Collision between Airliner and Passenger Stair at Helsinki Airport on August 28, 2025

L2025-03

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 between an airliner and a passenger stair at Helsinki airport on August 28, 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.

Subject matter expert Jani Holmberg was appointed as the head of the investigation team. Team members were subject matter expert Kristian Rintala and special investigator Mikko Tikkanen. Subject matter experts Tomi Tuominen and Olli Himanen contributed to the investigation. The investigator-in-charge was Chief Air Safety Investigator Janne Kotiranta.

The National Transportation Safety Board (NTSB) of the United States and the Civil Aviation Administration of China (CAAC) appointed accredited representatives 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 and its summary were published on July 2, 2026 on the SIAF's website at www.sia.fi.

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Cover photo: SIAF

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1 FACTUAL INFORMATION

1.1 History of Flight

On Thursday, August 28, 2025 at 1352[1], a serious incident occurred on the apron[2] at Helsinki airport (HEL/EFHK)[3] when the left wing of a Juneyao Air Boeing 787-9 Dreamliner (registration B-20DI) hit a stationary self-propelled passenger stair vehicle during arrival on stand S43.

Dollies that had been used during the loading of another airplane docked on adjacent stand S45 were parked between stands S43 and S45. Some of them were within the section of equipment restraint area (ERA) of S43 that was marked on the tarmac as a no-parking zone.

At 1337, a ramp team leader[4] of Aviator ground handling service provider came to S43 and performed a foreign object debris (FOD) inspection[5]. One of three team members that arrived on the stand after the leader noticed that a passenger stair operator had not been designated and offered to operate the stair in addition to his other planned tasks. He boarded the vehicle and moved it to a holding position nearer to the stand, but because of the dollies he had difficulty finding a parking position that would have allowed further movement of the stairs after the airplane's arrival. As seen from the driving cab, the vehicle appeared to remain outside S43 ERA. The operator remained in the cab and raised the stairway in preparation for the airplane's arrival. He had no direct field of view in the direction of the arriving airplane.

After a flight from Pudong airport, Shanghai, the incident airplane landed on runway 22L at 1347, vacated the runway and proceeded under air traffic control (ATC) instructions toward S43. It carried 224 occupants, including 14 crew and 210 passengers.

The flight crew saw the stairs, but their attention was focused on a docking guidance system display on the terminal wall. The airplane made a left-hand turn from taxiway AW to S43. The distance of the left wing tip and the top of the stair canopy from the ground was about 7.5 m and 8.1 m, respectively.

When one of the ramp team members saw that a collision was impending, he pointed his hand in the direction of the airplane and alerted the team leader of the dangerous situation by shouting, but due to environmental noise the leader did not hear the call, and an obstruction blocked his view in the direction of the potential collision point. The team member gave the flight crew a stop signal by crossing his arms above the head. This signal was repeated by the other team member. The team leader noticed that a dangerous situation was developing and started running toward the docking guidance system emergency stop button, also located on the terminal wall. At the moment the airplane's wing hit the stairs, he pushed the button, and a STOP indication appeared on the system display. The flight crew noticed the stop signals and brought the airplane to a halt on the S43 lead-in line at about 40 m from the intended parking position.

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1 The collision occurred at 1052 UTC. The times given in this report are Finnish daylight saving time (UTC + 3 h).

2 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 (Trafi Regulation AGA M3-1).

3 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.

4 A ramp team consists of a team leader and team members required for the assigned task. They receive an arriving airplane on the apron and perform unloading and loading, among other operations.

5 A foreign object debris inspection means ensuring that no objects that could cause damage to the arriving or departing airplane are found on the apron.

They were unaware of the collision. A team member signaled the flight crew to engage the parking brake, went to the airplane to hook up his headset to the intercom system[6] and notified the flight crew of the collision. After engine shutdown, one flight crew member went to the cabin, looked out of a window, and verified that a collision had happened.

A police unit that arrived on the scene gave the stair operator a breathalyzer test at 1452. No alcohol was detected. A preliminary interview was also carried out.

The ground handling service provider brought another stair vehicle to the rear right-hand passenger door, from which the passengers disembarked and were bussed to the terminal.

Police boarded the airplane to breathalyzer test the flight crew. No alcohol was detected.

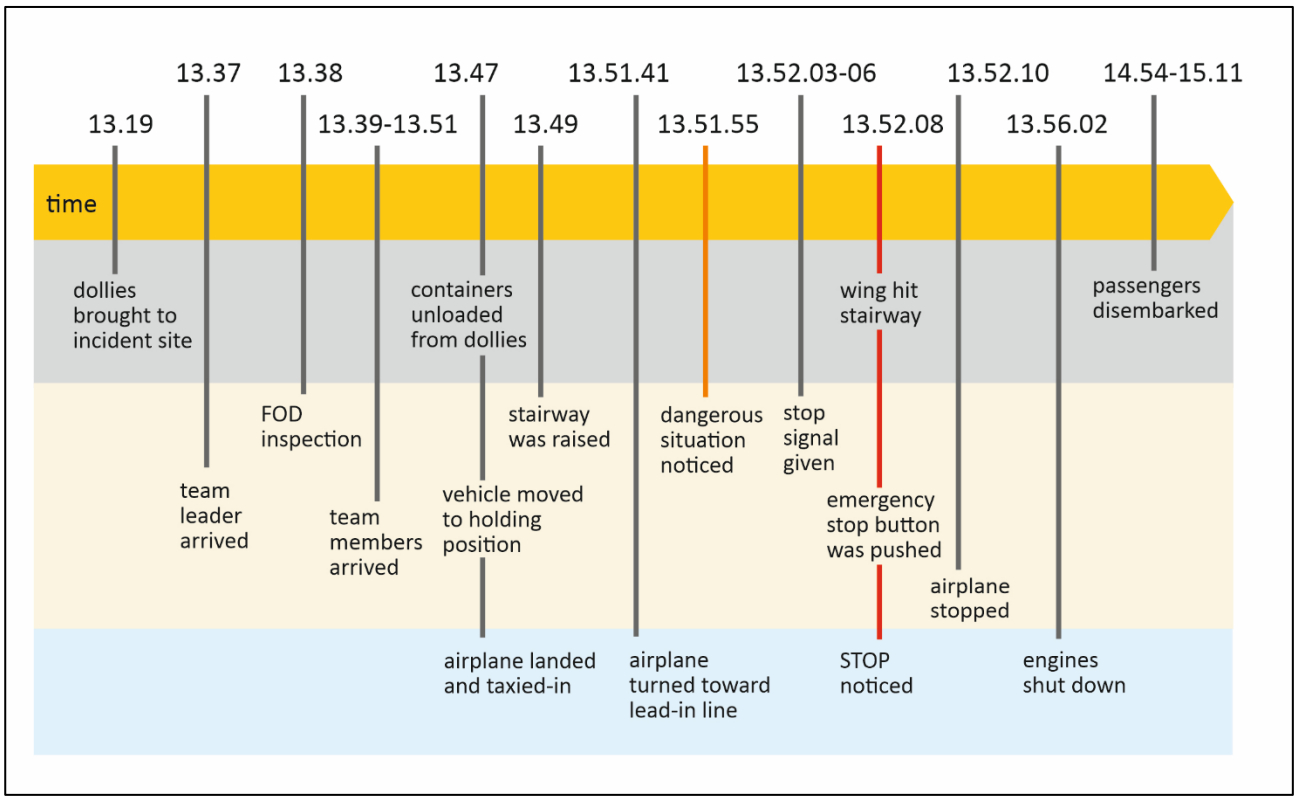

Figure 1. Incident timeline. (Diagram: SIAF)

1.2 Alerting and Rescue Operations

The emergency response center (ERC) at Kerava received an emergency call at 1358. The call was made by the shift supervisor of the ground handling service provider after a ramp team member had notified him of the incident. During the call, the supervisor went on the incident site and discussed the need of alerting rescue services with the marshaller[7], who then alerted aerodrome operator Finavia's rescue units. The ERC also dispatched a police unit to the scene.

The serious incident was reported to Finavia's rescue service at 1403, and the first unit arrived at 1405.

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6 An intercom system is used for communication between the crew members of an aircraft. It also enables communication with the flight crew and ground personnel.

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

The ERC initially rated the occurrence as a *major aircraft accident* (task code 233A) but subsequently downgraded the category to *minor aircraft accident* (213A).

The first of two rescue units from Central Uusimaa Rescue Department arrived at 1423. The ERC units assumed general operational control, in which capacity they first secured the area and began to exercise movement control. The flight crew and passengers remained on board. None of the passengers felt a need for psychosocial support although it was offered. The passengers were bussed to the terminal. The stairway was lowered hydraulically to free the wedged vehicle, which was removed from the scene at 1822. This concluded rescue actions, and the site was released for SIAF investigators for on-scene examination.

1.3 Injuries to Persons and Damage to Aircraft

There was no injuries to persons or damage to environment.

Airplane damage was limited to the leading edge of the left wing tip, which exhibited mainly scratches and a dent near the leading edge center point. The wing structure was unaffected, and the integral fuel tank did not sustain damage.

The stair vehicle sustained damage to the stairway elevating mechanism, upper section of the stairway and the canopy.

