Passenger Falling Accident at Helsinki-Vantaa Airport on November 12, 2024

L2024-03

SYNOPSIS

Pursuant to the second subsection of section 2 of the Safety Investigation Act (525/2011), the Safety Investigation Authority of Finland (SIAF) decided to investigate an accident that occurred at Helsinki-Vantaa airport on November 12, 2024. When a passenger was disembarking from an ATR 72-500 airplane, a passenger door handrail collapsed unexpectedly, and the passenger fell to the apron sustaining serious injuries. The primary focus of the investigation was on the design and operation of the handrail.

Olli Borg was appointed as the head of the investigation team. Team members and subject matter experts were Britt Eklund-Itäinen and Raine Lehtonen. Mikko Virtanen and Krista Oinonen participated in the investigation as specialists. The investigator-in-charge was Chief Air Safety Investigator Janne Kotiranta.

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 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, its summary and appendices were published on the SIAF's website at *www.turvallisuustutkinta.fi*.

Investigation designator: L2024-03
Investigation report 7/2025
ISBN: 978-951-836-686-0 (PDF)
ISSN: 2341-5991

Cover photo: SIAF

CONTENTS

1 FACTUAL INFORMATION

1.1 History of Flight

An ATR 72-500 operated by Nordic Regional Airlines (Norra) landed at Helsinki-Vantaa airport at 1353 on November 12, 2024. Once the airplane had taxied to remote stand 133, the engines were shut down at 1356. The flight was carrying 9 passengers and 4 crew members.

A member of ground staff knocked on the passenger door to indicate that the cabin crew was cleared to open the door and passengers could disembark and proceed to board a bus waiting next to the airplane. The purser[1], who was stationed at the rear of the cabin, opened the door, and two handrails of a set of steps that is integral with the door deployed. Once the bus driver had signalled that passengers were cleared to board the vehicle, disembarkation began.

After most of the passengers had exited the airplane, two remaining passengers arrived at the door, one of them carrying a lightweight suitcase and a canvas bag in her left hand and holding a small handbag in the crook of the right arm. Upon coming on the top of the steps, she grabbed the right-hand handrail. As she began to move down the steps, the handrail collapsed unexpectedly. The passenger lost balance, landed on the apron right flank first and sustained head injury. The accident occurred at 1400.

1.2 Alerting and Rescue

The bus driver was the first to observe the fall and notified the purser of the accident. The purser reported the event to the flight crew via interphone, explaining that a passenger had fallen to the ground. The flight crew called air traffic control (ATC) and requested an ambulance at the airplane.

The controller pressed an equipment fault button. This notified the duty operator of Kerava Emergency Response Center (ERC) of an imminent emergency call from ATC and alerted the airport rescue service to execute local standby procedures. The operator received a call from ATC at 1402:50 and entered the occurrence in the alert log, citing as risk assessment ATC's notification of "*passenger falling down airplane steps, stand 133*." Based on risk assessment, the response was classified as a category[2] C (urgent) task and labeled in the ERC system as *tripping*[3] (code 745). The ERC did not dispatch police to the scene.

At 1409:06 the ERC operator received another emergency call reporting the accident from a security guard who had arrived on the scene. He explained what had happened and gave an assessment of the passenger's condition. He was told by the operator that an ambulance was already on its way.

The first persons to assist the passenger were her spouse and the bus driver. The purser came to help after calling the flight crew, bringing blankets that were used to cover the passenger.

Paramedic unit EKU6232 of Central Uusimaa Rescue Department had completed a category A task at 1407:14 and reported this to the operator, who assigned the unit a new task and directed it to proceed to the airport access gate at Lentoasemantie 1, Vantaa, at 1410:33. The unit acknowledged this at 1410:50 and arrived at the gate at 1424:41[4]. The airport security

---

1 Norra uses the term *senior cabin crew member* (SCCM) in the company's internal communications.

2 Category A = high-risk paramedic task; category B = likely high-risk paramedic task; category C = paramedic task, slight deterioration of the vitals; category D = paramedic task, no deterioration of the vitals.

3 In the ERC classification system, a fall is labeled tripping when it occurs below 2 m height from the ground.

4 The target response time of 30 min for a category C task was met.

control room sent a security guard to meet the unit, but the on-duty fire chief (AR30) of the airport rescue service arrived at the gate first and guided it to the scene of the accident.

Prior to assigning the new task to EKU6232, the ERC attempted at 1407:57, to alert airport rescue service's first response unit (AR101) to the accident site but elected not to do so because the unit was engaged in another task. Another attempt was made at 1409:57, but the unit was still engaged. It had been supporting EKU6232 in the abovementioned category A task, and the ERC event log indicated that it was not called off until 1428:07, while EKU6232 had already been relieved from the task at 1407:14.

