



Collision of Airplane with Ground Power Unit at Helsinki Airport on August 16, 2025



L2025-02

SYNOPSIS

Pursuant to the second subsection of section 2 of the Safety Investigation Act (525/2011), the Safety Investigation Authority Finland (SIAF) decided to investigate a collision of an airplane with a ground power unit that occurred at Helsinki airport on August 16, 2025.

The purpose of a safety investigation is to promote general safety, the prevention of accidents and incidents, and the prevention of losses resulting from accidents. A safety investigation is not conducted in order to allocate legal liability.

The appointed team leader was subject matter expert Kimmo Lius. The team members were subject matter experts Petri Koistinen and Jouko Lankinen and Senior Safety Investigator Vaishnave Mohanathas. The investigator-in-charge was Chief Air Safety Investigator Janne Kotiranta.

Senior safety investigator Heikki Harri participated in the investigation.

The Bureau of Enquiry and Analysis for Civil Aviation Safety of France (BEA) and the Transportation Safety Board of Canada (TSB) appointed an accredited representative for the investigation.

The safety investigation examines the course of events of the incident, its causes and consequences, and the search and rescue actions as well as any actions taken by the authorities. The investigation specifically examines whether safety had adequately been taken into consideration in the activity leading up to the accident and in the planning, manufacture, construction and use of the equipment and structures that caused the accident or incident or at which the accident or incident was directed. The investigation also examines whether the management, supervision and inspection activity had been appropriately arranged and managed. Where necessary the investigation is also expected to examine possible shortcomings in the provisions and orders regarding safety and the authorities' activities.

The investigation report includes an account of the course of events of the accident, the factors leading to the accident and its consequences, as well as safety recommendations addressed to the appropriate authorities and other instances regarding measures that are necessary in order to promote general safety, the prevention of further accidents and incidents, the prevention of loss and the improvement of the effectiveness of the operations of search and rescue and other authorities.

An opportunity is reserved to those involved in the accident and to the authorities responsible for supervision in the field of the accident to comment on the draft investigation report. These comments have been taken into consideration during the preparation of the final report. A summary of the comments is at the end of the report. Pursuant to the Safety Investigation Act, no comments given by private individuals may be included in the investigation report.

The investigation report was translated into English by TK Translations.

The investigation report, its summary and appendices were published on the SIAF's internet website at www.siaf.fi on October 1, 2026.

Investigation identifier: L2025-02
Investigation report 5/2026
ISBN: 978-951-836-698-3 (PDF)
ISSN: 2341-5991

Cover photo: SIAF

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1 FACTUAL INFORMATION

1.1 History of Flight

On Saturday August 16, 2025, at 1040¹, a serious incident² occurred on the apron³ at Helsinki airport (HEL/EFHK)⁴ when an airplane parked on stand 131 rolled forward during engine start and struck a ground power unit (GPU). Investigation found that the airplane's parking brake had not been engaged.

The scheduled departure time of service AY1175, which was operated by Norra on behalf of Finnair to Gdańsk, Poland, was 1025. The ATR 72-500 turboprop carried 64 passengers and four crew members. It had undergone maintenance during the previous night and was towed by a ground handling service provider tug operator to the stand where the crew was waiting.

At 1038, the flight crew received start-up approval from air traffic control (ATC). Because parking brake was not engaged, the airplane rolled forward after engine start. A dispatcher was in position to give hand signals during engine start and to assist in the removal of the wheel chocks and in GPU operation. While adjacent to the airplane on the right-hand side level with the cockpit, he turned around, saw the airplane coming toward him and dashed to safety on the left-hand side of the airplane. The flight crew was running a checklist and failed to notice airplane movement. After rolling about nine meters the airplane struck the GPU.



Figure 1. The airplane and the ground power unit after the collision. (Photo: SIAF)

¹ The time of the day is derived from cockpit voice recorder and air traffic control radio communication recordings. The times given in this report are Finnish daylight-saving time (UTC +3 h).

² A serious incident is defined in Annex 13 to the Convention on International Civil Aviation issued by the International Civil Aviation Organization (ICAO).

³ Apron means a defined aerodrome area intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, and for fuelling, parking or maintenance (Traficom, regulation AGA M3-1).

⁴ Aerodromes are identified by a 3-letter IATA (International Air Transport Association) code and by a 4-letter ICAO (International Civil Aviation Organization) location indicator.

After the impact, the pilot-in-command (PIC) engaged parking brake, shut down the engines, and pulled a fire handle⁵ without the first officer's (FO) participation, and called "cabin crew at stations, cabin crew at stations" to alert the cabin crew members to stand by for possible evacuation. After about 40 s from the impact, a cabin crew member called the PIC via interphone to report damage to a propeller and cabin windows and explained that passengers were showing signs of distress. About one minute and a half later, the cabin crew member called the PIC again stating that the airplane had hit ground equipment and windows on the right-hand side of the cabin had sustained damage.

At 1043, the PIC reported the occurrence to ATC without declaring a distress or urgency condition, explained that parking brake had not been engaged and proposed that the passengers be deplaned. ATC canceled the start-up approval and began to collect information to get an overall picture of the situation. The marshaller⁶ contacted ATC to report foreign object debris on nearby taxiways and suggested that the affected taxiways be closed. Because the control tower, about 500 m away, commanded a direct view toward the occurrence site, tower personnel could see that airplane and GPU debris had spread over a wide area.

After communicating with ATC, the PIC notified the passengers of the occurrence and then inquired the cabin crew again about airplane damage, adding that he would request a bus for the passengers. After the PIC had terminated communication with the cabin crew, the FO proposed that the flight crew run the Parking and Leaving the Aircraft checklist. Once this was done, the PIC reported the occurrence to the company operations control center and asked to dispatch buses for the passengers.

A person in the ATC facility reported the occurrence to the shift supervisor and inquired what alert category should be assigned to the event. It was opted to classify the occurrence as an apron accident. After the occurrence was reported, the alert pushbutton was operated at 1048. The PIC contacted ATC again on radio, explaining that the situation was under control, to which the controller replied that the occurrence had been classified as an aviation accident. At 1049, the person in the ATC facility called the supervisor again and asked who should call the emergency response center (ERC) to report the event. The task was assigned to control tower personnel because they had better situational awareness.

The cabin crew opened the rear door at 1054 after being cleared to do so by the PIC, who, however, had not canceled the "cabin crew, at stations" call.

The passengers remained on board until the PIC cleared the cabin crew to begin deplaning via the rear door at 1109. The last person exited at 1118 after some 30 min from the impact.

Airport rescue service and Central Uusimaa Rescue Department received an alert at 1048, and the first units arrived at the occurrence site at 1051. A police unit arrived at 1104 and breathalyzer-tested the flight crew. The results showed 0.00 ‰ for both crew members.

⁵ Fire handles are on the overhead panel. Pulling on a handle feathers the respective propeller, shuts off fuel flow to the affected engine, closes the bleed air and deice valve, disconnects the generator thereby de-energizing the electrical system, arms the fire bottles and closes hydraulic fluid supply to the propeller brake (Norra, ATR 72 Operations Manual Part B).

⁶ A marshaller ensures safety and security at an airport and oversees adherence to apron and aircraft stand procedures.

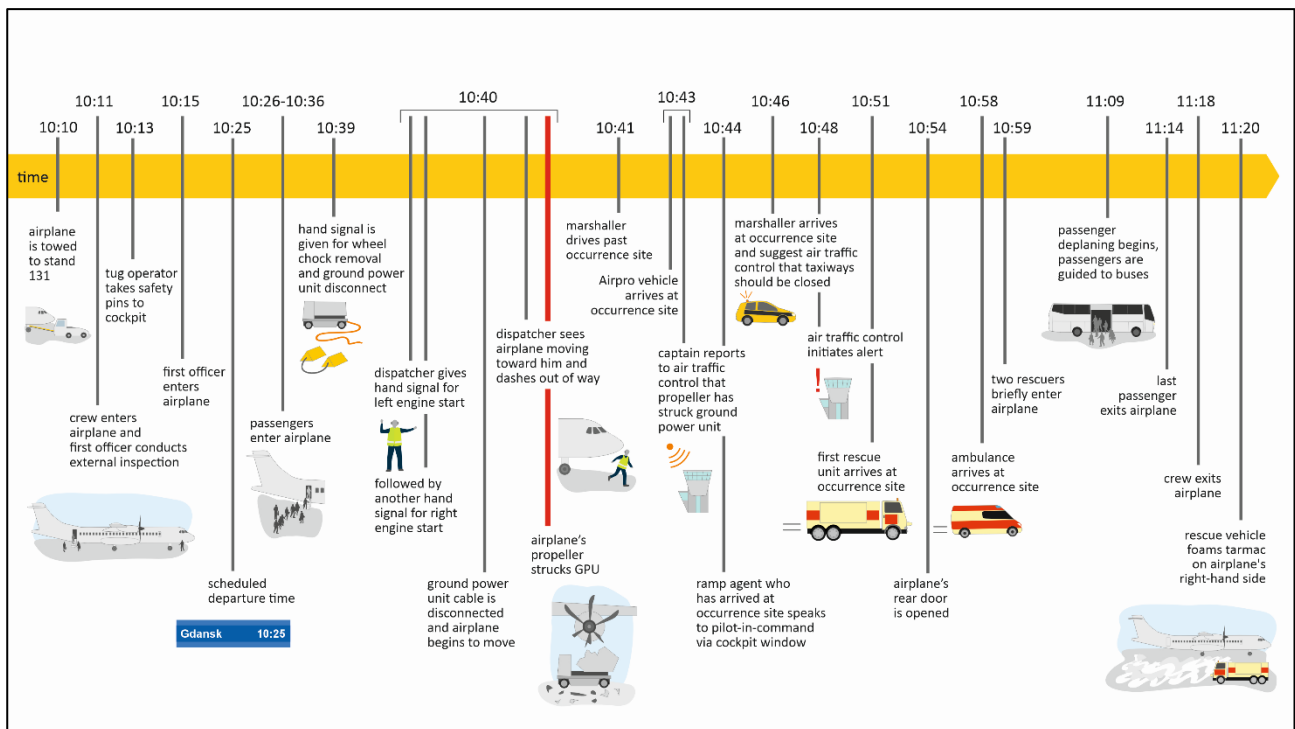


Figure 2. Accident timeline. (Figure: SIAF)

1.2 Alerting and Rescue Operations

The first emergency call, at 1043, indicated that an airplane had nearly hit a dispatcher and “slid” toward a GPU on stand 131. The caller requested that only a police unit be dispatched to the scene, while the ERC operator verified that there were no injuries. During the call, that lasted 35 s, the operator made a risk assessment and issued to police a task under code 201B for a traffic accident. Tasking was entered in the police alerting system on “standby”⁷ status and therefore did not require immediate action.

The alert that initiated accident response was made in the ATC facility at 1048⁸ and was received in the airport rescue service facility and the ERC. At 1049, a call from the ATC facility to the ERC provided initial information of the occurrence. Airport rescue service and Central Uusimaa Rescue Department received the alert at 1048 under task code 233B⁹ whereas police and paramedic units were dispatched under code 233A.¹⁰ At the same time, the facilities of Hospital District of Helsinki were notified of an aviation accident.

Units of airport rescue service and the rescue department were conducting an exercise inside the terminal when the alert was issued and proceeded to the occurrence site practically simultaneously. The on-duty fire officer AR30 of the rescue service received additional information of the cause of the alert on his way to the site. ATC explained that an airplane had moved during engine start and its propellers had struck a GPU on stand 131, adding that the PIC had explained that the situation was under control. AR30 did not contact the PIC on radio. Because the airport does not have a discrete communication frequency for abnormal

⁷ “Standby” status means that a report is received by an emergency response center or police but no unit has been assigned to carry out the task.