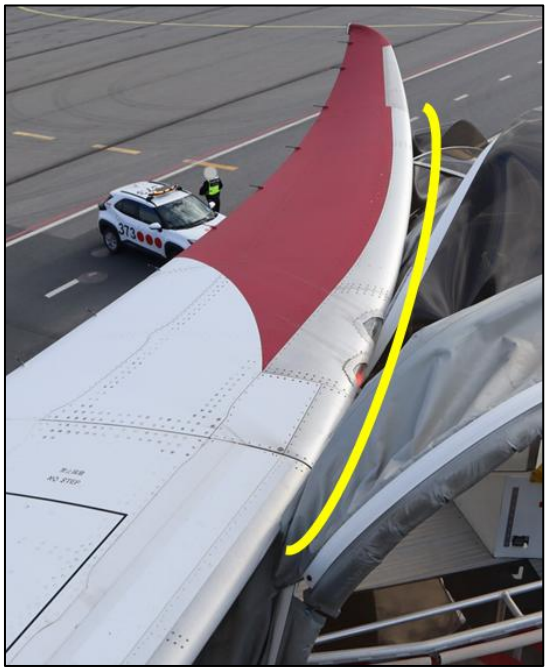

Figure 2. The yellow line indicates the damaged wing section. (Photo: SIAF)

Figure 3. Damaged stairway canopy. (Photo: SIAF)

2 BACKGROUND INFORMATION

2.1 Environment, Equipment, and Systems

2.1.1 Helsinki Airport

The serious incident occurred at Helsinki airport located in the municipality of Vantaa about 20 km from downtown Helsinki. The three-runway airport is Finland's biggest airport and the main airport in Uusimaa region. 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 approximately 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.

Several ground handling service providers operate at the airport. Most of the services are offered by Aviator and Airpro. Aircraft operators purchase turnaround and other services from these providers. Ground handling service providers have also negotiated contracts with Finavia. About 2,000 motor vehicles are approved for operation in the airport premises, while the number of driving permit holders is over 3,000.

A decline in aircraft movements during last few years has led to reduction in the number of airlines operating to the airport, which in turn has increased competition between ground handling service providers. Even though major investments have been carried out at the airport, reduction in traffic has affected the airport’s economics.

2.1.2 Ground Support Equipment Parking Areas

Areas for extended parking of ground support equipment are available on the apron, but their usefulness in daily operations is limited by their location at considerable distances from equipment deployment sites. Equipment may also be parked closer to stands outside ERAs. No-parking zones are marked on the tarmac with red hatching or cross-hatching. Equipment is parked for short duration both adjacent to and inside ERAs, primarily during loading and unloading operations. The equipment deployment area measures about 200 hectares. Finavia may issue a notice to remove or impose a penalty fee for equipment left in an inappropriate location. Equipment parking is monitored by the marshaller in addition to his other tasks.

2.1.3 Aircraft Stand

An aircraft stand is a designated area for short-term or long-term parking of aircraft and for departure and arrival activities. Aircraft maintenance and de-icing may also be carried out on a stand. However, in order to maintain safety and due to space constraints, all activities cannot be performed simultaneously.

2.1.4 Equipment Restraint Areas

Red equipment restraint lines (ERL) mark the boundaries of ERAs, which shall be free of personnel or equipment not involved in moving of an airplane during departure or arrival.

Figure 4. Aerial view of S45 and S43, with a triangular hatched no-parking zone in between. ERLs continue as a dashed line where they border the no-parking zone. The airplanes (Airbus A350-900 and Boeing 787-9) shown are in the same category as the incident airplane. (Photo: Google Maps ©2025)

Parking on an ERL has become a norm at Helsinki airport. The collision occurred between S43 and S45. These stands are in close proximity, and their ERAs overlap partially.

A no-parking zone that partially covers both S43 and S45 ERAs is shown in the overlap section.

Due to space constraints, ground support equipment may be parked in no-parking zones for loading or unloading an airplane occupying the adjacent stand, or for other reasons. This will in practice lead to situations where dollies or other loading equipment are parked inside S43 and S45 ERAs during an airplane's arrival on either one of these stands.

Figure 5. The location of dollies and the stair vehicle after the collision. (Photo: SIAF)

Finavia's apron chart shows taxiways, service roads and stand boundaries among other information. The stand boundaries do not coincide with tarmac markings in that the boundaries of overlapping ERAs are drawn both with broken and continuous lines (figure 6).

The apron information board (figure 7) shows ERA boundaries with continuous red lines. Ramp personnel referring to the board may therefore come to an understanding that a vehicle is not within S43 ERA. Actually, the ERL runs along the opposite edge of the no-parking zone.

The markings on the information board and the apron chart do not agree with the ERL painted on tarmac. Ramp personnel may have difficulty with creating a mental picture of ERA boundaries as well as their continuation and direction in the overlap area. This may lead to the misconception of a vehicle being parked on or outside an ERL, even though it is actually inside the ERA. The special features of S43 and S45 are not known to all employees

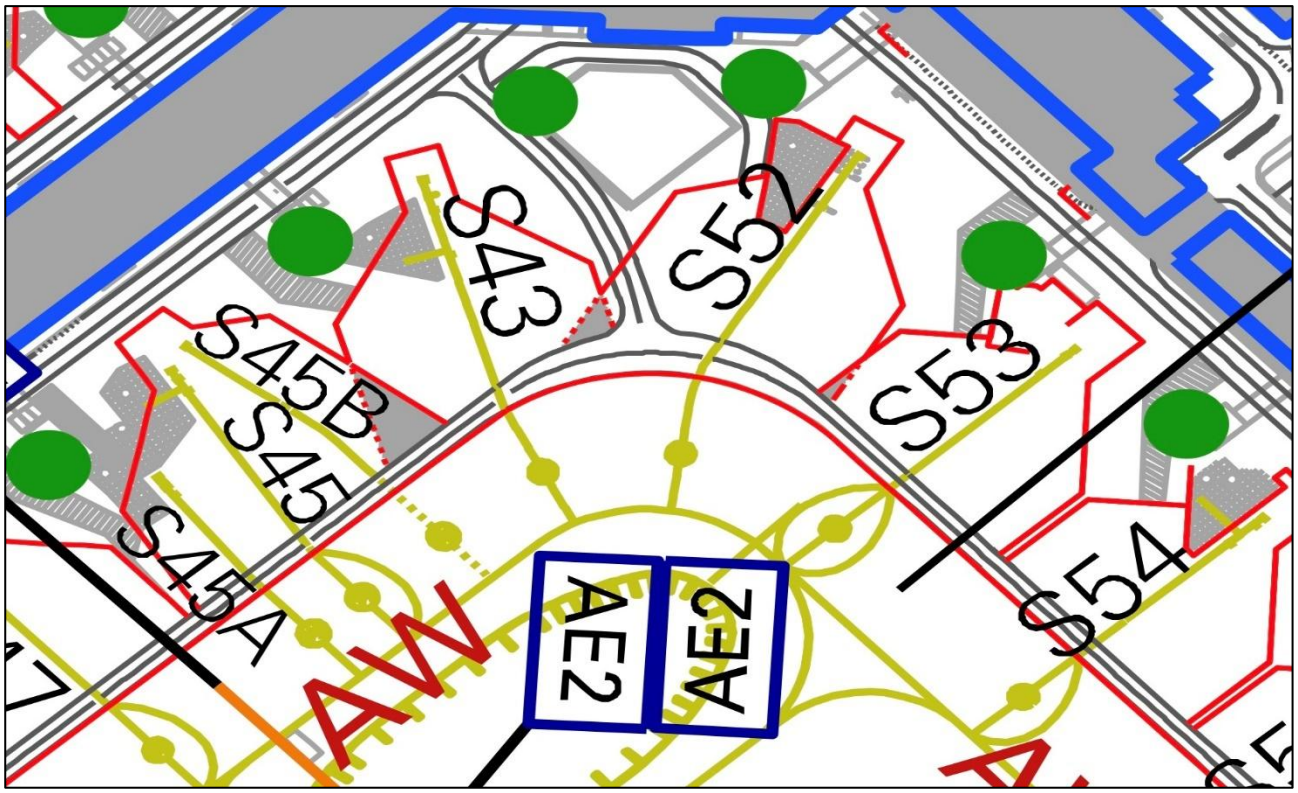

Figure 6. Stands as shown on the apron chart (effective as of September 1, 2025). (Chart: Finavia)

