

AI2012-6

**AIRCRAFT SERIOUS INCIDENT
INVESTIGATION REPORT**

**AIR BUSAN CO., LTD.
HL 7517
JAL EXPRESS CO., LTD.
JA 8998**

August 31, 2012

 **JTSA** *Japan Transport Safety Board*

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 prevent future accidents and incidents. It is not the purpose of the investigation to apportion blame or liability.

Norihiro Goto
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 SERIOUS INCIDENT INVESTIGATION REPORT

**1. AIR BUSAN CO., LTD.
BOEING 737-400, HL7517
2. JAL EXPRESS CO., LTD.
BOEING 737-400, JA8998
ON RUNWAY 34 AT FUKUOKA AIRPORT, JAPAN
AROUND 11:34 JST, DECEMBER 26, 2010**

July 13, 2012

Adopted by the Japan Transport Safety Board

Chairman	Norihiro Goto
Member	Shinsuke Endo
Member	Toshiyuki Ishikawa
Member	Sadao Tamura
Member	Yuki Shuto
Member	Toshiaki Shinagawa

SYNOPSIS

<Summary of the Serious Incident>

On December 26 (Sunday), 2010, a Boeing 737-400, registered HL7517, operated by Air Busan Co., Ltd., was taxiing toward runway 34 at Fukuoka Airport for takeoff to Gimhae International Airport (Busan, the Republic of Korea) as the company's scheduled flight 141.

Another Boeing 737-400, registered JA8998, operated by JAL Express Co., Ltd., was approaching Fukuoka Airport upon receiving a landing clearance as the scheduled flight 3530 of Japan Airlines International Co., Ltd. (The aircraft was operated under the contract between the two companies, in which flight operations were entrusted to JAL Express Co., Ltd.)

JA8998 executed a go-around around 11:34 JST (UTC+9hr, unless otherwise stated all times are indicated in JST on a 24-hour clock) following the instructions of the air traffic controller, because HL7517 entered the runway.

There were 153 persons on board HL7517, consisting of a Pilot in Command (PIC), five other crewmembers and 147 passengers, while 108 persons were on board JA8998, consisting of a PIC, four other crewmembers and 103 passengers. Nobody suffered injuries and no aircraft involved had damage.

<Probable Causes>

It is probable that this serious incident occurred because the flight crew of the departing aircraft (HL7517), to which the local controller instructed to hold short of the runway, failed to recognize part of the instruction and misinterpreted that they had obtained a clearance to enter the runway, while the local controller did not confirm the read-back of the instruction, resulting in a situation where HL7517 entered the runway, causing the arriving aircraft (JA8998) which had earlier obtained a landing clearance from the same controller to attempt to land on the same runway.

Probable contributing factors to the misinterpretation of the HL7517 flight crew that they obtained a clearance to enter the runway are as follows:

- (1) There was an inquiry about the possibility of an intersection departure.
- (2) HL7517 was urged to confirm whether preparations for departure were completed just before the holding instruction.
- (3) The flight crew of HL7517 had thought that the controller was trying to have them depart before the landing of incoming JA8998.
- (4) The holding instruction included an air traffic control phraseology which indicates a taxiing route.

Abbreviations and Acronyms used in this report are as follows:

AIP	Aeronautical Information Publication
ASDE	Airport Surface Detection Equipment
CRM	Crew Resource Management
CVR	Cockpit Voice Recorder
DFDR	Digital Flight Data Recorder
DME	Distance Measuring Equipment
FOM	Flight Operations Manual
PF	Pilot Flying
PM	Pilot Monitoring
RVR	Runway Visual Range
RWSL	Runway Status Light System
TACAN	Tactical Air Navigation System
VMC	Visual Meteorological Condition
VOR	Very High Frequency Omni-Directional Radio Range
VORTAC	VOR and TACAN

Unit Conversion Table

1 ft	0.3048 m
1 kt	1.852 km/h (0.5144 m/s)
1 nm	1.852 m

1. PROCESS AND PROGRESS OF THE INVESTIGATION

1.1 Summary of the Serious Incident

The occurrence covered by this report falls under the category of “An attempt of landing on a runway being used by the other aircraft” as stipulated in Clause 2, Article 166-4 of the Ordinance for Enforcement of the Civil Aeronautics Act of Japan and is classified as an aircraft serious incident.

On December 26 (Sunday), 2010, a Boeing 737-400, registered HL7517, operated by Air Busan Co., Ltd., was taxiing toward runway 34 at Fukuoka Airport for takeoff to Gimhae International Airport (Busan, the Republic of Korea) as the company’s scheduled flight 141.

Another Boeing 737-400, registered JA8998, operated by JAL Express Co., Ltd., was approaching Fukuoka Airport upon receiving a landing clearance as the scheduled flight 3530 of Japan Airlines International Co., Ltd. (The aircraft was operated under the contract between the two companies, in which flight operations were entrusted to JAL Express Co., Ltd.)

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1.2 Outline of the Serious Incident Investigation

1.2.1 Investigation Organization

On December 26, 2010, the Japan Transport Safety Board designated an investigator-in-charge and one investigator for this serious incident.

1.2.2 Representatives of the Relevant States

An accredited representative of the Republic of Korea, as the State of Registry and the Operator of the aircraft involved in this serious incident, and an accredited representative of the United States of America, as the State of Design and Manufacture of the aircraft, participated in the investigation.

1.2.3 Implementation of the Investigation

December 27 and 28, 2010 On-site Investigation and Interviews

1.2.4 Comments from Parties Relevant to the Cause of the Serious Incident

Comments were invited from parties relevant to the cause of the serious incident.

1.2.5 Comments from the Relevant States

Comments on the draft report were invited from the relevant States.

2. FACTUAL INFORMATION

2.1 History of the Flight

Around 11:30 on December 26, 2010, a Boeing 737-400, registered HL7517, operated by Air Busan Co., Ltd., started taxiing from Spot 56 at Fukuoka Airport to runway 34 for takeoff.

The outline of the flight plan for HL7517 was as follows:

Flight rules:	Instrument Flight Rules (IFR)
Departure aerodrome:	Fukuoka Airport
Cruising speed:	405 kt
Cruising altitude:	Flight Level (FL) 160
Route:	IKE (Iki VOR/DME) – A582 (airway) – PSN (reporting point) – KMH (reporting point)
Destination aerodrome:	Gimhae International Airport
Estimated elapsed time:	0 hr 37 min

In the cockpit of HL7517, the PIC sat in the left seat as the PF (pilot flying: pilot mainly in charge of flying) and the First Officer (FO) in the right seat as the PM (pilot monitoring: pilot mainly in charge of duties other than flying).

Another Boeing 737-400, registered JA8998, operated by JAL Express Co., Ltd., took off from Sendai Airport at 09:29, and it was flying to Fukuoka Airport.

The outline of the flight plan for JA8998 was as follows:

Flight rules:	IFR
Departure aerodrome:	Sendai Airport
Cruising speed:	453 kt
Cruising altitude:	FL 300
Route:	GTC (Niigata VORTAC) – KMC (Komatsu VORTAC) – MAE (Matsue VOR/DME) – TTE (Toyota VOR/DME)
Destination aerodrome:	Fukuoka Airport
Estimated elapsed time:	1 hr and 59 min

In the cockpit of JA8998, the PIC sat in the left seat as the PF and the FO in the right seat as the PM.