⁸ The time of the day is derived from the nationwide Erica data system.

⁹ Rescue service task code 233B indicates a major aviation accident, urgency category B (second most urgent).

¹⁰ Police and paramedic service task code 233A indicates a major aviation accident, urgency category A (most urgent).

situations, the frequency to be used is designated on a case-by-case basis, which was not done in the investigated occurrence.

The first vehicle to reach the occurrence site, at 1051, was airport rescue service unit LE23. It reported to AR30 that there were no signs of smoke or fire. Establishing contact with AR30 proved difficult because interference in radio communication was experienced inside the terminal. The ERC relayed the additional information received from ATC to the incident commander RKU33 at 1052, giving the location of the occurrence site, stating that there were no injuries and explaining that the flight crew intended to request buses for the passengers. The rescue service and ERC units that had discontinued the exercise in the terminal arrived at 1053. RKU33 directed rescue units to assemble at a staging point in the immediate vicinity of the aerodrome's movement area.

After the airplane's rear door was opened at 1054, the crew of rescue service unit AR101 briefly entered the airplane to assess the overall situation in the cabin and found that there were no injuries.

At 1057, RKU33 set up a command post and ordered AR30, police unit PIU024 and paramedic field supervisor EKU61 to proceed to the command post. Some rescue units initially took position on the downwind side of the airplane, which exposed their crews to composite dust from the damaged propeller. After this hazard was recognized at the command post, RKU33 ordered the relocation of the command post and rescue units to the upwind side of the airplane at about 1102. The first paramedic unit, EKU631, arrived at 1058 accompanied by other emergency rescue service units, followed by EKU61 and PIU024 at 1104.



Figure 3. Vehicle positions on the downwind side of the airplane before command post relocation. The red arrow shows debris location. (Photo and annotation: Central Uusimaa Rescue Department)

RKU33 secured the occurrence site before passenger deplaning by establishing a 25 m radius danger area around the airplane and an additional 25 m hazard area on its downwind side.

RKU33 directed that the danger area be foamed¹¹ to provide protection against composite dust hazard by suspending any fragments and dust from the propeller and the GPU.

The passengers boarded buses before foam application. Since the danger area was on the downwind side of the airplane, they exited via the door on the opposite, i.e., upwind side. After completion of deplaning at 1114, the crew left the airplane at 1118 using separate transport. Airport rescue service unit LE14 began to apply foam on the danger area at 1120.

The passengers were taken to the terminal for checkup, accompanied by EKV6231 and EKV61 to provide assistance if required. Personnel from Vantaa social and crisis emergency services arrived in the terminal in case their services were needed.

EKU61 canceled standby at the alerted hospitals at 1102, and the paramedic task was terminated at 1223. At 1144, RKU33 relieved rescue units that had been on standby at the staging point. Airport rescue service and rescue department units were stood down at 1344.

Airline and ground handling service provider personnel subsequently received crisis and psychosocial support from their employers and occupational health services.

1.3 Injuries to Persons and Damage to Aircraft

The airplane's fuselage sustained major damage on impact with the GPU. The right-hand engine was damaged. The propeller disintegrated, and fragments caused extensive airframe damage when propeller and GPU splinters punctured the pressure hull.¹² Propeller fragments struck cabin windows located in line with the propeller, dislodging the inner pane complete with the frame. Frame fragments ended up on the floor and on passengers. Outer surfaces of the windows were extensively scratched.

¹¹ Rescue services may deploy fire suppression foam at an accident site to prevent or contain fire. In the investigated accident, foam was used to prevent spreading of composite dust with the wind.

¹² The aircraft pressure hull is the sealed section of the fuselage that is supplied by air from the airplane's pressurization system. Pressure is maintained by regulating the inflow and outflow of air.



Figure 4. The propeller blades disintegrated on impact. (Photo: SIAF)



Figure 5. Propeller and GPU fragments struck cabin windows in line with the propeller, dislodging the inner panes complete with frames. (Photo: SIAF)

Propeller and GPU fragments scattered over a large area. A piece of aluminium GPU chassis was found about 250 m away near stand 29. Brisk westerly wind contributed to the spreading of fragments. The largest piece, a propeller blade section over one meter long, was projected high over the airplane and landed about 30 m from the fuselage and next to the dispatcher. The substantially damaged airplane and GPU were subsequently repaired for re-entry into service.



Figure 6. The orange circles indicate airframe damage. The yellow rectangle shows the reinforced fuselage section. (Photo: SIAF)

2 BACKGROUND INFORMATION

2.1 Environment, Equipment and Systems

2.1.1 Aircraft

The occurrence airplane was an ATR 72-500 manufactured in 2007 under serial number 741 and entered in Finnish civil aircraft register as OH-ATE during the same year. It is powered by two Pratt & Whitney Canada PW127F/M turboprops driving six-blade Hamilton Sundstrand 568F-1 constant speed propellers. The serial number of the affected engine is ED1976.

The airplane carries a maximum of 68 passengers in addition to two pilots and two cabin crew members. At the time of the occurrence, the left and right wing held 1,400 and 1,420 kg of fuel, respectively. The airplane held a valid certificate of airworthiness.

2.1.2 Helsinki Airport

The three-runway airport is Finland's biggest airport and the main aerodrome in Uusimaa region. It is located in the municipality of Vantaa about 20 km from downtown Helsinki. It handled about 17 million passengers in 2025. About 1,500 companies and businesses that employ 20,000 people provide services at the airport. The number of commercial aircraft

movements in 2025 was 153,000. About 40 to 50 airplane types operate to the airport, which has available about 40 airbridge-equipped parking stands depending on the airplane type. This capacity is supported by dozens of remote stands. Demand for stands is highest during the morning and afternoon peak hours, and stands are also used for extended night parking.

Four ground handling service providers operate at the airport. Aircraft operators purchase turnaround and other services from selected operators. Most of the services are offered by Aviator and Airpro.

2.1.3 Aircraft Stand

Stand 131 is located on nearly flat level ground as viewed in the direction of airplane movement, yet having a slight lateral incline toward a grass area on the left. The stop line is 49.25 to 49.30 m above sea level.¹³ Distance from the stand to the nearest taxiways is about 80 m.

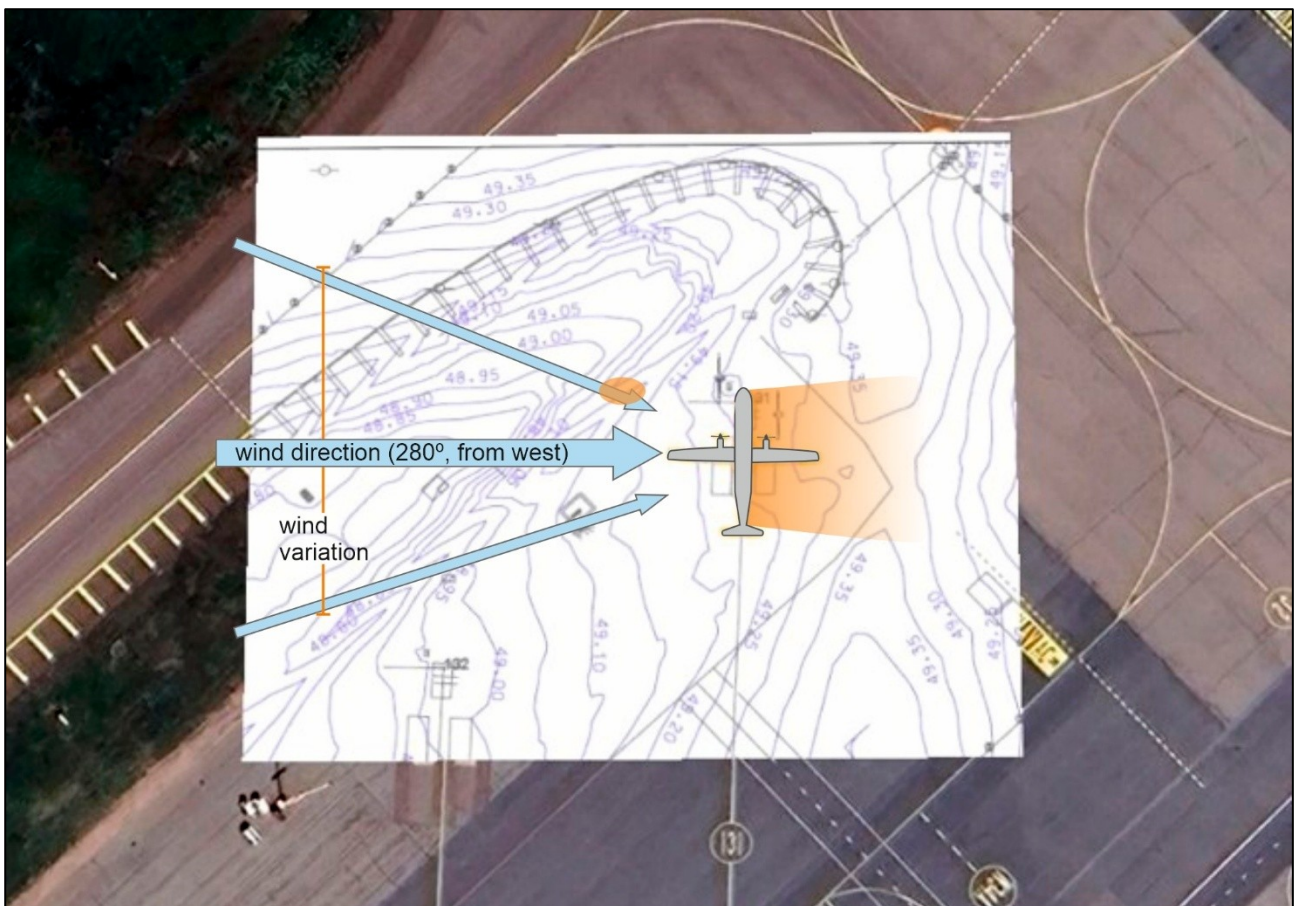


Figure 7. Wind direction and variation. Areas where most debris was located are shown in orange. (Photo: Finavia and Google Earth, annotations SIAF)

During the post-occurrence inspection, the marshaller found debris on taxiways VG and AV from abeam stand W34 to taxiway VG and proposed that ATC close the taxiways from abeam stand W35 to taxiways AV, AG and WG.

¹³ Finavia stand 131 incline measurement data of October 20, 2025.