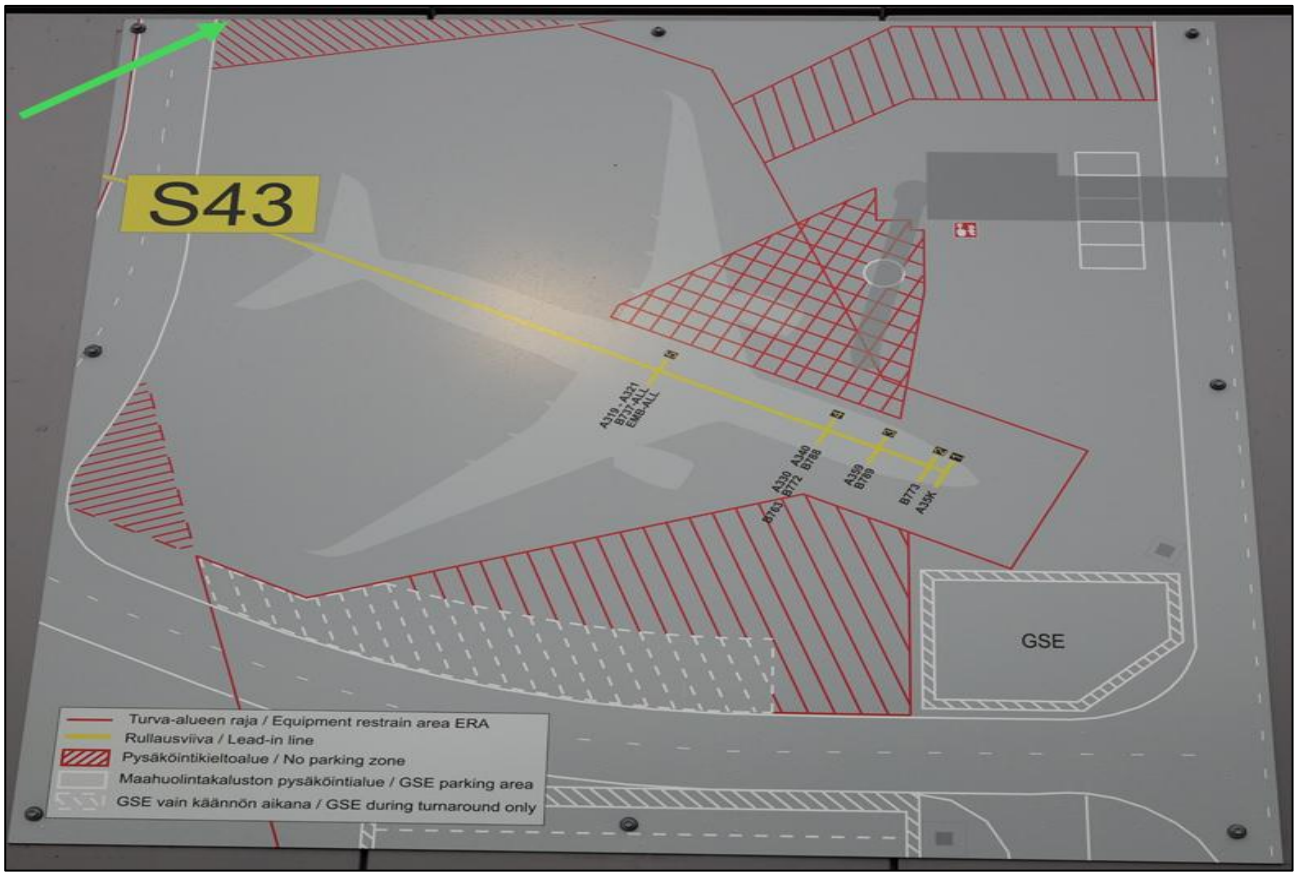

Figure 7. S43 information board on the terminal wall. The green arrow indicates the location of the stair vehicle inside the red hatched area. (Photo: SIAF)

2.1.5 Boeing 787-9 Dreamliner

Over 1,100 Boeing 787 Dreamliners are in service worldwide in several versions. The airplane is a twin-engine widebody[8] airliner designed for two-pilot operation.

The incident airplane, serial number 64316, was handed over to Juneyao Air in August 2019. The airplane was entered in Chinese civil aircraft register as B-20DI. The airplane can seat 324 passengers.

The airplane had undergone appropriate maintenance and was airworthy when it departed on flight HO1607 from Shanghai and had logged a total of 18,192 flight hours. Weight and balance calculations indicated that its landing weight on arrival at Helsinki was 179,500 kg. The airplane carried 11,100 kg of fuel after the flight.

2.1.6 ABS-580-E Passenger Stair

The ABS-580-E electrically powered self-propelled passenger stair vehicle is manufactured by TLD-Europe and used for passenger boarding and disembarkation. The vehicle is 9.16 m long, 5.74 m high and 3 m wide. Its empty weight with batteries installed is 9.650 kg. Its maximum driving speed is 18 km/h. The type is used extensively at Helsinki airport. The incident vehicle, call sign R169, was built in 2021 and is owned by TRC Group.

The operator moves the vehicle to a position next to the airplane's fuselage after engine spooldown and adjusts the height of the stairway for the airplane type, after which the top platform is adjusted visually. The height is determined from numbers located under the stairway. A total of 12 selectable heights, or levels, are available, which means that the overall height of the vehicle can vary between 5.93 and 8.14 m. The height for the incident airplane type should have been set at level 9, but at the time of impact the stairway was set to level 12.

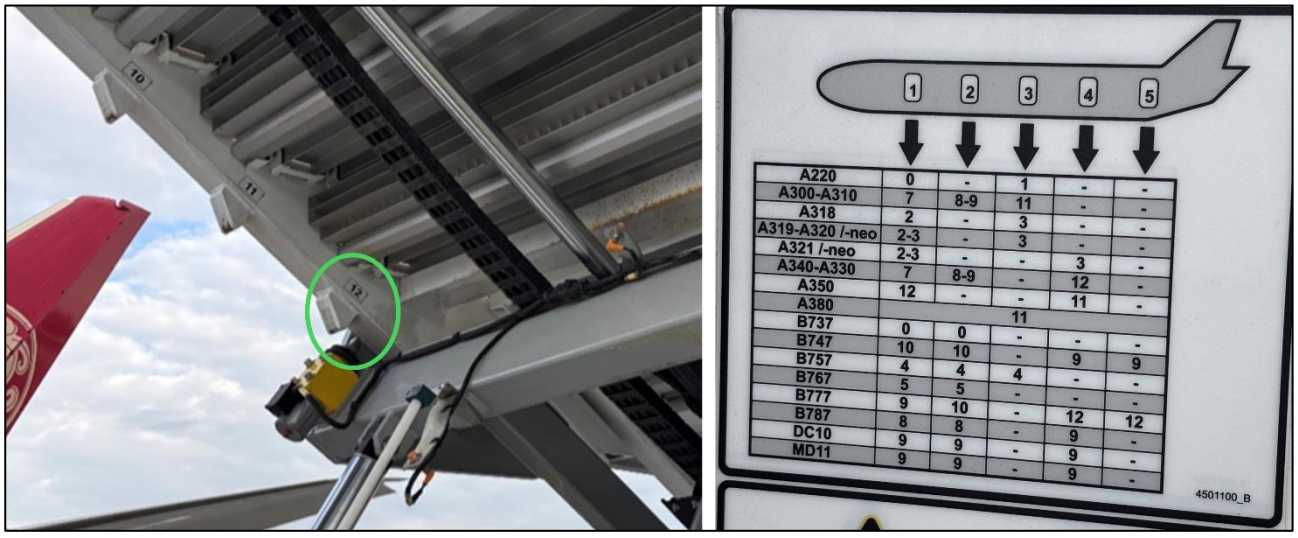

Figure 8. On the left, number 12 indicating stairway level is circled in green. On the right, an instruction placard in the driving cab. (Photo: SIAF)

[8] A widebody airplane has a twin-aisle cabin with seats arranged in three groups per row. These airplanes are commonly used for long-haul flights.

2.2 Conditions

Meteorological conditions at the airport were typical of late August, and it was determined that weather conditions were not a contributory factor in the incident. Air temperature at 1352 was +18 °C, wind was from the south at an average speed of 4,6 m/s, and sky was clear[9]. The tarmac was clean and dry.

2.3 Recordings

The Emergency Response Center Agency released for the investigation team occurrence-related event logs, emergency call recordings and VIRVE network recordings retrieved from the nationwide Erica data system. These were used to verify the course of the events, rescue operation and related communications.

Finavia provided aerodrome surveillance camera footages, and ATC radio communication and telephone call recordings along with recorded radar data were received from Fintraffic Air Navigation Services. These were used to determine traffic and actions of personnel on the apron before and after the incident.

The airplane's flight data recorder[10] was downloaded to retrieve data related to the arrival phase of the flight and the operation of airplane systems and components. Cockpit voice recorder data was not available. The collision was not detected by aircraft systems.

2.4 Organizational and Management Information. Safety Management

2.4.1 Personnel Information

The stair vehicle operator had about 12 years of experience of ground handling including one and a half years as stair vehicle operator and about six months as ramp team leader.

The ramp team leader had about 27 years of experience of ground handling and about 15 years as ramp team leader.

The belt loader operator had performed ground handling tasks for one and half years.

The high loader operator had a career of six and a half years in ground handling, accumulated in 2015–2020 and 2024–2025. During the Covid-19 pandemic he had carried out other duties until hired by Aviator in 2024.

The airplane crew consisted of four flight crew members and ten cabin attendants. The flight crew held valid certificates and met the applicable medical requirements.

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9 Data: Finnish Meteorological Institute meteorological aerodrome report issued on August 28, 2025. "METAR EFHK 281050Z 18009KT 140V210 9999 FEW038 18/07 Q1013 NOSIG=."

10 A flight data recorder stores a wide range of data including the airplane's heading, speed and altitude.

Table 1. Flight crew's flying experience.

Flight hours	Last 24 h	Last 30 days	Last 90 days	Total
Pilot-in-command, pilot flying				
Boeing 787	9 h 13 min	39 h 17 min	145 h 21 min	3,098 h 58 min
Total	9 h 13 min	39 h 17 min	145 h 21 min	5,282 h 16 min
First officer, pilot monitoring				
Boeing 787	9 h 13 min	53 h 18 min	213 h 9 min	1,202 h 54 min
Total	9 h 13 min	53 h 18 min	213 h 9 min	2,558 h 26 min
First officer, relief pilot 1				
Boeing 787	9 h 13 min	78 h 4 min	247 h 28 min	866 h 38 min
Total	9 h 13 min	78 h 4 min	247 h 28 min	8,513 h 42 min
First officer, relief pilot 2				
Boeing 787	9 h 13 min	41 h 44 min	107 h 23 min	184 h 4 min
Total	9 h 13 min	41 h 44 min	107 h 23 min	1,422 h 5 min

2.4.2 Organizations

Juneyao Air, founded in 2005 and based in Shanghai operates domestic and international flights from the city's two international airports, Pudong and Hongqiao, with a fleet of 103 airplanes, most of which are narrow-body[11] airliners manufactured by Airbus. The fleet consists of 10 Boeing 787-9 Dreamliners.

Aviator was founded in 2010. It is a Nordic ground handling service provider offering services at 15 airports. Operations at Helsinki are performed by Aviator Airport Services Finland that was founded in 2014. Its services include transporting passengers, luggage between terminals and airplanes, aircraft ground movement, cargo loading and unloading, de-icing and a range of other activities. The company employs about 400 persons in baggage hall and apron duties.

