

ERMENONVILLE ACCIDENT



3 March 1974

On **Sunday 3 March 1974**, the DC-10 registered TC-JAV, carrying out flight TK981, left Istanbul bound for Paris with **167 passengers and 12 crew members** on board. The aeroplane landed at Paris Orly at 11:02 and 50 passengers disembarked. Before taking off again for London, the aeroplane was refuelled, the luggage was loaded and **217 additional passengers** boarded the aircraft.

For this second leg, the aeroplane should not have been full but due to a strike by British Airways, a large number of passengers who had been blocked at Orly airport, were booked on flight TK981. Among the passengers were supporters of the England rugby team which the day before, had played against France in the Five Nations Tournament.

After a stop of one hour, and thirty minutes behind schedule, the aeroplane took off from Orly airport at around 12:30 bound for London airport. At 12:40, just after flying over Meaux and at an altitude of around **12,000 feet**, the air traffic controllers heard a confused transmission from flight 981. A few seconds before, the sound of a decompression was heard and the activation of the aural “pressurization” and “overspeed” warnings.

At the same time, flight 981 disappeared from the secondary radar screen of the control tower when the aeroplane pitched down towards the ground at a speed of around **430 knots** (i.e. around **800 km/h**).

Only **77 seconds** elapsed between the decompression and impact with the ground. No fire, **no survivor**.

The wreckage was found in the *Bosquet de Dammartin*, in the heart of Ermenonville forest, not far from Senlis situated 37 km north-east of Paris.



The aeroplane had cut a 700-metre long by 100-metre wide swath through the forest.

Fifty years on, this accident remains the air disaster with the largest number of fatalities in France. It is the fourth deadliest accident in the history of civil aviation.

The death toll was 346.

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THE ACCIDENT SCENARIO

11:35: Closure of the left-hand rear hold door.

12:24: Clearance to taxi to runway 08.

12:28: Clearance to line up on take-off runway, initial climb to 4,000 feet.

12:30 : Take-off.

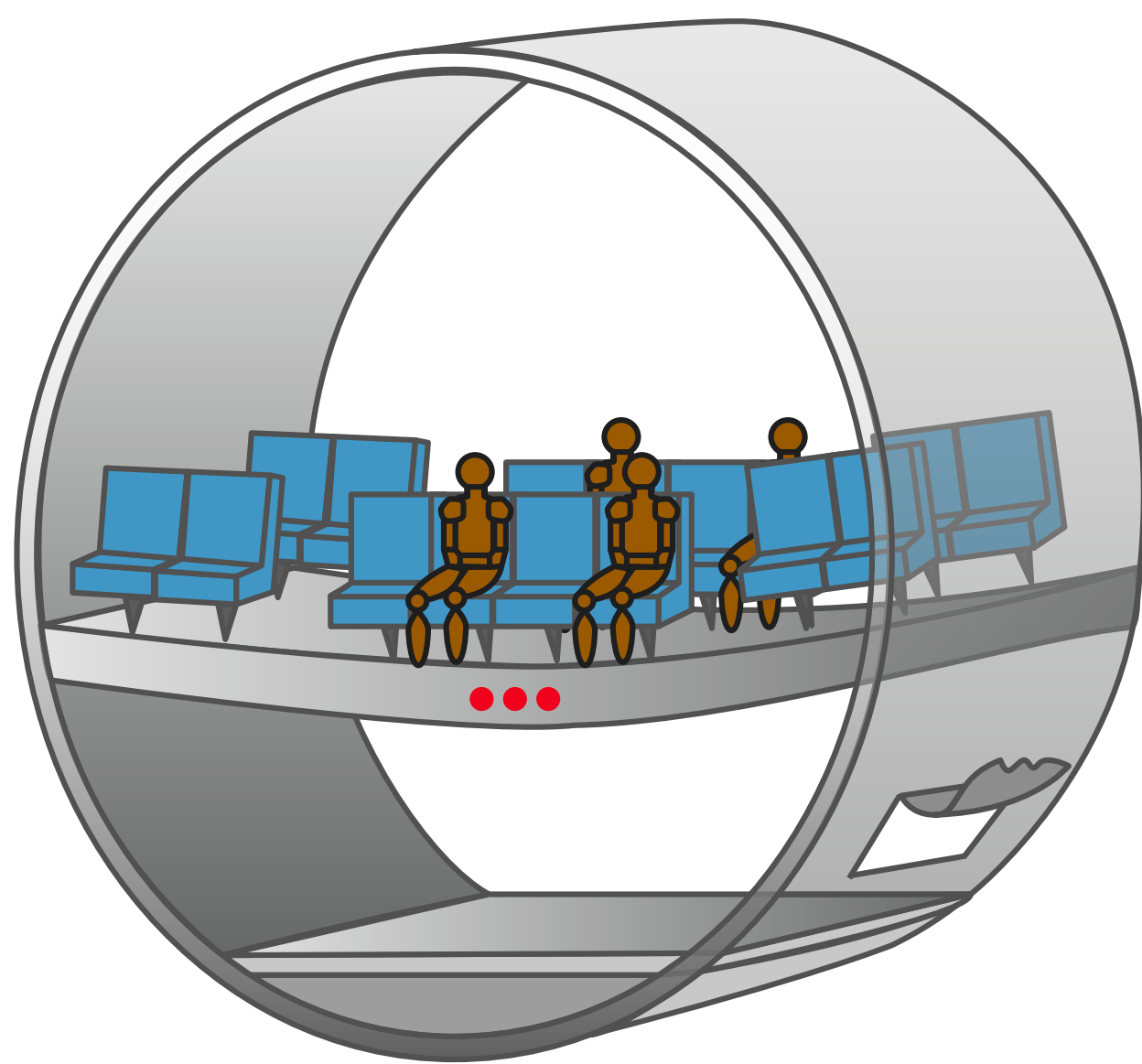
12:33: Clearance to climb to 6,000 feet.

