= Widerøe Flight 710 =

Widerøe Flight 710 , commonly known as the Torghatten Accident ( Norwegian : Torghatten @-@ ulykken ) , was a controlled flight into terrain into the mountain of Torghatten in Brønnøy , Norway . The Widerøe @-@ operated de Havilland Canada Dash 7 crashed on 6 May 1988 at 20 : 29 : 30 during approach to Brønnøysund Airport , Brønnøy . All thirty @-@ six people on board LN @-@ WFN were killed ; the crash remains the deadliest accident of the Dash 7 and in Northern Norway . The direct cause of the accident was that the aircraft had descended from 500 meters to 170 meters ( 1 @,@ 500 ? 550 ft ) at 8 nautical miles ( 15 km ; 9 @.@ 2 mi ) instead of 4 nautical miles ( 7 @.@ 4 km ; 4 @.@ 6 mi ) from the airport .

An investigation found several shortcomings in the airline 's operating procedures , in particular lack of proper cockpit communication and mutual control of the descent and approach plans . This was in part caused by the airline electing to not follow the Sterile Cockpit Rule and that a passenger was sitting in a cockpit jump seat during the flight . The investigating commission also found lack of proper pilot training in the airline . Flight 710 was the second of four Widerøe accidents between 1982 and 1993 , all of which revealed shortcomings in the airline 's operations and internal control .

= = Flight = =

The accident aircraft was a four @-@ engine de Havilland Canada DHC @-@ 7 Dash 7 Series 102 , with serial number 28 , built in 1980 . It was bought used by Widerøe in 1985 and registered as LN @-@ WFN on 8 November 1985 . Its certificate of airworthiness was last renewed on 4 November 1987 and was valid until 30 November 1988 . The aircraft had operated 16 @,@ 934 hours and 32 @,@ 347 cycles prior to its last flight . The last A @-@ check took place on 15 April 1988 , after which the aircraft had flown 147 hours and 30 cycles . The 58 @-@ year @-@ old captain held a D @-@ certificate issued 8 April 1981 and was last renewed on 11 December 1987 . He took his initial license in 1949 and had worked as a pilot in Widerøe since 1 April 1960 . At the time of his last renewal , he had flown 19 @,@ 886 hours , of which 2 @,@ 849 hours were with the Dash 7 . He had completed periodical flight training with the Dash 7 on 8 March 1988 . He had just come home from a six @-@ week vacation in Spain .

The first officer was 31 years old and held a C @-@ certificate which limited him to being first officer on the Dash 7 . The certificate was issued on 5 January 1987 and had been valid for the Dash 7 since 23 February 1988 . He had started his flight training in 1977 and had completed it in the United States in 1979 . He was hired as a pilot for Widerøe on 6 February 1986 , where he had originally served on the de Havilland Canada DHC @-@ 6 Twin Otter . He was checked out as first officer on the Dash 7 in February 1988 . He had a total flight time of 6 @,@ 458 hours , of which 85 were on the Dash 7 . The flight attendant was 28 years old and had worked for Widerøe since 1983 .

The aircraft had been used during the morning of 6 May on a multi @-@ leg flight from Bodø Airport to Trondheim Airport , Værnes and back . It had then flown back to Trondheim where it changed crew . They had arrived at Trondheim with a flight at 18 : 50 on 5 May and left the hotel in Trondheim at 16 : 15 on 6 May . Flight 710 was scheduled to fly from Trondheim via Namsos Airport , Høknesøra ; Brønnøysund Airport , Brønnøy ; and Sandnessjøen Airport , Stokka . It departed Værnes at 19 : 23 , one and a half hours after scheduled , because of technical problems with another different aircraft . Flight 710 had a crew of three : a captain , a first officer and a flight attendant . The aircraft was packed and therefore a jump seat in the cockpit was used by a passenger , bringing the number of people on board to 52 .

The aircraft made a stop @-@ over at Namsos , where sixteen of the passengers disembarked . This reduced the number of passengers on board to thirty @-@ three , but the passenger occupying the jump seat continued to sit there on the next leg . The captain was the flying pilot for the segment . The aircraft departed Namsos at 20 : 07 and contacted Trondheim Air Traffic Control Center ( ATCC ) at 20 : 13 to receive permission to ascend to flight level 90 ( FL 90 ) , which was received . During the flight , the passenger in the jump seat held a conversation with the captain and asked

several questions regarding the operations . The first officer did not participate in this discussions , and it was he who conducted radio contact with air traffic control and the airline 's operations ' center .