TCR Group offers ground handling and ground support equipment rental services at over 180 airports. At Helsinki, its services are performed by TCR Finland and consist of equipment rental and maintenance. The number of motorized and non-motorized rental units is about 230 and 750, respectively.

Finavia is an aerodrome operator that serves 20 airports and employs 2,000 persons, of whom about 500 are positioned at Helsinki. Finavia's apron crews carry out the following activities:

- Supervision of apron operations and safety
- Marshaling
- De-icing coordination
- Planning of airplane parking
- Turnaround capacity management
- Ground traffic training
- Eurocontrol[12] cooperation

[11] An airplane with a single-aisle cabin with passenger seats located on each side.
[12] Pan-European air traffic management organization.

- Maintenance of overall apron picture in cooperation with ATC.

2.4.3 **Roles of Ground Handling Personnel**

Shift supervisors manage the work of ground handlers. At the beginning of a shift, designated flights are allocated to arrival teams, which means that an individual handler will carry out several tasks during each shift. Although each ground handler is in principle assumed to perform the same initially assigned task throughout the shift, unexpected situations may lead to retasking. However, the duties of a ramp team leader and his team member or members remain unchanged from the beginning until the end of a shift.

The supervisor determines the size of each arrival team based the size of the arriving airplane and other factors. The basic composition of an arrival team at Helsinki is two persons, one of whom is the team leader and the other a team member.

Other personnel involved in ground handling include, for example refuelers, who work independently of arrival teams.

Arrival teams used to include a member who was responsible for dolly movement. Since 2015, this person has been an independent dolly fleet manager who brings dollies to the apron, frequently before an airplane's arrival, which allows him to accept the next assignment earlier. From this follows that dollies can no longer be repositioned for easier load handling once ground handling is in progress.

The arrival team moves to the apron before the flight's arrival and prepares to receive the airplane. One the team's tasks is to ensure that the ERA is clear of persons or equipment. The team leader or a team member conducts an FOD inspection before the airplane taxies-in. At the time of the airplane's arrival, the team leader should position near the emergency stop button, which, when operated in a potentially hazardous situation, would cause a red STOP command to appear in the visual docking and guidance system (VDGS)[13] display mounted on the terminal wall. If this happens, the flight crew must interrupt taxi.

After the airplane is stopped and the engines are shut down, and the anti-collision lights[14] are switched off, the team leader signals the team members that it is safe to approach the airplane.

Team members first position chocks forward and aft of the landing gear wheels and safety cones at the wings and engines. The team leader then performs a walk-around to inspect the airplane's external condition. After this inspection, the ground power unit (GPU) is connected to the airplane, and the team leader clears team members to move passenger stairs and other ground support vehicles next to the airplane. When an airbridge is used for disembarkation, the leader also authorizes to move it to the applicable exit door.

Ground handling during turnaround typically involves

- disembarkation of arriving passengers and boarding of departing passengers
- refueling
- removal of cargo and luggage from holds and reloading
- emptying of waste tanks and filling of potable water tanks
- loading of catering supplies
- cabin cleaning and maintenance operations as applicable.

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[13] A visual docking guidance system directs the flight crew to stop the airplane at the correct parking position.

[14] Anti-collision flights are installed to improve the aircraft's visibility. When they are on, ground handlers know that it is not safe to approach the aircraft.

The ramp team leader directs and supervises ground operations throughout the turnaround. Due to space constraints and safety considerations, turnaround operations are performed sequentially.

After the airplane is loaded and passengers have boarded, the entry door is closed. This indicates to the ground handling personnel that they can initiate departure operations, which include moving of vehicles and equipment away from the airplane and disconnecting the GPU.

One team member is the dispatcher who inspects the airplane externally for any damage that it may have sustained during turnaround, and team members remove the safety cones and wheel chocks. The airplane is then pushed to the taxiway following the flight crew's instructions.

Aerodrome space constraints have led to parking of ground support equipment outside ERAs, which is not in compliance with procedures. Problems are also created by in some places unclear tarmac markings and unawareness of the purpose of certain markings. Inappropriately parked equipment may result in deviations from other approved protocols. To give two examples, either one or both wings of an arriving airplane may pass above incorrectly parking dollies, and equipment is repeatedly driven under wings.

The degree of clarity of tarmac markings does not always contribute to compliance with approved procedures. Markings can be misinterpreted when viewed from an angle, either from the cockpit or from the ground. Conversely, they can be understood better when seen from directly above. A person viewing the markings of overlapping ERAs may conclude that the ground support equipment he will need to use is outside his ERA and presents no danger. The boundaries of overlapping ERAs are marked both with a solid line and a dashed line, which may at least to a degree affect making the correct interpretation of their purpose.

Conditions and operating environment apart, situations that require expeditious retasking of personnel emerge during a shift. These may include delayed airplane arrivals and employees' absence from work due to illness. When this happens, an employee may not have sufficient time for careful preparation in order to perform his duties as instructed, which in turn affects his concentration on the assigned task and makes him more prone to mistakes. Some of these cases will be subject to an occurrence report.

FOD inspection status is not always apparent to persons working at an airport. During peak hours and in the event of flight delays, the ramp team may not reach the stand before the airplane's arrival, in which case the inspection is left undone, and the airplane enters an uninspected stand. Flight crews are not notified of lack of inspection, and the docking system display usually activates while the airplane is still airborne. Neither will the ATC ground controller be aware of FOD inspection status when he or she issues taxiing instructions to the airplane. The airplane proceeds toward its assigned stand provided that the display shows the correct airplane type, distance to go, and lateral distance from the stand centerline. On the other hand, the arrival team cannot ascertain whether the inspection has been carried out upon their arrival at the stand. Aviator's ground handling personnel reports non-completion of FOD inspections for handling in the company's safety management system.

Collisions between airplanes and ground support equipment mainly take the form of a passenger stair, a lifting device or an airbridge contacting the airframe during positioning at a door. In aviation, a so-called no-touch policy is observed, which means that a passenger stair, airbridge or any such equipment may not come into direct contact with the airframe.

2.4.4 Safety Management

Airlines / Air operators shall purchase ground handling services at Finavia airports under airport-specific contracts. Contracts include a description of mutual obligations and responsibilities of the parties, among other items. Ground handling service providers shall comply with instructions given in Finavia's operations manual and its reference material, and they shall participate in joint meetings of airport stakeholders. The objectives of these meetings are the maintenance and development of overall airport safety, coordination of various functions and operations and ensuring expeditious flow of air traffic. Auditors of Finavia and Traficom have access to ground service providers' safety documentation, instructions, self-audit material and training records. Service providers are independently responsible for the compliance of their operations, for the activities of their subcontractors and for the training and qualifications of their own employees.

According to Finavia's operations manual, organizations operating at an airport are directly responsible for the occupational safety of their employees and for compliance with occupational safety standards. Finavia takes into consideration matters that are related to the sharing of responsibilities and general organizing of activities in contracts it negotiates with other organizations operating at airports. General occupational safety related communication and cooperation matters are agreed in these negotiations.

A central component of Finavia's safety management is the safety management system (SMS), which is a part of the organization's management system and includes, among other matters

- safety principles and procedures
- description of the safety management organization
- management of change
- instructions and guidelines for occurrence reporting and investigations.

As part of safety management, Finavia uses incidents and safety information generated internally or by other organizations for risk identification, to which end it has agreed on information sharing with other similar operators and receives occurrence reports from sources such as Fintraffic and various airlines. Finavia's flight safety unit sorts reports into categories for analysis and investigates individual occurrences if required. It conducts self-audits in accordance with its annual auditing plans and audits other operators as necessary.

Finavia receives reports of ground handling accidents, serious incidents and occurrences by e-mail, processes them and gives them a risk classification that it uses to monitor risk level changes and to prepare recommendations with the aim of improving safety at Helsinki airport. Reported occurrences are discussed with other stakeholders.

Vehicle operation at the airport is regulated and requires authorizations. Regulation ensures that drivers recognize inherent risks associated with moving in the airport area and all flight safety related matters are adequately addressed. Instructions governing vehicle movement are in Finavia's ground operations manual and in Helsinki airport's airside traffic instructions.

For airside driving, a driver shall have a specific and valid driving permit that is temporary and can be granted after the applicant has successfully completed training arranged by the airport operator. Vehicles used at the airport shall have a permit granted by Finavia when the condition and equipment of the vehicle meet applicable requirements.

Although Finavia does not monitor the use of ground handling equipment at its airports, marshallers ensure that equipment is not left in no-parking zones. According to instructions *Short-term storage and parking of equipment on the apron is permitted only in areas designated*

for the purpose. These areas are intended for use by personnel involved in aircraft turnaround. Extended parking or storage of equipment is not permitted in areas reserved for equipment storage. Apron areas marked in red cross-hatching and hatching are no-parking zones. Instructions also state that *driving ground equipment under a wing or the fuselage of an airplane is forbidden unless required for a ground handling activity.*

Aviator has in place an SMS that covers the entire concern and includes general safety management instructions and procedures for all operating locations. The system contains a description of the allocation of responsibilities and risk assessment and mitigation procedures. Risk assessment is done using a risk classification matrix. Aviator has established risk levels for its operations. The SMS consists of guidelines and procedures to be followed after close calls and accidents, and a description of reporting and report processing. Aviator encourages its employees to exercise proactive safety management and active reporting of close calls. Finally, the SMS establishes internal procedures to be followed during safety investigations. However, due to local differences between airports, it may not be possible to adhere to the general guidelines, in which case country-specific instructions that contain descriptions of non-standard processes may be prepared.