The ATC alert of the equipment fault caused the airport rescue service facilities to initiate local standby procedures[5] (green alert) and was also received in the security control rooms. Security service records indicate that the alert was received at 1403. AR30 called ATC over the nationwide public safety network (VIRVE) and inquired about the reason for the alert and was told that "*a passenger had tripped on airplane stairs*." On hearing this, AR30 wondered why no alert from the ERC had been issued to the rescue service facilities or over VIRVE network. He left to investigate the situation and arrived on the scene at 1411. After assessing[6] the passenger's condition he elected to move her into the bus that remained alongside the airplane to keep her warm and wait for the arrival of an ambulance. This happened at about 1415.

AR30 had understood that the passenger had *tripped on the apron* and hit her head and was therefore unable to establish a clear picture of the level of trauma energy[7] to which she had been subjected. Only after the situation was over did he learn that the passenger had *fallen* from approximately 1.5 m height.

AR30 also tried to contact AR101 but was unsuccessful. Next, he talked to the rescue service duty officer and asked him to relay an alert to AR101. Both AR101 and the duty officer were unaware of the fact that ATC had initiated local standby procedures. AR101 was alerted by the duty officer and arrived on the scene at 1418:30, by which time the passenger had already been helped into the bus.

1.3 Consequences

1.3.1 Passenger's Prehospital Care

Upon EKU6232's arrival on the scene, a paramedic talked to the passenger to find out her condition, and when the passenger said that she was able to walk, the paramedic and a rescuer helped her from the bus into the ambulance. Her spouse was offered the option of riding in the ambulance, but he said he would come to the hospital by his own means and was taken in the bus to the airport terminal at 1427.

The paramedic report indicated that the passenger had a recollection of falling from the stairs. After the fall, she could move her arms and legs, and her speech was coherent. A bump was observed on her forehead, and she complained of headache and flank pain.

After the paramedics had completed an initial examination, the passenger was taken to Meilahti hospital emergency department for further examination. Paramedic units did not

---

5 ATC will issue an alert if paramedic response is needed on board an aircraft or if a laser pointer is aimed at an aircraft.

6 The on-duty fire chief does not carry first response equipment. AR30 merely interviewed the passenger and conducted an initial assessment.

7 Trauma energy is the measure of a force that induces a physical trauma. Traumas are described as high-energy and low-energy traumas (Peräjoki & Taskinen 2017: 546).

report the event to the social and crisis emergency services team of Vantaa-Kerava Wellbeing Services County.

1.3.2 Medical Treatment

After imaging tests in the emergency department showed serious injuries, the passenger was moved to the Orthopedic and Traumatology Ward of Meilahti Bridge Hospital for monitoring until she was discharged on the second day in the hospital on November 14.

She was advised to contact the emergency department again in case she experienced changes in her condition, and on November 16 she re-registered in the emergency department. After examination, a treatment plan was produced and pain medication was increased.

She subsequently visited the hospital on November 25 and 29, and treatment has continued into 2025.

Table 1. Timeline of rescue operations (Table: SIAF)

Time	Event
1400:00	Accident occurs on stand 133.
1402:50	ERC operator receives call from ATC.
1403:00	Airport rescue service receives alert from ATC.
1407:14	EKU6232 called off from previous task.
1407:57	AR101 assigned to task.
1407:59	AR101 not alerted.
1409:06	ERC receives call from security guard on scene.
1409:57	AR101 assigned to task.
1411:00	AR30 arrives on scene.
1410:32	AR101 not alerted.
1410:33	EKU6232 alerted.
1415:00	AR30 assesses passenger's condition and has her moved into bus.
1418:30	AR101 arrives on scene alerted by ERC operator.
1424:41	EKU6232 arrives on scene.
1428:07	AR101 called off from previous task, according to ERC.
1440:21	EKU6232 takes passenger to hospital.

2 BACKGROUND INFORMATION

2.1 Environment, Equipment and Systems

2.1.1 Helsinki-Vantaa Airport

The accident occurred at Helsinki-Vantaa airport[8] approximately 20 km from downtown Helsinki. Helsinki-Vantaa is Finland's biggest airport and the main aerodrome in Uusimaa region. It is an important hub of long-haul traffic between Europe and Asia, and in 2023 it handled approximately 15 million[9] passengers.

The airport is served by three runways that are maintained in operational condition all year round. Apron services include aircraft parking, marshalling[10] and rescue services and a business flight terminal.