The flight history of HL7517 and JA8998 up to the time of the serious incident was summarized as below, based on the records of Air Traffic Control (ATC) communication, the radar tracking records, the data of the digital flight data recorder (DFDR), as well as the statements of the flight crewmembers of the two aircraft and the air traffic controllers.

2.1.1 History of the Flights Based on Records of ATC Communication, the Radar Tracking Records and DFDR Records

11:24:36	HL7517 requested a pushback from Spot 56 from the ground controller and was approved.
11:28:52	HL7517 requested a taxi clearance from the ground controller.
11:28:55	JA8998 reported to the local controller that it was approaching the point HARRY and requested that it would vacate the runway at taxiway E1 after landing. The local controller instructed JA8998 to continue approaching.
11:29:08	The ground controller asked HL7517 whether it would accept an intersection

departure*¹ from taxiway W8.

11:29:26 HL7517 replied that it would accept it.

11:29:28 The ground controller instructed HL7517 to start taxiing to W8 via taxiway C4 and parallel taxiway B. HL7517 read it back.

11:32:11 The local controller issued a landing clearance on runway 34 to JA8998. He added information saying “WIND 240 AT 5 KT, AFTER LANDING, E1.” JA8998 read back the landing clearance. At this time, JA8998 was about 5.6 nm from runway 34 threshold at an altitude of about 1,800 ft.

11:32:39 The ground controller instructed HL7517 to taxi to W8 and contact the local controller and it read it back. At this time, HL7517 was taxiing on parallel taxiway B.

11:33:02 HL7517 called the local controller saying “ABL 142.”

11:33:04 The local controller asked if the correct flight number was 141.

11:33:07 HL7517 corrected it to “141.”

11:33:09 The local controller requested HL7517 to report when ready and the it replied “READY.”

11:33:14 The local controller instructed HL7517 saying “ROGER, HOLD SHORT OF RUNWAY 34 VIA W8.”

11:33:17 HL7517 replied to the local controller saying “RUNWAY 34 VIA W8, ABL141” and then, started to turn into W8 from parallel taxiway B.

11:33:32 The local controller called JA8998 saying “WIND CHECK, 250 AT 5KT.”

11:33:44 At first HL7517 turned its nose to the right from W8 and then, made a left turn toward the runway.

11:34:08 The local controller instructed JA8998 to go around. At this time, JA8998 was about 1.2 nm from runway 34 threshold at an altitude of about 350 ft.

11:34:11 HL7517 aligned itself with the runway center line.

11:34:13 JA8998 read back the go-around instructions and climbed from an altitude of about 300 ft. At this time, JA8998 was about 1.0 nm away from runway 34 threshold; about 1.3 nm away from HL7517.

11:34:28 HL7517 confirmed a takeoff clearance with the local controller.

11:34:31 The local controller replied to HL7517, “NEGATIVE, I SAID YOU HOLD SHORT OF RUNWAY 34 VIA W8 DUE TO INBOUND TRAFFIC.”

11:34:49 HL7517 replied, “I’M SORRY, I HEARD LINE UP.”

2.1.2 Statements of Flight Crew

(1) PIC of HL7517

HL7517 was pushed back from Spot 56 and the FO requested a taxi clearance from the ground controller. The ground controller asked FO whether an intersection departure from W8 was acceptable. The PIC accepted it. Later the ground controller instructed HL7517 to taxi to W8.

The PIC knew that there are frequent takeoffs and landings at Fukuoka Airport, and therefore, thought that the instructions for the intersection departure had been issued because of the busier condition.

*¹ The intersection departure denotes a takeoff procedure in which an aircraft starts a takeoff roll from any intersection with taxiway or another runway except the end of a runway without using the whole runway length.

The FO changed the radio frequency to the local controller and reported, “ABL141 WITH YOU,” near taxiway B5. The local controller instructed saying “ABL141, VIA W8 RUNWAY 34.” There were no words heard between “ABL141” and “VIA W8.”

The PIC interpreted that the local controller was trying to let them depart as soon as possible and ordered the FO to prepare for takeoff. When HL7517 was about to enter the runway, the PIC saw a landing light of an approaching aircraft but thought that there was a plenty of distance.

There were no instructions from the local controller for 10 to 15 seconds after that. Therefore, the PIC asked the FO to say “ABL141, READY.” The local controller answered that he had instructed the aircraft to hold short of the runway. In reply, the PIC said “SORRY.” This did not mean that they had made a mistake. The word “SORRY” was meant to express their involvement in the situation of disrupted traffic by the go-around of the arrival aircraft. The PIC thought that there were problems with communication and he said “SORRY” for that.

Later when the aircraft executing a go-around appeared fairly away, HL7517 received a takeoff clearance. It was on time as far as the schedule is concerned.

The PIC flew to Fukuoka Airport roughly twice a month. As the intersection departure from W8 was his first experience, he did a performance check for the departure. He interpreted that the air traffic controller instructed the intersection departure to expedite takeoff by considering the air traffic.

If the FO’s read-back had been made (by pressing the press-to-talk button) before the end of the transmission from the local controller, the last part of the transmission might have been (cut and) inaudible. The instruction “HOLD SHORT” was not heard for some reasons.

(2) FO of HL7517

The FO was asked by the ground controller whether the intersection departure from W8 was acceptable, and upon confirming with the PIC, answered the ground controller that they would accept it. Later, HL7517 entered parallel taxiway B4 and changed to the local controller’s frequency near W8.

In response to the local controller’s instruction “VIA W8 RUNWAY 34,” the FO read back verbatim “VIA W8 RUNWAY 34.” The local controller mentioned neither “HOLD SHORT” nor “LINE UP.”

Spotting an aircraft about 4 nm away on final, HL7517 entered the runway from W8. Considering the ATC characteristic at Fukuoka Airport – landing clearances are often issued to an aircraft even at 1,000 ft or below, HL7517 entered the runway without doubt when it heard “VIA W8 RUNWAY 34.” The FO thought that the local controller was trying to put HL7517’s takeoff from W8 prior to other aircraft’s landing.

HL7517 waited for a takeoff clearance on the runway, but no clearance was issued. Therefore, the FO confirmed with the local controller following the direction of the PIC. The controller replied to the effect that the instructions “HOLD SHORT” had been issued.

Later, the controller made the approaching aircraft go around, and then the takeoff clearance was issued.

During the time mentioned above, radio transmission went on without noise or hearing difficulty.

If “HOLD SHORT” instruction had received, they would have never entered the

runway. Such an instruction as runway entry before takeoff is always confirmed by both PM and PF. Therefore, the FO firmly believes that if he had heard "HOLD SHORT," he should have read it back and conveyed it to the PIC.

(3) Flight Crewmembers of JA8998

The flight crew requested a prioritized ATC handling because one of their passengers needed urgent medical treatment, and obtained high speed approach and priority landing permissions from ATC. JA8998 maintained higher speed than usual on final approach. Later, approach lights, runway edge lights and other lights came into sight at about 900 ft. After a little while, it received a go-around instruction from the local controller, saying something like, "GO AROUND, TRAFFIC ON THE RUNWAY." The flight crew recalled that they had received a landing clearance from the local controller before spotting the approach lights, then the runway edge lights.

Snow was whipping across the windshield on final approach under the poor weather condition. Following the go-around instruction from the local controller, the flight crew initiated the go-around procedures. When the aircraft began to climb, they saw flashing lights of an aircraft on the runway.

