



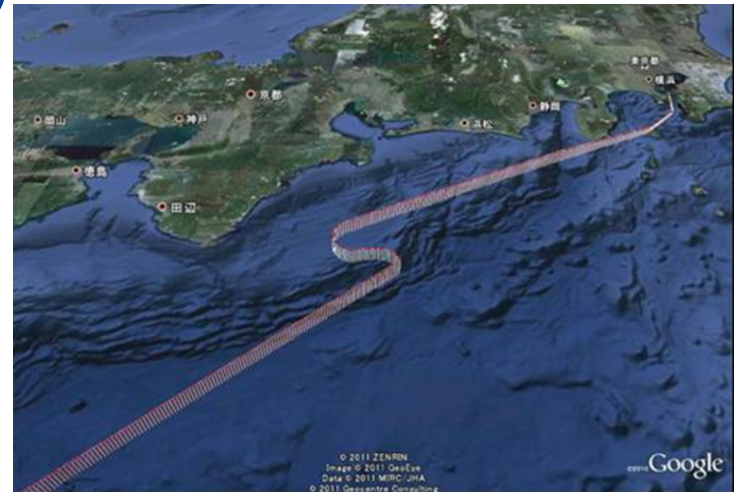
# B737 Left Roll and Dove

ANA

All Nippon Airways

# Narrative

- \* 6 Sep, 2011
- \* NH140 (Operated by Air Nippon)  
B737-700, from Okinawa to Tokyo(Haneda)
- \* FL410 , 23nm south of LHE  
(Hamamatsu)
- \* Cruising at Mach 0.73(ECON 0.77)
- \* VMC, Pitch-dark night

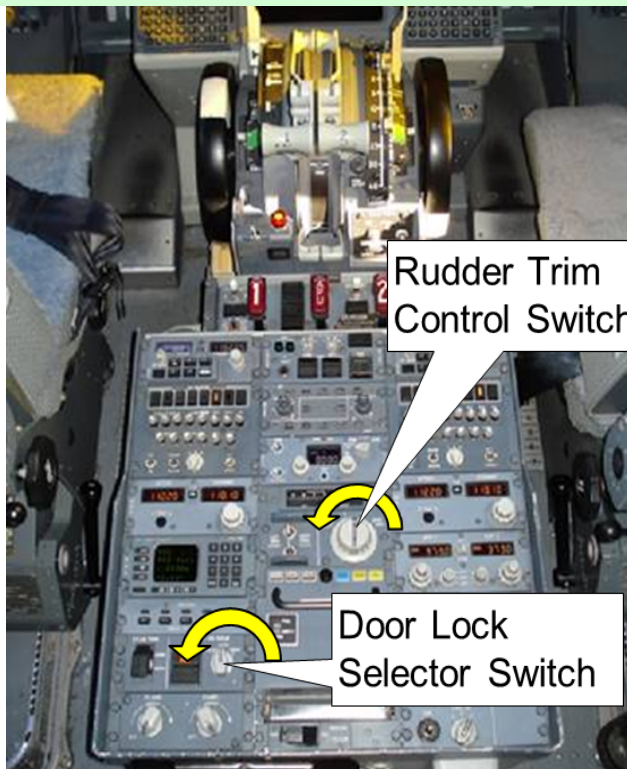


# Narrative

- \* When the Capt. tried to enter the cockpit from his use of restroom, the co-pilot mistakenly operated the rudder trim knob when he actually intended to unlock the door to the cockpit to let the captain back in.
- \* As a result, B737 dived from 41000ft to 34000ft.
- \* Serious Incident

# From Cap exit from the cockpit, to Cop notice the mistake

① While the PIC is out of flight deck for rest room, ATC clears NH140 to proceed direct to TATEYAMA. As PF operated CDU, PF heard PIC knocking on the cockpit door at almost same time. PF then quickly executed CDU command key and reached Cockpit door unlock knob without carefully looking the SW itself.



Switch” instead of “Door unlock switch.  
(Duration: left for 6 sec. ⇒ 2 sec. off ⇒ then  
Duration: left for 6 sec. ⇒ 2 sec. off ⇒ then  
again left for 6 sec.)

③ PF became aware that he made a mistake at the end of total 12 sec. rudder trim movement to the left.

