

Inadvertent Opening of Forward Cargo Door in Flight

Each aircraft had the forward cargo door rupture/open in flight; one cause was called correctly (UAL 811), two were called bombs (AI 182 and PA 103) and one is unknown (TWA 800) but may be called bomb or fuel explosion near cargo door as probable cause. The forward cargo door ruptured/opened in flight on all of them. Why the door rupture/opened is a mystery.

United Airlines Flight 811:

Probable Cause: The NTSB determines that the probable cause of this accident was the sudden opening of the forward lower lobe cargo door in flight and the subsequent explosive decompression."

[NTSB/AAR 92/02 Page 92](#)

Air India Flight 182:

"There is considerable circumstantial and other evidence to indicate that the initial event was an explosion occurring in the forward cargo compartment."

Canadian Aviation Safety Board Air India 23 June 1985, page 58

Pan Am Flight 103:

"Cause: The in-flight disintegration of the aircraft was caused by the detonation of an improvised explosive device located in a baggage container positioned on the left side of the forward cargo hold at aircraft station 700."

[UK AAIB Report 2/90 Page 57](#)

"The analysis of the flight recorders, using currently accepted techniques, did not reveal positive evidence of an explosive event."

[UK AAIB Report 2/90 Page 56](#)

Trans World Airlines Flight 800:

"Investigators also said that a cargo door, presumably the front one, had been found significantly closer to Kennedy International Airport, where the flight originated, than almost all of the other parts located so far."

[News Reports from Associated Press, Reuters, major newspapers, press releases from NTSB, FBI](#)

Investigators from NTSB believe the initial event was a center fuel tank explosion. The FBI continues to believe it was bomb or missile.

Comment: Doors ruptured/opened leading to fatal accidents on four aircraft. Why doors ruptured/opened is a mystery. The distinct crash similarities of aircraft type, radar returns, wreckage plot, sudden short loud sound, abrupt power cut, fodded engines, inflight damage, missing bodies, torn off noses, and start place of damage qualify three aircraft into one class from which the deduction may be made that one unifying cause had the same effects. Another accident with the same similarities except for a torn off nose and less wreckage may also be included in that class. The unifying cause for all four accidents is the inadvertent rupture/opening of the forward cargo door inflight. 2 Nov 97

Sequence of Destruction for TWA Flight 800

Hot humid air in forward cargo compartment was subjected to cold conditioned air after takeoff on hot summer evening near New York on July 17, 1996. Condensation was precipitated out and formed on cold metal fuselage skin. Poly-X wire bundle which held cargo door motor on power was chafed by the friction of continuous vibration against clamp or many door openings and closings on it. Sheath around bundle was worn through to insulation and then worn through to bare wire. Condensed water met the bare wire and shorted against fuselage metal charring wires and powering on door motor which attempted to turn all ten cam sectors to unlocked position. At 13700 feet MSL and 300 KCAS, the eight lower cam sectors were prevented from unlocking because of strengthened locking sectors. However, the two midspan latches have no locking sectors. The slack in bellcranks, torque tubes, and high time worn cam latches allowed the aft midspan latch to rotate just past center allowing the 3.5 PSI internal pressure to rupture outward the forward cargo door at the aft midspan latch.

The nine foot by eight foot squarish door burst open at midspan latch sending the latch and door material spinning away in the setting sun which reflected upon the shiny metal as it spun away erratically and appeared as red-orange streak to ground observers moving all which ways. The aft door frame was clean of attachment to door and bulged outward. Fuselage skin was torn vertically. The door fractured and shattered. The bottom eight latches held tight to the bottom eight latch pins on bottom sill while bottom external skin of door blew away. The top piece of

red topped cargo door opened out and up smashing into the white fuselage skin above it leaving the red paint of the door on the white paint between passenger windows above. The red paint of the trim was rubbed away showing the white paint underneath. The top piece of the door took the hinge with it and fuselage skin as it is tore away. The loose red painted trim piece and top of door flew directly aft and impacted the right horizontal stabilizer leaving a red paint transfer mark on it. The hinge still appears to be working normally likely having overtravel impression marks on the opposite hinge when door overextended to slam on fuselage above. The top piece of the door shows inward damage when it hit fuselage above.

The explosive decompression of the thirty eight thousand pounds of internal force on the door blew out a large hole about twenty feet wide and forty feet high on the right side of the nose forward of the wing. Parts of the cargo hold structure were the first parts to leave the aircraft. The now uncompressed air molecules rushed out of the huge hole equalizing high pressure inside to low pressure outside while making a very loud noise. Fuselage skin was peeled outward at various places on the right side of the nose. The sudden rushing air was recorded on the Cockpit Voice Recorder as a sudden loud sound. The explosive decompression of the forward cargo hold severely disrupted the nearby main equipment compartment which housed power cables and abruptly shut off power to the Flight Data Recorder.