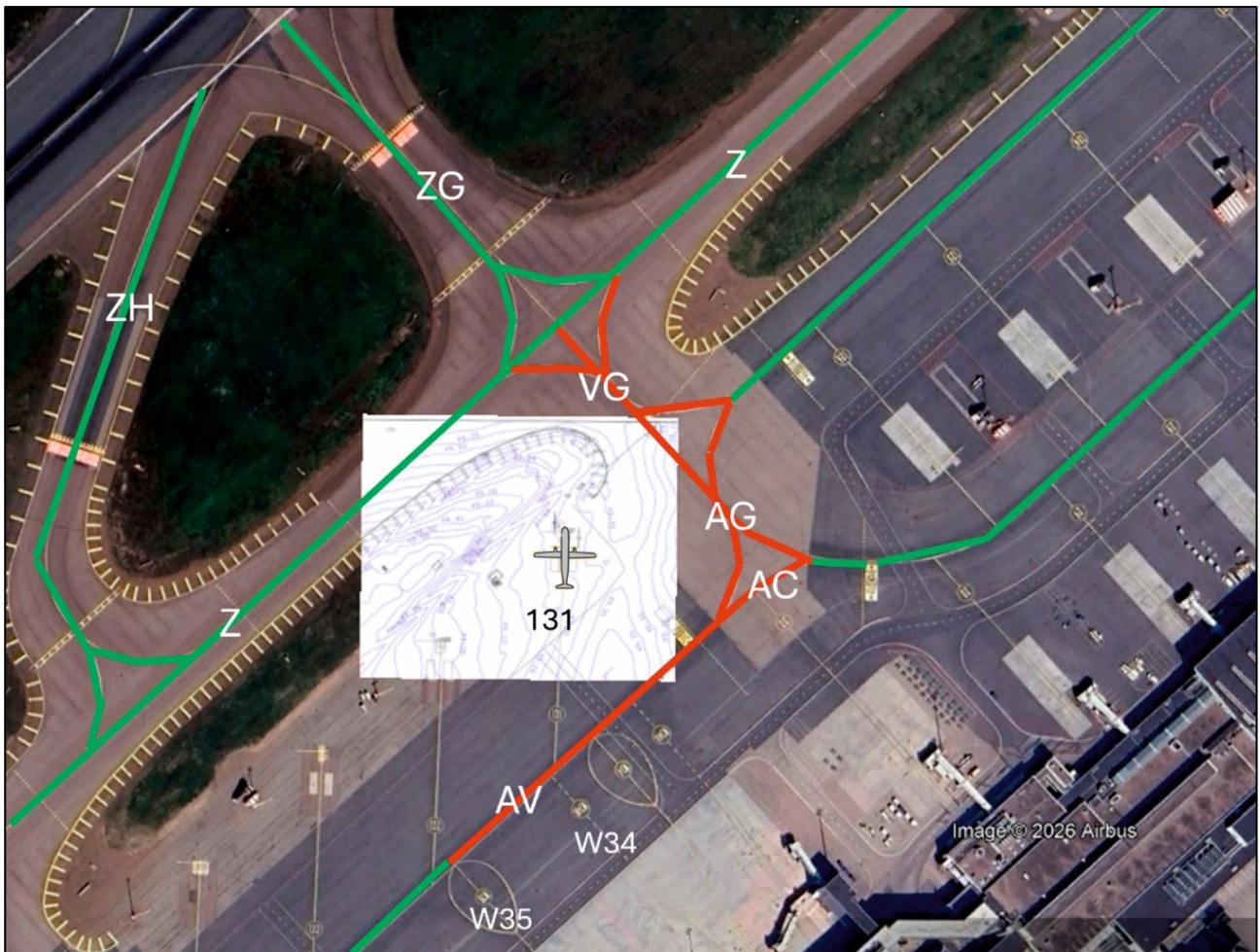


Figure 8. Taxiways closed immediately after the occurrence are shown in red. (Photo: Finavia and Google Earth, annotations SIAF)

2.1.4 Ground Power Unit

The Guinault GA90V13D1100¹⁴ mobile GPU was manufactured in 2019. Airpro rents ground support equipment from TCR Finland, and they are managed by Finnair for turnaround of airplanes operated by Norra and Finnair.

The GPU supplies electrical power to the airplane for predeparture checks and maintenance purposes when the engines are not operating. The GPU enables the operation of the airplane's electrical systems including cockpit avionics, lighting and air conditioning, conserves engine and auxiliary power unit hours and saves fuel. GPUs are widely used at airports in particular by commercial operators.

The 260 l fuel tank of the GA90 consists of two molded compartments attached to the chassis on either side of the generator and interconnected by a rigid tube mounted on the chassis. The fuel supply line draws fuel from the right-hand compartment, while the return line is connected to the left-hand compartment.

¹⁴ The Guinault GA90 ground power unit operates on 115/200 V 400 Hz voltage. Its dimensions are length 3,300 mm, width 1,880 mm and height 1,790 mm. The unit weighs 2,200 kg.



Figure 9. Guinault GA90 ground power unit. (Photo: TCR Finland)

2.2 Conditions

Weather at the airport at the time occurrence was partly cloudy. ATIS¹⁵ broadcast at 1020 included temperature +16 °C, wind from 280° at average speed of 9 m/s and good visibility. The apron was dry. A TAF¹⁶ issued at 1020 forecast possible gusts and rain showers.

Weather conditions did not contribute to the occurrence. Strong wind scattered debris over a large area.

¹⁵ ATIS (automatic terminal information service) is an automatic service providing by means of voice broadcasts information such as current meteorological conditions. "METAR EFHK 160720Z 28015KT 250V310 9999 FEW026 SCT049 15/09 Q1004 NOSIG=."

¹⁶ TAF (terminal area forecast) is a statement of meteorological conditions expected at an aerodrome, provided by the Finnish Meteorological Institute. "TAF EFHK 160529Z 1606/1706 28013KT 9999 BKN045 PROB40 TEMPO 1606/1618 30015G27KT TEMPO 1610/1622 FEW030CB=."

2.3 Recordings

2.3.1 Flight Data Recorder

A flight data recorder (FDR)¹⁷ records a wide range of performance parameters associated with airplane motion, flight control inputs and engine and systems operation. Figure 10 shows traces derived from the airplane's FDR. The yellow box marks the 35 s timeframe inside which the aircraft starts moving, the engine hits the GPU and the flight crew shuts down the engines.

The left engine (engine 1) was started first. The absence of a propeller speed (NP1) parameter suggests that condition lever no. 1 (CL1) remained in the feather (FTR) position during the initial start-up sequence. The right engine (engine 2) was then started. Torque on both engines increased and stabilized at approximately 6 %, while propeller speeds increased and stabilized at 70.5 %, which is the nominal value with the respective condition lever set to AUTO.

The airplane started moving, and ground speed increased during approximately 12 seconds.

Longitudinal acceleration exhibited a sudden peak of approximately +0.23 g, corresponding to rapid deceleration. Simultaneously, ground speed decreased to zero, and propeller speed decayed by nearly 30 % (70.5 % → 42.75 %), and then increased by more than 30 % until reduced again (76 % → 70.5 %) after 5 s. Engine no. 2 torque momentarily more than quadrupled until restored to the previous value (6 % → 24.74 % → 6 %). These abrupt and transient parameter variations are consistent with a propeller strike against the GPU.

Approximately 8 seconds after the impact, fuel flow to both engines decreased to zero, indicating that both engines were shut down.

¹⁷ A flight data recorder stores information of airplane operation and is one component of the combination recorder, also called "black box."

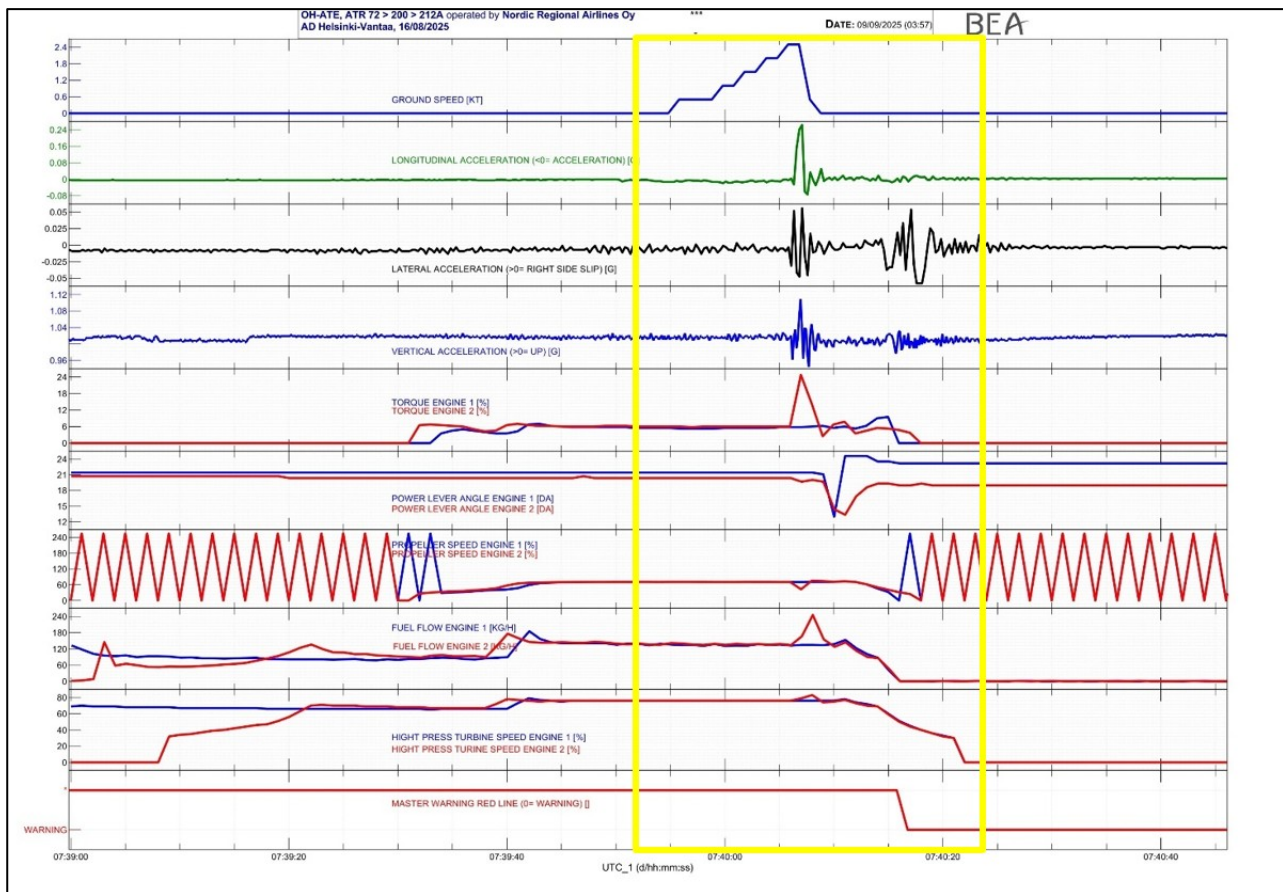


Figure 10. Flight data recorder data. The yellow box marks the 35 s timeframe inside which the propeller hit the GPU and the crew shut down the engines. (Figure: BEA, annotations SIAF)

2.3.2 Cockpit Voice Recorder

Downloading of cockpit voice recorder (CVR) data at the facilities of the Bureau of Enquiry and Analysis for Civil Aviation Safety of France (BEA) produced six discrete audio channels.

The 11 min recording from the occurrence flight begins when the first engine is started and ends when the flight crew switches off electrical power. Flight crew actions before the start-up of the of first engine were not captured.

Right engine start-up, flight crew conversation and passenger announcements are heard on the recording together with communication between the flight crew and the cabin crew, and between the flight crew and ATC.

The sound of the propeller striking the GPU and subsequent flight crew actions are heard clearly on the recording, which ends with the flight crew reading the Parking and Leaving Aircraft checklist.

2.3.3 Other Recordings

The Emergency Response Center Agency released for the investigation team occurrence-related event logs, emergency call and radio communication recordings, recorded communication via talkgroups established in the nationwide public safety network and footage of emergency vehicle dashboard cameras.

Extensive aerodrome surveillance camera footage yielded a clear picture of the course of the occurrence.

2.4 Organizational and Management Information

2.4.1 Personnel Information

The airplane crew consisted of two flight crew members and two cabin crew members. The PIC and the FO held valid licences, ratings and certificates and had completed required refresher training including evacuation drills.

