilization of the image projector due to problems in the equipment. The pieces of information were just read aloud for the ATCOs, compromising the formation of a mental model by the ATCOs.

As for the day of the event, eight ATCOs would have to be in the TWR-GL for activation of the positions prescribed in the Operational Model for operation of the aerodrome under those circumstances.

On the occasion of the incident, 5 (five) positions were active.

According to the 4 September 2014 work schedule, there were 7 (seven) ATCOs on duty, but for the configuration of runways on that date there should be 9 (nine).

On the occasion of the incident, there was no operational agreement between the DTCEA-GL and the Aerodrome Operator defining such positions along with the consequences of their utilization on the circulation of aircraft.

The collision occurred in the movement area outside of the TWR-GL jurisdiction, and the controller responsible for GND-GL did not have visual contact with the site of the incident.

Nevertheless, there was a monitor beside the GND-GL position repeating the images of the Aerodrome Operator security camera located in apron number 2. The camera was seldom utilized by the ATCOs because its *mouse* was difficult to handle.

The movement of aircraft in the apron is a shared responsibility of the PIC and Aerodrome Operator, under control of GND-GL.

The Aerodrome Operator gave instructions for the parking of aircraft in discordance with the PDC published for the airport.

The Aerodrome Operator informed the interdiction of the TWY L3 access to the apron number 2 at 17:14:23 UTC, but until 17:45 UTC no visual sign of the interdiction had been provided to mitigate the risk and prevent aircraft from entering the apron via TWY L3.

1.18 Operational aspects

The B777 aircraft (EK247) landed on runway 15 of SBGL and, after vacating the runway, was instructed by GND-GL to taxi to apron number 2 via TWY L3.

During the taxi, as the B777 was entering apron number 2, the right hand side wing tip of the aircraft hit the vertical stabilizer of a B737 (PR-GUD), which was parked close to the parking stand 40.

On the day of the occurrence, the Rio de Janeiro Terminal Area (TMA-RJ) had operational restrictions due to weather.

Santos Dumont Airport (SBRJ) was operating IFR, and only for departures. The runway in use in SBRJ was RWY 02.

The ceiling was 600ft, less than the necessary 1,300ft for a VFR landing on the RWY 02 of SBRJ.

Landing on runway 20 was impracticable in SBRJ due to the wind direction, which would have meant a tailwind of 8kt on a wet runway. Such combination and variables made it unviable for regular aviation aircraft to land in SBRJ.

As a result, most of the aircraft were being diverted to SBGL.

Galeão Aerodrome was operating IFR, with landings on runway 15, and takeoffs from runways 10 or 15.

The quantity of aircraft diverting to SBGL was added to the number of those originally destined for SBGL.

On the day of the occurrence, a routine briefing was delivered to the ATCO team that was about to replace the ones that were working in the control of the SBGL operations. The briefing was held, as usual, from 17:00 to 17:15 (UTC).

At 17:14:23 UTC, the Aerodrome Operator, by means of a phone call made by the Apron Supervisor, informed GND-GL that no aircraft was allowed to enter the apron number 2 via TWY L3.

The TWR-GL Supervisor received the information, and relayed it in a loud voice to his team of ATCOs.

However, during the briefing delivered before duty to the takeover ATCO team, the takeover Supervisor did not receive the information.

At 17:41:53 UTC, the ATCO on duty at the GND-GL position in the afternoon shift instructed the B777 to enter apron number 2 via TWY L3.

1.19 Additional information

1.19.1 TWR-GL Operational Model in force at the time of the incident

Item 4- OPERATIONAL ROUTINES

TWR-GL had a work shift optimized and in accordance with the regulations in force (ICA 100-18, ICA 100-30, and ICA 100-25) in order to meet the requirements for the provision of air traffic services with a minimum of 7 (seven) ATCOs per work team.

5.1 SERVICE HANDOVER/TAKEOVER

The takeover Supervisor, before entering duty, shall comply with the prescribed checklist, get acquainted with the operation and with the following items (...)

The ATCO team must be complete for the takeover, in accordance with the work shift.