The first officer contacted the airline at 20 : 16 and informed that they expected to arrive at 20 : 32 . At 20 : 20 : 29 , the aircraft asked permission from Trondheim ATCC to switch to Brønnøysund Aerodrome Flight Information Service ( AFIS ) , which was granted . The aircraft announced at 20 : 20 : 42 that they would start the descent and would switch to Brønnøysund AFIS . Contact was made at 20 : 22 : 34 , at which time the aircraft announced it was 25 nautical miles ( 46 km ; 29 mi ) from the airport and at FL 80 . AFIS informed that there were no known aircraft in the area and that runway 22 was in use ; wind was 5 knots ( 9 km / h ; 6 mph ) from southeast , 5 nautical miles ( 9 km ; 6 mi ) visibility , a light shower and 6 ° C ( 43 ° F ) . At 20 : 23 : 22 the first officer held a 62 @-@ second conversation with the airline ordering a taxi for one of the passengers so he could reach his connecting ferry .

The captain asked for the descent checklist at 20 : 24 : 24 . The fasten seat belt sign was switched on and the flight attendant started the process of preparing the cabin for landing . At 20 : 24 : 46 the captain , as part of the checklist , informed the first officer that they would go down to 1 @,@ 500 meters ( 5 @,@ 000 ft ) at Torghatten and then down to 170 meters ( 550 ft ) . This was followed first by a partially unreadable conversation between the captain and the first officers , which included if they were to fill fuel , and then an unreadable conversation between the captain and the jump seat passenger . The direction of the VHF omnidirectional radio range ( VOR ) and distance measuring equipment ( DME ) at Brønnøysund was checked at 20 : 26 : 37 .

The approach checklist was started at 20 : 27 : 01 , at which time the aircraft 's altitude reached 500 meters ( 1 @,@ 500 ft ) . The first point on the checklist were not readable , but the last three were . At 20 : 27 : 32 the captain asked for flaps and landing gear , which were immediately deployed by the first officer and resulted in the aircraft gaining 70 meters ( 200 ft ) of altitude . The landing gears were confirmed locked at 20 : 28 : 00 . Four seconds later the passenger asked the captain if there were reserve systems which could be used if the landing gear did not deploy properly . At this point the aircraft started the descent from 500 meters ( 1 @,@ 500 ft ) .

AFIS asked for the aircraft 's position at 20 : 28 : 10 , and the first officer responded at 20 : 28 : 13 that it was 8 nautical miles ( 15 km ; 9 mi ) away . He asked AFIS for a wind check , and AFIS responded that it was from 220 degrees and 8 knots ( 15 km / h ; 9 mph ) . The first officers confirmed the information at 20 : 28 : 24 . The aircraft reached 170 meters ( 550 ft ) altitude and remained at that height for the rest of the flight . A short conversation was initiated by the passenger at 20 : 28 : 55 . Three seconds later , the captain asked for " 25 degrees flaps and props fully fine " . This was confirmed by the first officer two seconds later . The pre @-@ landing checklist was completed between 20 : 29 : 04 and : 19 .

The autopilot had been used since 25 seconds after take @-@ off from Namsos and was used for the remainder of the flight . From 20 : 29 : 21 all four engines showed increasing torque and immediately before the crash the aircraft had shifted its angle from ? 2 @.@ 5 degrees to 5 degrees . At 20 : 29 : 29 the ground proximity warning system showed ' minimum ' . The aircraft crashed into the western side Torghatten at 20 : 29 : 30 at 170 meters ( 560 ft ) elevation .

The aircraft flew into the mountain at an angle of 15 to 20 degrees , with the starboard side towards the mountain . The aircraft was ascending at a seven @-@ degree angle , plus / minus one degree . The tip of the starboard wing was the first to hit the mountain , followed by engine number four ( the right @-@ most ) . The engine was immediately torn off and the aircraft started to rotate . The aircraft started being torn in the back rib of the starboard wing . Then the nose and port wing from engine number two ( the inner ) hit a depression in the mountain @-@ face , causing engine number one to loosen from its nacelle and the port wing to break between the engines . At the same time the aircraft 's body was broken in two . The aircraft 's forward movement stopped , the wreck pieces rotated with the vertical stabilizer away from the mountain @-@ side , the port wing caught on fire and exploded and the rest of the aircraft fell down the slope . On the way down , the starboard wing caught on fire .