The North regional control centre then cleared the DC-10 to climb to 23,000 feet. Three or four seconds before 12:40, the sound of a decompression was recorded and would be heard on the CVR (Cockpit Voice Recorder). This was caused by the **left-hand rear cargo door opening** and then **separating** from the aeroplane.

Due to the difference in pressure between the hold and passenger cabin, the cabin floor above the cargo door partially collapsed. Two blocks of three occupied seats were ejected from the aeroplane and all the elevator and elevator trim control cables running under the cabin floor of the DC-10 were severed which also resulted in the loss of control on engine 2.

1972's accident (Windsor)

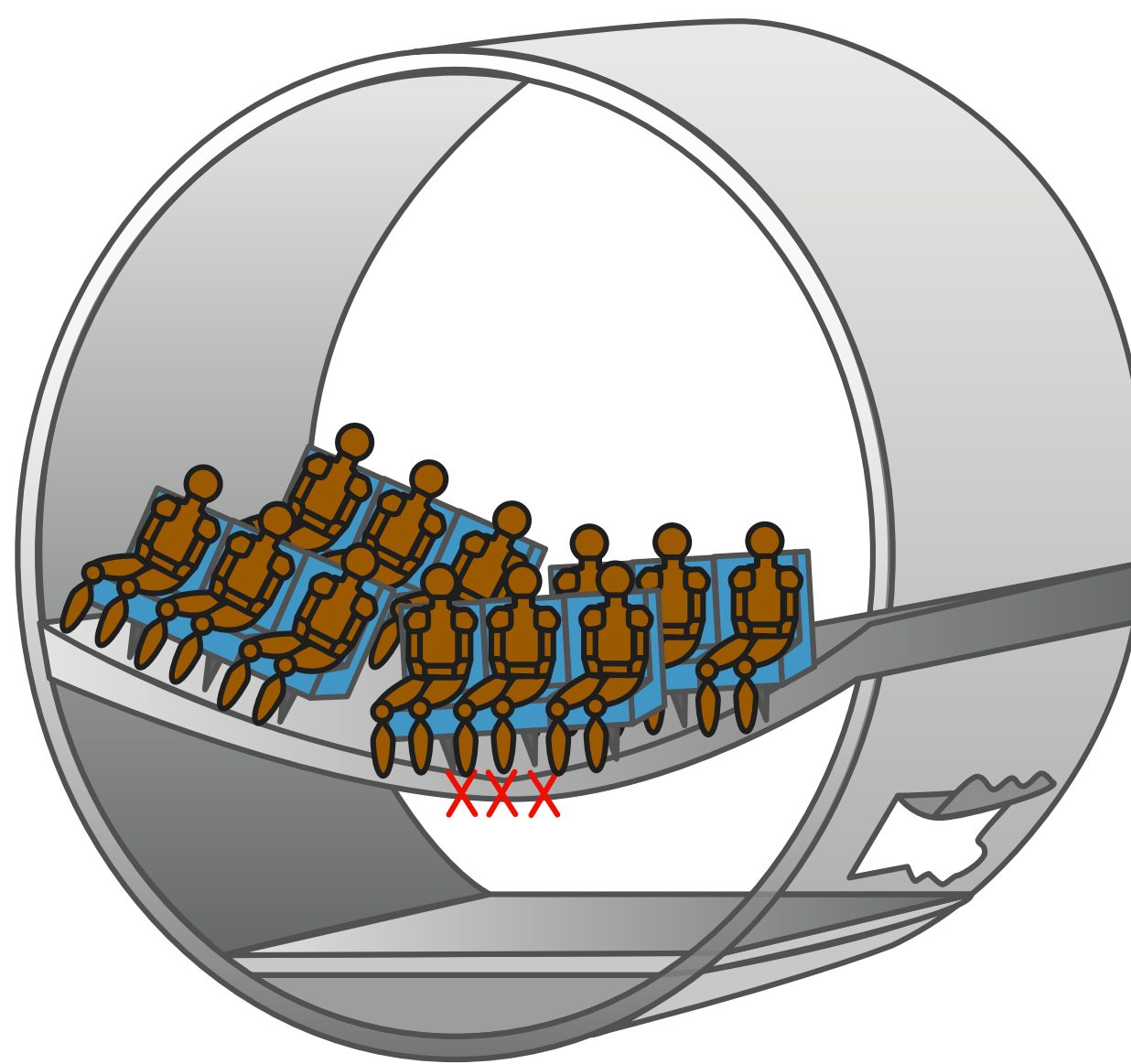
*venting issues
+ floor slightly loaded*