After landing, JA8998 vacated the runway at taxiway E1 and parked at Spot 1. An ambulance was standing by to receive a patient through the aft right door called R2.

2.1.3 Statements of Air Traffic Controllers

When HL7517 requested the taxiing instruction, visibility was not quite good. The ground controller asked HL7517 about possibility of the intersection departure from W8, because it could avoid the crossing of the runway and passing of the glide path hold line (GP Hold Line) which affect approaches of arrival aircraft (See 2.5 (2) for the detail).

JA8998 made an initial contact near the point HARRY (about 12 nm from Fukuoka Airport) on final approach. At that time, the local controller received a flight progress strip of HL7517 from the ground controller and was told that the intersection departure from W8 had been instructed to the aircraft.

Since the local controller had already issued a landing clearance to JA8998, he instructed HL7517 to "HOLD SHORT OF RUNWAY VIA W8," and then to "REPORT WHEN READY." If the local controller had found the read-back from HL7517 questionable, he would have responded with a confirmation. But he actually did not take any action, because nothing questioned him. The radio communication and its timing with other aircraft did not hinder the reception of the read-back from HL7517.

The local controller provided weather information to JA8998 seeing the general picture: JA8998 on final approach, and other departing and approaching aircraft. Because HL7517 did not stop short of the runway and entered the runway, the local controller instructed JA8998 to go around.

After giving the go-around instruction to JA8998, the local controller was asked by HL7517 whether it could take off. The local controller answered saying "NEGATIVE," and "I TOLD YOU, HOLD SHORT OF RUNWAY VIA W8." HL7517 simply replied "SORRY." The local controller did not feel the hurriedness or changed tone of voice in the reply. HL7517's crew said something like "I HEARD LINE UP."

The traffic condition before and after the serious incident was not very heavy: two or three aircraft for domestic departures on the east side of the runway and sole international departure,

HL7517, on the west side of the runway.

When the incident occurred, the weather condition at the airport was visual meteorological conditions (VMC). Poor visibility by snowfall made the airport runway operation take a special procedure in which an international departure aircraft, except an intersection departure, took W8, crossed the runway, taxied to E12 via and A7, to use the full length of the runway, because B6, on which GP Hold Line is installed, is not used in order to protect the glide path emission for runway 34 landing.

Considering the timing of the communication transfer from the ground controller to the local controller, the local controller thought that HL7517 had not heard the landing clearance for JA8998.

The local controller thought the wording "HOLD SHORT OF...VIA" was used by other controllers and an intersection departure was instructed with the word "VIA."

This serious incident occurred around 11:34 on December 26, 2010 and the location was on runway 34, Fukuoka Airport, about 2.4 nm (about 4.5 km) from JA8998.

(See Figure 1: Estimated Taxiing Route, Figure 2: DFDR Records of HL7517, Attachment 1: ATC Communication Transcript)

2.2 Personnel Information

2.2.1 Flight Crew

(1) PIC of HL7517	Male, Age 61	
Airline Transport Pilot Certificate (Airplane)		February 25, 2008
Type rating for Boeing 737		January 16, 1989
Class 1 Aviation Medical Certificate		
Valid until		June 30, 2011
Total flight time		18,328 hr 18 min
Flight time in the last 30 days		59 hr 10 min
Total flight time on the type of aircraft		7,035 hr 45 min
Flight time in the last 30 days on the type of aircraft		59 hr 10 min
(2) FO of HL7517	Male, Age 43	
Commercial Pilot Certificate (Airplane)		September 25, 2009
Type rating for Boeing 737		September 25, 2009
Class 1 Aviation Medical Certificate		
Valid until		April 30, 2011
Total flight time		4,502 hr 57 min
Flight time in the last 30 days		46 hr 20 min
Total flight time on the type of aircraft		644 hr 03 min
Flight time in the last 30 days on the type of aircraft		46 hr 20 min
(3) PIC of JA8998	Male, Age 39	
Airline Transport Pilot Certificate (Airplane)		August 13, 2008
Type rating for Boeing 737		December 22, 2000
Class 1 Aviation Medical Certificate		
Valid until		January 20, 2011
Total flight time		5,887 hr 08 min
Flight time in the last 30 days		40 hr 33 min

Total flight time on the type of aircraft	5,523 hr 23 min
Flight time in the last 30 days on the type of aircraft	40 hr 33 min
(4) FO of JA8998	Male, Age 29
Commercial Pilot Certificate (Airplane)	January 24, 2007
Type rating for Boeing 737	October 9, 2008
Class 1 Aviation Medical Certificate	
Valid until	June 2, 2011
Total flight time	1,341 hr 16 min
Flight time in the last 30 days	51 hr 00 min
Total flight time on the type of aircraft	1,080 hr 26 min
Flight time in the last 30 days on the type of aircraft	51 hr 00 min

2.2.2 Air Traffic Controller

(1) Local controller	Male, Age 50
Air Traffic Controller Qualification Certificate	
Aerodrome control service	September 1, 1994
Fukuoka Aerodrome Control Facility	July 17, 2001
Medical Certificate	
Valid until	June 30, 2011
Aviation Control English Language Proficiency Certificate	
Valid until	March 4, 2011

2.3 Meteorological Information

The aviation weather observations at Fukuoka Airport were as follows:

11:30	Wind direction 280°, Wind velocity 10 kt, Wind direction variable 220° to 320°
	Visibility Over 10 km, Snow shower
Cloud: Amount	1/8, Type Cumulus, Cloud base 1,000 ft
	Amount 5/8, Type Cumulus, Cloud base 2,500 ft
	Amount 7/8, Type Cumulus, Cloud base 3,000 ft
Temperature	4 °C, Dew point -2 °C
Altimeter setting (QNH)	29.87 inHg

2.4 Communications

At the time when this serious incident occurred, the condition of radio communication between the air traffic control tower and HL7517 or JA8998 was normal.

2.5 Information about Aerodrome and Ground Facilities

(1) Runway

Fukuoka Airport has a runway (16/34) with a length of 2,800 m and a width of 60 m sandwiched by a parallel taxiway A, Domestic Terminal and a control tower to the east; and a parallel taxiway B and International Terminal to the west. At the time of the occurrence of this serious incident active runway was 34.

(2) W8

The GP Hold Line is installed on B6 to avoid interference on ILS course signal by a departing aircraft from the International Terminal, which intends to use the full length of

runway 34. W8 is used for intersection departures (the remaining runway length is published on AIP); or when an aircraft uses runway full length, not by crossing the GP Hold Line but by crossing the runway, taxiing to the end of the runway via E10 and parallel taxiway A7.

(3) Stop Bar System

At Fukuoka Airport, the stop bar system is installed to indicate the place where taxiing aircraft must stop, which comprises of stop bar lights, runway guard lights, taxiway centerline lights and a control panel. At the time of the occurrence the system was not in operation, because the situation then didn't meet the operational criteria.

(4) Airport Surface Detection Equipment (ASDE)

At Fukuoka Airport, ASDE has been installed to monitor aircraft and vehicles on the ground. But it was out of operation then because hardware upgrading was in progress.

The magnetic heading, the ground speed, the brake pressure and other data recorded on the DFDR was used to generate the ground track of HL7517 due to the absence of preciseness of latitude and longitude data, and ADSE record.