At least nine passenger's bodies were never found, only bone fragments. The number three engine also ingested metal in baggage and started on fire from inefficient burning of fuel. The number three engine with pylon started to vibrate and a stator blade from the engine was spit out and impacted directly behind it in the right horizontal stabilizer.

The floor beams above the cargo hold were bent downward, fractured and broken from the sudden decompression. The main structural members of door and frame were gone and compromised. The flight attitude of the aircraft was askew to the left from reaction of explosive decompression to the right. Air rushed into the hole and weakened other skin and frame peeling skin outward. The 300 knots of air pressed upon the weakened nose and crumpled it into the large hole. The nose tore off and landed in a dense debris heap apart from the rest of the plane.

The port side forward of the wing was smooth and unshattered while the starboard side forward of the wing was shattered, torn, and frayed at ruptured cargo door area and severely disturbed over twenty feet by forty foot explosive decompression zone. Outward petal shaped fuselage skin appeared at aft midspan latch from rupture. Aft midspan latch was blown away. Outward peeled skin appeared from blowout. Fuselage skin remained smooth next to blown out skin.

The rest of the plane without the nose suddenly decelerated from 300 knots and caused whiplash injuries to passengers. Passengers inside fuselage had baro-trauma to eardrums which

ruptured trying to equalize middle ear pressure. The plane maneuvered with huge gaping wound in front increasing drag. The wind force disintegrated the fuselage and wings. Fuel poured out of ruptured tanks as wreckage fell. The broken fuselage, the ruptured wings, the fuel cloud, the center tank, and the spinning, on fire engine number three met at 7500 feet and exploded into a bright loud fireball putting singe marks on the fuselage skin while leaving earlier departed nose burn and singe mark free. The center tank exploded as well as other nearby fuel tanks. Forward passengers were not burned because they were in the earlier separated nose. The debris fell and spread out from 7500 feet to sea level in windblown southeast direction, leaving a wide debris field.

Ground observers heard the fireball explosion of the center tank and other fuel and looked up. They saw fire and smoke and falling debris.

Explosive decompression at the forward cargo hold led to suspicion of bomb in cargo compartment but bomb later ruled out. Debris ejected to the right from explosive decompression led to suspicion of missile exploding on left side of nose. Streak of shiny metal object spinning away reflecting evening sun to ground observers led to suspicion of missile exhaust but later ruled out.

Fire/explosion of center tank into fireball led to suspicion of center tank explosion as initial event. There were difficulties in determining ignition source, fuel volatility, unheard fuel explosion sound on CVR, unilateral fuselage damage, singe marks, and other evidence needed to corroborate center tank explosion as initial explosion.

Fuselage rupture at aft midspan latch of forward cargo door inflight is initially rejected because bottom eight latches are found latched around locking pins while two midspan latches are unexamined and status unreported.

Questions about center tank explosion as initial event which evidence raises.

1. Sudden loud sound on Cockpit Voice Recorder is described as start of aircraft breakup but not sound of explosion. Sound on CVR does not match other staged Boeing 747 center tank explosion. How can an explosion in the center tank be powerful enough to start the aircraft breakup and blow off nose of Boeing 747 and not be heard on CVR?

Sudden loud sound is sound of explosive decompression which gives a sudden loud sound when forward cargo door ruptures/opens in flight. The TWA 800 sudden loud sound was linked to PA 103 sudden loud sound on CVR which was linked to AI 182 sudden loud sound on CVR which was linked to DC-10 cargo door explosive decompression on CVR. UAL 811 had a cargo door rupture/open in flight and recorded a sudden loud sound on the CVR. The sound is

the sudden rushing of air molecules which were compressed now moving fast outward to equalize with the lower pressure outside air.

2. Center tank explosion would be spherical, not directed, and would either give no damage forward of the wing or about equal damage on both sides of the fuselage of TWA 800. The wreckage reconstruction shows smooth skin with little damage forward of the wing on the port/left side yet severe, shattered, torn, and frayed damage on the starboard/right side of the fuselage in the cargo door area. How can a center tank explosion cause unilateral damage only on starboard side?

Explosive decompression and rupture of forward cargo door area when aft midspan latch ruptures would give shattered, torn and frayed, damage to cargo door area while leaving port/left/opposite side smooth and light damage. Cargo door rupture would give the unilateral damage on starboard side as shown by TWA 800 wreckage.