Non catastrophic outcome

1974's accident (Ermenonville)

*venting issues
+ floor heavily loaded*



Catastrophic failure

12:39: The aeroplane's nose-down attitude rapidly increased to -20 degrees.

Even though engines 1 and 3 had been retarded, the speed increased to 362 knots (around 660 km/h). In a few seconds, the pitch attitude would progressively decrease to -4 degrees and the speed stabilised at around 430 knots (approximately 800 km/h).

A few seconds later, the DC-10 crashed into Ermenonville forest at around 15 km from the village, Saint-Pathus. It was overhead this village that the initial decompression occurred and the first components (**including the door**) were lost.



**Go to the dedicated
page on the BEA website**



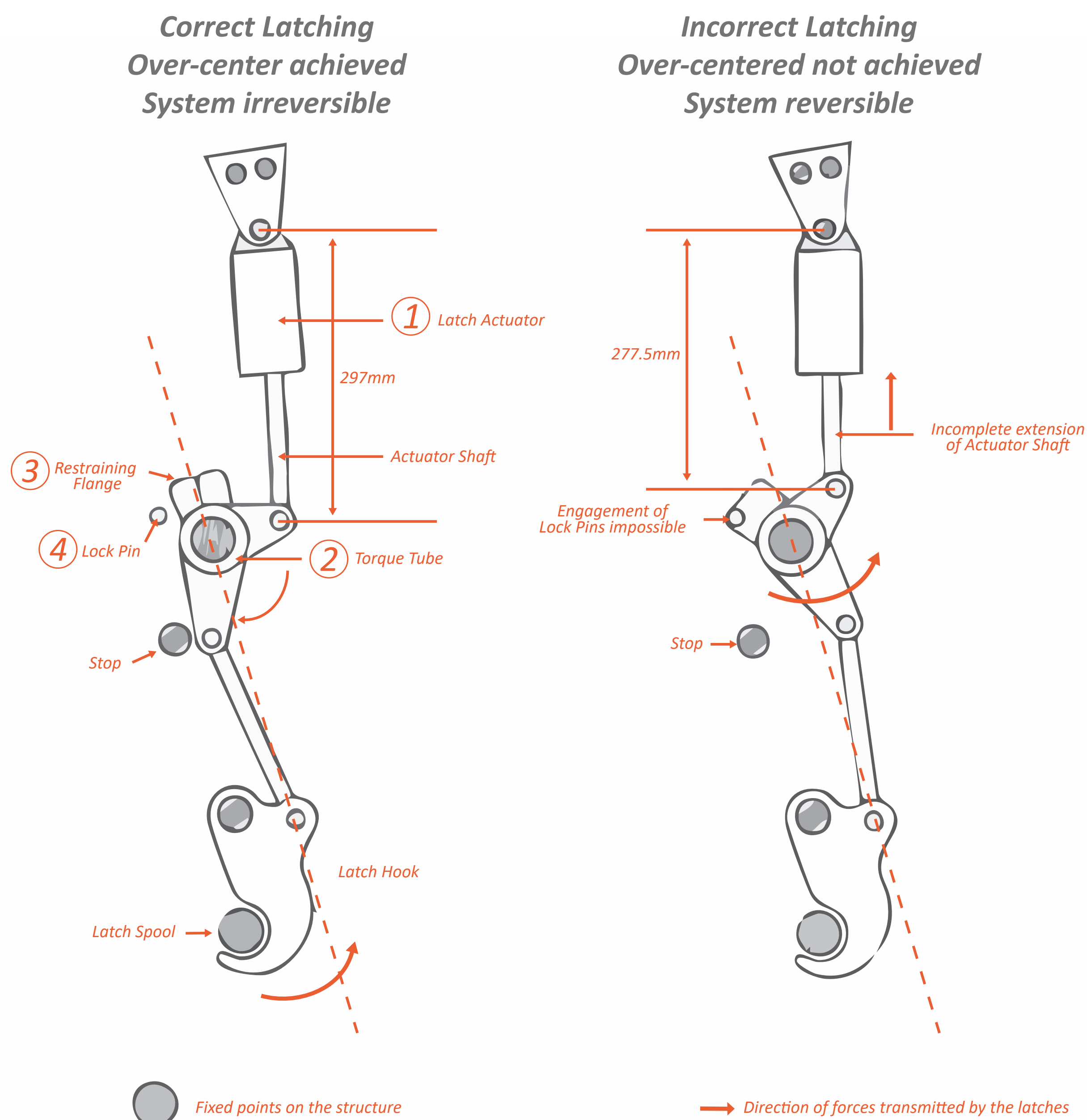
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THE DC-10 CARGO HOLD DOOR