2.6 Information on DFDRs and Cockpit Voice Recorders

HL7517 was equipped with a DFDR (parts number: 980-4700-033) made by Honeywell of the United States of America and a Cockpit Voice Recorder (CVR) (parts number: 2100-1020-00) made by L3 Communications of the United States of America, while JA8998 a DFDR (parts number: 980-4700-033) and a CVR (parts number: 980-6022-001), both made by Honeywell.

The records at the time of the occurrence of this serious incident were stored on both aircraft's DFDRs with a maximum recording time of 25 hr or more. But the records on their CVRs with a maximum recording time of 2 hr had been overwritten, because both aircraft continued service for several flights after the serious incident. Therefore, the records at the time of the serious incident were not available.

Meanwhile, the time data on both aircraft's DFDRs was corrected by correlating the VHF transmission keying signals on the DFDRs with NTT time signals on the ATC communication records.

2.7 Additional Information

2.7.1 ATC Phraseology

(1) Holding Short of Runway

The following is the phraseology described in paragraph 2 ATC Clearance etc. (6) a, (III) Aerodrome Control Procedure, III Standards for Air Traffic Control Procedure (hereinafter referred to as "Standards for ATC Procedure"), Fifth Air Traffic Control Services Procedure Handbook, Air Traffic Service Procedure Handbook, which has been established by the Civil Aviation Bureau (CAB) of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT):

HOLD SHORT OF RUNWAY [number]. ([traffic information])

(2) Instructions for Taxiing

Followings are phraseologies described in paragraph 4 Taxiing (1) a, (III) Aerodrome Control Procedure, Standards for ATC Procedure, International Civil Aviation Organization (ICAO) Doc. 4444 The Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM) (hereinafter referred to as "the ICAO DOC") and FAA ORDER

JO 7110.65T (hereinafter referred to as “FAA ORDER”) as well as Chapter 3 AIRPORT TRAFFIC CONTROL (제3장항공교통관제) - Terminal (터미널) (hereinafter referred to as “ the ATC Procedure of the Republic of Korea”), ATC PROCEDURE (항공교통관제절차)

	Standards for ATC Procedure	ICAO DOC	FAA ORDER	ATC Procedure of the Republic of Korea
Holding instruction	<i>HOLD SHORT OF [location]. ([traffic information])</i>	<i>HOLD SHORT OF [position]</i>	<i>HOLD SHORT OF [location], ([traffic information])</i>	<i>HOLD SHORT OF ([runway number/location])</i>
	<i>HOLD ON [location]. ([traffic information])</i>	<i>Hold [distance] FROM [position]</i>	<i>HOLD ON [taxi strip, run up, pad]. ([traffic information])</i>	<i>HOLD ON (taxi strip, run-up pad, etc.)</i>
			<i>HOLD AT [specific point]. ([traffic information])</i>	
Instructions about taxiing route	<i>TAXI VIA [route]</i>	<i>TAXI VIA [identification of taxiway]</i>	<i>TAXI VIA [route]</i>	<i>TAXI VIA [route]</i>
	<i>TAXI ON [taxiway]</i>	<i>TAXI VIA RUNWAY [number]</i>	<i>TAXI ON [runway number/taxiway]</i>	<i>TAXI VIA (runway/taxiway number, etc.)</i>
	<i>TAXI TO [location/intersection designator]</i>	<i>TAKE/TURN FIRST/SECOND LEFT/RIGHT</i>	<i>TAXI TO [location]</i>	<i>TAXI TO (position)</i>
	<i>TAXI [direction]</i>		<i>TAXI [direction]</i>	<i>TAXI [direction]</i>
			<i>TAXI ACROSS RUNWAY [number]</i>	<i>TAXI ACROSS RUNWAY [number]</i>
			<i>TAXI TO RUNWAY [number] VIA [route]</i>	<i>TAXI VIA [route], HOLD SHORT OF (location)</i>

(3) Holding on Runway

Following phraseologies are stipulated in paragraph 2 ATC Clearance etc. (3) a, (III) Aerodrome Control Procedure, Standards for ATC Procedure:

RUNWAY [number] LINE UP AND WAIT. ([traffic information])

RUNWAY [number] AT [intersection designator], LINE UP AND WAIT. ([traffic information])

Following phraseologies are stipulated in 3-9-4 (Taxi Into Position And Hold: TIPH)

(이륙위치에서의 대기), the ATC Procedure of the Republic of Korea:

LINE UP [AND WAIT].

LINE UP RUNWAY (활주로번호 : runway number)

(4) Instructions for Taxiing and Holding Combined

There are no descriptions in Standards for ATC Procedure. But following descriptions are stipulated in FAA ORDER 3-7-2 TAXI AND GROUND MOVEMENT OPERATIONS, Clause a and 3-7-2 “Taxi and Ground Movement Operation(지상활주 및 지상운행)” in the ATC Procedure of the Republic of Korea, and the both provisions are almost the same in contents.

3-7-2 TAXI AND GROUND MOVEMENT OPERATIONS (FAA ORDER)

a. (Omitted) *If it is the intent to hold the aircraft/vehicle short of any given point along the taxi route, issue the route, and then state the holding instructions.*

3-7-2 Taxi and Ground Movement Operation (지상활주 및 지상운행)

(ATC Procedure of the Republic of Korea)

(Omitted) *As far as the taxiing route is concerned, when it is the intent to hold the aircraft/vehicle at any given point, issue the necessary route, and then state the holding instructions.*

((Omitted) *지상활주 경로를 따라 어느 지정된 지점에서 항공기나 차량을 대기시키하고자 할 때에는, 필요시 경로를 통보하고 대기지시를 발부한다.*)

2.7.2 Intersection Departure

Procedures are stipulated in paragraph 2 ATC Clearance etc. (2), (III) Aerodrome Control Procedure, Standards for ATC Procedure as follows:

(2) *Intersection departures shall be handled as follows:*

a. *When the air traffic controller intends to have an aircraft take off with the given procedure described on AIP and other documents or when an agreement has been obtained from the pilot, the intended intersection shall be issued.*

(Example) *All Nippon 843, do you accept C8N intersection departure?*

All Nippon 843, we accept C8N.

All Nippon 843, taxi to C8N.

b. *When an aircraft requests an intersection departure, it can be authorized depending on the traffic condition.*

* *[Intersection designator] INTERSECTION DEPARTURE APPROVED.*

c. *When the pilot who takes off with the given procedure requests information about the remaining length from the intersection where the takeoff roll starts to the runway end, the information shall be provided. (Omitted)*

* *RUNWAY [number] AT [intersection designator] INTERSECTION DEPARTURE [remaining length] METERS / FEET AVAILABLE.*

2.7.3 Procedure for Glide Path Hold Line

Procedures are stipulated in paragraph 4 Taxiing (4), (III) Aerodrome Control Procedure, Standards for ATC Procedure as follows:

(4) *Procedures for the glide path hold line shall be as follows:*

(a) *In case of having an aircraft taxi beyond the glide path hold line, instruct it to cross the line.*

**CROSS GP HOLD LINE (necessary instruction or clearance) (traffic information)*
(Omitted)

- (b) *When there is an arriving aircraft cleared for an ILS approach with the weather conditions of cloud ceiling 800 ft or more, and ground visibility 3,200 m or more, after instructing an aircraft to cross the glide path hold line, inform the arriving aircraft which has started the ILS approach without delay that the precision of the glide slope signal is not ensured.*