3. TWA 800 wreckage reconstruction shows outward peeled skin, outward rupture hole, and paint transfers. Water impact damage would be inward, not outward. How could water impact damage produce outward peeled skin, outward rupture hole, and paint transfers?

Explosive decompression in nose of TWA 800 would give outward peeled skin in nose, outward rupture hole, and paint transfers as internal high pressure rushes outward to equalize with the low outside pressure.

4. TWA 800 wreckage reconstruction shows red paints smears only above the forward cargo door area and nowhere else on both side of the Boeing 747 fuselage. This indicates that the red painted door below ruptured/opened outward, slammed upward, and smashed into the white painted area above and transferred red paint from door onto white paint between windows. How did red paint smears get where they are?

After the rupture at aft midspan latch the door fractured and upper piece of the red painted door was pushed outward, rotated on its hinge, slammed upward and smashed into the white painted fuselage skin above, transferring red paint to the white painted area between the passengers windows, as shown by the TWA 800 reconstruction. UAL 811 also had paint transfer from door to fuselage when its door opened in flight.

5. A center tank explosion would be far enough away from power cables to allow the Flight Data Recorder to record longer than the abrupt power cut it suffered. How can a center tank explosion which is not loud enough to be heard on the CVR and some distance away be strong enough to abruptly cease power to the FDR?

The explosive decompression in the cargo compartment would severely disrupt the cargo hold floor and the adjacent main equipment compartment in which the FDR and power cables are located. The severe disruption would abruptly cease power to the FDR. UAL 811 also had abrupt power cut when its cargo door opened in flight.

6. How could forward cargo door rupture/open when bottom eight latches are latched and locked in TWA reconstruction?

The forward cargo door of Boeing 747s is about nine feet by eight feet square. It has a hinge on the top and eight cam latches on the bottom. On each nine foot side is one midspan latch. The bottom eight cam latches go around eight latching pins. Over each cam latch is a locking sector. The two midspan latches have no locking sectors. The forward cargo door could rupture at the midspan latch and the hinge and bottom eight latches could still be attached to fuselage skin. The top of the door with hinge attached would tear off with the fuselage skin and spin away. The bottom eight latches could stay attached to bottom sill and continue down to the sea with the nose. The middle of the large door can still be ruptured/opened while the lower part stays attached to airframe. Doors can open/rupture with most or all latches latched. TWA 800 reconstruction shows aft mid span latch missing which implies it became unlatched. The aft door frame sill is smooth and not attached to door which implies door opened in that area.

7. How could forward cargo door rupture cause center tank explosion?

When cargo door ruptures in flight a huge hole is created in nose which the 300 knot slipstream tears off. The falling, noseless, structurally compromised aircraft disintegrated into wings of rupturing fuel tanks, fuselage pieces including center tank, and spinning hot on fire jet engine. When falling debris reached about 7500 feet, the fodded on fire engine number three ignited the fuel cloud and center fuel tank into a fireball. Center tank fire/explosion occurred but later and lower than forward cargo door rupture initial event.

Event, consequence, significance, source for destruction sequence:

1. Hot humid air in forward cargo compartment was subjected to cold conditioned air after takeoff on hot summer evening near New York on July 17, 1996.

NTSB exhibits gave takeoff time and temperatures plus the airconditioning system in Boeing 747s.

2. Condensation was precipitated out and formed on cold metal fuselage skin.

Water was available to ground any bare wires to fuselage skin. Observation made of water

cascading out of forward cargo hold of Boeing airliner by John Barry Smith standing in concourse at San Francisco Airport on December 6, 1997.

3. Poly-X wire bundle which held cargo door motor on power was chafed by the friction of continuous vibration against clamp or many door openings and closings on it. Sheath around bundle was worn through to insulation and then worn through to bare wire.

Bare wires can be shorted to ground causing power to go to door motor. NTSB exhibits list two forward cargo hold charred wiring fires. NTSB hearing on aging aircraft detailed problems with poly-x wiring chafing from vibration. NTSB AAR 92/02 detailed problems with chafing wires causing door motor to turn on. TWA 800 had poly-x wiring.

4. Condensed water met the bare wire and shorted against fuselage metal charring wires and powering on door motor which attempted to turn all ten cam sectors to unlocked position.

Event explains how door motor got power to turn on. NTSB exhibits list two previous cargo hold charred wire fires. NTSB AAR 92/02 lists two uncommanded cargo door opening on Boeing 747s caused by electrical problems, UAL preflight and UAL 811.