The Handover Supervisor may only leave the TWR-GL premises when the Takeover Supervisor states to be aware of all the orders and conditions in force.

5.1.2 TAKEOVER CONTROLLER

For taking over, the ATCO must get assured that the operational position meets the parameters specified in the checklist presented in this Operational Model, and, before starting duty, s/he shall stay near the Handover ATCO for a time that is sufficient to observe the operation and evolution of the air traffic in order to get acquainted with the procedures being adopted.

5.1.3 HANDOVER CONTROLLER

a) For handing over, f*ollow the instructions contained in the checklist…*

During a visit of TWR-GL, and watching a video of the ATC service handover/takeover, it was possible to observe that the checklist was not available to be used by the ATCOs during the handover/takeover procedure.

In an interview with the ATCOs and Supervisors, the investigation commission was informed that the checklist was not being used for the service handover/takeover. The communications between the ATCOs were not standard, and the items of information transmitted to the takeover team were those deemed important, in detriment of the ones prescribed in the operational model.

1.19.2 Operational Agreements between TWR-GL and the Aerodrome Operator

According to information collected, there were four agreements between DTCEA-GL and the Aerodrome Operator.

An analysis of the agreements identified that the ones dealing with Runway Incursion / Runway Desobstruction and Sweeping had become effective in 2013, and were still in force.

The operational agreement dealing with Aircraft Circulation on the apron, and the one dealing with the Use of the Taxiways I and K for Aircraft Parking had already expired.

1.19.3 Table A-1 of RBAC 154 (Aerodrome Design)

This table establishes the aircraft category for operation on the taxiways according to respective wingspan:

Code letter	*wingspan*
A	*less than 15m*
B	*from 15m to 24m exclusive*
C	*from 24m to 36m exclusive*
D	*from 36m to 52m exclusive*
E	*from 52m to 65m exclusive*
F	*from 65m to 80m exclusive*

1.19.4 RBHA 91 – General Rules for Civil Aircraft Operation

The RBHA 91 reads:

91.101 - Applicability

This subpart establishes only operational rules applicable to the operation of civil aircraft within the Brazilian Airspace. The "reserved" sections of this subpart would contain the rules referring to the ICAO Annex 2, "Rules of the Air". However, in the Brazilian

Legislation, the issuance and enforcement of such rules are competence of the Department of Airspace Control (DECEA), an organization of the Command of Aeronautics.

Item 91.102 – General Rules

(a) No person is allowed to operate a civil aircraft in Brazil, unless the operation is conducted in accordance with this regulation, with the air traffic rules contained in ICA 100-12 "Rules of the Air and Air Traffic Services", with the information contained in the Aeronautical Information Publications (AIP Brasil, AIP Brasil Map, ROTAER, AIP Supplement, and NOTAM), and with other pertinent documents published by the Airspace Control Department (DECEA).

The item 91.123 (Compliance with ATC clearances and instructions) reads:

b) *Except in an emergency, no person is allowed to operate an aircraft in discordance with an ATC instruction in an area where air traffic control is being provided.*

The item *91.3* of this same regulation reads:

The pilot in command is directly responsible for the operation of the aircraft, and has ultimate authority for such.

1.19.5 RBAC 129 – Operation of foreign companies whose objective is air transport in Brazil:

129.19 – Air traffic rules and other procedures

(a) Every pilot has to be familiarized with the applicable rules, the navigation and communication facilities, the air traffic control, and other procedures of the areas to be flown in Brazil.

(b) Every foreign airline company must establish procedures to guarantee that all their pilots have the knowledge required by paragraph (a) of this section, and must also verify the ability of every pilot to conduct the operations safely and in accordance with the applicable rules and procedures.

(c) Every airline company must comply with the practices, procedures, and other special requirements established by the ANAC concerning the operation of national airlines in locations where they already operate.

1.19.6 ICA 100-12 – Rules of the Air and Air Traffic Services

If a clearance is not convenient for the pilot in command of an aircraft, s/he may request another clearance, which will be granted whenever there is no harm or conflict for the air traffic.