= = Cause = =

The commission found that the direct cause of the crash was that the approach was started 4 nautical miles ( 7 km ; 5 mi ) too early and that the aircraft therefore came below the height of the terrain . No specific reason for the early approach was found , although there were several non @-@ compliance by the crew members to regulations and procedures . Specifically , the commission pointed to the lack of internal control which would have identified operation shortcomings and the lack of proper cockpit procedures , especially regarding callouts . There were no technical faults to the aircraft , and the pilots had full control of the aircraft at the time of the collision , making it a controlled flight into terrain .

Interviews with random pilots in Widerøe showed that the airline had shortcomings in its training procedures , in part because it lacked a Dash 7 simulator . There was a culture in the airline to divert from cockpit procedures and cooperation . The flight plans often made procedures for mutual control of procedures impractical , and they were commonly skipped . The commission was of the impression that Widerøe 's transition from an all @-@ Twin Otter airline to also operate the more demanding Dash 7 was not properly carried out , which had resulted shortcomings in the training and operating procedures . All checklists during the flight were followed correctly . However , the pilots did not elect a method of double @-@ control of the descent and approach , such as by using briefings and callouts .

The pilots had several non @-@ compliances to regulations in their descent . This included using " Torghatten " during the captain 's briefing , despite no marking on the map using this name , nor one being located close to the mountain . The aircraft was supposed to have flatted out at 750 meters ( 2 @,@ 500 ft ) , but instead this took place at 500 meters ( 1 @,@ 500 ft ) . The next descent was started at 8 nautical miles ( 15 km ; 9 mi ) instead of 4 nautical miles ( 7 km ; 5 mi ) from the airport and the aircraft thus came under permitted altitude .

The aircraft was using instrument flight rules ( IFR ) and Torghatten was covered in fog . The visibility was within the permitted range of IFR . The commission found five errors on Widerøe 's maps which could have influenced the accident . This included a formulation which gave the impression that DMR was not in use ; a closed " Torget " marker beacon was still on the maps ; a vertical flight plan from Lekan was not included ; the height limitations in the accident area were noted through comments rather than through a graphical presentation ; and confusion as to when the timing of final approach should start . The commission also criticized the airline for its checklists instructing the pilots to one of VHF channels to the company frequency during descent , at a time when non @-@ safety @-@ related communication is unwanted .

Because the aircraft was fully booked , a passenger was allowed to sit in the jump seat in the cockpit . The passenger had no connection with the airline , but was granted permission by the captain via acquaintance in the airline . Several of the other passengers were employees in Widerøe and should ? according to the airline 's rules ? instead have been seated there . From Namsos to Brønnøysund there were available seats in the cabin , but the jump seat passenger continued to sit in the cockpit . The commission felt that the passenger 's conversation with the captain drew his attention and concentration away from his duties at a critical point of the flight . This also disrupted communication between the two pilots , resulting in the mutual control being disrupted .

= = Salvage and investigation = =

The aircraft crashed into Torghatten , which is located 5 nautical miles ( 9 km ; 6 mi ) south @-@ west of Brønnøysund Airport . The mountain is 271 meters ( 888 ft ) tall and is a distinct height in an area which is otherwise rather flat . The aircraft hit the western side of the mountain at a point where the terrain is forty degrees steep . The center line of the flight path is 800 meters ( 2 @,@ 600 ft ) from Torghatten . The wreck was spread over an area 60 to 100 meters ( 200 to 330 ft ) below the point of impact .

AFIS made several attempts to call up the aircraft . It received a call from a resident close to Torghatten which said they had heard aircraft noise followed by a crash . Brønnøysund Fire

Department and an ambulance helicopter with a doctor was dispatched to Torghatten . The rescue work was made difficult by low clouds , small fires and explosions . The terrain was difficult and the lack of daylight made assisting the situation difficult . A helicopter with medical personnel and the airport direct arrived at 21 : 25 , while a meeting place for the next of kin was established at the airport . At 23 : 30 the police stated that there was no hope of finding survivors and the scene changed from a search to an investigation scene . Due to the fog it was not possible to verify that all people had been killed until the next day . Seventy @-@ five people from the Home Guard participated in the salvage .