Because they had operated domestic and regional services during the two weeks preceding the occurrence they had experienced little effects of time zone stress. Their roster for the day of the occurrence had begun at 0530 and was scheduled to end at 1535.

The PIC, who held a valid flight crew license and a medical certificate, had two days off before the occurrence. The FO also held a valid flight crew license and a medical certificate. He had reported for duty on the day before the occurrence after having two days off. The flight crew members' assignments and rest periods for the fortnight preceding the occurrence were in compliance with the applicable rosters.

Table 1. Flight crew's flying experience.

Flight hours	Last 24 h	Last 30 days	Last 90 days	Total
Pilot-in-command				
ATR 72	2 h 20 min	61 h 55 min	108 h 21 min	2,850 h 15 min
Total	2 h 20 min	61 h 55 min	108 h 21 min	4,470 h 42 min
First officer				
ATR 72	9 h 2 min	57 h 04 min	137 h 58 min	457 h 29 min
Total	9 h 2 min	57 h 04 min	137 h 58 min	701 h 39 min

The cabin crew consisting of a cabin crew member (CCM) and a senior cabin crew member (SCCM) held a valid cabin crew attestation (CCA) and a medical certification. The CCM and the SCCM had been on duty on three and two days preceding the occurrence, respectively. Their assignments and rest periods during the fortnight preceding the occurrence were in compliance with the applicable rosters.

The tug operator and the dispatcher were Airpro employees. After the tug operator had towed the airplane from the maintenance hangar to the stand and driven away, the dispatcher arrived to assist the flight crew during departure. The tug operator and the dispatcher had undergone Airpro's in-house training.

Airpro uses a digital competence management system. All employees must receive training in accordance with the company training program before undertaking operational tasks. The aim of the three-day training course is to ensure that new employees get the knowledge, skills and attitude they will need to carry out their assigned tasks safely and effectively. Responsibility for training is with Airpro's head of training and training specialists.

Airport operated the buses that took the passengers to the terminal.

2.4.2 Organizations and Safety Management

Norra (Nordic Regional Airlines) operates domestic and European services on behalf of Finnair. Norra is a jointly owned company, in which Danish Air Transport and Finnair hold 60 % and 40 % of the shares, respectively. Its 24-aircraft fleet consists of 12 ATR 72s. As an air operator certificate holder, Norra is responsible for the airworthiness of its aircraft and ensures that they are maintained in accordance with an approved maintenance program. Maintenance, repair and modifications must be performed in a certified maintenance organization approved by the competent authority. Norra has in place a line maintenance contract with Finnair, while base maintenance is outsourced to Solinair, a Slovenian maintenance, repair and overhaul organization.

Norra uses Aviation Quality Database (AQD) safety management system that includes a reporting function. Aviation stakeholders are obliged to exercise safety management in order to recognize operational hazards, assess the impact of related risks and execute actions needed to eliminate these risks or reduce them to an acceptable level. About 4,000 quality and occurrence reports are entered in the system annually. Of some 2,300 safety occurrence reports submitted in 2025, 74 were related to flight crew actions, whereas in 2023, the number of reports in this category was 31, and in 2024 the number was 48. Recurring topics in flight crew related safety observations were anomalies linked to approach speeds and stabilization of approaches¹⁸ and to taxi and powerback¹⁹ speed exceedances. Three parking brake related reports – one of which pertained to the investigated occurrence – were filed in 2023–2025.

Airpro offers apron and customer services across 11 airports in Finland. In 2024 the company, which is a subsidiary of Finavia, had some 1,400 employees and its revenue was about 84 million euros. Approximately one half of company personnel is positioned at Helsinki airport.

About 4,000 to 5,000 safety observations are entered in the company's safety reporting system each year. In 2025 the number of reports was about 6,500, of which 1,500 were related to delays of various nature. 55 towing-related reports, of which 7 were submitted in 2025, were recorded at Helsinki airport in the last four years. Recurrent themes in these reports were shift manning, technical issues and delays.

2.5 Preventive Actions of Authorities

The Finnish Transport and Communications Agency Traficom ensures that the safety standards and procedures in Finland's aviation meet international standards and European Union (EU) requirements. To carry out its assigned task, Traficom oversees and audits Finavia and Fintraffic operations and issues national aviation regulations and supplementary advisory circulars. Regulations and circulars of a general nature are grouped in GEN series of documents, in which circular GEN T1-4²⁰ contains guidelines for reporting of accidents, serious incidents and occurrences in aviation, and GEN M1-3²¹ covers ground handling at airports.

¹⁸ Criteria for stabilized approach are in Norra's Operations Manual Part A, para. 8.3.1.7.2.

¹⁹ Powerback is the maneuver where an aircraft reverses under its own engine power.

²⁰ Traficom (2021). Advisory circular GEN T1-4. Revision 7.0.
https://www.traficom.fi/sites/default/files/media/regulation/Ilmailuohje_GEN%20T1-4_rev%207%2027122021_final2.pdf

²¹ Traficom (2024). Regulation GEN M1-3.
https://www.traficom.fi/sites/default/files/media/regulation/Maarays_GEN%20M1-3_2024_final.pdf

2.6 Rescue Services and Their Preparedness

Finavia operates Helsinki airport and maintains regulatory around-the-clock rescue service to respond to aviation accidents and incidents in airport premises and surrounding areas. Regulations governing the provision of rescue services include the Convention on International Civil Aviation²², Aviation Act²³ and Commission Regulation (EU).²⁴ Aeronautical search and rescue service arrangements are detailed in Traficom regulation ANS M1-6 and in the Aeronautical Search and Rescue Manual issued by Fintraffic Air Navigation Services.

Finavia launched in early 2025 a project to revamp rescue services at the airport. As part of the revamp, a revised minimum response directive became effective on January 1, 2025. The document details staffing strength and deployment of personnel within the airport area.

The air traffic control (ATC) facility is equipped with an alert button that relays an alert direct to the ERC and airport rescue service. Upon receiving an alert, the ERC activates predetermined emergency response services. The number and type of responding units is adjusted based on additional information from ATC or on orders from the incident commander or the medical rescue director. Tasking is relayed to Eastern Uusimaa Police Department and the airport security control room. Additional resources in case of an aviation emergency at the airport are requested primarily from Central Uusimaa and Helsinki Rescue Departments. Aerodrome rescue and firefighting (ARFF) categories are defined in aviation regulations and based on the size of aircraft using the aerodrome, and each aerodrome shall ensure that its readiness is compatible with the applicable ARFF category.

Fintraffic Air Navigation Services is responsible for airspace management and delivery of air route and air navigation services in Finland.

Central Uusimaa Rescue Department provides services in Vantaa-Kerava and Central Uusimaa Wellbeing Service Counties under a contractual arrangement. Its area of operation includes the municipalities of Vantaa and Tuusula, and therefore the department is responsible for overall command and control of rescue operations at the airport and in its vicinity and for incident command and control in the event of an accident or a hazardous situation in its assigned area. The department is also responsible for rescue services response planning in its area.

For these contingencies, the department has in place a rescue plan, which states that as part of exercising overall command and control the department allocates necessary resources and issues appropriate orders in the event of an aviation accident. Although the focus of the plan is on accidents that may occur in the vicinity of Helsinki airport, it may be applied across entire Central Uusimaa region and to other accident categories.

Eastern Uusimaa Police Department's area of responsibility covers 15 municipalities in the eastern and central parts of Uusimaa region, including the airport. The department is responsible for the maintenance of general order and safety at the airport, where it has a service desk for use by passengers. In the event of an accident, its tasks include ensuring unhindered rescue operations and arranging receipt of passengers in the terminal building in cooperation with other authorities.

Hospital District of Helsinki and Uusimaa's area of responsibility encompasses the airport, which is recognized as a high-priority target in the decision on the standard of service.

²² Decree on implementation of Convention on International Civil Aviation 22.4.1949/331 (SopS 11/1949).

²³ Aviation Act 864/2014.

²⁴ EU Commission Regulation (EU) N:o 139/2014.

Response planning for paramedic services including psychosocial help is assigned to the district. The district's hospitals are prepared to accept a large number of injured persons in case of a potential or an actual accident. Victims are triaged based on the severity of their injuries and transported to hospitals to be treated in intensive care and other wards or to be transferred to other hospitals. Hospitals receive an advance notice of a probable or actual aviation accident as part of the established rescue services alerting procedure. The district has in place a cooperation agreement with Central Uusimaa Rescue Department for initial response actions and urgent paramedic care. The district has also in place a cooperation agreement with the airport rescue service for initial response at the airport.

2.7 Regulatory Framework

Annex 14 to the Convention on International Civil Aviation issued by the **International Civil Aviation Organization** (ICAO) contains standards for aerodrome design and operations, while the contents of aeronautical information services is defined in Annex 15. ICAO member states shall adhere to standards and recommendations issued by the organization unless they have notified ICAO of national differences. ICAO does not require ground handling service providers to establish a separate safety management system.

Regulation (EC) No 2018/1139 of the European Parliament and of the Council lays down essential requirements for the provision of ground handling services at aerodromes. The regulation states that the provider of ground handling service is responsible for the safe operation of its activities at the aerodrome, while the national competent authority shall be responsible for the oversight and enforcement tasks with respect to organizations responsible for the provision of ground handling services. In Finland, this authority is the Finnish Transport and Communications Agency Traficom.

Commission Regulation (EU) No 965/12 stipulates that every aircraft operator shall establish and maintain a comprehensive safety management system (SMS). Essential safety management requirements are in Annex III Part ORO.GEN.200.²⁵ The operator is required to identify safety hazards entailed by its activities and evaluate associated risks in a proactive manner. The SMS shall promote an open safety culture and active occurrence reporting.

The European Union Aviation Safety Agency (EASA) issues regulations and acceptable means of compliance that EU member states shall comply with. EASA regulations are based both on ICAO standards and recommendations and on EU's directives and implementing regulations issued by the EU Commission. EASA provides guidance to and oversees the aviation safety authorities of EU member states and publishes the Standardised European Rules of the Air (SERA) series of regulations.

SERA.14095²⁶ defines distress and urgency conditions as follows:

- i) Distress is a condition of being threatened by serious and/or imminent danger and of requiring immediate assistance.
- ii) Urgency is a condition concerning the safety of an aircraft or other vehicle, or of some person on board or within sight, but which does not require immediate assistance.

²⁵ EASA (2016). Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Annex III – Part-ORO. https://www.easa.europa.eu/sites/default/files/dfu/Consolidated%20unofficial%20AMC&GM_Annex%20III%20Part-ORO.pdf

²⁶ <https://www.easa.europa.eu/en/document-library/easy-access-rules/online-publications/easy-access-rules-standardised-european>

The rule also states that the radiotelephony distress signal “mayday” and the urgency signal “pan pan” shall be used at the commencement of the first distress and urgency communication, respectively. The use of concise standard terms in distress and urgency conditions is essential because specific key words combined with correct phraseology will initiate a correct action. A “mayday” or a “pan pan” signal is easily distinguishable among normal radio chatter and allows the receiver to classify the situation immediately as a distress or an urgency condition and to trigger the correct procedure. If plain language were used, the message would not necessarily be understood, and initiating the correct action in a critical situation could be time-consuming, or the message might remain unregistered or be disregarded.

The Finnish Transport and Communications Agency Traficom issues national aviation regulations and supplementary advisory circulars. Regulation GEN M1-3²⁷ applies to organizations which offer ground handling services for commercial air transport on such airports to which the EASA regulation applies.