Aviator procedures require that the ERA shall be clear of all equipment on the airplane's arrival. Although moving of a stair vehicle is not allowed with the stairway raised, the vehicle may be moved over a short distance to the final position. Parking under a wing is not permitted. As a rule, driving stairs and other vehicles under a wing is prohibited even though local or aircraft operator specific exemptions may be granted. Aviator requires that passenger stair operators have required qualifications obtained during a four-phase training program of no less than 70 h duration and hold a certificate of passing the final examination.

Juneyao's safety management was examined. Investigators focused on the flight crew's tasks during taxiing-in and on the operator's work and reporting procedures.

The contents of Juneyao's operations manual (OM) essentially meets the requirements of Helsinki airport operations manual. The operator requires that the equipment of its ground handling service providers comply with applicable local requirements, their personnel is trained for their duties and the personnel's competence is verified. The OM requires that an apron inspection shall be completed five minutes before the airplane's arrival. Helsinki airport does not offer wing-walkers to ensure wing-tip clearance during taxiing-in, as required in the OM. The OM prohibits driving ground equipment under a wing or the fuselage unless this is required for a ground handling activity.

The flight crew conducts post-landing actions immediately on vacating the runway, and during subsequent taxiing-in they can then concentrate on ground navigating and taxiing in accordance with ATC's instructions. On the incident flight, the pilot-in-command held the role of pilot flying and was responsible for aircraft handling and control, including operation of the power levers and wheel brakes for taxi speed adjustment, and for maintaining visual lookout. The first officer was pilot monitoring, who maintained lookout and handled communications with ATC. If needed, the pilot-in-command communicated with the ground handling service provider and other partners.

The pilot flying is faced with a difficult task of maintaining awareness of the wing tip trajectory while simultaneously scanning the area ahead of the airplane, since wings and wing tips are located at an oblique angle relative to the flight deck. Pilots rely on the maintenance of adequate obstacle clearance when they adhere to taxi instructions received from ATC.

Juneyao procedures state that during approach to a VDGS-equipped stand, low taxi speed shall be maintained, and the stand shall be checked for obstacles.

Although the flight crew notices the stair vehicle, their primary focus was on the VDGS display. Moreover, as seen from the cockpit, the distance to the wing causes problems in assessing wing tip trajectory. Regardless of this, pilots can stop taxi whenever they are in doubt of unobstructed taxiing path. Long duration of the rotation possibly affected the flight crew's attentiveness during the investigated incident.

2.4.5 **Risk Management**

Finavia uses two risk management techniques. A general risk management process is carried out at regular intervals to assess not only operational safety risks but also other risk categories such as financial and reputational risks. Using a risk matrix prepared for the purpose, each risk is given a value of probability and severity. The other technique, called safety review, focuses on risk management during changes. Finavia also maintains a hazard log for its airports, but these logs are not applicable to ground handling as in Finavia's view aircraft operators and ground handling service providers should conduct their own risk management.

Aviator has assessed unauthorized entry into an ERA as a high-risk event. Other high-risk conditions are the possibility of hitting a wing with the raised stairway, and unclear boundary lines and other tarmac markings on aprons S43 and S45. Deliberate violation of instructions in order to expedite or facilitate own actions is classified as a medium-level risk. According to the SMS, a high-risk or medium-risk action must not be carried out until its risk level is lowered. A ramp team member was reassigned as an independent dolly fleet manager in 2014. This change was not subjected to risk assessment because Aviator initiated a management of change risk assessment procedure in 2015.

Juneyao carries out continuous operational risk assessment, but a separate risk assessment procedure for parking stands is not conducted. As a part of ground handling service provider selection, the company assesses the provider's risk management during changes, and responsibilities are recorded. Juneyao's view is that the ground handling services provider is responsible for operational contract compliance in its daily operations.

An Apron Safety Committee has been established at Helsinki airport to handle apron safety matters with other stakeholders operating at the airport. The committee's meetings are convened by Finavia. The committee is composed of representatives of ground handling service providers, aircraft operators and other companies operating at the airport. Participation in the committee's monthly meetings is voluntary. The committee maintains an action item list that shows hazards that are pending rectification. Although actions are allocated to responsible members and their implementation is monitored, rectification of every hazard brought up by stakeholders is not pursued actively.

Airports can be regarded as a common workplace or a workplace of mutual hazards, much in the same way as seaports and shopping malls. A workplace of mutual hazards is a working environment shared by employees of independent contractors who operate in an undivided space and can therefore endanger or harm other employees through their own actions[15]. The

[15] Centre for Occupational Safety (2025a). *Yhteinen työpaikka, yhteisten vaarojen työpaikka ja vuokratyö*. December 6, 2025. https://ttk.fi/tyoturvallisuus/vastuut-ja-velvoitteet/yhteinen-tyopaikka-yhteisten-vaarojen-tyopaikka-ja-vuokratyo/

key objective in such a workplace is mitigation of mutual hazards[16]. To achieve this objective, stakeholders should strive to reduce and eliminate hazards and possibly harmful factors through cooperation, operational coordination and open information sharing.

The concept of common workplace is not understood in an identical manner by all stakeholders at Helsinki airport. Finavia sees that several common workplaces can be identified within the airport premises, and they are not under the same controlling party. In Finavia's opinion, the primary controlling party during turnaround is the aircraft operator who has purchased services from a ground handling service provider. Service providers' view, on the other hand, is that aircraft operators do not always give sufficient instructions for ground handling, and they also expect that Finavia assumes a more significant role when it comes to addressing issues caused by apron congestion and restoring tarmac markings.

It has been found that human factors are either the primary cause or a contributory factor in 80 percent of aviation accidents. Key human or organizational factors in ground operation accidents include[17]

- inadequate awareness and communication
- inadequate resources and processes
- inadequate organization of personnel and errors in process implementation.

2.5 Preventive Actions of Authorities

Finnish Transport and Communications Agency Traficom is an authority in permit, licence, registration, approval, safety and security matters in the domain of transport and communications in Finland, in which capacity it ensures that the safety standards and procedures in Finland's aviation meet ICAO standards and European Union (EU) requirements. To carry out its assigned task, Traficom monitors and audits operation of Finavia and Fintraffic. During past few years, Helsinki airport has been subjected to random inspections that have so far not been extended into ground handling service, with the exception of security arrangements[18].

Essential documents governing aviation safety are *Finnish Aviation Safety Programme*, *Finnish Plan for Aviation Safety* (FPAS) [19] and *Finnish Aviation Safety Performance Indicators and Targets*, all issued by Traficom.

FPAS does not contain an in-depth discussion of ground handling related matters but lists two actions related to the matter. They are SYS.GH.001 Ground handling safety and OPER.GCOL.008.1 Collisions while taxiing to or from a runway. In the ground handling safety domain, the identified systemic safety threats include scenarios such as errors caused by tight schedules and shortcomings in the management of change in regard to changes occurring in the operating environment. The proposed action is to address and manage the listed risk scenarios as part of safety management. As for collisions while taxiing to or from a runway, it

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16 Centre for Occupational Safety (2025b). *Yhteisen työpaikan ja yhteisten vaarojen torjunnan käsitteet.* December 6, 2025. https://ttk.fi/tyosuojelun-yhteistoiminta/tyoturvallisuus-kuntoon-tyonantajien-yhteistyolla/yhteinen-tyopaikka-ja-yhteisten-vaarojen-torjunnan/.

17 Muecklich, N., Sikora, I., Paraskevas, A., & Padhra, A. (2023) *The Role of Human Factors in Aviation Ground Operation-related Accidents/Incidents: A Human Error Analysis Approach. Transport Engineering* (Oxford), 13, Article 100184.

18 At an airport, premises security includes inspection of passengers, luggage and cargo.

19 Finnish Plan for Aviation Safety, issued on April 1, 2025.

is stated that organizations must process these threats in their safety management and take action to reduce the risk thereof.

Finnish Aviation Safety Performance Indicators and Targets sets safety performance indicators to be monitored by ground handling service providers. These include collision during taxiing to or from runway and damages related to inadequate FOD inspections. Corresponding ground handling related indicators set to the aerodrome operator are collision during taxiing to or from runway, sufficient apron monitoring and damages related to FOD inspections. Of these indicators, collision during taxiing to or from runway is also allocated to Traficom.

Traficom has found that the annual average number of situations where a collision occurs during taxiing to or from a runway is one. A single incident of this category occurred during the first half of 2025[20].

2.6 Rescue Services and Their Preparedness

Finavia maintains regulatory aeronautical rescue services at Helsinki airport, providing 24/7 response to aviation accidents and incidents and first response requirements.

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. In March 2025, staffing was increased by allocating one additional rescuer, and in September one more rescuer was added to the staff. The minimum staffing consists of one shift supervisor, one rescuer-in-charge and six rescuers.

Finavia's rescue service has in place a contract with Vantaa-Kerava Wellbeing Services County. During a rescue or paramedic operation, the supervising rescue officer or paramedic field supervisor assumes command and control.

Uusimaa region paramedic services are under the responsibility of HUS Group. Central Uusimaa Rescue Department provides paramedic services in Vantaa-Kerava and Central Uusimaa Wellbeing Service Counties under a contractual arrangement and has a paramedic field supervisor and ambulances in continuous readiness.

Central Uusimaa Rescue Department is tasked with performing rescue services, preventing accidents and preparing for disruptions and emergency conditions. Its area of responsibility covers Central Uusimaa and Vantaa-Kerava Wellbeing Service Counties. In accordance with the provisions of a decision on the standard of services, wellbeing service counties provide rescue and paramedic services in Central Uusimaa region. The department has in immediate readiness eight rescue units, two lead units, three lifting platform units, one heavy rescue unit and one water tender. Target response time is one minute from the receipt of an alarm. Medical response assets include 24-hour advanced life support level paramedic units. The district is also responsible for initial response at Helsinki airport.