5. At 13700 feet MSL and 300 KCAS, the eight lower cam sectors were prevented from unlocking because of strengthened locking sectors. However, the two midspan latches have no locking sectors.

The eight bottom latches held tight to locking pins because of AD 88-12-04 which strengthened all the eight locking sectors. NTSB AAR 92/02 describes the AD, door, and all latches.

6. The slack in bellcranks, torque tubes, and high time worn cam latches allowed the aft midspan latch to rotate just past center allowing the 3.5 PSI internal pressure to rupture outward the forward cargo door at the aft midspan latch.

UAL 811 had small rupture at aft midspan latch as shown in photograph in NTSB AAR 92/02. NTSB exhibit lists 3.5 PSI pressure differential. TWA 800 was extremely old aircraft with over 93000 flight hours.

7. The nine foot by eight foot squarish door burst open at midspan latch sending the latch and door material spinning away in the setting sun which reflected upon the shiny metal as it spun away erratically and appeared as red-orange streak to ground observers moving all which ways.

Press reports reveal eyewitnesses say different colored streaks going every which way from all directions. Time of 8:31 PM and angle of low sun to aircraft in east and observers to the west

had to be perfectly aligned for spinning falling shiny piece of metal to reflect as streak to observers.

8. The aft door frame was clean of attachment to door and bulged outward.

Aft midspan latch blown away at rupture time and caused outward bulge. NTSB reconstruction photograph shows bulge and missing latch.

9. Fuselage skin was torn vertically.

Explosive decompression bursts outward limited by stringers and bulkheads which are vertical and match the other cargo door accident, UAL 811. NTSB photograph shows the vertical tears of TWA 800.

10. The door fractured and shattered.

NTSB photograph shows the damage. 38000 pounds of force were suddenly released onto now weakened door and it burst apart. 99 inches times 110 inches times 3.5 PSI equals 38115 pounds of force on the ten latches and hinge.

11. The bottom eight latches held tight to the bottom eight latch pins on bottom sill while bottom external skin of door blew away.

The bottom of large door held tight while middle of door ruptured in a troublesome section of a high time Boeing 747, Section 41 and Section 42. TWA 800 had not yet had the Section 41 retrofit. NTSB exhibit states bottom eight latches latched.

12. The top piece of red topped cargo door opened out and up smashing into the white fuselage skin above it leaving the red paint of the door on the white paint between passenger windows above. The red paint of the trim was rubbed away showing the white paint underneath. The top piece of the door took the hinge with it and fuselage skin as it is tore away.

The loose red painted trim piece and top of door flew directly aft and impacted the right horizontal stabilizer leaving a red paint transfer mark on it.

The hinge still appears to be working normally likely having overtravel impression marks on the opposite hinge when door overextended to slam on fuselage above.

The top piece of the door shows inward damage when it hit fuselage above.

Sequence of door opening out and up and transferring paint above is described in text and

drawing in NTSB AAR 92/02. Inward movement of top of door is described in AAR 92/02. Normal working hinge attached to top of door is described in AAR 92/02. Overtravel impression damage is described in text and picture in AAR 92/02.

13. The explosive decompression of the thirty eight thousand pounds of internal force on the door blew out a large hole about twenty feet wide and forty feet high on the right side of the nose forward of the wing.

NTSB photograph shows decompression rectangle zone on right side of nose.

14. Parts of the cargo hold structure were the first parts to leave the aircraft.

The first parts of plane to depart indicate trouble started there. NTSB exhibits show first parts to leave were from cargo structure.

15. The now uncompressed air molecules rushed out of the huge hole equalizing high pressure inside to low pressure outside while making a very loud noise.

NTSB AAR 92/02 states crew of UAL 811 heard a 'tremendous explosion,' when door opened in flight.

16. Fuselage skin was peeled outward at various places on the right side of the nose.

Outward peeling indicates force from within, not without. UAL 811 had same outward peeling of fuselage skin in cargo door area.

17. The sudden rushing air was recorded on the Cockpit Voice Recorder as a sudden loud sound.

Sound matches other Boeing 747 sudden loud sound of explosive decompression and a DC-10 cargo door decompression sound according to NTSB chart.

18. The explosive decompression of the forward cargo hold severely disrupted the nearby main equipment compartment which housed power cables and abruptly shut off power to the Flight Data Recorder.

Cables for power and signal run through the forward cargo hold to the adjacent MEC. The cargo floor is severely disrupted when explosive decompression occurs in cargo hold according to AAIB 2/90 report and will cut off power abruptly.