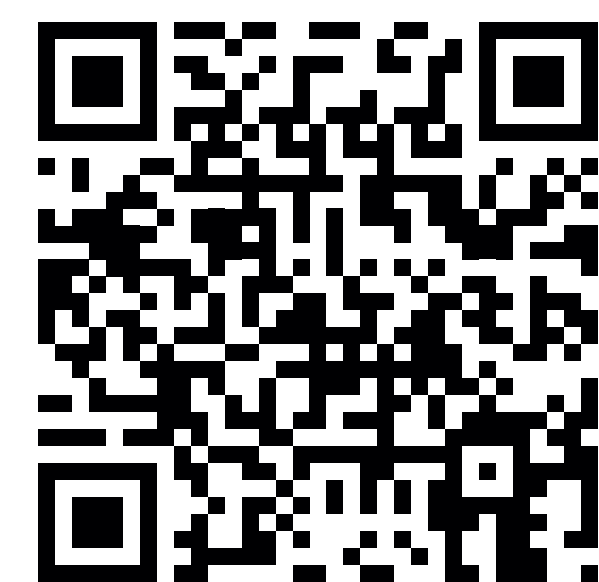
Six bodies, various seat components and fuselage debris were found in fields near Saint-Pathus. A more in-depth analysis of the debris found that one of the pieces was the left-hand rear cargo door of the baggage hold.

The safety investigation was able to show that before taking off, this door had **not been correctly locked** and that the **warning light**, located in the cockpit, **extinguished prematurely** due to an incorrectly adjusted contactor.