1.20 Utilization of other investigation techniques

Nil.

2 ANALYSIS

On the day of the incident, on account of adverse weather conditions, SBRJ was closed for landings, and regular aviation aircraft began to be diverted to SBGL.

As a result, the aprons of SBGL received a larger number of medium size aircraft (E-190, A319, A320, A321, and B737), which were directed to a remote area of the apron number 2 near TWY L3, in accordance with instructions of the Aerodrome Operator.

Due to the increased number of aircraft, the apron number 2 area, which was originally used by general aviation aircraft, began to be used by regular aviation aircraft, in accordance with instructions issued by the Aerodrome Operator.

Since one of the ways to access the apron number 2 was via TWY L3, it was alternately open and restricted a few times during the day, and finally closed at 17:14:23 UTC, on request of the Aerodrome Operator.

The work of coordination for opening, restricting and closing taxiway L3 was being done directly between the Apron Supervisor (representing the Aerodrome Operator) and the TWR-GL Supervisor.

The operational agreement between DTCEA-GL and the Aerodrome Operator, dealing with the movement of aircraft in the apron, and the agreement dealing with the use of Taxiways I and K for the parking of aircraft had expired.

The communication between GND-GL and the Apron Supervisor was made by means of radiotelephony, and the phraseology utilized was not standard, different from what is normally utilized in aviation.

The utilization of phraseology different from the standard prescribed for aviation can create an unnecessary excess of information, and cause misunderstandings, which, in turn, may lead to incidents.

SBGL had several sites of work in progress, which would occasionally result in operational restrictions in the use of taxiways and runways.

When there are works being done in an operational area, the normal operation of an aerodrome requires a series of special mitigating measures, by means of an updated risk management under constant supervision.

Continuous changes in the area of movement of the aerodrome added to the complexity of the aircraft circulation and, therefore, to the workload of air traffic controllers (especially those working in the GND-GL), who constantly received information relative to the opening and closing of taxiways. These changes could also lead the controllers to some complacency, when they became part of the routine.

An example of this situation in the occurrence may be identified in the response of the TWR-GL Supervisor when asked about the reason why s/he did not pass the information on the closing of TWY L3 to the takeover supervisor.

According to the handover supervisor, that was a routine situation, and, thus, the piece of information was not necessary.

On the day of the occurrence, the takeover TWR-GL and GND-GL ATCOs were briefed, as usual, from 17:00 UTC to 17:15 UTC.

At 17:14:23 UTC, the Aerodrome Operator, by means of the Apron Supervisor, informed the TWR-GL Supervisor that no aircraft could be allowed to enter apron number 2 via TWY L3.

The TWR-GL Supervisor received the information, and relayed it in a loud voice to his team of ATCOs.

However, the takeover supervisor, who attended the briefing of the takeover ATCO team, did not receive the information.

According to the Operational Model, the takeover ATCO responsible for the GND-GL position, before entering duty, had to stay beside the handover ATCO for a time sufficient to get acquainted with the procedures being adopted.

Since the supervisors were not making use of the checklist during the service handover/takeover, and since there was not a consensus on the importance of the piece of information for the takeover ATCO team, the closing of TWY L3 was not discussed by the supervisors, who thought it was not relevant information, and could be dealt with directly by the GND-GL handover/ takeover ATCOs.

According to the ATCO who took over the GND-GL position, the handover ATCO did not pass the information during the handover procedure. The handover controller affirmed the opposite.

Neither the briefing nor the procedures prescribed for the handover/takeover followed the routine contained in the DTCEA-GL Operational Model.

At 17:41:53 UTC, the ATCO working in the GND-GL position in the afternoon shift, instructed the B777 to taxi to apron number 2 via TWY L3.

It is a fact that GND-GL made a mistake by instructing the aircraft to taxi via TWY L3, which, at that moment, was not suitable for the type of aircraft.

However, such fact may be associated with a decreased level of attention on the part of the ATCO, on account of the frequent changes and lack of an alert to be transmitted by the handover ATCO team.

It was observed that the ATCOs, no matter where their position inside the TWR-GL could be, did not have direct visual contact with the site of the incident.