The regulation contains obligations for the airport operator, the aircraft operator and the ground handling service provider. The aircraft operator is required to ensure that the service provider’s operations comply with aviation safety requirements. This means that the operator must be satisfied that the service provider has the appropriate instructions and equipment and its personnel have necessary training for the operator’s operations and equipment. The ground handling service provider is obliged to ensure that its operations comply with the specific ground handling conditions and instructions. It shall also have instructions and procedures for the safe use of its equipment as part of its SMS.

2.7.1 Norra’s Procedures

Standard operating procedures (SOP) are a set of instructions and procedures that prescribe exactly how aircraft crew and ground crews should conduct routine tasks in a consistent manner during all flight phases from predeparture preparation to post-flight actions. SOPs ensure that all involved persons have a common understanding regardless of the situation at hand, and that they adhere to procedures established for safe operation by the aircraft operator and the manufacturer.

SOPs are documented in the aircraft operator and manufacturer’s operation manuals and aircraft type specific checklists. Aircraft manuals include an expanded checklist that breaks down check items into step-by-step actions to be done by a specified flight crew member, while during various flight phases the flight crew runs the applicable abbreviated checklist. SOP training is an essential part of an aircraft type rating course.²⁸

Crew resource management (CRM)²⁹ is implemented to improve the crew's interpersonal and external communication, workload management, decision making, leadership, situational awareness, use of available resources and threat and error management.

The objective of CRM is to achieve clear and accurate communication and task sharing between the crew members. Situational awareness is maintained by perception of the aircraft’s status and environment, while structured decision-making models help the crew to

²⁷ Finnish Transport and Communications Agency (2024) GEN M1-3, Regulation – Ground Handling at Airports.

²⁸ An aircraft type rating course is required for flight crew to legally operate a specific aircraft type such as the ATR 72 or the A320. The course, which is divided into theoretical training, procedures training, emergency training and simulator training (theoretical knowledge examination and check flights) phases, will be taken by all flight crew members assigned to fly a specific aircraft type.

²⁹ Norra’s crew resource management is described in Operations Manual Part A, para. 8.3.1.8.

handle challenging situations. Leadership is based on the targeted and optimized use of available resources.

Checklists ensure that all crucial tasks are performed correctly and systematically during every flight phase. They eliminate reliance on memory alone for error and lapse prevention, support correct task sharing in the cockpit and release the flight crew's capacity for other actions. They cover procedures for normal and abnormal operation and emergency situations.

Checklist task assignment is not necessarily based on the roles of the PIC and the FO. It can also be built on the designated roles of the pilot flying (PF) and the pilot monitoring (PM), or in specific situations, such as during taxi, on the crew members' seating position, i.e., left pilot (LP) and right pilot (RP).

Types of checklists and their execution methods are:

1. Read-and-do checklist

The PM reads each item aloud and immediately performs the corresponding action. This method works well on the ground and in other situations where actions are performed sequentially one at the time.

2. Challenge-and-response checklist

The PM reads an item aloud and the PF verifies that the corresponding action is performed. This method is used in flight and in critical phases where mutual understanding between the pilots must be ensured.

3. Flow

This method means a series of actions where the pilot checks the aircraft systems and functions in a memorized, logical sequence and verifies each item either mentally or verbally to set the aircraft correctly for each flight phase.

Abnormal and emergency checklists are usually based on the read-and-do method. Both pilots are responsible for maintenance of situational awareness while the PM runs the checklist, the PF concentrates on flying the aircraft and at the same time follows checklist work.

Norra's ATR 72 checklists cover both normal and abnormal operation.³⁰ Their purpose is to ensure that the airplane is operated properly and is in acceptable condition for flight.

Checklists and procedures are developed by the aircraft operator using the airplane manufacturer's recommendations. An operator is allowed to amend checklists in order to adapt them to its operations provided they remain compliant with the AFM³¹. Norra has made significant changes and reorganizations in the pre-departure procedures and checklists compared with the manufacturer's documents (see figures 11 and 12).

Norra's checklist policy states that checklists that a single flight crew member runs independently and therefore do not require interpersonal communication can be completed using the flow method, but all items must be verified by reading aloud and using the applicable checklist, whereas checklists that require interpersonal communication or are not related to daily routines must be performed using the read-and-do procedure.

³⁰ Norra's checklists and checklist procedures are described in Operations Manual Part B, para. 2.3.

³¹ The Aircraft Flight Manual is an official document created by the airplane manufacturer.

The predeparture procedure states that the PF prepares the cockpit while the PM performs the external inspection of the airplane.³²

The Cockpit Preparation checklist may be omitted during a turnaround when aircraft electrical system is not switched off, and the flight crew is not changed. On the other hand, it must be run after any maintenance action or in case the cockpit has been left unsupervised.

Setting parking brake is mentioned halfway down the Cockpit Preparation checklist. In the expanded checklist, the parking brake procedure includes checking and if necessary, raising accumulator pressure and engaging the brake.

ATR 72-500 NORMAL CHECKLIST	
Crew at station	
*Oxygen masks	Chk
*Lateral switches	Chk
Systems	Test
N/W steering	As Req
Landing elevation	Set
Altimeters	QNH xxx, xxx ft QNH xxx, xxx ft
Fuel quantity	Actual block Rq block
To briefing	Performed
Before engine start	
Signs	Set
Nav/TMS	Set/Chk
Parking brake	Chk
Doors	Closed
Fuel pumps	On
Tail prop	Removed
Beacon	On
After engine start	
Emergency lights	Armed
Antiskid	Tested
Flaps	15°
XPR	Alt
APM	Set
Overhead panel/Anti-ice	Set
AFCs	Set
N/W Steering	On
Speeds/trim	Set
Taxi	
T/O briefing	Reviewed/Set
T/O config test	Performed
Air bleed	Norm
Cabin	Clear

EFB	Check
CB Panels	Check
Batteries	On
Ext pwr	On
MIN Cabin light	On
Fuel	Check
Doors	Check
Spl	Check
Ldg gear	Check
MFC	Check
ENG 1 Fire protection	Check
Ext light	As required
Propeller brake	Check
CVR/DFDR	TEST
Anti-icing/Deicing	Check
HTG	Check
ACW Elec pwr	Check
Hydraulic	Check
ELT	Check
Ann lgt	Test/As required
Air bleed/comp temp	Check
Oxygen	Check
Avionics Vent	Auto
Compit sink	Check
ENG 2 Fire protection	Test
Trims	Check
Radios/ADF	On
XPR/TCAS	Stby/Test
Idle gate	Check
Emer audio cancel	Check
Parking brake	Set
Engine levers	Check
Flight controls/Flaps	Check
Radar	Stby
NAV's	On
ADU	SET
EFIS	On
ADC	SET
Stby instr	Check
Pwr mgt	TO
PEC/EEC	ON
ENG instr	Check
Fuel	Reset
Pressurisation	Check
Stick pusher/Shaker	Check
Anti skid	Check
Landing gear	Down
APM	Check
Gear pins	On Board
Cockpit Door Locking System	*Check/On

H-MODE CHECKS:	
• ENG 2 fire protection	
• PEC/EEC	
• PL/CL	
• Parking brake	
• WFT ON	
H-MODE START:	
• Doors (right side)	
• ENG 2 fuel pump	
• Wing light	
• Prop brake	

Figure 11. Norra's ATR 72 normal checklist with parking brake related items outlined in yellow. (Figure: Norra, annotations SIAF)

³² Norra's cockpit preparation is detailed on the reverse side of the abbreviated checklist.

FINAL COCKPIT PREPARATION	
PARKING BRAKE.....	ENGAGED/PRESS CHECKED
ALTIMETERS.....	SET & CHECKED
LANDING ELEVATION.....	SET
GNSS / COM / NAV (GPS).....	SET
FUEL QTY.....	CHECKED
ENG FUEL USED.....	RESET
MEMO panel.....	CHECKED
PWR MGT.....	TO

BEFORE PROPELLER ROTATION	
CDLS (if installed).....	ON
T.O BUGS.....	SET & CHECKED
TRIMS (3 axes).....	SET
TAIL PROP.....	ON BOARD
DOORS.....	CLOSED
SEAT BELTS.....	ON
BEACON.....	ON

BEFORE TAXI	
PROP BRAKE.....	OFF
COCKPIT COM HATCH.....	CLOSED
CL 1 + 2.....	AUTO
ANTI-ICING.....	AS RQRD
ANTI-SKID TEST.....	PERFORMED
FLAPS.....	15°
NWS.....	ON

TAXI	
TAXI & T.O LIGHTS.....	ON
BRAKES.....	CHECKED
AFCS / ADU.....	SET / CHECKED
TO CONFIG TEST.....	PERFORMED

Figure 12. The airplane manufacturer’s normal checklist. (Figure: ATR)

Abnormal and emergency checklists are run using the read-and-do method except for memory items,³³ which are read in the quick reference handbook.³⁴ When memory items are needed, the pilot calls “memory items (for the failure).”

In the event of exceptional conditions on the ground during taxi, takeoff and landing the PIC calls “cabin crew at stations, cabin crew at stations.” The flight crew assesses the severity of the situation, and the cabin crew prepares for evacuation. The PIC shall terminate the situation by calling “cabin crew, normal operation.”³⁵

³³ Memory items are critical actions that must be taken in response to a non-routine event so quickly that reference to a checklist is not practical in order to regain control of the aircraft.

³⁴ A quick reference handbook contains procedures for abnormal and emergency situations in an easily and quickly accessible format.

³⁵ Norra’s procedures for abnormal situations on the ground are described in Operations Manual Part B, para. 3.1.1.

CALL-OUTS – ATR 72		
EMERGENCY CALL-OUTS		
CALL-OUT	SITUATION	CABIN CREW ACTIONS
PREPARED EMERGENCY LANDING		
"CHIEF OF CABIN TO COCKPIT, CHIEF OF CABIN TO COCKPIT" or EMER CALL (by pressing ATTND CALL button several times) (PA failure: 6 or more chimes with SEAT BELT sign)	EMERGENCY	SCCM reports to cockpit immediately. SCCM needs information about the following five things: <i>Why? / Where? / When? / Reseating? / Who will inform passengers?</i>
"BRACE FOR IMPACT, BRACE FOR IMPACT" (PA failure: 6 or more chimes with SEAT BELT sign)	Approximately 2 minutes before impact	"Cabin clear" report to cockpit at the latest. Cabin crew shall take their assigned duty stations and repeatedly order passengers to bend down.
AFTER EMERGENCY LANDING		
"CABIN CREW AT STATIONS, CABIN CREW AT STATIONS" (PA failure: Call-out not usable)	Right after aeroplane has come to a complete stop	Cabin crew shall open their seat belts, assess the situation and outside conditions, and wait for the next order.
"EVACUATE, EVACUATE, EVACUATE" (PA failure: 6 or more chimes with ATTND CALL button)	EVACUATION	Cabin crew verify outside conditions, open the exits and order passengers out by shouting, using all available exits.
"CABIN CREW, NORMAL OPERATION" followed by a calm, explaining announcement to passengers (PA failure: 2 chimes with ATTND CALL button)	No danger, passengers shall stay at their seats	If CDR does not immediately make the announcement, SCCM must order passengers to stay seated and inform them that CDR will give further information.
ABNORMAL SITUATION ON GROUND OR IN-FLIGHT		
"CABIN CREW AT STATIONS, CABIN CREW AT STATIONS" (PA failure: Call-out not usable)	Due to exceptional conditions on ground or in-flight, CDR wants cabin crew to be especially alert. CDR terminates situation by giving call-out or by calling cabin crew via interphone.	Cabin crew must take their assigned duty stations, be alert, assess inside and outside conditions, and wait for the next order.
"CABIN CREW, TAKE YOUR SEATS" (PA failure: Call-out not usable)	Rough turbulence. Not enough time to inform cabin crew via interphone.	Cabin crew must sit down immediately, secure themselves and trolleys as situation allows and order passengers to fasten their seat belts.
"PASSING 13 000 FT"	Decompression. When safe altitude is reached after emergency descent.	Cabin crew take and use their 120 l oxygen bottles, check the cabin, and report injuries and damages to flight crew.