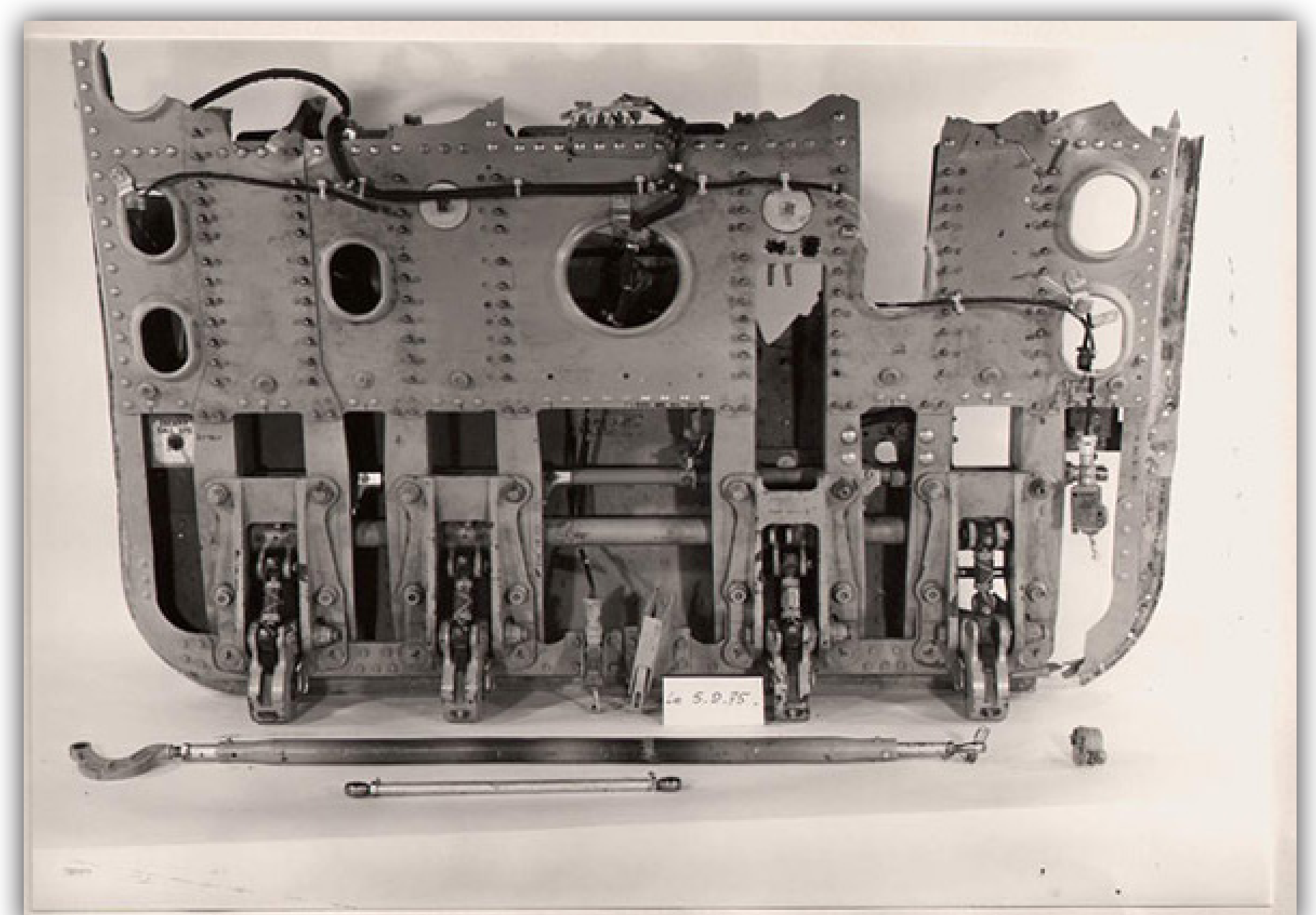
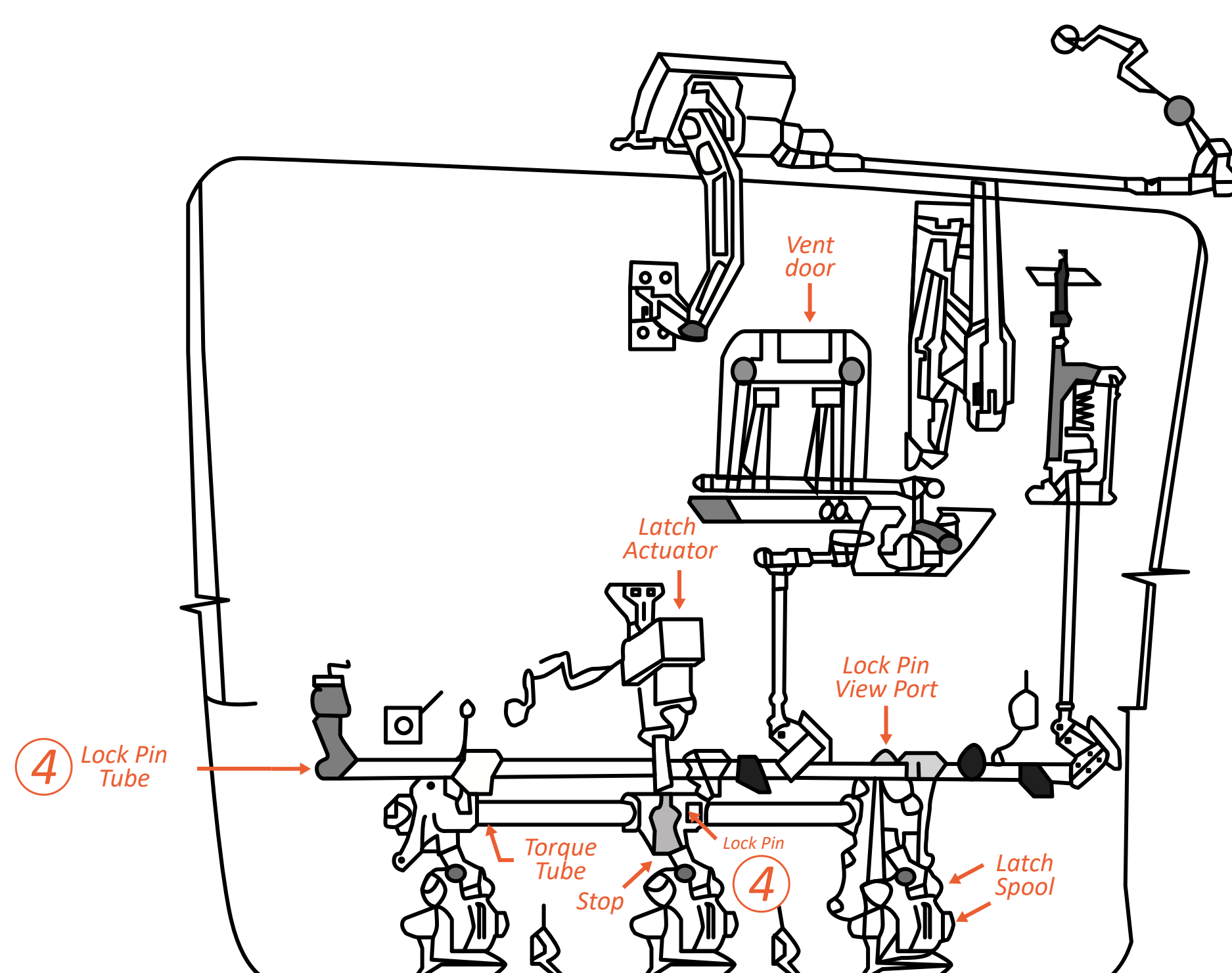