However, there was an image monitor beside the GND-GL position, which repeated the images of a security camera located in apron number 2. According to the controllers, the camera was hardly utilized by them, due to problems with the handling of the computer *mouse*.

The Aerodrome Operator was responsible for defining the position of aircraft parking stands in the apron.

During the investigation, it was observed that the aircraft final stop positions in the remote area of the apron number 2 were not in accordance with the positions declared in the SBGL Parking Display Chart (PDC), published by the DECEA.

There was “T” stop signage outside the taxiway lines at an angle of 090º with the apron. The signage was being used without being plotted in the PDC.

The lack of visualization of the site of the incident by the ATCO may also be considered a factor of risk for the occurrence of an incident in that position.

After the readback of the message, the B777 complied with the instruction given by GND-GL.

The B737 aircraft hit by the B777 was aligned with the “T” stop sign close to position 40, but at a distance of 3.6 meters short of where it had to be.

As those positions had been planned for the general aviation, their utilization by larger aircraft required an improvisation regarding the parking of the aircraft in a position that short of the prescribed one, in order to allow room in front of the aircraft for the movement of fuel tankers, pushback tractors and other ramp services.

On account of that, the access to the apron became three meters narrower in practical terms, impairing the taxi of aircraft with a larger wing span, as was the case of the B777.

Since those parking stands were utilized only occasionally (i.e., when SBRJ airport would be closed for operations), the horizontal signage (parking stands 37 through 43) was not changed, and was dependent on the work of the Apron Supervisor in contact with GND-GL.

It is probable that the operation risk was not accurately analyzed, since there was not a provisional horizontal signage applied by the Aerodrome Operator for the identification of the latent conditions related to a closed TWY L3.

It is possible to consider that this fact may have been transformed in a latent condition, which, associated with any other event, could generate an active failure.

As for the RBHA 91.123 (Compliance with ATC Clearances and Instructions), which reads: "*except in emergencies, no person is allowed to operate an aircraft in contradiction with an ATC instruction in an area where air traffic control is being provided",* this condition existed at the time of the incident, and the B777 flight crew just followed the very instructions given by GND-GL.

3 CONCLUSIONS

3.1 Facts

a) The pilots had valid licenses and certificates;

b) The pilots had qualification and enough experience for the flight in question;

c) The aircraft documents were valid;

d) The maintenance services were considered periodical and adequate;

e) The aircraft departed from Dubai (OMDB), destined for Rio de Janeiro (SBGL) with 177 POB;

f) After landing, the aircraft was instructed to enter apron number 2 via taxiway L3, which was supposed to be closed;

g) When the B777 aircraft entered apron number 2 via taxiway L3, its right hand side wing tip hit the vertical stabilizer of a B737 that was parked close to the parking stand number 40;

h) The B777 aircraft sustained damage to the right hand side wing tip, and the B737 aircraft had its vertical stabilizer substantially damaged; and

i) None of the aircraft occupants was injured.

3.2 Contributing factors

3.2.1 Human Factor

3.2.1.1 Medical Aspect

Not a contributor.

3.2.1.2 Psychological Aspect

Not a contributor.

3.2.1.3 Organizational information

a) Support system – a contributor

Despite the existence of a daily briefing to alert the air traffic controllers on duty, the checklist prescribed in the Operational Model in force at the DTCEA-GL was not being utilized.

Despite the fact that there was an official PDC chart published by the pertinent Brazilian Authority, the aircraft parking positions in the apron number 2 were being utilized by the Aerodrome Operator in discordance with the official document.

3.2.2 Operational Factor

3.2.2.1 Concerning the operation of the aircraft

a) Airport Infrastructure – a contributor

The work in progress and the restrictions in the operational area of the Antonio Carlos Jobim International Airport (SBGL) resulted in the opening, restriction, and closing of taxiway L3. The actions taken by the apron supervisor were not sufficient for preventing the incident.