Figure 13. ATR 72 emergency callouts and cabin crew actions. (Figure: Norra)

The airplane manufacturer's Flight Crew Operating Manual (FCOM)³⁶ lists actions in the event of severe mechanical damage on the ground and indicates that the flight crew shall shut down the engines in a controllable manner and apply the emergency evacuation procedure if required.

³⁶ ATR 72-500 emergency procedures are in Flight Crew Operating Manual section FC/75.

ENG 1(2) SEVERE MECHANICAL DAMAGE - Alert - (without Dedicated Alert) - on Ground		
ENG 1(2) SEVERE MECHANICAL DAMAGE - Alert - (without Dedicated Alert) - on Ground		
41516efb-ecfd-499e-9f6-67d578e29862		
NEW		
18 OCT 2024		
ALL		
CONDITION	VISUAL	AURAL
Severe mechanical damage on ground can be recognized by: Any abnormal noises	NIL	NIL
- OR -		
Any abnormal vibrations		
- OR -		
Non-response of the engine to power lever movement		
- OR -		
Severe variations of the engine parameters: TQ, NH, fuel flow, ITT, loss of power....etc.		

ENG 1(2) FIRE OR SEVERE MECHANICAL DAMAGE ON GROUND		E70.03
▶ AIRCRAFT..... STOP <i>Set PL on GI position, reverse as required</i> ▶ BRAKE HANDLE..... PARKING ▶ CL 1+2..... FTR THEN FUEL S.O. ▶ FIRE HANDLE (affected ENG)..... PULL ■ If fire persists ▶ AGENT 1 (affected ENG)..... DISCH ■ If fire persists 30 s after AGENT 1 DISCH ▶ AGENT 2 (affected ENG)..... DISCH ▶ ATC (VHF 1)..... NOTIFY <i>Only VHF 1 available on battery</i> ■ If evacuation required ▶ EMERGENCY EVACUATION (ON GROUND) procedure (E99.05) APPLY		

Figure 14. Emergency procedures the airplane manufacturer's FCOM. (Figure: ATR)

Norra's abnormal procedures³⁷ are described in the FCOM. Seamless crew cooperation is essential during abnormal situations in flight. The procedures prescribe that although the PIC is responsible for task assignment, this does not detract from the FO's responsibility to offer assistance when necessary.

Norra applies in its flight operations the FORDEC model,³⁸ which is a decision-making tool used in aviation and other industries involving critical situations. It provides a logical and structured framework that helps decision-makers such as pilots to act efficiently and reduces the possibility of errors also in high-pressure and time-critical situations.

2.7.2 Airpro's Procedures

Airpro has produced a Ground Operations Manual (GOM)³⁹ and a Ground Handling Training Manual⁴⁰. The English language GOM is available to employees in company intranet and is accessible via a tablet in working locations. The Ground Handling Training Manual is also available in English. Safety and deicing training are covered in specific manuals.

³⁷ Norra's abnormal procedures are described in Operations Manual Part A, para. 8.9.1.

³⁸ A FORDEC procedure is described in Norra's Operations Manual Part, para. 8.9.2.

³⁹ The Ground Operations Manual contains information and general instructions of procedures and company-specific and general practices to all personnel involved in ground handling tasks both airside and elsewhere at an airport.

⁴⁰ Airpro's ramp service training modules are described in Ground Handling Training Manual, para. 11.4.

Ground handling shall be carried out as described in applicable manuals. Procedures relevant to the investigated occurrence⁴¹ are

- airplane handling during arrival and departure
- airplane departure and dispatching, including predeparture tasks
- powerback
- airplane towing, including towing preparation and completion.

A matter of particular relevance to the occurrence is that according to the instructions the brake operator is responsible for engaging parking brake. The tasks in the instructions are divided between the tug operator and brake operator and should be followed during completion of towing. Airpro has developed a single-person towing procedure in which the tug operator shall engage parking brake when necessary, after towing and follow the airplane operator's parking brake procedure (checklist). Airpro's procedure includes the following caution: "Always follow the checklist. If you do not follow the checklist, serious consequences may result. If a checklist is not available, single-person towing is prohibited."

2.7.3 Fintraffic ANS Procedures

Fintraffic ANS's procedures for abnormal events describe the use of radio frequencies during alerts and rescue operations.⁴²

2.8 Other Investigations

2.8.1 L2025-03 Collision between Airliner and Passenger Stair at Helsinki Airport

On August 28, 2025, soon after opening the probe into the occurrence that is the subject of this report, a serious incident occurred at Helsinki airport when a Boeing 787-9 impacted parked mobile boarding stairs during taxiing-in to the stand next to the terminal building, damaging the left wing and the stair vehicle. The investigation focused on the arrangements and procedures of ground handling services.

2.8.2 Occupational Safety Hazard and Taxi Damage at Helsinki Airport

Finnair conducted an internal investigation into an occurrence that happened on January 27, 2002, at Helsinki airport when an ATR 72 rolled forward during engine start and struck a GPU on stand 124, causing minor damage to the airplane and the GPU and occupational hazard to three ground handling service provider employees. Investigation found that the airplane's parking brake had not been engaged. Contributing factors were slippery tarmac, slightly higher-than-normal propeller thrust and slight incline of the stand. Safety recommendations included amendments to checklist procedures and registration system related instructions and improvement of procedures of ground handling service providers contracted by Finnair. Additional recommendations addressed determination of the ATR's longitudinal balance, investigation into deicing procedures and improved wheel chock management.

⁴¹ The procedures are described in Airpro Ground Handling Manual 0.1, section 4 chapters 4.6 (Aircraft Departure), 4.8 (Powerback) and 4.9 (Towing). Para. 6.6.3.2 (Predeparture Table) contains a checklist for actions to be carried out before the airplane's departure. Paras. 4.9.3.2 (Pre-Towing Preparation) and 4.9.6 (Completion of Towing) are checklist-type descriptions of actions to be performed during preparation and completion of towing, respectively. Para. 4.9.7 (Single-Person Towing) describes Airpro's specific procedure for towing by one person.

⁴² ANS Finland (2020). ATCC Finland TWR/APP TTK OPS liite 5 - Hälytys- ja pelastuspalvelu Helsinki-Vantaan lentoasemalla.

3 ANALYSIS

Investigation used the ACCYAN (Accident Cycle Analysis) method to analyze the event. In this method, developed by the SIAF, the full spectrum of an occurrence is looked at in four phases that are circumstances and conditions, pre-occurrence developments, occurrence sequence and post-occurrence actions. The first two of these, i.e., circumstances and conditions and pre-occurrence developments are “under the surface” and therefore invisible. An occurrence “surfaces” when it happens. The first step in the full procedure is to identify factors that contributed to the occurrence, and the second step consists of drawing conclusions from these factors.

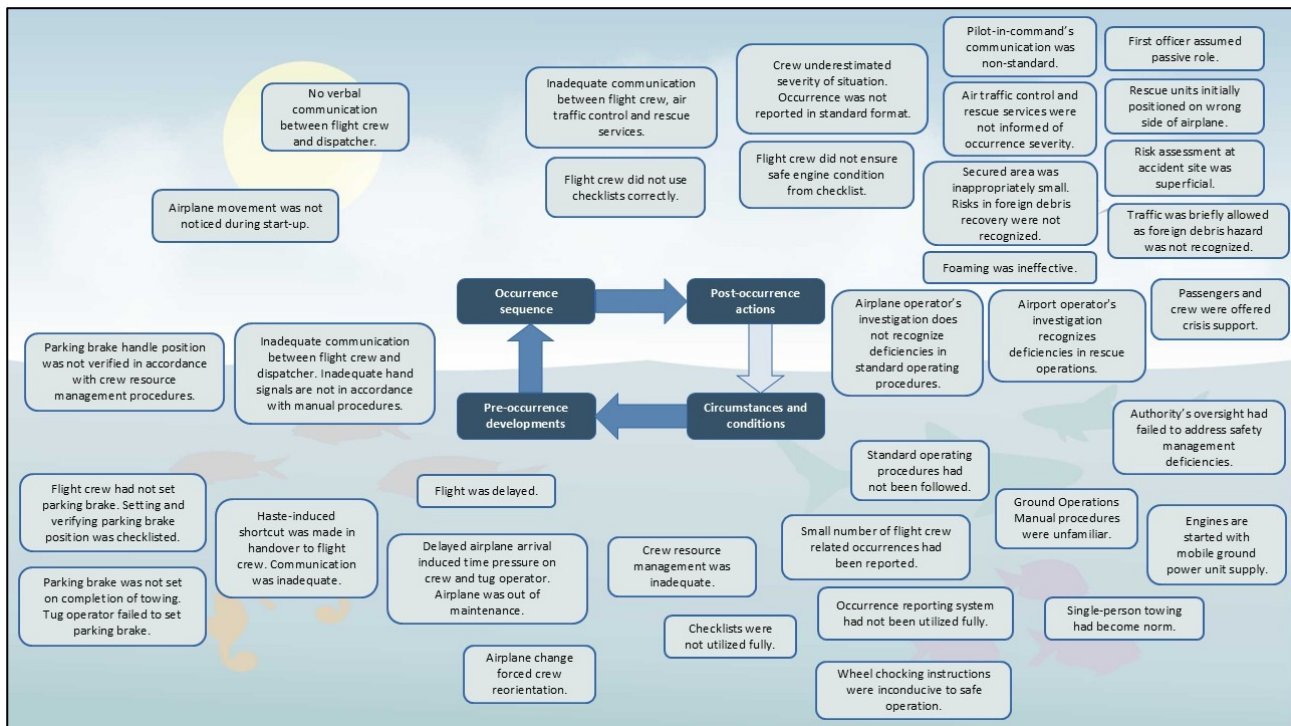


Figure 15. L2025-02 ACCYAN analysis step 1: Identifying contributing factors. (Figure: SIAF)