The department is responsible for rescue services response planning in authority's capacity. Responsibility for paramedic response planning including psychosocial support rests with HUS Group. Internal response planning at the airport is carried out by Finavia.

2.7 Regulatory Framework

Annexes to the Convention on International Civil Aviation issued by the **International Civil Aviation Organization** (ICAO) contain standards and recommended practices that prescribe

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[20] Traficom. *Situation overview: Collisions while taxiing to or from a runway.* February 3, 2026. https://tieto.traficom.fi/fi/tilastot/yhteentormaykset-rullattaessa-kiitotielle-tai-kiitotielta-gcol.

the physical characteristics, equipment and related aeronautical information procedures. These are in Annex 14 *Aerodrome Design and Operations, vol 1* and Annex 15 *Aeronautical Information Services*.

Annex 14 contains standards for the marking and lighting of apron taxiways, taxi signs and various restricted areas. These requirements are intended for aerodrome operators.

Annex 15 primarily defines the contents of aeronautical information services and explains how these services should be established by and between the member states. Aeronautical Information Publication (AIP) Finland complies with the standards prescribed in Annex 15.

The member states shall adhere to ICAO standards and recommendations unless they have notified ICAO of national differences. ICAO does not require ground handling service providers to establish a separate SMS.

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

Guidelines for airport operators are in EASA's ADR regulation group, which is the certification basis of Finland's airports. The group includes requirements and guidelines for airport infrastructure, equipment, organization, operations and safety management. Although ground handling arrangements per se are not covered, airport operators are obliged to coordinate safety procedures with other organizations operating at the airport and ensure that they adhere to airport specific instructions. ADR regulations also oblige the airport operator to determine the number of personnel required for its operations although but no guidance for staffing level determination is given.

EASA publishes safety information bulletins (SIB) to direct aviation stakeholders' attention toward safety considerations and safety actions. In Finland, SIBs are incorporated in national instructions and statutes.

Two SIBs are related to ground handling. They are SIB 2020-7R2 *Progressive Restart of Aerodrome Operations after Complete or Partial Closure* (2020) and SIB 2022-06 *Risks Emerging During Ramp-up Aviation Activities* (2022), both issued with a view to preparing for post-pandemic resumption of operations at airports. They prompt aerodrome operators to increase collaboration with ground handling service providers, ensure that aerodrome infrastructure meets the applicable requirements, and inspect the condition of taxiway and apron signs and markings.

Regulation (EU) No 376/2014 of the European Parliament and of the Council lays down requirements related to the reporting, analysis, and follow-up of safety occurrences in civil aviation by ensuring that relevant civil aviation safety information is reported, collected, stored, protected, exchanged, disseminated and analyzed. The sole purpose of occurrence reporting is to promote the prevention of accidents and incidents, not to imply culpability or allocate legal liability.

Commission Regulation (EU) No 139/2014 lays down requirements and administrative procedures related to aerodromes pursuant to Regulation (EC) No 2018/1139 of the European Parliament and of the Council. The regulation lays down procedures and conditions for certifying of aerodromes. Annex II of the regulation establishes requirements for the

competent authorities involved in the certification and monitoring of aerodromes. Helsinki airport holds a certificate referred to in the regulation.

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 of its operation at the aerodrome. National competent authority shall be responsible for the monitoring and enforcement with respect to ground handling service providers. In Finland, this authority is Finnish Transport and Communications Agency Traficom.

Commission Implementing Regulation (EU) 2025/23 lays down requirements for the safe provision of ground handling services and organizations providing them. The regulation was issued in December 2024 and will becomes applicable in March 2028. It prescribes requirements for appropriate procedures during aircraft arrival, including apron inspections, marking of airplane danger areas and location of ground equipment.

Finnish Transport and Communications Agency Traficom issues national aviation regulations and supplementing advisory circulars. Expansion of the EU regulatory framework has significantly narrowed the scope of national regulation, which currently covers primarily state and recreational aviation. Regulations and advisory circulars of a general nature are grouped in GEN series of documents, in which advisory circular GEN T1-4 contains guidelines for reporting of accidents, serious incidents and occurrences.

Ground handling is covered by GEN M1-3, which applies to organizations that offer ground handling services in Finland for commercial air transport on airports to which the EASA regulation applies. The regulation contains obligations for the airport operator, aircraft operator and the ground handling service provider. The airport operator shall when necessary provide guidance for ground handling services taking into account applicable regulations, select ground handling service providers and monitor their operation. The aircraft operator has the right to choose its own partner among ground handling service providers. It is also required to ensure that the service provider's operations comply with aviation safety requirements[21]. This means that the operator must be satisfied that the service provider has the appropriate instructions and equipment and its employees receive necessary training for the operator's operations and equipment. The service provider shall also ensure that its operations comply with the specific ground handling conditions and instructions, and it shall have instructions and procedures for the safe use of its equipment as part of its management system.

GEN M1-3 further stipulates that *the ground handling service provider shall designate an accountable manager who is ultimately responsible for safety. They are responsible for ensuring that all activities can be financed and carried out in accordance with the applicable requirements and that the organisation has an appropriate structure and qualified personnel. The accountable manager is also responsible for creating and maintaining a well-functioning management system. Ultimately, they are responsible for the safety and compliance of the operations towards the competent authority.* According to the regulation, *in order to manage safety risks, a ground handling service provider shall, as part of its management system, develop and maintain a safety management system. The system shall also include procedures related to the safety culture, safety communications and reporting, as well as operational procedures and training.*

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

The primary objective of **Aviation Act** is to ensure flight and aviation safety in all forms of operation that affect the use of aircraft. According to the act, responsibility for safe operation rests with the pilot-in-command, also during taxi in the movement area.

The operation of organizations that provide ground handling services in the movement area are governed by the Aviation Act and aviation safety regulations. These ground handling service suppliers shall develop an SMS to ensure the safety of their own operations. The system must contain occurrence reporting and handling of occurrences.

According to section 4 of the act, aviation operators shall take account of the national aviation safety program, as well as related objectives and monitoring in their operations. Chapter 8 focuses exclusively on ground handling services. For example, section 89 defines these services for the purpose of the Aviation Act, and section 90 covers supply of these services.

The civil aviation law of the People's Republic of China, Section 2 Crew Article states that responsibility for safe operation of the aircraft rests with the pilot-in-command.

Aeronautical Information Publication Finland (AIP Finland) contains essential standing information of services, products and responsibilities that are managed with Aeronautical Information Service Finland, such as aerodrome charts. The material is available to download on the internet. The electronic version that was in effect at the time of the investigated incident had become available on August 7, 2025. AIP is maintained by Fintraffic.

Finavia's guidelines and instructions cover items such as moving on the apron, parking of ground support equipment, use of high-visibility clothing, jet blast avoidance and refueling safety. Instructions for other ground handling functions are under the responsibility of individual operators. Compliance with Finavia's instructions is monitored as part of general situation monitoring and with random checks.

2.8 Other Investigations

2.8.1 L2025-02 Aviation Accident at Helsinki Airport on August 16, 2025

By the time the SIAF launched the probe into the incident discussed in this report, it had initiated an investigation into a partly similar accident that happened on the apron at Helsinki airport, when a parked ATR 72-500 moved inadvertently forward after engine start and impacted a GPU. The investigation focuses on the role of human factors in aviation accidents.

2.8.2 Aviation Accident at Singapore Airport on December 19, 2013

The Air Accident Investigation Bureau of Singapore has issued a report of a similar serious incident that occurred on December 19, 2012 at Changi airport, Singapore (SIN/WSSS)[22].

A ground handling service provider staff member had left a cargo container and two baggage dollies in the ERA for loading operation that was about to take place on the adjacent stand. During the turn to the stand the incident airplane's first officer directed his attention to the right side of the lead-in line while the pilot-in-command scanned its left side and the docking system display. The left engine ingested a cargo container and sustained damage while the airplane was still moving.

An FOD inspection had been carried out before the airplane's arrival. The adjacent stands were located at an angle and their ERAs overlapped partly. The flight crew relied on the

[22] Air Accident Investigation Bureau of Singapore, *BOEING B777-200, REGISTRATION 9V-SRP CARGO CONTAINER INGESTION 19 DECEMBER 2013.* https://isomer-user-content.by.gov.sg/287/df9f8b4b-866c-41eb-843e-5f10dcaf777e/container-ingestion-19-dec-13---fr.pdf

docking system display, and ground crew members who were working on the other stand did not pay attention to the overlap of the ERAs or the containers parked therein.

3 ANALYSIS

Investigation used the ACCYAN (Accident Cycle Analysis) method to analyze the serious incident.