The Accident Investigation Board Norway was informed about the accident at 21 : 10 . Four members of the investigation commission were appointed , consisting of leader Lieutenant General Wilhelm Mohr , Pilot Hallvard Vikholt , Lieutenant Colonel Asbjørn Stein and Chief @-@ of @-@ Police Arnstein Øverkil . Because of poor weather conditions , the commission was not assembled in Brønnøy until 15 : 00 on 7 May . The same day the National Criminal Investigation Service arrived to assist AIBN . Six people appointed by the Canadian Aviation Safety Board , including representatives from de Havilland Canada and Pratt & Whitney Canada , were sent to aid the investigation . Four representatives from Widerøe were available for consultation with the commission . The investigation commission was later supplemented by Psychologist Grethe Myhre and Øverkil replaced by Arne Huuse .

The VOR / DME system was tested by the Civil Aviation Administration on 7 May and found to be working correctly . AIBN established a base of operations at the hangar at Brønnøysund Airport and used a helicopter to freight the pieces of the wreck there and bodies to Trondheim University Hospital for identification . Technical investigations started on 9 May . The aircraft was equipped with a flight data recorder and a cockpit voice recorder . Both were found intact and were decoded at the Air Accidents Investigation Branch in the United Kingdom . Improper use of the microphone made it difficult to hear the captain 's voice , but it was possible to reconstruct the conversations and line of events . A memorial service was held on 10 May and was attended by Prime Minister Gro Harlem Brundtland . The last Home Guard personnel concluded their work on 11 May and the police concluded their investigations at Torghatten on 13 May .

In May 2013 the investigation board was made aware of that two passengers had each their Mobira NMT @-@ 450 mobile telephone with them on the flights . As this had not been mentioned in the original report , AIBN conducted a review of the issue and especially if the telephones could have influenced the vertical navigation . They concluded in December that this was not the case , as there were no indications of interferences and that there are no instances where electromagnetic interference has been a contributing cause to an aviation accident .

= = Aftermath = =

Flight 710 was the second fatal and write @-@ off accident of a Dash 7 , and remains the deadliest . It was at the time the third @-@ deadliest aviation accident in Norwegian history , after the Holtaheia Accident in 1961 and Braathens SAFE Flight 239 in 1972 . It has since been relegated to the fourth @-@ deadliest by Vnukovo Airlines Flight 2801 . It remains the deadliest accident in Northern Norway .

The commission recommended that Widerøe update its maps for Brønnøysund , review and improve its landing procedures , improve its internal control procedures to ensure that pilots follow the airline 's flight operation regulations , and introduce the Sterile Cockpit Rule . The commission recommended that the Civil Aviation Administration change the flight paths at Brønnøysund to increase the altitude around Torghatten . Flight 710 was the second of four fatal Widerøe accidents which occurred between 1982 and 1993 . In the first accident , Flight 933 , a poor cockpit culture had also been discovered , but little was followed up , in part because of a conspiracy theory which surfaced regarding a collision with a fighter jet . Also in the following two major Widerøe accidents , Flight 893 in 1990 and Flight 744 in 1993 , the investigation uncovered operational shortcomings .

The press had an aggressive coverage of the accident . Several major press organizations attended the memorial service , and newspapers published close @-@ up pictures of crying next of

kin on their front pages . The Norwegian Press Complaints Commission , a committee appointed by the newspapers themselves , acquitted Dagbladet after a complaint for their aggressive image use . However , the accident coverage started an internal debate among journalists about their coverage of major accidents . The conclusion was that private sorrow was not to be covered in the media and since the media has had a strict self @-@ enforcement of such a policy .

Brønnøysund Airport installed the SCAT @-@ I satellite @-@ based landing system on 29 October 2007 . Avinor 's Steinar Hamar stated at the opening ceremony that the system would have prevented both Flight 710 and Flight 744 at Namsos Airport in 1993 . The roll @-@ out , taking place at most of Avinor 's regional airports , is scheduled for completion in 2013 .