

# **Falling of the Inside Door of the Large Carry-in Entrance in Unit 6 Reactor Building <Causes and Measures>**

## **<Overview>**

During electrical replacement work of ceiling crane in Unit 6 Reactor Building at 10:50 AM on February 15, 2013, a worker tried to open the inside door of the large carry-in entrance of the Reactor Building in order to carry equipment out of the building.

However, since the inside door did not automatically stop opening (going up) at supposed position, the worker who sensed the abnormality of the situation turned off the power to stop the inside door.

It has fallen down to the floor due to the fracture of the suspension part later on (estimation: 7m).

No injury has been reported due to the incident.

# Specification of the Inside Door

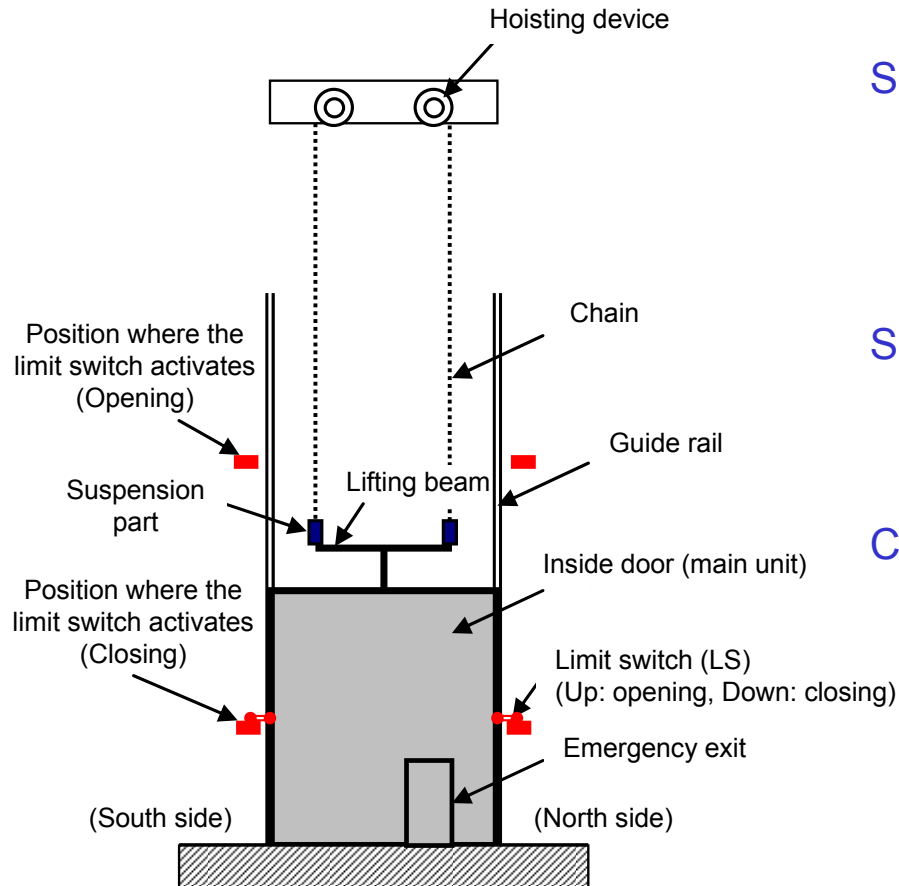


Figure-2 Outline of the large carry-in entrance (inside door) (View from the inside of the building)

## Specification

- Dimension: Width approx. 4.9m x Height approx. 5.8m x Thickness approx. 250mm
- Weight: Approx. 5 tons

## Safety device (fall prevention)

- Fall preventer locking pin (manually operated after full opening)