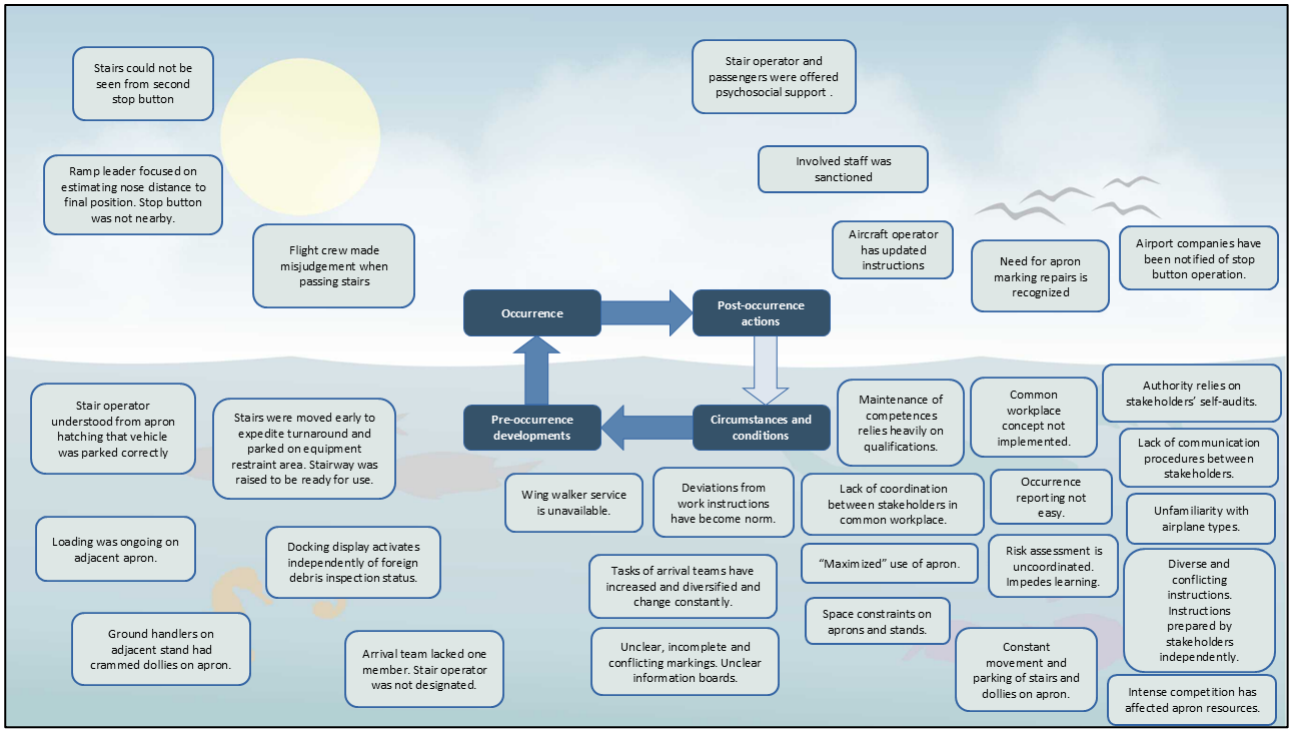

Figure 9. L2025-03 ACCYAN analysis step 1: Identifying contributing factors. (Diagram: SIAF)

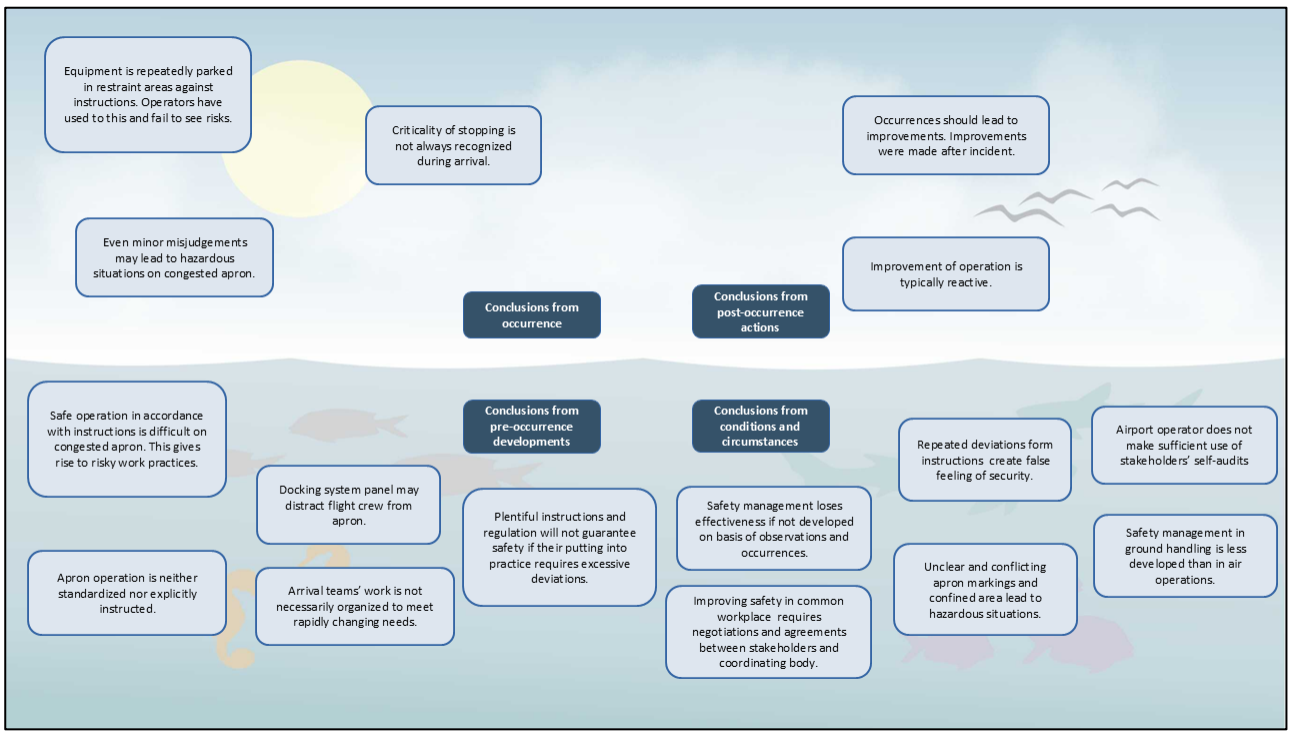

Figure 10. L2025-03 ACCYAN analysis step 2: Drawing conclusions. (Diagram: SIAF)

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 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.

3.1 Circumstances and Conditions

At 1352 on August 28, 2025, during taxiing-in at Helsinki airport, the left wing of an airplane struck a passenger stair vehicle parked between two adjacent stands in an equipment restraint area (ERA).

Space constraints have hampered the airport's gradual expansion, while the size of airplanes, number of passengers and quantity of items carried on board have increased over the years. Simultaneous efforts to maximize the number of stands have led to partial ERA overlap. Although available areas are generally sufficient for airplanes, confined spaces affect safe and expeditious simultaneous ground handling on adjacent stands significantly.

For the same reason, parking on equipment restraint lines (ERL) has become an accepted practice and gradually an established norm, apparently also on less confined stands. Stand-specific operational risks have not been commonly identified, and they are not consistently explained during familiarization training either. Occurrences resulting from incorrect parking go easily unreported, and the airport has no common occurrence reporting channel.

Stand overlapping for space maximization places particular requirements on the clarity of signs and markings. Tarmac markings are not identical between stands, and the diagram on the stand S43 information board does not correspond fully to tarmac markings. Tarmac markings are difficult to visualize when viewed from the apron – they are much easier to view and interpret in aerial photos. Markings are major contributors to safe working conditions.

Operators involved in the investigated incident had assumed that the stair vehicle was outside the ERA on the airplane’s arrival. Had the vehicle remained in its initial position, its relocation after the airplane’s arrival would have required driving under a wing, which would have been contrary to instructions. Finding a suitable holding position was difficult due to dollies left in the area for ground handling on the adjacent stand, and the dollies masked some of the tarmac markings, which rendered ERA boundaries less conspicuous. Weather conditions were good. In the winter, however, tarmac markings can be covered by snow and therefore invisible, which adds emphasis to the importance of adequate working space and the correctness and clarity of information boards and signs.

Some airports use wing walkers to ensure wing tip clearance in confined areas, but this service is not available at Helsinki. Intense competition in ground handling business creates pressure to assess the need and use of human resources. The tasks of ramp teams have increased, and sufficient staff is not always available. Teams used to include a member assigned for dolly handling, but because of streamlining these persons were detached from ramp teams and were redesignated as dolly fleet managers, who do not coordinate dolly redeployment with the teams. Empty dollies are also left parked in places where they hamper other apron operations. An additional problem arises from the fact that dollies are assigned to individual operators, which has prevented the emergence of a cross-utilization practice.

Although ground handling qualifications are obtained during initial training, which includes hands-on familiarization, all aerodrome-specific features do not necessarily become evident to all trainees during familiarization. Regular refresher training would be one way to maintain competences and highlight best practices and observations made.

The number of ground equipment on the apron is high, and its operators work for several stakeholders. Apron procedures are not harmonized; instead, they are prepared by the airport operator, equipment operators and their contract partners. Neither are operations under centralized coordination, and instructions may be contradictory. The fact that instructions are not prepared as a concentrated effort but operator-specific causes difficulties in overall evaluation. The common workplace model is not implemented at the airport unlike, for example, in a major seaport.

Lack of coordination also emerges as a factor when the success of self-auditing is assessed. In many domains, the authority's monitoring is largely based on operators' self-auditing. One example is found in the uncoordinated risk assessment of ground handling and in the resulting situation where interlinking effects of various operators' work remain easily unidentified. Current inter-operator communication practices do not enable sharing of observations of identified safety threats, which would be conducive to learning from mistakes. This leads easily to a situation where actions are initiated only after an accident or a serious incident has occurred.

Finavia does not have a system that ground handling service providers could use for electronic occurrence reporting. Reports are consequently submitted by e-mail and other means. Neither does Finavia maintain a hazard log for ground handling or apron work, which precludes overall risk assessment in these domains. The situation is therefore different compared with, for example, flight crew community, where pilots use an air safety report (ASR) system to report their own or observed errors or safety risks. The aircraft operator's safety department handles each report and allocates the occurrence a risk factor. Airlines use the ASR system to monitor the risk levels in their operational sectors and develop operations by amending and revising instructions. Aviation is highly regulated when it comes to air operations, but the same level of regulation is not yet applied to apron operations.

Monitoring of ground handling is based on service providers' self-auditing and is therefore unable to address the overall picture since each service provider assesses its operations independently. Effective safety promotion in a common workplace typically requires that the area proprietor or any other similar actor assumes a coordinator's role. The desired outcome is that operations are assessed as an entity where the effects of individual operators' actions on the comprehensive working environment are recognized.