# Action in the cockpit

Captain Exit Cockpit (22:46:47)

Determined Time

ATC; Direct PQE (Tateyama) (22:48:06~09)

Estimated Time

Recognized Door knocked (22:48:20)

Start

CDU Input

Execute (22:48:22)

Start time (22:48:27)

RUD Trim SW Operation

Termination time (22:48:40)

Phase I

Captain knocked cockpit door

Outside of the cockpit

CA Interphone Call

## <Phase II>

### Until Landing at HND airport

- ① At the point where PF became aware he made a mistake, B737 banked to left exceeding  $35^\circ$  triggering warning sound. PF started recovery maneuver 3 sec. after B737 rolled into  $35^\circ$
- ② When PIC returned cockpit, the aircraft was almost stable condition, and PIC quickly took over and now PIC became PF.
- ③ The rest of the flight was normal and landed at Haneda airport.

#### ·Bank Angle:

(Left)  $\Rightarrow 80^\circ \Rightarrow 50^\circ \Rightarrow 131.7^\circ$

#### ·Heading: $052^\circ \Rightarrow 257^\circ$

(CCW  $155^\circ$ diviation)

#### ·**OVERSPEED** Warning

(Mmo.82  $\Rightarrow$  **M.828**)

#### ·**Stall** Warning

#### ·Flight Maneuvering Load

**Acceleration Limits Over**

(MAX2.5G  $\Rightarrow$  **2.68G**)

#### <sup>6</sup>·ALT: 41,000Ft $\Rightarrow$ **34,000Ft**

Note; Autopilot became CWS-R/CWS-P because of added force on CW and losing ALT.

Determined Time

Action in the cockpit

Estimated Time

RUD Trim SW Operation

Start (22:48:27)

Terminate (22:48:40)

CAP entered cockpit (22:50:14)

Recovery Start (22:48:45)

20sec

Tookover the control

(22:50:34) 34,200ft

Roll 80 ° (22:48:47)

Roll 50.4 ° (22:48:49)

Roll 131.7 ° (22:48:55)