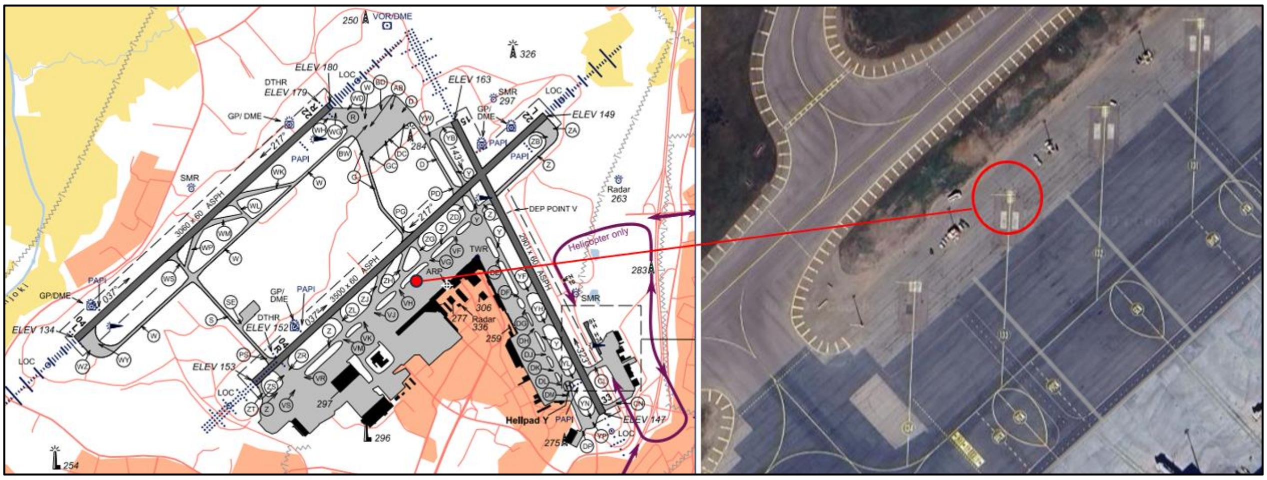

Figure 1. The airplane was parked on remote stand 133 (shown in red). (Figures: eAIP Finland and Google Maps©, annotations: SIAF)

2.1.2 Nordic Regional Airlines

Nordic Regional Airlines (Norra) operates regional air services for other air carriers. Its 24-aircraft fleet consists of 12 short-range ATR 72 turboprops and 12 medium-range Embraer 190 jets operated mainly on European services.

The company's main customer is Finnair, and its majority owner is Danish Air Transport, which was founded in 1989 and owns 60 % of the shares. Finnair as strategic partner is a minority owner with 40 % of the shares. Norra's head office and operations control center are at Helsinki-Vantaa airport, and some financial management functions are in Seinäjoki.

2.1.3 ATR 72-500

The ATR 72-500 is a high-wing passenger and cargo airplane manufactured by the French-Italian ATR[11] consortium founded in 1981. It carries a crew or 4 and 68 to 72 passengers depending on the configuration.

The airplane is powered by two Pratt & Whitney Canada PW127M turboprops driving six-bladed propellers. Maximum takeoff weight is 23,000 kg, range with full passenger load 1,648

8 International Air Transport Association (IATA) code: HEL, International Civil Aviation Organization (ICAO) code: EFHK
9 Finavia: *Passengers by Airport 1998–2023*
10 Marshalling service means the ground guidance of aircraft by a dedicated vehicle unit.
11 Avions de Transport Régional

km and flight altitude 7.6 km. The occurrence aircraft, registered OH-ATM, had entered service on May 13, 2011.