In order to completely lock the door, the latch actuator shaft ① must be sufficiently extended. This leads to the rotation of the torque tube ② and the restraining flange ③ in order to give access for the engagement of the locking pins ④ when the mechanism has reached its locking position (after the over-centre).

In this occurrence, the **locking pins were not in place** although there was a view port to visually check they were correctly engaged.



Operation of the cargo door mechanism



PRECURSORY OCCURRENCE & SAFETY RECOMMENDATIONS

Two years earlier, **on 12 June 1972**, while flying over Windsor, in Ontario, Canada, flight 96 carried out by a McDonnell Douglas DC-10 operated by American Airlines suffered an explosive decompression at around **11,750 feet** and **481 km/h** due to the **cargo door being ripped off**. This accident **did not cause any casualties** among the **67 passengers and crew** on board.

The examination of the cargo door, which was found largely intact close to Windsor, found that the **latches designed to hold the door closed in flight had not operated correctly and the locking pins were not in place**.

Following this accident, **two safety recommendations** were issued by the NTSB (the BEA's American counterpart):

- Recommendation A-72-97 regarding the modification of the cargo door locking system to make it physically impossible to position the external locking handle and vent door to their normal door locked positions unless the locking pins are fully engaged.
- Recommendation A-72-98 regarding the means to minimize the pressure loading on the cabin flooring in the event of sudden depressurization of the cargo compartment.

SIMILARITIES BETWEEN THE TWO ACCIDENTS

- 1/ The latches were not completely locked and the locking pins were not in place.
- 2/ Sudden decompression in the cargo compartment caused damage to the cabin floor, its structure and the flight controls.

The Ermenonville accident could have been avoided if the corrective measures had been taken.

OTHER SIMILARITIES

- 3/ The warning light in the cockpit extinguished although the door was not properly closed.
- 4/ The altitude reached by the American Airlines DC-10 at the time of the decompression (11,750 feet) was more or less the same as that of the Turkish Airlines DC-10 (12,000 feet).

These two nearly identical occurrences underline the need for **robust designs** and the **importance of safety recommendations**.

These accidents echo the Boeing 737 MAX accidents in Indonesia (in October 2018) and in Ethiopia (March 2019) with corrective actions not implemented by the regulatory authorities after the first occurrence. It wasn't until the second disaster that changes to the aircraft became mandatory.



Photo of the American Airlines DC-10 door from the accident in 1972.