** GLIDE SLOPE SIGNAL NOT PROTECTED. (traffic information)*

- (c) *When an arriving aircraft conducting an ILS approach has passed the approach gate with the weather conditions of cloud ceiling 800 ft or less, or ground visibility of 3,200 m or less, do not instruct the aircraft to cross the glide path hold line. However, this shall not apply when the arriving aircraft has reported runway in sight. In this case, inform the arriving aircraft that the precision of the glide slope signal is not ensured.*

2.7.4 Manuals of Air Busan Co., Ltd.

Flight Operations Manual (FOM) stipulates the followings in Chapter 2 Operations Policy:
(Omitted)

2.4.2 Clearance Awareness

- b. *It is very important to receive ATC instruction/clearance accurately for smooth Air Traffic flow and Near Miss prevention. When there is any conflict on ATC instruction/clearance within PF, PM or Supportive Flight Crew, make sure to confirm with ATC.*

Ex: "Seoul Approach, AIRBUSAN 8803, Confirm Heading 270 or Say again (Heading/Altitude)"

(Omitted)

- d. *Some important clearance from ATC such as Runway Crossing or Hold Short instruction must be fully Read Back.*

1) ATC: "AIRBUSAN 8803, Hold short of runway 33L"

2) PM: "AIRBUSAN 8803, Holding short of runway 33L"

3) PF: "Holding short (of runway) 33L"

2.7.5 Operation of Stop Bar System

- (1) Fukuoka Airport Office has established the Work Processing Procedures and it contains the operation of the stop bar system as follows:

(Omitted)

1. The stop bar system shall be operated when runway 34 is in use.

2. The stop bar system shall be operated when the RVR is 600 m or less, or when considered necessary by the air traffic controller.

3. The stop bar system shall be controlled along with instructions or clearances for aircraft to enter or cross the runway.

4. Controllable stop bar lights are installed on E-10, E-11, E-12, W-8 and W-9 for departure; and at W-8 and E-10 for runway crossing.

- (2) Paragraph 5.3.19, Chapter 5 in Annex 14 to the Convention on International Civil Aviation contains the following descriptions about the stop bar system:

Application

Note 1. – (Omitted)

Note 2. – Runway incursions may take place in all visibility or weather conditions. The provision of stop bars at runway-holding positions and their use at night and in visibility conditions greater than 550 m runway visual range can form part of effective runway incursion prevention measures. (Omitted)

2.7.6 Notice to Controllers on Read-Back Confirmation

The Director General, CAB issued notices to air traffic controllers after the series of incidents occurred at Osaka International Airport on September 6 and October 5, 2007 and a serious incident at Kansai International Airport on October 20, the same year. The contents of the notices are as follows:

- (1) Air traffic controllers should remind themselves of the importance of confirming a read-back and pay full attention to read-back errors and at the same time, when necessary, take such actions as correction and reconfirmation. (A notice about a thorough implementation of the confirmation of pilot read-backs in air traffic control, dated on October 22, 2007)
- (2) Not only when a read-back is incorrect but also when it is ambiguous, vague or doubtful, air traffic controllers should confirm it without fail.

When issuing an ATC instruction or a clearance, air traffic controllers, under some circumstances, should be aware that providing relevant traffic information may facilitate pilots' understanding of the situation regarding the instruction or the clearance. In particular, because the ATC instructions "HOLD SHORT OF RUNWAY" will result in safety problems if there is a discrepancy in mutual understanding, air traffic controllers should positively provide information about arrival aircraft or other aircraft. (A notice about read-back confirmation and providing information regarding ATC instructions, dated on October 31, 2007)

2.7.7 English Proficiency

The flight crew of HL7517 and the local controller had English language proficiency levels for radiotelephony communication as required by ICAO and the CAB, Japan.

3. ANALYSIS

3.1 General

3.1.1 Airman Competence Certificate

The PICs and the FOs of both HL7517 and JA8998 held valid airman competence certificates and valid aviation medical certificates.

3.1.2 Air Traffic Controller Competence Certificate and Others

The local controller held a valid air traffic controller competence certificate and a valid medical certificate.

3.1.3 Relations to Meteorological Phenomena

It is highly probable that the meteorological condition at the time of this serious incident had no bearing on the occurrence of this case.

3.2 Analysis

3.2.1 Radio Communication between HL7517 and Local Controller

Judging from the statement described in 2.1.2 (2), it is probable that the radio communication between HL7517 and the local controller was good at the time of the occurrence of this serious incident. In the statement described in 2.1.2 (1), the PIC of HL7517 recalled, “if the FO’s read-back had been made before the end of the transmission from the local controller, it might have caused the last part of the transmission to be (cut and) inaudible,” and the absence of the HL7517’s CVR records at the time of the serious incident made it impossible to confirm how the ATC transmission was received in the cockpit.

However, the ATC Communication Transcript in Attachment 1 shows that in response to the local controller’s instruction at 11:33:14 “ROGER, HOLD SHORT OF RUNWAY 34 VIA W8,” HL7517 read back the second half of the instructions “RUNWAY 34 VIA W8, ABL141” at 11:33:17. Therefore, HL7517 did not start the read-back before the end of the local controller’s transmission.

Judging from the facts that the ATC communication records contain a clicking noise which indicates the end of transmission had been left just after the response “ABL141, READY” at 11:33:13; and the DFDR records of HL7517 as shown in Figure 2, indicate that the VHF transmission keying signal of the aircraft had been off when the local controller issued the instructions “ROGER, HOLD SHORT OF RUNWAY 34 VIA W8,” it is probable that there is no possibility that the local controller transmitted before the end of the transmission of HL7517.

The phrase “HOLD SHORT OF” was clearly recorded in the ATC communication records.

These facts prove that the instruction “HOLD SHORT OF” from the local controller was received by HL7517.

3.2.2 Developments Up to Go-around Instruction from Local Controller to JA8998

(1) HL7517’s Awareness about Landing Clearance for JA8998

As the description in 2.1.1 and the statement in 2.1.3 indicate, a landing clearance for JA8998 had been issued before HL7517 established communication with the local controller. Therefore, HL7517 was not aware of the issuance of the landing clearance for JA8998.

(2) Inquiry about Possibility of Intersection Departure

According to the statement in 2.1.2 (1), the PIC of HL7517 had no experience of the

intersection departure from W8 before. Therefore, it is probable that he interpreted the inquiry from the ground controller about the possibility of the intersection departure as one of the means of speeding his departure.

(3) Confirmation of Readiness for Departure

As described in the ATC Communication Transcript in Attachment 1, just before the local controller issued the instruction “HOLD SHORT OF RUNWAY 34 VIA W8,” the local controller called HL7517 saying “REPORT WHEN READY” to confirm whether its preparations for departure had been completed. It is probable that this was intended to let HL7517 depart without delay after the arrival of JA8998, this inquiry conversely gave the PIC of HL7517 a strong interpretation that the local controller was trying to speed his departure.

(4) Awareness of HL7517 Flight Crew

After the local controller’s instruction “HOLD SHORT OF RUNWAY 34 VIA W8,” the HL7517 flight crew did not read back the first half of the instruction “HOLD SHORT OF,” though it was an important phrase which must be read back, as indicated in the statements in 2.1.2 (1) and (2) as well as in the description in 2.7.4. Therefore, it is highly probable that they did not interpret it as the instructions of holding and as a result, their awareness was focused only on the second half “RUNWAY 34 VIA W8.”

