TWA Flight No. 891/26 – June 26, 1959
Athens (Greece) – Chicago, Illinois (USA)

BOARD OF INQUIRY
Characteristics of the plane crash
Hypotheses regarding the causes of the explosion of tank No. 7 and 6
Board of Inquiry's final verdict

Excerpts from *Civil Aeronautics Board* (CAB) report made public in the United States of America in 1960.
(Times are referred to UTC)

Board of Inquiry

Accident involving a Trans World Airlines Super-Constellation plane, type L-1649A, Reg. No. N7313C, which took place in the vicinity of Olgiate Olona, Italy, on June 26, 1959.

Immediately after the plane crash the Italian Ministry of Defense appointed a Board of Inquiry to investigate the accident. Chairman of the Board was Major General Duilio Fanali, Inspector of the Air Force Academy.
Mr. Martyn V. Clarke of the Bureau of Safety was designated by the Civil Aeronautics Board (CAB) as the official U.S. Government representative to the Board of Inquiry and to assist that Board.
Mr. Clarke headed up an American Advisory Group comprised of American technicians from TWA, Lockheed (the plane's manufacturers), the pilots' association, the Federal Aviation Association (FAA), etc., who had assembled in Milan to provide technical assistance to the Italian accident board. This advisory group did assist the Italian board in the detailed technical examination of the wreckage and in securing the testing of many of the components in American laboratories.

Characteristics of the plane crash

From the concurrence of all the inquiries made, it emerges that:

(1) Weather conditions in the area at the time of the crash were very unfavourable, with continuous electrical discharges and strong turbulence, as is confirmed also by the fact that the [bodies of the] passengers and the crew were found, in the wreckage of the fuselage, with their safety belts fastened;

(2) At 4:32 p.m. the plane was leaving Saronno NDB at an altitude of 10,000 ft., climbing in the direction of Biella NDB;

(3) At 4:32'40" p.m. the plane, en route toward Biella NDB at an altitude above 10,000 ft., was 12'20" flying time away from Biella NDB;

(4) At 4:33' p.m. the plane sent out its last radio signal to Milan Regional Control;

(5) At the time of the crash the plane, in all probability, was flying within the configuration and speed set forth in the operational procedure, on the prescribed route;

(6) In flight, at between 4:33' and 4:35' p.m., an explosion occurred in tank No. 7, and this explosion spread to tank No. 6;

(7) No emergency call was sent out by the plane's crew;

(8) The main piece of the wreckage struck the ground at 4:35 p.m. at about seven kilometers from the point where the last radio signal had been sent out;

(9) The emergency conditions, which arose after the last radio contact, the disintegration of the plane in flight and its crashing to the ground took place within the space of about 2 minutes;

(10) No particular emergency measure appears to have been taken by the crew aboard the plane.

From the factual elements summed up above, it appears evident that the accident was of a sudden and violent nature and was due to unexpected conditions of abnormality which rapidly resulted in the explosion of tank No. 7, immediately followed by either an excess of pressure or another explosion in tank No. 6 and then by the plane's disintegrating in flight.

Hypotheses regarding the causes of the explosion of tank No. 7 and 6

The possible causes of the igniting of the gasoline vapours in tank No. 7 and consequently of the exploding of tanks No. 7 and 6 may be classified into two main groups, namely:

(a) Structural failure due to aerodynamic stresses of any kind (turbulence, excessive manoeuver loads, etc.), ensuing explosion of the fuel tanks and, finally, disintegration of the aircraft;

(b) Explosion of the fuel tanks, caused directly or indirectly by:

(1) faulty operation and fire in the engines;

(2) fires of a different nature;

(3) breakdowns and malfunctioning of the flight instruments and controls in general;

(4) foreign bodies of any kind striking the aircraft;

(5) sabotage;

(6) electric discharges from the atmosphere,

and consequent disintegration of the aircraft.

Conclusion:

On the basis of the premise stated above, namely, that before the crash the plane was in normal condition as regards care and structural soundness. No condition of overstress from manoeuvring, gust, excessive speed, flutter, etc., can explain the type of breakage the aircraft was found to have suffered.

Of the seven hypotheses mentioned the Board of Inquiry appointed by the Italian Air Ministry, in the absence of further significant and concrete evidence, points to the following hypothesis:

Explosion set off by static electricity discharges (streamer corona) as the probable cause of the accident.

Board of Inquiry's final verdict

The breaking up in flight of Super Constellation plane type 1649-A, No. 7313-C, was due to the explosion of the fuel vapours contained in tank No. 7, followed immediately by either an excess of pressure or a further explosion in tank No. 6.

In the absence of other significant and concrete evidence, taking into account the stormy weather conditions, with frequent electric discharges, existing in the area at the time of the crash, it may be assumed that the explosion of the fuel vapours contained in tank No. 7 was set off, through the outlet pipes, by the igniting of the gasoline vapours issuing from these pipes as a consequence of static electricity discharges (streamer corona) which developed on the vent outlets.

The Board feels that the hypothesis mentioned above presents the highest degree of plausibility as compared with all the others taken under examination.