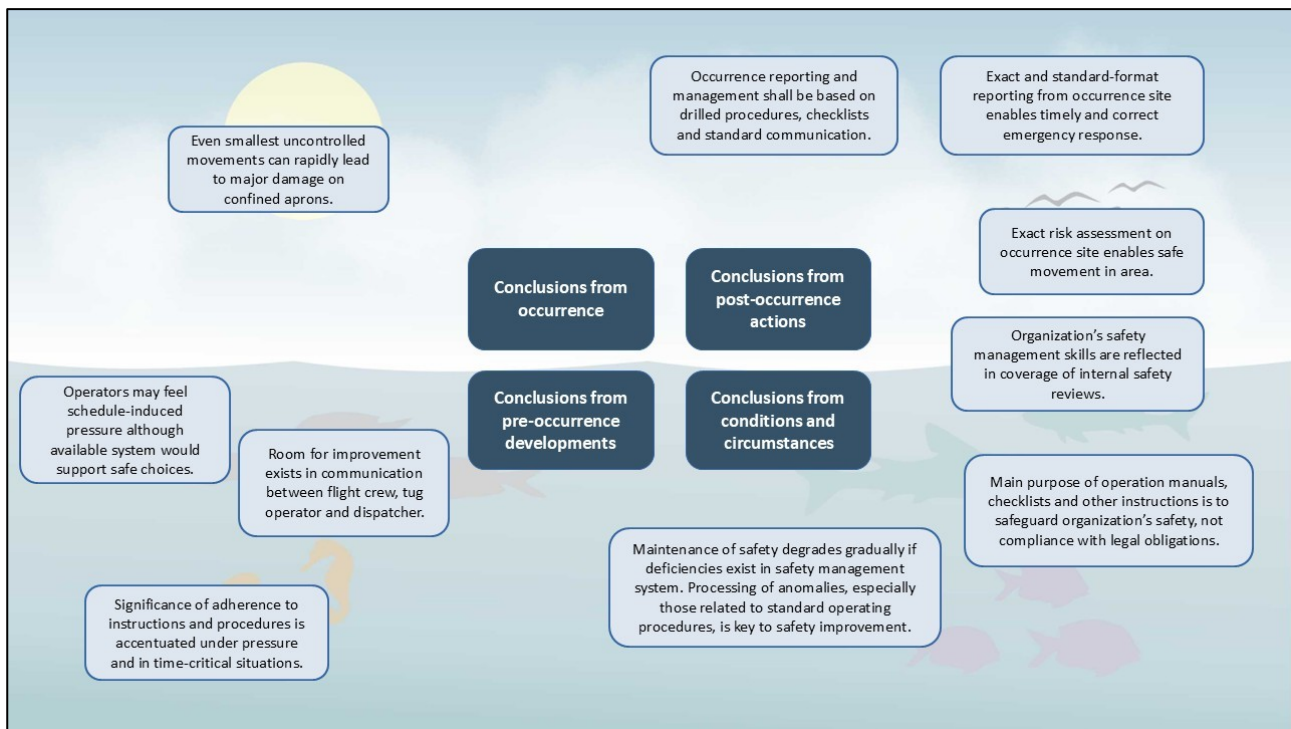


Figure 16. L2025-02 ACCYAN analysis step 2: Drawing conclusions. (Figure: SIAF)

3.1 Circumstances and Conditions

The airplane was towed to the stand where the crew was waiting. Departure was delayed due to an airplane change, and the crew boarded the airplane before the tug operator had completed all his assigned tasks. The cabin crew members were concerned about the positioning of cabin equipment because the airplane had undergone maintenance and wanted to begin preparations before the passengers' arrival.

According to the standard procedure, the airplane is ready on the stand, and the ground handling service provider's employees have completed the parking procedure before the crew's arrival, so in this case established procedures were not followed.

The main purpose of operating manuals, checklists, other documents and procedures is to ensure safe operation of an organization, from which follows that undertaking tasks without reference to applicable instructions jeopardizes safety. Procedures must be properly documented.

Occurrence reports are a source of valuable information for a learning organization to exploit. Inadequate reporting on a safety-critical field seldom indicates that mistakes are not made; instead, it often reflects lack of belief in the usefulness of reporting, fear of being stigmatized in a small organization, or inadequate guidance or encouragement toward assuming correct reporting practices. About three percent of occurrence reports filed in Norra in 2025 were related to cockpit procedures.

Studies⁴³ indicate that about one half of operator-submitted occurrence reports in commercial air transport are cockpit procedures related. This significant discrepancy implies that these occurrences are not recognized, or they are not reported within an organization as frequently as suggested by reference material.

Instead of being a static condition, safety is a continuous process that requires input from every professional involved in order to create an organization that is constantly vigilant and willing to learn even from minor occurrences. Carelessness on part of a single individual is seldom the only cause of a human error.

Norra's procedures had previously stated that the forward nosewheel chock could be left in place after engine start for powerback. This was changed after an International Air Transport Association (IATA) operational safety audit (IOSA) conducted in 2017 found that unnecessary items must not be kept in the equipment restraint area and stated that wheel chocks were considered foreign objects and should be removed before powerback.

Traficom's audit reports did not discuss Norra's reporting on flight crew work, the number of reports, or Airpro's adherence to the applicable ground handling manuals.

3.2 Pre-occurrence Developments

No specific procedure is established for the handover of responsibilities between the tug operator and the flight crew. One of the tug operator's tasks after completion of towing is to enter the cockpit and engage parking brake. Inadequate communication between the operator and the crew combined with non-compliance with an established procedure was a contributing factor in the investigated occurrence.

As a rule, airplane towing is carried out by two persons, one of which operates the tug and the other is in the cockpit to operate the airplane's brakes. The ground handling service provider and the airplane operator together have created a procedure for single-person towing, which was adopted as a standard ATR pushback procedure during 2023.

The tug operator had accustomed to perform his tasks in a specific order, but the routine was interrupted when the flight crew entered the cockpit before he had carried out all steps of the procedure. The flight crew opened the airplane's entry door, although this is usually done by the tug operator. When the tug operator entered the cockpit, he found it already occupied by the pilot-in-command and got an impression that the pilot-in-command was in a hurry since he had already commenced flight crew procedures before the tug operator had completed his tasks and felt that his presence was a hindrance in the cramped space. An airplane cockpit is a confined environment. The ATR cockpit has two seating positions and a jump seat⁴⁴ and may feel a tight fit when the occupants are standing instead of occupying their seats. All this led to the tug operator to leave the cockpit in order to not hamper flight crew actions. A tug operator or other person may find difficult to point out an unusual condition to the pilot-in-command or ask him or her to carry out an action without reference to the checklist or other applicable document or procedure.

⁴³ IATA (2025). Annual Safety Report - 2024. https://www.iata.org/contentassets/a8e49941e8824a058fee3f5ae0c005d9/safety-report-executive-summary-and-safety-overview-2024_final.pdf

ICAO (2025). Safety Report - 2025 Edition. https://www.icao.int/sites/default/files/sp-files/safety/Documents/ICAO_SR_2025.pdf

EASA (2025). Annual Safety Review 2025. <https://www.easa.europa.eu/en/document-library/general-publications/annual-safety-review-2025>

⁴⁴ The jump seat is locked against the cockpit bulkhead and used only during check flights and other special situations.

The flight crew did not engage parking brake or verify brake handle position although this is listed on the reverse side of Flight Deck Preparation checklist and included as an item to be double-checked in Before Engine Start checklist. Company procedures allow a flight crew member to run Flight Deck Preparation checklist using the flow method provided that all items are verified verbally. Flight Deck Preparation checklist shall always be performed when the airplane is out of maintenance or if the cockpit has been left unsupervised.

The dispatcher had no verbal communication with the flight crew. During engine start, he did not show the “verify/set parking brake” hand signal, which could have provided a safeguard and prevented the occurrence. Norra’s Flight Crew Operations Manual does not mention the hand signal. On the other hand, although Airpro’s Ground Operations Manual contains a mention of the hand signal, it is not usually shown.

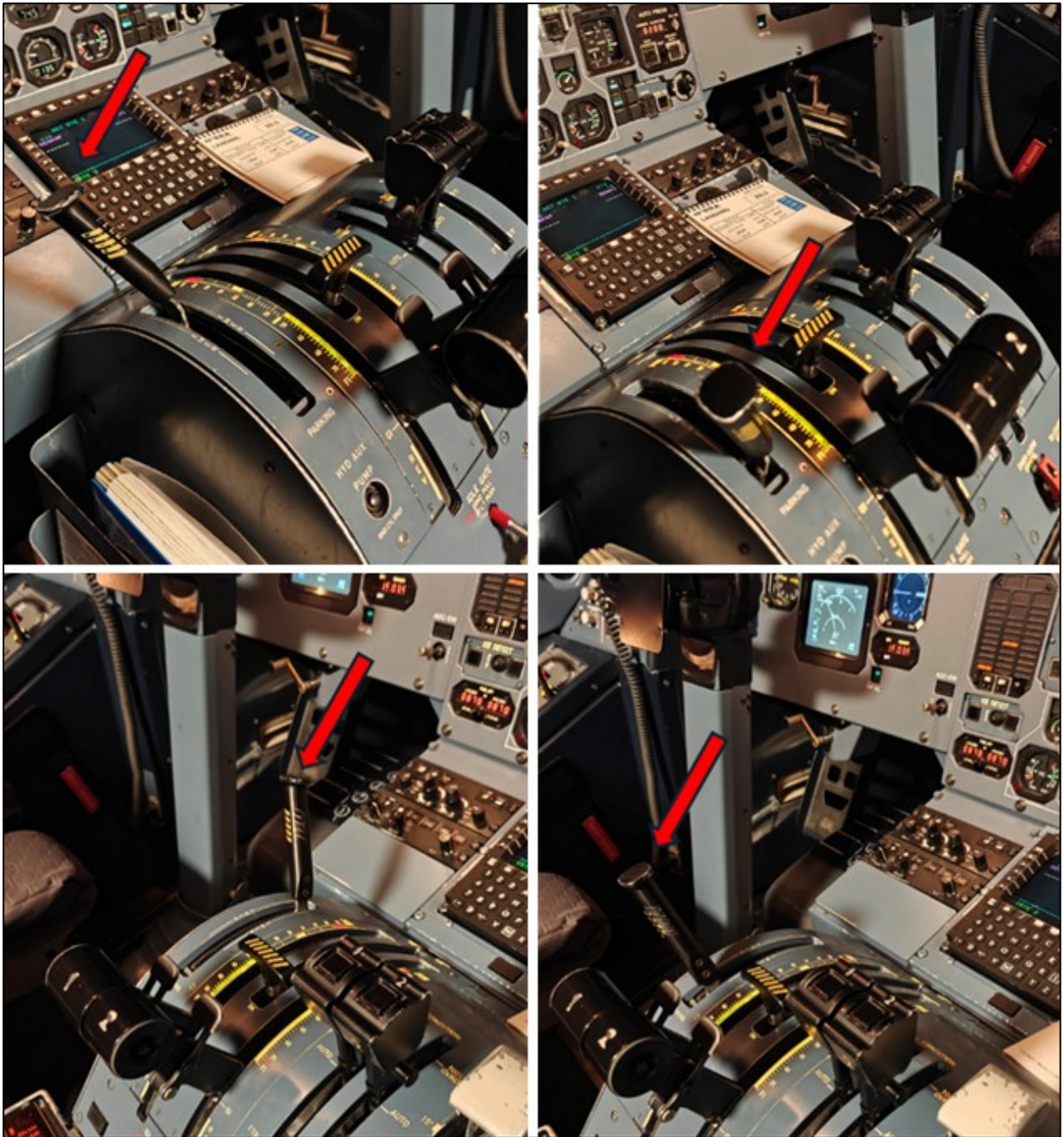


Figure 17. The left-hand photos show the parking brake handle in disengaged position, and in the right-hand photos the handle is in engaged position. The upper and lower photos were taken from the left and right seat, respectively. (Photos: SIAF)

3.3 Occurrence Sequence

Cockpit tasks are divided between the pilot-in-command and the first officer as prescribed in standard operating procedures. The flight crew members failed to notice that parking brake was not engaged before the occurrence. Neither did they realize that the airplane rolled forward about 9 m during 15 s preceding the impact during engine start.

Specific apron procedures are developed for different operators. Due to the inherently confined nature of aprons, even minor uncontrolled airplane movements may lead to a collision with apron structures or equipment. When not in use, ground power units are parked in designated areas and deployed to a position on the right-hand side of the airplane next to the cockpit when needed to supply electrical power to the airplane.