It is probable that when this serious incident occurred, the PIC believed that the departure had been speeded as described in 3.2.2 (2) and (3), while, according to the statement in 2.1.2 (2), the FO interpreted that the local controller had the intention of departing HL7517 before the landing of JA8998.

Therefore, it is probable that the flight crew of HL7517 became certain that they had obtained a clearance to enter the runway by interpreting “RUNWAY 34 VIA W8” as “(LINE UP AND WAIT or TAXI INTO POSITION AND HOLD) RUNWAY 34 VIA W8.”

In response to the local controller’s instruction, HL7517 read back only “RUNWAY 34 VIA W8.” If HL7517 read back with correct ATC phraseology out of firm belief that it had obtained the clearance to enter the runway, the local controller could have a chance to find the error.

ATC communication is the essential part of ensuring the safety of air traffic. The flight crew of HL7517 should have carefully listened to the ATC instruction and read it back with correct ATC phraseology.

(5) Read-back Confirmation by Local Controller

As described in 2.1.1, when the local controller issued the instruction “HOLD SHORT OF RUNWAY 34 VIA W8,” the FO of HL7517 read back only the second half “RUNWAY 34 VIA W8,” and the local controller failed to confirm the read-back. Therefore, it is highly probable that the local controller believed without a doubt that HL7517 would hold short of the runway at W8 as instructed.

Upon hearing a read-back an air traffic controller compares what he or she instructed with the read-back to confirm that they are the same, and this must be done without fail. In this serious incident, “HOLD SHORT OF” was the phrase to mean the instruction of holding. The local controller shouldn’t have failed to confirm whether this phrase had been included in the read-back.

Depending on the situation, it is effective to provide necessary information such as an incoming aircraft on final approach.

Air traffic controllers were, as describe in 2.7.6, urged to remind themselves of the need to confirm their read-back in October 2007. The CAB has to take another set of measures to make sure that the read-back is carried out without exception.

(6) Entering the Runway

The DFDR records of HL7517, indicated in Figure 2, shows that HL7517 entered the runway without stopping.

(7) Go-around instructions to JA8998

According to the description in 2.1.1 and the statement in 2.1.3, the local controller provided weather information to JA8998 at 11:33:32 and when he visually swept across the airport, he realized that HL7517 had entered the runway and instructed JA8998 to go around at 11:34:08. According to the DFDR records of HL7517 shown in Figure 2, HL7517 turned its nose to the right once at 11:33:44 to enter the runway from W8 before making a left turn and then, aligned itself with the runway center line for takeoff at 11:34:11. Therefore, this fact indicates it was shortly after HL7517 passed the hold line that the local controller realized its incursion into the runway.

3.3 ATC Phraseology

The local controller issued the instruction “HOLD SHORT OF RUNWAY 34 VIA W8” to HL7517 in order to have it hold short of the runway, but “VIA” as a word to show the taxiing route was used along with an ATC phraseology for the holding instruction, rather than clearly indicating a specific position for holding by using “ON” or “AT” as described in 2.7.1 (2). The word used probably served to help the flight crew of HL7517 to misinterpret that they have obtained a clearance to enter the runway.

Instructions intermingled with taxiing and holding should be avoided, and should be issued in accordance with Standards for ATC Procedure and if needs be, traffic information should be added for better understanding.

When a situation requires both taxiing and holding instructions, as described in 2.7.1 (4), route instruction should be issued first followed by a holding instruction.

3.4 Severity of This Serious Incident

When JA8998 executed a go-around and started climbing, its distance from HL7517 was about 1.3 nm (about 2.4 km) as described in 2.1.1. According to the statement in 2.1.2 (3), it is highly probable that the flight crew of JA8998 visually recognized HL7517 on the runway when they saw the aircraft’s flashing lights.

The ICAO severity judgment tool dictates that this serious incident falls under the category C – An incident characterized by ample time and/or distance to avoid a collision, which is stipulated in the severity classification scheme for this serious incident, Manual on the Prevention of Runway Incursions of ICAO (Doc 9870).

(See Attachment 2: Classification of the Severity of Runway Incursions)

3.5 Support Systems

As described in 2.7.5 (2), the use of the stop bar system can be considered to be effective means of preventing runway incursions, regardless of the weather condition and other factors.

Furthermore, the Runway Status Lights System (RWSL^{*2}) has also been developed for automated visual support to pilots and ground vehicle operators without air traffic controllers' involvement. Therefore, it is desirable that the CAB actively introduces these new support systems.

^{*2} RWSL is a system which automatically illuminates runway entrance lights and takeoff hold lights by detecting the positions of aircraft and vehicles based on inputs from radar and other various surveillance sensors independent of air traffic controllers' instructions, in order to prevent runway incursions for takeoff or runway crossing and erroneous departures while another aircraft is crossing the runway.

4. PROBABLE CAUSES

It is probable that this serious incident occurred because the flight crew of the departing aircraft (HL7517), to which the local controller instructed to hold short of the runway, failed to recognize part of the instruction and misinterpreted that they had obtained a clearance to enter the runway, while the local controller did not confirm the read-back of the instruction, resulting in a situation where HL7517 entered the runway, causing the arriving aircraft (JA8998) which had earlier obtained a landing clearance from the same controller to attempt to land on the same runway.

Probable contributing factors to the misinterpretation of the HL7517 flight crew that they obtained a clearance to enter the runway are as follows:

- (1) There was an inquiry about the possibility of an intersection departure.
- (2) HL7517 was urged to confirm whether preparations for departure were completed just before the holding instruction.
- (3) The flight crew of HL7517 had thought that the controller was trying to have them depart before the landing of incoming JA8998.
- (4) The holding instruction included an ATC phraseology which indicates a taxiing route.

5 ACTIONS TAKEN

5.1 Actions taken by Fukuoka Airport Office

After the occurrence of this serious incident, the Fukuoka Airport Office of the Osaka Regional Civil Aviation Bureau, MLIT notified its air traffic controllers to reconfirm the following matters on holding instructions:

The paragraph 2 ATC Clearance etc. “Holding Short of the Runway,” (III) Aerodrome Control Procedure, Standards for ATC Procedure, stipulates that “HOLD SHORT OF RUNWAY [number]” is the phraseology which must be used when instructing an aircraft to hold short of the runway. The paragraph 4 Taxiing “Instructions with Regard to Taxiing,” stipulates that “HOLD ON [location]” and “HOLD SHORT OF [location]” is the phraseology which must be used when instructing an aircraft to hold at a specific location. When using “AT” or “VIA” in addition to an instruction for holding short of the runway, the term may cause the pilot’s misinterpretation that a clearance to enter the runway has been obtained, because they are used as part of an intersection departure instruction or taxi instruction indicating routes.

In order to prevent pilots’ misinterpretation, instructions shall be issued in accordance with Standards for ATC Procedure and at the same time, when an air traffic controller instructs an aircraft to hold short of the runway, he or she shall actively provide it with traffic information.

* ATC phraseology to be used when instructing an aircraft to hold.