The coordination for the parking of Brazilian regular aviation aircraft in the remote parking area of the apron number 2 (not in accordance with the parking stand positions published by the DECEA, and under the responsibility of the Aerodrome Operator) contributed to the occurrence of the incident.

b) Managerial Supervision – a contributor

The process of supervision and coordination between the Aerodrome Operator and the DTCEA-GL concerning the activities of planning, technical/operational execution, and applied mitigating actions resulting from the management of risk on account of the atypical operation in SBGL, contributed to the occurrence of the incident.

3.2.2.2 Concerning ATS units

a) ATS supervision – a contributor

There was inadequate management of the operational functions during the shift work and/or lack of monitoring of the actions on the part of the ATCOs' team supervisor, when required, in the operational position of GND-GL.

b) Traffic coordination – a contributor

There was inadequacy in the exchange of information between the ground control operational positions and the ATCOs' team supervision.

There was inadequacy in the exchange of information between the apron supervisor and the ATC team supervisor.

c) Handover/takeover of ATC position – a contributor

There was inadequacy in the exchange of information both during the provision of air traffic services and at the handover/takeover of the GND-GL air traffic control positions.

3.2.3 Material Factor

3.2.3.1 Concerning the aircraft

Not a contributor.

3.2.3.2 Concerning ATS technology systems and equipment

Not a contributor.

4 SAFETY RECOMMENDATION

A measure of preventative/corrective nature issued by a SIPAER Investigation Authority or by a SIPAER-Link within respective area of jurisdiction, aimed at eliminating or mitigating the risk brought about by either a latent condition or an active failure. It results from the investigation of an aeronautical occurrence or from a preventative action, and shall never be used for purposes of blame presumption or apportion of civil liability.

In accordance with the Law n°12970/2014, recommendations are made solely for the benefit of the air activity operational safety.

Compliance with a Safety Recommendation is the responsibility of the holder of the highest executive position in the organization to which the recommendation is being made. An addressee who judges to be unable to comply with a Safety Recommendation must inform the CENIPA on the reason(s) for the non-compliance.

Safety Recommendations made by the CENIPA:

To the National Civil Aviation Agency (ANAC):

I - 235/CENIPA/2013 – 001 Issued on 02/02/2015

Work with the SBGL Aerodrome Operator, seeking to establish formal procedures for the timely and expeditious provision of all the necessary information by the Engineering and Operational Sectors to the DTCEA-GL, so that the latter has enough time for the changes and adjustment of the air traffic controllers' operational model.

I - 235/CENIPA/2013 – 002 Issued on 02/02/2015

Work with the SBGL Aerodrome Operator, seeking compliance with the ICAO Annex 14 prescriptions relative to infrastructure, so that all aircraft operating on Taxiway L3 are well clear of obstacles and other aircraft parked on Apron 2.

I - 235/CENIPA/2013 – 003 Issued on 02/02/2015

Publicize the contents of this Final Report to all Brazilian Aerodrome Operators.

To the Airspace Control Department (DECEA):

I - 235/CENIPA/2013 – 004 Issued on 02/02/2015

In a standardized and systemic manner, improve the daily alert briefing delivered by the Team Supervisors to the work team on duty, tackling all the information items that may be utilized by air traffic controllers, mainly in aerodromes undergoing a process of airport modification.

I - 235/CENIPA/2013 – 005 Issued on 02/02/2015

Reevaluate and refine the Operational Model applied by DTCEA-GL.

I - 235/CENIPA/2013 – 006 Issued on 02/02/2015

Publicize the contents of this Final Report to all the Detachments of the Airspace Control Department.

5 CORRECTIVE/PREVENTATIVE ACTION ALREADY TAKEN

Following the event, Emirates Airline issued a Company NOTAM instructing crews not to taxi into Apron 2 via L3 taxiway when any airplanes are parked on stands 37-43.

6 DISSEMINATION

- UAE General Civil Aviation Authority (GCAA) – United Arab Emirates
- (Brazil's) Airspace Control Department - DECEA
- (Brazil's) National Civil Aviation Agency (ANAC)
- INFRAERO
- Gol Airlines
- Emirates Airline

7 APPENDICES

Nil.

On 02 / 02 / 2015.