

CONTRIBUTING FACTORS

Contributing factors. *Actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident or incident occurring, or mitigated the severity of the consequences of the accident or incident.*

The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability.

3.3.1 There is no regulatory FAA requirement in class E cargo compartments for active fire suppression.

3.3.2 Freighter main deck class E fire suppression procedures which rely on venting airflow and depressurization as the primary means of controlling a fire are not effective for large Class E cargo fires involving dangerous goods capable of Class D metal fire combustion.

3.3.3 No risk assessment had been made for the failure of the cargo compartment liner based on the evolution of cargo logistics and associated cargo content fire threats, cargo hazards and bulk carriage of dangerous goods.

3.3.4 The regulation standards for passive fire suppression do not adequately address the combined total thermal energy released by current cargo in a large cargo fire and the effect this has on the protection of critical systems.

3.3.5 FAA and EASA regulatory requirements do not recognize the current total fire risk associated with pallets, pallet covers and containers as demonstrated by the NTSB/FAA testing.

3.3.6 Class 9 Hazmat packing regulations do not address the total or potential fire risk that can result from lithium battery heat release during thermal runaway. Although non-bulk specification packaging is designed to contain leaks and protect the package from failure, the packaging for Class 9 does not function to contain thermal release.

3.3.7 The growth rate of container and pallet fires after they become detectable by the aircraft's smoke detection system can be extremely fast, precluding any mitigating action and resulting in an overwhelming total energy release and peak energy release rate for a standard fire load that cannot be contained.

3.3.8 The course to return to Dubai required a series of complex radio communication relays due to the Pilot Flying's inability to view and tune the radio transceivers.

3.3.9 The relay communication between the Pilot Flying, relay aircraft and the various ATC stations resulted in communication confusion, incomplete and delayed communications, which contributed to the escalated workload and task saturation for the Pilot Flying.

3.3.10 The Fire Main Deck non-normal checklist in the QRH was not fully completed by the crew or adhered to regarding the fire suppression flight level or land at nearest airport instruction.

3.3.11 Task saturation due to smoke and multiple systems failures prevented effective use of the checklist by the crew.

3.3.12 Communications between the ATCO units involved multiple stages of information exchange by landline and the destination aerodrome was not fully aware of the specific nature of the emergency, the difficulty that the Pilot Flying was experiencing or the assistance required.

3.3.13 The Pilot Flying had not selected transponder code 7700, the emergency code, when radio communication with the destination aerodrome was not established.

3.3.14 Task saturation due to smoke and multiple systems failures prevented effective use of the checklist by the crew

3.3.15 The incapacitation of the Captain early in the event sequence, resulted in a single pilot scenario. The numerous cascading failures and smoke in the cockpit resulted in task saturation and an extreme workload for the remaining pilot.

3.3.16 The crew was not equipped with an alternative vision system or method for managing a smoke filled cockpit that would allow the crew to view the primary instruments.