HOLD SHORT OF RUNWAY [number]

HOLD SHORT OF [location]

HOLD ON [location]

5.2 Actions taken by CAB

- (1) A study group on measures to prevent runway incursions had discussions from 2007 to 2008, and recommended to create a guidance manual for ATC communication to fill the communication gap between air traffic controllers and pilots. In response to this recommendation, the CAB, MLIT brought out the ATC Communication Handbook and distributed them to air traffic controllers as a guideline for ATC communication in order to prevent runway incursions and improve ATC services on the whole. (An office circular, dated April 19, 2011)
- (2) The CAB also amended AIP to add pilots’ read-back procedures in response to ATC clearances, ATC instructions and ATC approvals, and published this on May 3, 2012, urging pilots to read back holding instructions by using the appropriate phrase, such as “HOLDING” or “HOLDING SHORT OF,” without omitting them. In addition, the CAB revised Standards for ATC Procedure to add a provision about the confirmation of the read-back from pilots. In particular cases where pilots’ read-back on instructions for holding short of the runway lack phrases such as “HOLDING” or “HOLDING SHORT,” or when read-back contents are vague, revised standards require air traffic controllers to confirm pilots’ read-back about the holding instructions. The CAB established new ATC phraseologies to be used on such occasions.

5.3 Actions taken by Air Busan

After the occurrence of this serious incident, Air Busan Co., Ltd. took the following measures:

- (1) The company provided intensive ATC-related training as ground education, reexamined Crew Resource Management (CRM) and clarified the task sharing among crew members.
- (2) The company issued a notice to secure the DFDR and CVR data in case of an accident and/or serious incident.
- (3) The company provided educational programs on basic ATC phraseologies, ordered its flight crew to strictly follow and read back ATC instructions, and reminded them that a predicted operation based on experience or guess is absolutely prohibited.

Figure 2: DFDR Records of HL7517

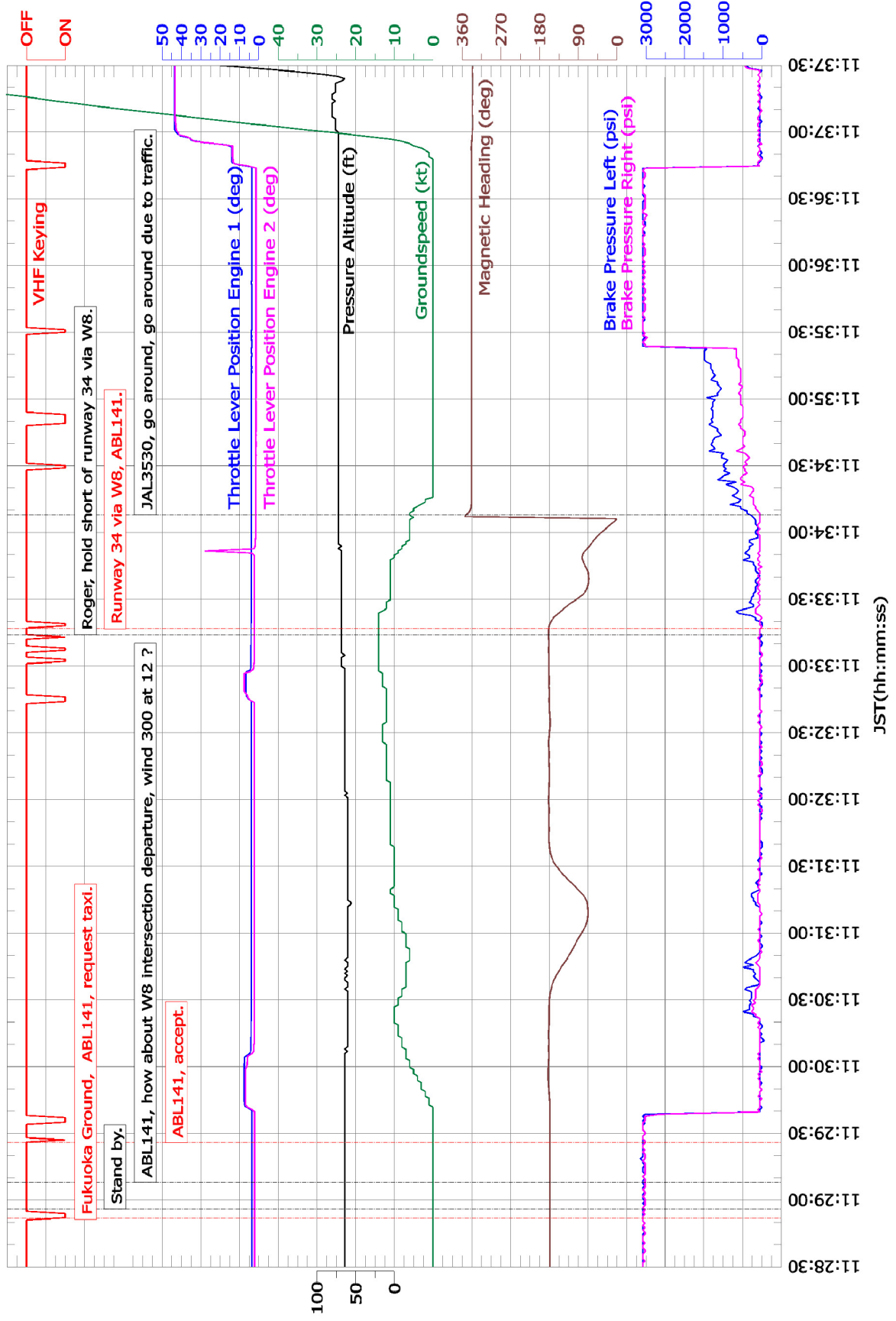
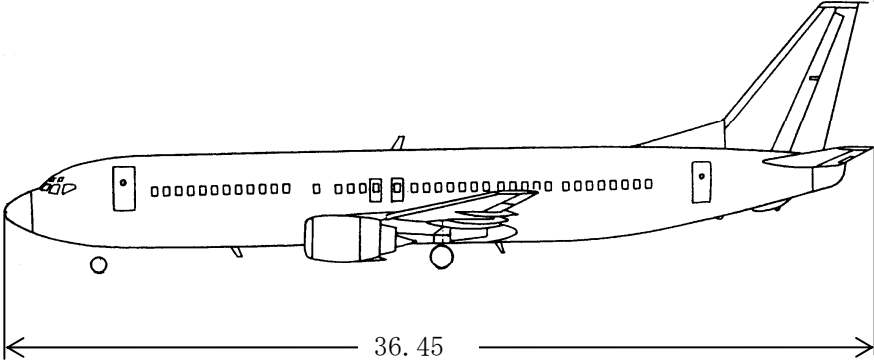
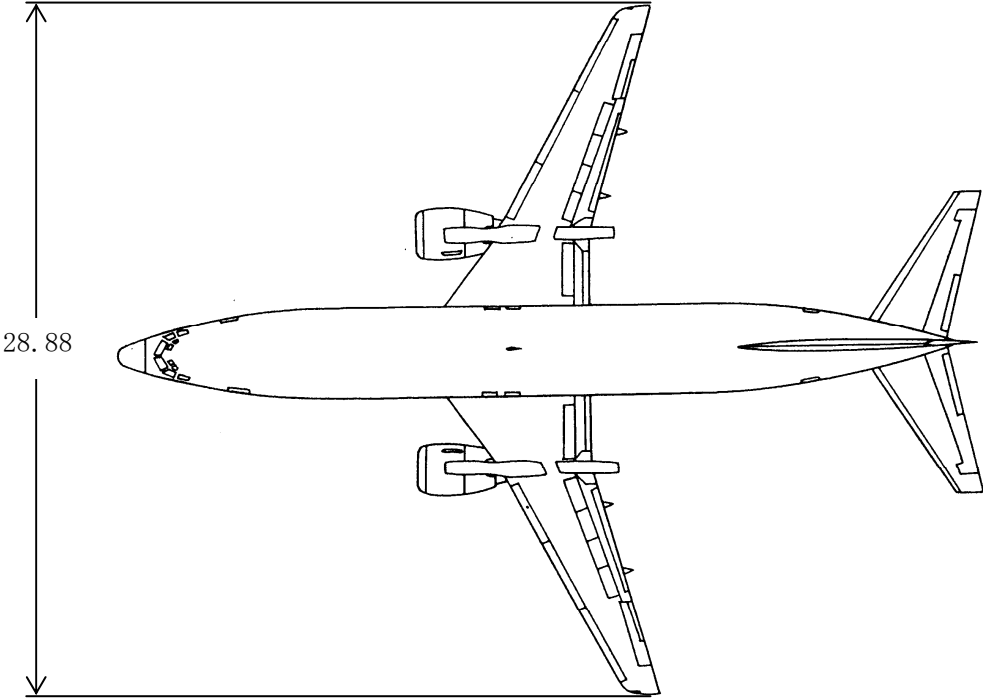
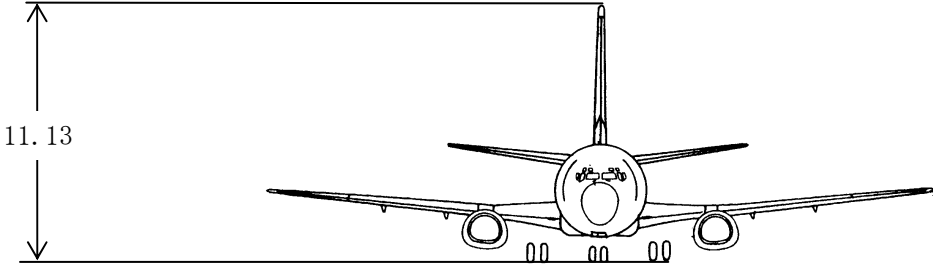