Seatbelt signs turned on

Phase I

Phase II

PA

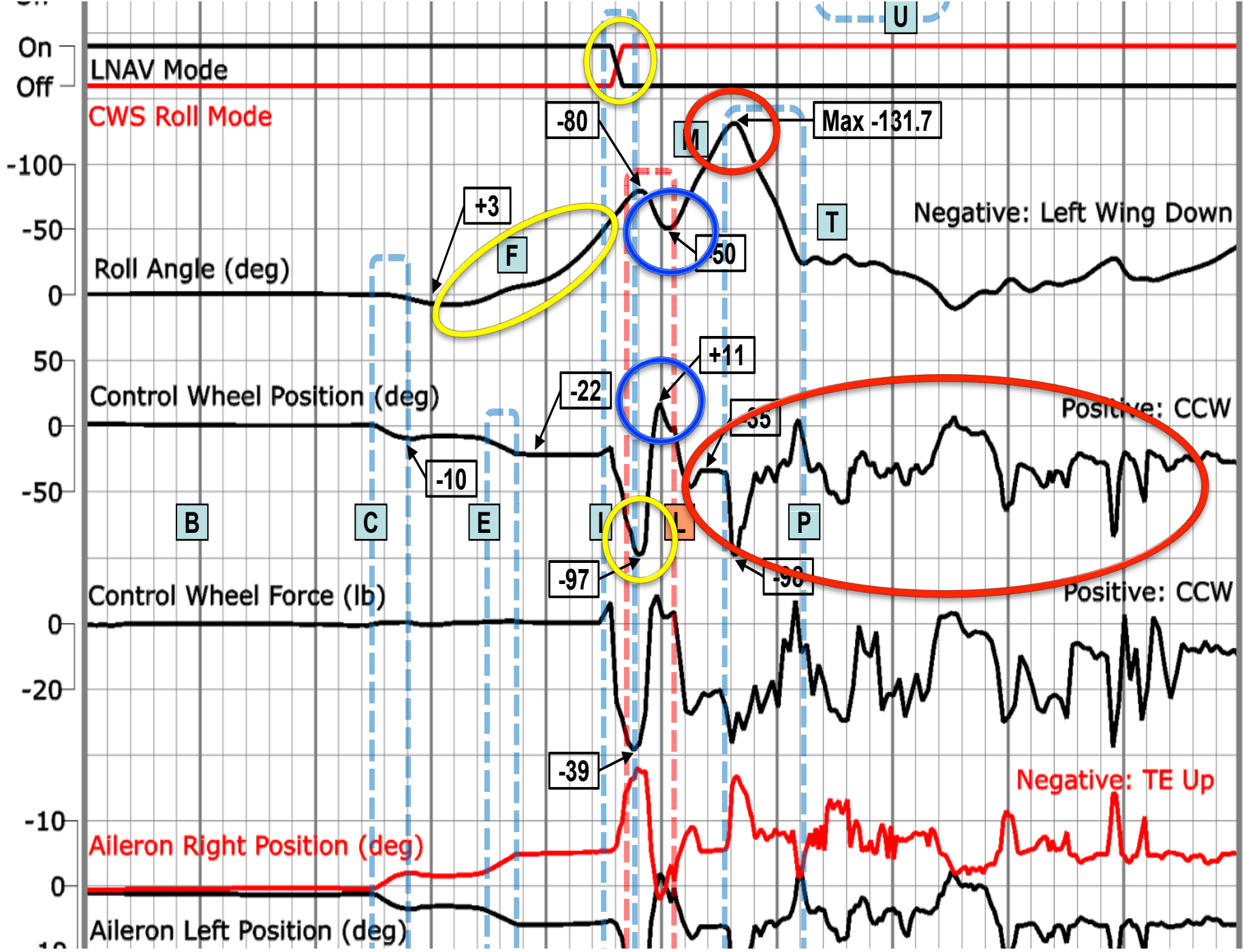
Landing HND

(23:26)

CA numeric keys operated (22:49:25)

Door Open (22:50:10)

Outside of the cockpit





# Probable Cause

① Cop operated rudder switch by mistake

Workload was concentrated at the particular point. (ATC, CDU operation, Outside-watch, etc)

PF's mind (PIC is expecting PF to open the door, First time to be left alone in the cockpit)

② The delay in notice to its erroneous

PF never felt something wrong with the operation (Operating sound, Shape of the SW, Feeling) (Could have been the trigger to cut error chain)

It was difficult to feel the differences between the door unlock sw and rudder trim sw during its operation

③ The delay in notice to change the attitude of the aircraft

Very little visual reference due pitch-dark night.

Insufficient monitoring of PFD.

The bank movement was linked with CDU operation (Go-direct) followed by rudder trim movement.

PF's eyes was fixed at surveillance camera.

④ Recovery Maneuver is not sufficient

PF released Cont. Wheel recovery movement where it should not have been.

Inadequate understanding of basic Upset Recovery maneuver (PF focused on rudder trim operation and surprised by warning sound)

Jerky Cont. on wheel recovery movement.

PF's eyes were away from PFD which led him delay in recognition of attitude change.

# Threats

- \* Work Load : ATC Direct PQE (Tateyama)  
FMS CDU Operation  
Captain knocked cockpit door  
Focused on the surveillance camera (Narrow Vision)
- \* Experience of Aircraft Type:  
Transition 3months ago from B737-500  
The first time the Cop left alone in the cockpit
- \* Time: Midnight
- \* Cockpit design: Similar position Rudder trim switch(B737-700) as Cockpit door(B737-500).