Monitoring by an authority does not necessarily bring to the fore fragmented information of reported occurrences and identified risks. Moreover, monitoring is largely delegated to operators as self-auditing since the authority's audits of ground handling services take place at two-year intervals.

3.2 **Pre-occurrence Developments**

Because the arrival crew lacked a stair operator, one team member proceeded to relocate the stair vehicle into a holding position to allow approach to the airplane's rear door and thereby expedite turnaround. He raised the stairway to the highest position while inside the ERA, which was against instructions. A collision risk was not recognized because the vehicle was understood to be outside the ERA.

The team member was given the task on short notice and therefore had not sufficient time for careful task planning. Unexpected retasking is common in ground handling because of flight delays, weather conditions or other such reasons. Careful preparation is needed for safe accomplishment of tasks in a demanding environment, while experience build-up including increasing knowledge of airplane types helps in work planning and risk identification.

At Helsinki, the visual docking guidance system (VDGS) display activates to guide the flight crew regardless of the status of a foreign object debris (FOD) inspection, which was completed prior to the investigated incident. However, guidance system allows the flight crew to use system information and maneuver the airplane to the stand although the FOD inspection remains undone. But on the other hand, an FOD inspection may focus on smaller loose objects that may be ingested into an engine.

At Helsinki, it has become a custom to allow the presence of vehicles within an ERA during an FOD inspection. It is also assumed that vehicles are less prone to ingestion into an engine than small articles, and there are many vehicles simply not high enough to be struck by a wing.

3.3 **Serious Incident**

The flight crew saw the stair vehicle during approach to the stand lead-in line but estimated that they could maintain adequate clearance to the vehicle and concentrated on steering the airplane to the stand using VDGS information. Flight crews' aerodrome charts do not show ERAs, and reading tarmac marking from an angle and above can be challenging. Flight crews encounter a wide variety of situations at different airports and may therefore remain unaware of certain risks, such as lack of a wing-walker service mentioned in their manuals.

Flight crews are seldom given a stop signal, either by hand or by using the emergency stop button when the VDGS is operational. The ramp team leader observed the airplane's arrival at some distance from the button and was concentrated on following the aircraft's nose getting nearer the final position. View from the second stop button, mounted on the airbridge, in the direction of the airplane would have been obstructed. On realizing that a collision was imminent, the team leader ran to the farther button, and at the same time the flight crew did not notice the team members' hand signals that were outside the crew members' field of view. Ramp team members may be unaware of all risks that would require a team member's presence near the emergency stop button.

3.4 **Post-occurrence Actions**

None of the passengers felt a need for psychosocial support although it was offered. The ramp team members involved were subjected to sanctions and were removed until further notice from the duties they executed at the time of the incident. As a rule, aviation stakeholders strive to foster thinking and a non-punitive culture that are based on an understanding that dangerous occurrences can and shall be reported without fear of being punished. Securing work assignments may also be understood as a punishment. It is important to go through post-occurrence actions in the workplace and discuss them openly. If personnel remains unaware of the reasoning behind actions, they may easily resort to misconceptions and let close calls and other such occurrences go unreported due to fear of sanctions.

As an immediate action, the aircraft operator amended taxi instructions for its flight crews. The focus of the revised instructions is on upgrading ground operations safety during taxiing and docking in particular. A new procedure to be applied before turning to the lead-in line requires flight crew members to verify that the correct airplane type is shown on the VDGS

display, and this should be accompanied by an “apron clear” callout to ensure that no obstructions or collision potential exists on the lead-in line.

Ground handling personnel’s instructions related to the manning of the emergency stop button were elaborated, and Airpro issued an apron safety alert on the topic. A need to restore apron markings was also recognized.

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. Ground handling at Helsinki airport is not possible in accordance with instructions in all situations. Ground support equipment is repeatedly parked in equipment restraint areas and no-parking zones.

   Conclusion: *Apron arrangements and resulting work practices are not conducive to safe operation.*

2. Although Helsinki airport can be regarded as a common workplace or a workplace of mutual hazards it does not have a coordinating body. The airport operator is not receptive to assuming this role.

   Conclusion: *Improving safety in a common workplace or in a workplace of mutual hazards requires negotiations and agreements between different stakeholders and a coordinating body.*

3. A common occurrence reporting system or a hazard log is not maintained for ground handling at the airport.

   Conclusion: *A common occurrence reporting system that is open to all stakeholders promotes learning of lessons from occurrences and close calls across organizational boundaries. Common and continuous risk assessment enhance safety.*

4. Air transport is susceptible to delays and cancellations, and the staffing of ground handling service providers varies daily.

   Conclusion: *Both organizations and individual employees are required to apply instructions and regulations due to the emergence of sudden and unexpected situations, which in turn increases the probability of operational errors.*

5. Foreign object debris inspections do not always pay attention to ground support equipment parked in equipment restraint areas.

   Conclusion: *Risks caused by large equipment are not necessarily recognized because the focus of a foreign object debris inspections is typically on detecting smaller items.*

6. The visual docking guidance system display activates regardless of the status of a foreign object debris inspection.

   Conclusion: *Visual docking guidance system activation is independent of the status of the foreign object debris inspection. An aircraft can arrive on an apron that has not been inspected for foreign object debris.*

5 SAFETY RECOMMENDATIONS

5.1 Apron Markings

In addition to space constraints, incomplete, unclear and conflicting apron markings affect safe conduct of work. Work practices where equipment is parked in equipment restraint areas have become a generally accepted norm.

The Safety Investigation Authority Finland recommends that

> *Finavia restores and harmonizes apron markings and the way information is presented in charts and on information boards. Particular attention shall be paid on the markings of overlapping equipment restraint areas and on their readability. [2026-S008]*

Apron operators shall be notified of the purpose of markings and implemented changes.

5.2 Risk Assessment Procedure in Apron Work

Individual operators' safety observations are not shared systematically. No method is available for total risk level determination in an apron environment.

The Safety Investigation Authority Finland recommends that

> *Finavia establishes a risk assessment method that is common to all operators at Finavia's airports and assumes the coordinator's role in matters related to overall apron safety. [2026-S009]*

An airport can be regarded as a workplace of mutual hazards and therefore needs a body that assumes overall responsibility for safety management. A common risk assessment method shall in particular look at the simultaneous use of those aprons that have overlapping equipment restraint areas.

5.3 Safety Actions

Juneyao issued on October 28, 2025 a bulletin in conjunction with the update of Boeing 787 standard operating procedures. The focus of the update is on improved ground operations safety, in particular during taxi and docking.

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Written Material

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Muecklich, N., Sikora, I., Paraskevas, A., & Padhra, A. (2023) *The Role of Human Factors in Aviation Ground Operation-related Accidents/Incidents: A Human Error Analysis Approach. Transport Engineering* (Oxford), 13, Article 100184.

Centre for Occupational Safety (2025a) *Yhteinen työpaikka, yhteisten vaarojen työpaikka ja vuokratyö*. December 6, 2025. https://ttk.fi/tyoturvallisuus/vastuut-ja-velvoitteet/yhteinen-tyopaikka-yhteisten-vaarojen-tyopaikka-ja-vuokratyo/

Centre for Occupational Safety (2025a)*Yhteisen työpaikan ja yhteisten vaarojen torjunnan käsitteet*. December 6, 2025. https://ttk.fi/tyosuojelun-yhteistoiminta/tyoturvallisuus-kuntoon-tyonantajien-yhteistyolla/yhteinen-tyopaikka-ja-yhteisten-vaarojen-torjunnan/

Investigation Material

1) Photographs, diagrams, and other material produced during on-site investigation
2) Meteorological data
3) Ground handling service provider's instructions
4) Ground handling service provider's safety management system
5) Ground handling service provider's risk assessment material
6) EASA safety information bulletins
7) Airport operations manual
8) Airport safety management system data
9) Air traffic statistics 2025
10) Aircraft operator's instructions
11) Finnish Aviation Safety Programme
12) Finnish Plan for Aviation Safety
13) Finnish Aviation Safety Performance Indicators and Targets

SUMMARY OF COMMENTS TO DRAFT FINAL REPORT

The draft final report was submitted for comments to the Transport and Communication Agency Traficom, the Civil Aviation Administration of China, the National Transportation Safety Board of the United States, Juneyao Air, Finavia and Aviator.

The Transport and Communication Agency Traficom proposed the report looks into differences both in contents and in requirements that exist between the ground handling service provider's and aircraft operators' operation manuals. The agency also wishes that the report analyzes the ways the ground handling service provider has taken into consideration previous employer's procedures and has actively promoted unlearning. Furthermore, the agency commented that in order to understand the multitude of duties and the overall picture, tasks related anti-icing and de-icing and weight and balance calculation, or load reporting in short, should be added to relevant task lists. Finally, in order to determine foreign object debris inspection status, the agency suggests that the visual docking guidance system logic be modified, the occurrence reporting system revised, and additions and specifying information be inserted in the self-audit procedure.

Finavia states the report should indicate the sources of the described observations and lay emphasis on the significance of non-procedural actions. Finavia also points out that the concepts of equipment restraint area and equipment restraint line are not explained in current legislation on aerodromes. As for space constraints at Helsinki airport, Finavia says that the aerodrome meets the applicable design criteria and legal requirements. The statement proposes that several items of information be added to the report, such as Finavia's view on the airport as a common workplace.

Aviator's comments included corrections and specifying amendments pertaining to the described events and their contributing factors. More specifically, the proposed changes had a bearing on the contents of employees' tasks, work procedures, assessment of change-related risks and terms used in the report.

Juneyao Air did not present any comments on the report.

The Civil Aviation Administration of China did not present any comments on the report.

The National Transportation Safety Board of the United States did not comment on the report.