The ground power unit battery may become a source of fire due to several reasons such as overcharging or heat exposure. Collision with a ground power unit may cause an electric shock or short circuit and thereby jeopardize the safety of the operator or other personnel in the vicinity, while a diesel-operated ground power unit may catch fire due to excessive heat, sparks or open flame. Furthermore, vapor from hot diesel fuel may combine with air to form a flammable mixture, and the fuel tank may then be breached by heat. Diesel oil may be hazardous to health and environment.⁴⁵

3.4 Post-occurrence Actions

The pilot-in-command did not use standard phraseology and message format in communication with air traffic control. He should have declared a distress or an urgency condition by transmitting “mayday” or “pan pan” to convey the severity of the situation to controllers. Failure to do so indicates that the flight crew underestimated the gravity of the occurrence and initially led to a delay in issuing an alert and to incorrect rescue service response.

As a result of insufficient crew resource management, the first officer assumed a passive role, and the pilot-in-command conducted the post-occurrence actions without the latter’s participation; in other words, the predetermined cockpit procedure was not executed. The pilot-in-command alerted the cabin crew immediately after the impact, but since this callout was not canceled, cabin crew remained on alert for an unnecessarily extended period of time.

Cabin crew reported the post-impact situation and their observations to the flight crew.

Although rescuers talked to the cabin crew, they did not communicate direct with the flight crew after the impact, and rescue units and the flight crew were not directed to change to a common radio frequency. Exchange of information between rescue units and the airplane crew was insufficient considering that rescuers did not establish the number of airplane occupant, or the amount fuel on board, or inquire about the presence of dangerous goods.⁴⁶

Rescue units initially took position on the downwind side of the airplane and therefore became exposed to composite dust. Other airport personnel present on the occurrence site were not removed from the affected area by rescuers.

Closure of the nearest taxiways was delayed because risks posed by foreign objects and debris were not recognized immediately. A more detailed risk assessment would have ensured safety of other traffic in the vicinity of the occurrence site. In addition, personnel involved in post-occurrence actions were not provided with adequate protective equipment considering dangers presented by foreign materials.

The incident commander ordered that the area around the airplane be foamed in order to suspend debris and composite dust. Because foam application was begun after passenger

⁴⁵ Finnish Institute of Occupational Health (2025). Onnettomuuden vaaraa aiheuttavien aineiden ohjeet (OVA-ohjeet) dieselöljystä. 27.10.2025. <https://ova.ttl.fi/dieseloljy>.

⁴⁶ Dangerous goods are articles or substances capable of posing a risk to health of passengers or to safety of the environment during transport. ICAO (2025). Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284). <https://www.icao.int/Dangerous-Goods/Technical-Instructions>

disembarkation, they were deprived of protection provided by foaming. An alternative method would have been to use water for dust suspension. Water would have prevented any foam-induced damage to vehicles and equipment and would not have hampered investigators' work in the same degree as foam.

The airplane operator's internal assessment revealed deficiencies in the flight crew's work, but no corrective actions were taken. Learning from occurrences is one of the main building blocks in the improvement of safety in aviation and in other safety-critical operations.

4 CONCLUSIONS

Conclusions encompass the causes of an accident or a serious incident. Cause means the different factors leading to an occurrence as well as relevant direct and indirect circumstances.

1. Failure to engage parking brake resulted in inadvertent forward movement of the airplane and collision with the ground power unit.

Conclusion: *Compliance with the airplane operator's procedures is crucial to safe aircraft operation.*

2. The flight crew reported the occurrence to air traffic control without declaring a distress or urgency condition. Alerting was made belatedly, and delay was experienced in building situational awareness.

Conclusion: *Compliance with to standard phraseology and communication practices is important in the event of an accident in order to ensure timely and adequate emergency response.*

3. The pilot-in-command carried out post-impact actions and external communication without the first officer's participation and did not make use of the latter's capabilities in accordance with good crew resource management principles.

Conclusion: *Compliance with standard operating procedures will ensure optimum work sharing between the crew members and maintenance of common situational awareness, which are central safety management elements in aviation.*

4. The number of cockpit procedures related occurrence reports in the airplane operator's reporting system was relatively small.

Conclusion: *An airplane operator will need a sufficient number of occurrence reports in order to be able to identify safety trends, to adjust the focus of training and to develop operations in a proactive manner.*

5. Investigation into the ground handling service provider's operations showed that work practices have occasionally deviated from procedures prescribed in applicable documents.

Conclusion: *Ground handling service providers and airplane operators shall adhere to mutually agreed procedures and oversee the big picture.*

6. Rescue service foamed the occurrence site to suspend harmful composite dust only after passenger disembarkation; therefore, foaming was largely ineffective.

Conclusion: *Rescue actions must be timely and based on risk assessment.*

7. A common radio frequency was not available to the flight crew and the rescue units.

Conclusion: *Direct communication between the aircraft and the rescue units clarifies the flow of information and enhances situational awareness. (Preliminary investigation L2021-E4, conclusion 4.⁴⁷)*

⁴⁷ Safety Investigation Authority Finland (2021) Risk of aircraft accident due to smell of oil-scented smoke in the cockpit at Helsinki-Vantaa airport on 30 October 2021. Report on preliminary investigation L2021-E4.

5 SAFETY RECOMMENDATIONS

5.1 Cockpit Procedures and Crew Resource Management

Deficiencies were found in Norra's cockpit procedures, and the number and quality of related occurrence reports were not conducive to safety improvement.

The Safety Investigation Authority Finland recommends that

Norra specifies procedures for the assessment and development of cockpit procedures and crew resource management. [2026-S010]

As part of this endeavor, employees should be encouraged to identify procedures that cause safety gaps. They should also be prompted to exercise active reporting of anomalies that occur when undertaking their assigned tasks.

5.2 Interface between Airplane Operator and Ground Handling Service Provider

Deficiencies were found in cooperation between Norra and Airpro. Actual working practices were not in line with procedures prescribed in manuals, and the transfer of responsibility for airplane control and management was not fully delineated.

The Safety Investigation Authority Finland recommends that

Norra and Airpro cooperate to introduce specifying information in their manuals and improve oversight of compliance with manuals in areas related to operational interfaces. [2026-S011]

5.3 Finavia's Communication Frequency Management

Lack of radio communication between the rescue units and the flight crew hampered building of common situational awareness.

The Safety Investigation Authority Finland reinstates the safety recommendation included in investigation L2021-E4 and recommends that

Finavia, Finavia's rescue service and Fintraffic Air Navigation Services cooperate to ensure that procedures prescribed in their manuals for direct radio communication between the aircraft and rescue units are applied whenever necessary, and that personnel and operators are informed of the procedure. [2026-S012]

This frequency should be available and mentioned in applicable documents.

5.4 Safety Actions

Airpro issued on November 3, 2025, a safety information bulletin that mandated the use of a checklist during single-person towing. A Ground Operations Manual revision dated October 7, 2025, included a requirement for the dispatcher to use the hand signal to verify parking brake

engagement before engine start, allowed the dispatcher to leave the forward nosewheel chock in place, and instructed the tug operator to ensure that parking brake is engaged on completion of towing. A number of pushback tractor types were subsequently approved for use.

Finavia's report into the occurrence focused on post-impact actions. The occurrence was classified as an accident in which Finavia was not involved. The report listed several corrective actions related to airport rescue service procedures. It contained findings stemming from issues encountered during foaming, non-standard foaming application, command and control arrangements and responsibilities, occupational safety, alerting procedures in a wide range of situations, and the number of rescue units deployed. The report submitted seven recommendations, most of which targeted Finavia's operation during an accident. One recommendation, that addressed alerting procedures, was directed to Fintraffic Air Navigation Services.

Norra conducted an internal investigation according to a standard company procedure. The focus was on pre-impact events and their probable causes. Five safety recommendations were issued. They concerned inclusion of the occurrence in future training programs, approval of tow tractors for use with the widest practical range of airplane types, advising crew members to attend defuzing and debriefing sessions after serious occurrences, expanded cooperation between the ground handling service provider and the airplane operator, and further development of the ground handling service providers' checklists.

Norra has carried out the following actions in order to improve apron safety:

1. Safety review of ATR departure procedures
2. Instruction that allows leaving the forward nosewheel chock in place during powerback
3. Safety walk as part of the ATR departure procedure.
4. Instruction that requires the flight crew to ensure that parking brake is engaged before engine start on receiving the applicable hand signal from the dispatcher.
5. The occurrence has been included in the annual refresher course.
6. The occurrence has been included in the check flight program.

REFERENCES

Written Material

- Safety Investigation Authority Finland (2017) *Laptop battery fire in the cabin of an airliner on 7 March 2017*. Investigation L2017-01.
https://turvallisuuustutkinta.fi/app/uploads/sites/8/2024/11/Investigation_report_L2017-01.pdf
- Safety Investigation Authority Finland (2021) *Risk of aircraft accident due to smell of oil-scented smoke in the cockpit at Helsinki-Vantaa airport on 30 October 2021*. Report on preliminary investigation L2021-E4.
- Safety Investigation Authority Finland (2026) *Collision between Airliner and Passenger Stair at Helsinki Airport on August 28, 2025*. Investigation L2025-03.
<https://www.turvallisuuustutkinta.fi/app/uploads/sites/8/2026/07/L2025-03-Investigation-Report.pdf>

Investigation Material

- 1) On-site examination material
- 2) Airpro documents
- 3) EASA regulations and other material
- 4) Finavia's internal investigation report and other material
- 5) Finnair's internal investigation report (2002)
- 6) Fintraffic ATIS information
- 7) Weather analysis of Finnish Meteorological Institute
- 8) Air traffic control instructions and procedures
- 9) Airplane flight data recorder and recordings
- 10) Airplane cockpit voice recorder
- 11) Airplane manufacturer's documents
- 12) Airplane damage report
- 13) Airplane crew members' flight experience data and rosters
- 14) Airplane crew members' licenses and medical certificates
- 15) Norra's internal investigation report and other documents
- 16) Emergency response center authority alert log and accident report
- 17) Air traffic control radio communication and emergency response center recordings
- 18) Traficom's audit report and other material

SUMMARY OF COMMENTS TO DRAFT FINAL REPORT

The draft final report was submitted for comments to the Airpro, (TSB), the Bureau of Enquiry and Analysis for Civil Aviation Safety of France (BEA), the airplane manufacturer (ATR), Norra, Finnish Transport and Communications Agency Traficom, Fintraffic Air Navigation Services, and the interested parties. Pursuant to the Safety Investigation Act, no comments given by private individuals are published.

Airpro proposed that specifying information of aircraft towing procedures be included in the report.

Transportation Safety Board of Canada stated that specifying information of the occurrence airplane's engine type be added to the report.

The Bureau of Enquiry and Analysis for Civil Aviation Safety of France stated that specifying information regarding the time of longitudinal acceleration should be specified in the text related to flight data recorder readout.

ATR proposed that specifying information should be inserted in the text related to engine parameter readout. The airplane manufacturer also stated that the report should point out the differences between the checklists included in the original airplane flight manual and those employed by the airplane operator.

Finavia proposed that rescue service unit call signs and references to the legal framework be specified.

Norra proposed that the term "aviation accident" be replaced with term that would better describe the nature of the event. Furthermore, Norra pointed out that the report does not address Finavia's responsibilities for coordination of occupational safety management on apron and in the supervision of common workplace safety at Helsinki airport. Norra concluded that the impact of the investigated occurrence should be assessed against the scope of operations.

Traficom and **Fintraffic** had no comments on the draft final report.