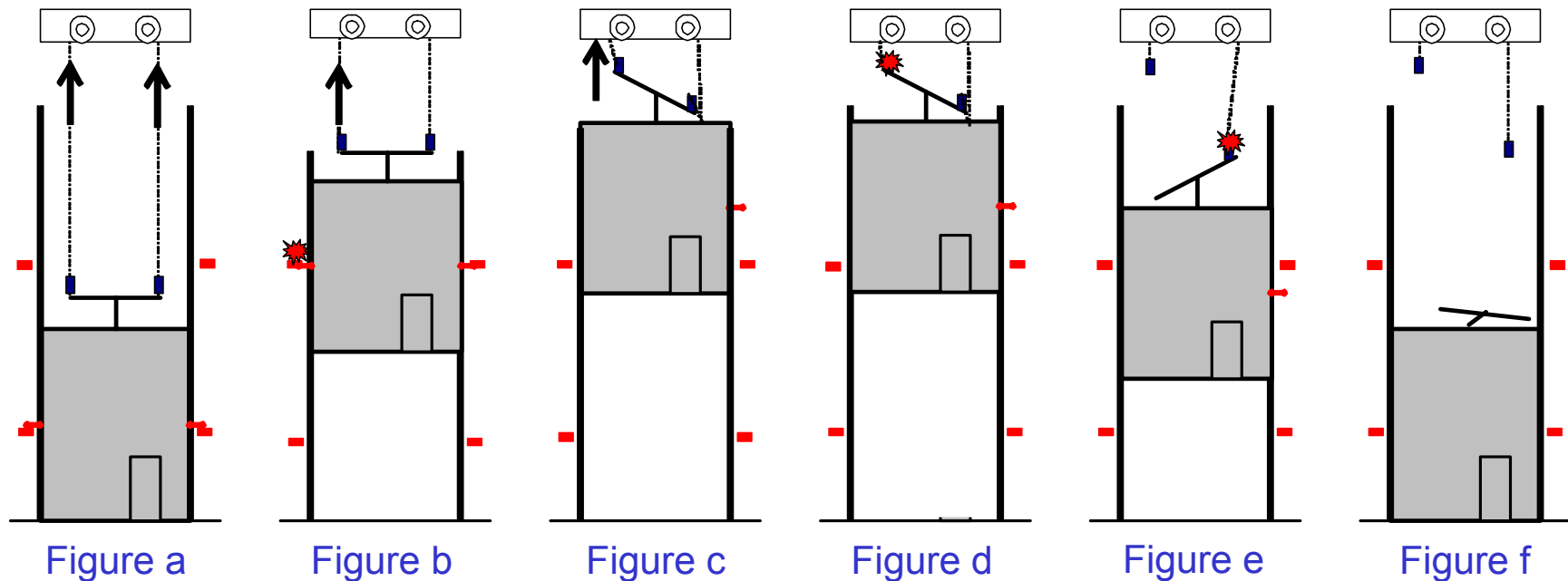
## Control of opening, closing and stopping

- Operate by “open”, “close” and “stop” button on the control board
- Two hoisting devices will be automatically stopped when the limit switches (LS) installed at both side of the inside door are activated

# Falling Condition of the Inside Door

Based on the site investigation and hearings from the workers, falling condition of the inside door is considered as follows:

- The inside door became half suspended (Figure c), since the left hoisting device did not stop (Figure b) though the right hoisting device stopped at normal position where the limit switch activates.
- Though the half suspended inside door swayed and getting caught with the guide rail, the left hoisting device kept hoisting (Figure c). Therefore, the left suspension part became broken (Figure d). Impact of the falling broke the right suspension part (Figure e), and the whole body of the inside door fell down (Figure f).



# Causes and Measures

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## Causes

<Factor analysis>

- The left hoisting device did not stop though the right hoisting device stopped at the normal position where the limit switch activates. (The limit switches installed at both side of the inside door are activated normally.)
- The inside door became half suspended and getting caught with the guide rail since only the left hoisting device kept hoisting.
- The suspension part of the half suspended inside door became broken, and the whole body of the inside door fell down.
- Though a worker sensed the abnormality of the situation and tried to operate a manual “stop” button on the control board, it did not function.

<Causes derived from the factors>

- A malfunction occurred to the controller which receive a stop signal and stop the hoisting device.  
(The cause of the malfunction is estimated to be its internal deterioration as the result of the site investigation, since no damage was found on the controller.)
- There was no way to stop the hoisting device automatically after the inside door passed through the stop position where the limit switch activates.
- The hoisting device kept operating until the suspension part became broken.
- There was no way for the worker to stop the inside door going up.  
(The “stop” button did not operate due to the malfunction of the controller.)

## Measures

We will implement the following measures as a result of the cause investigation:

- Replacement of the control board with a new one
- Detailed inspection to be conducted when the inside door is used after having been out of use for a long time period

Together with the replacement of the control board with a new one, we will add the following functions:

- Excess winding-up prevention function in the hoisting device
- Overload stop function
- Installation of an emergency stop button