19. At least nine passenger's bodies were never found, only bone fragments.

Where did those bodies go? What happened to them to reduce them to bone fragments requiring DNA analysis to identify? At least nine bodies always disappear when explosive decompression occurs in high time Boeing 747s according to AAIB, NTSB, TSB and Indian reports.

20. The number three engine also ingested metal in baggage and started on fire from inefficient burning of fuel. The number three engine with pylon started to vibrate and a stator blade from the engine was spit out and impacted directly behind it in the right horizontal stabilizer.

NTSB AAR 92/02 describes the sequence of FOD into number three and also number four and the subsequent vibration and fire.

21. The floor beams above the cargo hold were bent downward, fractured and broken from the sudden decompression. The main structural members of door and frame were gone and compromised.

AAR 92/02, AAIB 2/90, and NTSB TWA 800 exhibits describe the downward movement of the floor beams above cargo compartment.

22. The flight attitude of the aircraft was askew to the left from reaction of explosive decompression to the right. Air rushed into the hole and weakened other skin and frame peeling skin outward.

AAR 92/02 describes the actions of the aircraft after door opened in flight.

23. The 300 knots of air pressed upon the weakened nose and crumpled it into the large hole.

AAIB and TSB/Indian reports describe how nose came off after explosion in forward cargo hold at 300 KCAS of two Boeing 747s.

24. The nose tore off and landed in a dense debris heap apart from the rest of the plane.

AAIB 2/90, TSB/Indian Court, and NTSB TWA 800 exhibits describe the dense nose debris field present when nose comes off in flight of three Boeing 747s.

25. The port side forward of the wing was smooth and unshattered while the starboard side forward of the wing was shattered, torn, and frayed at ruptured cargo door area and severely disturbed over twenty feet by forty foot explosive decompression zone. Outward petal shaped fuselage skin appeared at aft midspan latch from rupture. Aft midspan latch was blown away. Outward peeled skin appeared from blowout. Fuselage skin remained smooth next to blown out skin.

AAIB 2/90, TSB/Indian, and NTSB photographs describe the lesser damage port side nose compared to the more severely damaged starboard side as well as the outward peeled skin on nose of three Boeing 747s.

27. The rest of the plane without the nose suddenly decelerated from 300 knots and caused whiplash injuries to passengers. Passengers inside fuselage had baro-trauma to eardrums which ruptured trying to equalize middle ear pressure.

Passenger injuries are described in NTSB exhibits, TSB/Indian report, AAIB 2/90, and NTSB exhibits.

28. The plane maneuvered with huge gaping wound in front increasing drag. The wind force disintegrated the fuselage and wings. Fuel poured out of ruptured tanks as wreckage fell. The broken fuselage, the ruptured wings, the fuel cloud, the center tank, and the spinning, on fire engine number three met at 7500 feet and exploded into a bright loud fireball putting singe marks on the fuselage skin while leaving earlier departed nose burn and singe mark free. The center tank exploded as well as other nearby fuel tanks. Forward passengers were not burned because they were in the earlier separated nose. The debris fell and spread out from 7500 feet to sea level in windblown southeast direction, leaving a wide debris field. Ground observers heard the fireball explosion of the center tank and other fuel and looked up. They saw fire and smoke and falling debris.

NTSB exhibits describe the breakup sequence and NTSB video shows fireball seconds later and thousands of feet lower than initial event. Engine number three was on fire for AAIB 2/90 and number four was on fire for NTSB AAR 92/02 after cargo hold ruptures.

29. Explosive decompression at the forward cargo hold led to suspicion of bomb in cargo compartment but bomb later ruled out.

Debris ejected to the right from explosive decompression led to suspicion of missile exploding on left side of nose.

Streak of shiny metal object spinning away reflecting evening sun to ground observers led to suspicion of missile exhaust but later ruled out.

Fire/explosion of center tank into fireball led to suspicion of center tank explosion as initial event.

Press reports, FBI reports, and NTSB reports describe the bomb, missile and center tank explanations.

30. There were difficulties in determining ignition source, fuel volatility, unheard fuel explosion sound on CVR, unilateral fuselage damage, singe marks, and other evidence needed to corroborate center tank explosion as initial explosion.

NTSB public hearing reveals the gaps in the center tank as initial event explanation.

31. Fuselage rupture at aft midspan latch of forward cargo door inflight is initially rejected because bottom eight latches are found latched around locking pins while two midspan latches are unexamined and status unreported.

barry@johnbarrysmith.com