Figure 3: Three angle view of Boeing 737-400

Unit : m



Attachment 1: ATC Communication Transcript

- GND Fukuoka Ground (121.7 MHz) << *Italic* : Communication with Ground >>
- TWR Fukuoka Tower (118.4 MHz) << **Boldface** : Communication with Tower >>
- ABL141 HL7517 (Air Busan 141) : Communication with ABL141
- JAL3530 JA8998 (Japanair 3530)

Time(JST)	Transmitter	Content
11:24:36	ABL141	<i>Fukuoka Ground, ABL141, request push back, spot 56.</i>
11:24:41	GND	<i>ABL141, Fukuoka Ground, push back approved runway 34.</i>
11:24:45	ABL141	<i>Cleared push back runway 34, ABL141.</i>
		(Omitted)
11:28:52	ABL141	<i>Fukuoka Ground, ABL141, request taxi.</i>
11:28:55	JAL3530	Fukuoka Tower, JAL3530, approaching HARRY, information "K", request E1 for vacation, vacate off runway.
11:28:56	GND	<i>Stand by.</i>
11:29:06	TWR	JAL3530, Fukuoka Tower, roger, continue approach.
11:29:08	GND	<i>ABL141, how about W8 intersection departure, wind 300 at 12?</i>
11:29:09	JAL3530	Continue approach, JAL3530.
		(Omitted)
11:29:26	ABL141	<i>ABL141, accept.</i>
11:29:28	GND	<i>Roger, ABL141, taxi via C4, Bravo to W8.</i>
11:29:35	ABL141	<i>Taxi via C4 then Bravo, W8, ABL141.</i>
		(Omitted)
11:32:11	TWR	JAL3530, departure rolling, runway 34, cleared to land, wind 240 at 5 kt, after landing, E1.
11:32:18	JAL3530	Cleared to land, after landing, E1, JAL3530.
		(Omitted)
11:32:39	GND	<i>ABL141, taxi to W8, contact Tower, 118.4.</i>
11:32:44	ABL141	<i>Taxi via W8, contact Tower, 118.4, ABL141.</i>
		(Omitted)
11:33:02	ABL141	Fukuoka Tower, ABL142, with you.
11:33:04	TWR	ABL142, correction, confirm 141?
11:33:07	ABL141	Correction, 141.
11:33:09	TWR	ABL141, Fukuoka Tower, report when ready.
11:33:13	ABL141	ABL141, ready.
11:33:14	TWR	Roger, hold short of runway 34 via W8.
11:33:17	ABL141	Runway 34 via W8, ABL141.
11:33:32	TWR	Wind check, 250 at 5 kt.
11:33:35	JAL3530	Thank you.
11:34:08	TWR	JAL3530, go around, go around due to traffic.
11:34:13	JAL3530	JAL3530, go around.
11:34:28	ABL141	ABL141, confirm cleared for take off?
11:34:31	TWR	ABL141, negative, I said you hold short of runway 34 via W8 due to inbound traffic.
11:34:49	ABL141	I'm sorry, I heard line up.
11:34:54	TWR	JAL3530, climb and maintain 5,000, direct DGC, contact Departure, sorry.
11:35:01	JAL3530	Direct DGC, Departure, JAL3530.
11:35:06	JAL3530	Ah, confirm 5,000?
11:35:08	TWR	5,000, affirm.
11:35:09	JAL3530	5,000, direct DGC, 1197, JAL3530.
11:35:14	TWR	JAL3530, do you ah..., can you take visual approach runway 34? Ah..., enter downwind?
11:35:30	ABL141	Tower, ABL141.
11:35:32	TWR	ABL141, stand by.
11:35:33	ABL141	Roger.
		(Omitted)
11:36:39	TWR	ABL141, wind 320 at 12 kt, runway 34, cleared for take-off, inbound 4 nm.
11:36:43	ABL141	Cleared for take-off runway 34, ABL141, sorry sir.
		(Omitted)
11:37:49	TWR	ABL141, contact departure.
11:37:52	ABL141	Contact departure 119.7, ABL141.
11:37:55	TWR	Good day.

Attachment 2: Classification of the Severity of Runway Incursions

Severity classification defined by the ICAO document "Manual on the Prevention of Runway Incursions (Doc 9870)" is as below.

Table 6-1. Severity classification scheme

<i>Severity classification</i>	<i>Description*</i>
<i>A</i>	<i>A serious incident in which a collision is narrowly avoided.</i>
<i>B</i>	<i>An incident in which separation decreases and there is significant potential for collision, which may result in a time-critical corrective/evasive response to avoid a collision.</i>
<i>C</i>	<i>An incident characterized by ample time and/or distance to avoid a collision.</i>
<i>D</i>	<i>An incident that meets the definition of runway incursion such as the incorrect presence of a single vehicle, person or aircraft on the protected area of a surface designated for the landing and take-off of aircraft but with no immediate safety consequenc</i>
<i>E</i>	<i>Insufficient information or inconclusive or conflicting evidence precludes a severity assessment.</i>

** Refer to Annex 13 for the definition of "incident".*