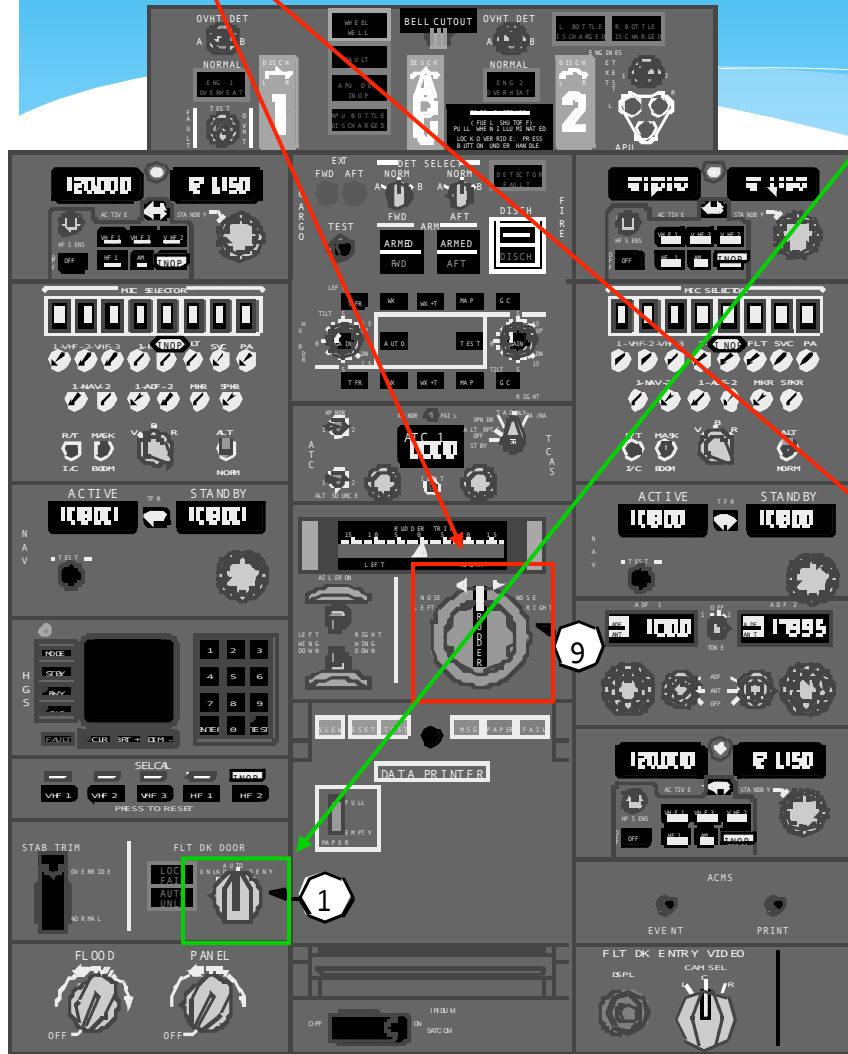
# Similar position

Rudder Trim Switch

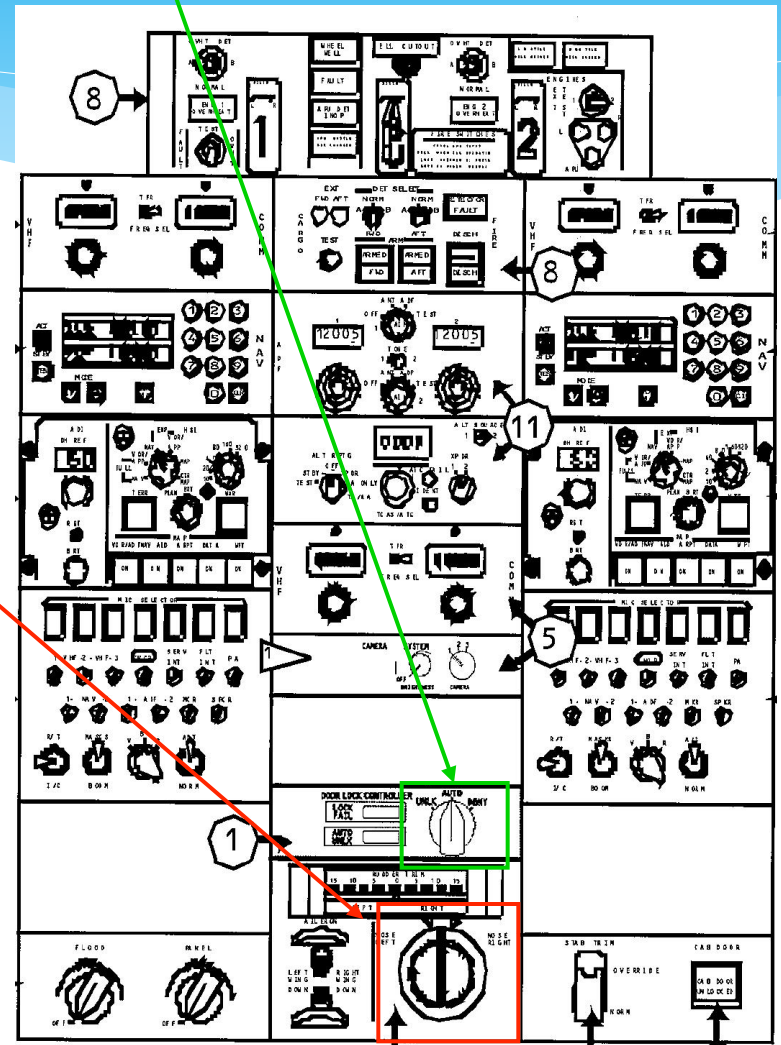
Operation Method  
⇒ Hold and Turn  
Size ⇒ Twice of FLT DK Door Switch

FLT DK Door Switch

Operation Method  
⇒ Push & Hold and Turn  
Size ⇒ The half of Rudder Trim SW



B737-700



B737-500

# Corrective Actions

- \* Making educational video material detailed introduction of this event and disseminate it to all flight crew in order to emphasize the importance of operating any switches.
- \* Preparation of Enhanced Stall Recovery training by information collection of how this training is done at other countries.
- \* Is ISARP FLT2.2.17 adequate?

# FLT 2.2.17

- \* The Operator shall ensure flight crew members complete training in procedures for aircraft upset recovery during **initial ground training** and subsequently during **recurrent training once every three (3) calendar years** or, if applicable, in accordance with the initial and continuing qualification schedule specified in the **Operator's AQP/ATQP** as approved or accepted by the Authority. **(GM)**

13:48:18 UTC

41002 feet





Question