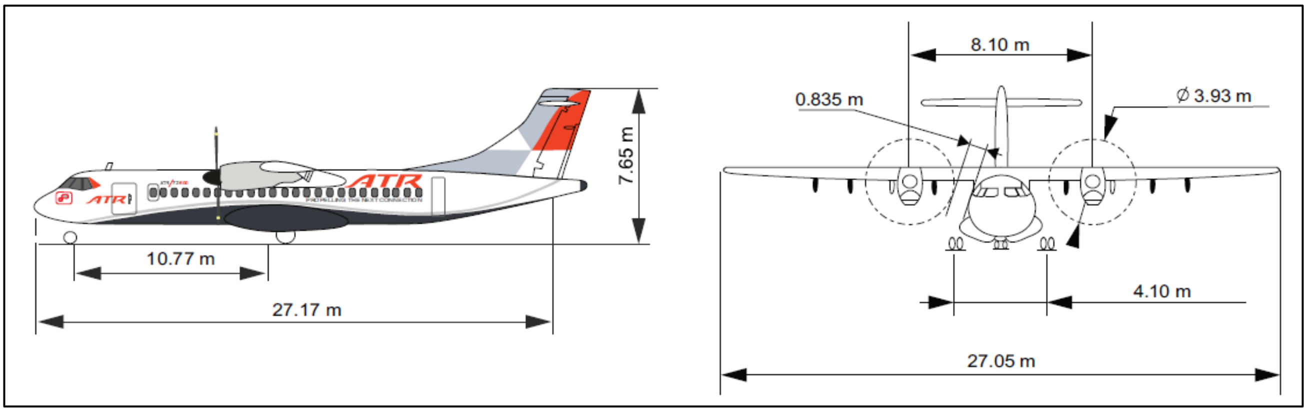

Figure 2. ATR 72-500 dimensions (Figure: ATR)

2.1.4 ATR 72-500 Doors and Exits

The ATR 72-500 has three doors and three emergency exits. The passenger door (6) is at the rear of the airplane on the left-hand side.

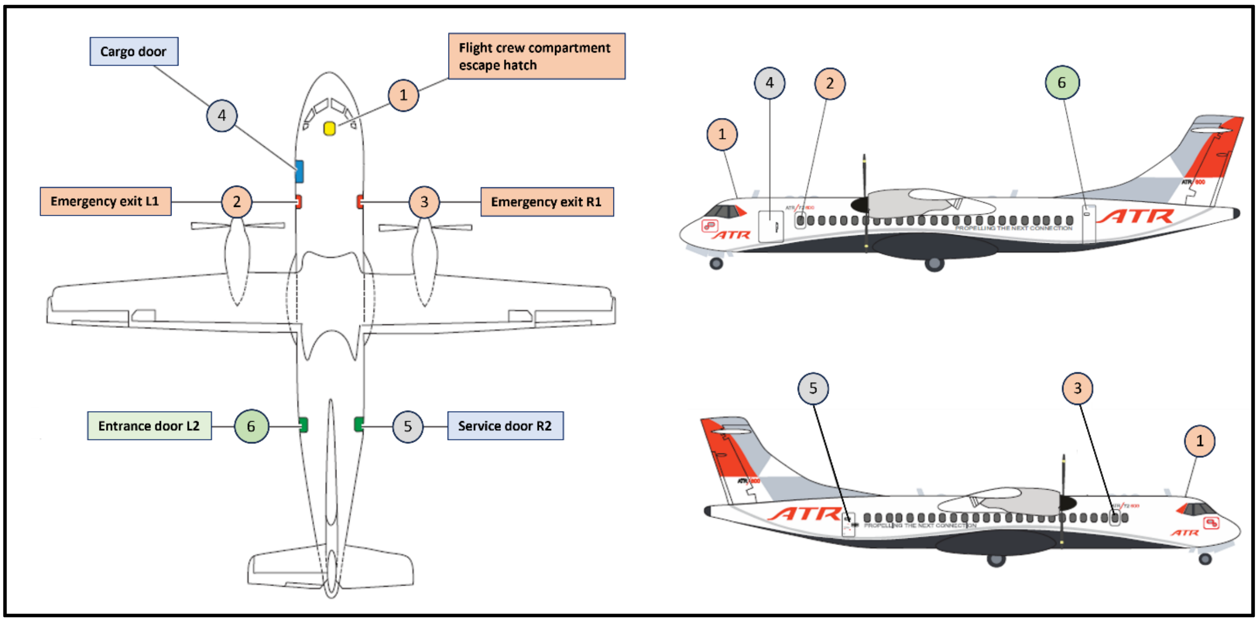

Figure 3. ATR 72-500 doors and exits (Figure: ATR, annotations: SIAF)

A service door (5), on the right-hand side opposite the passenger door is used to load baggage and catering supplies. The passenger door and service door can be used as emergency exits if necessary, depending on the situation.

An electrically operated upward-opening cargo door (4) is at the front of the airplane on the left-hand side. It is for loading and unloading baggage and cargo and not to be used as an emergency exit.

The airplane has three emergency exits. The flight crew can leave the cockpit via an overhead escape hatch (1) if other exits are unavailable. Two emergency exits (2 and 3) at the front of the airplane opposite each other can be used for leaving the airplane during evacuation. Normally they are integral parts of the airframe, but in an emergency, they are released and free to fall on to the ground or into water.

Table 2. Door and emergency exit dimensions and sill heights (Table: Norra)

Emergency exit / door	Dimensions (height x width)	Sill height
Flight crew escape hatch (1)	0.51 x 0.48 m	3.18 m
Emergency exit (2 and 3)	0.91 x 0.51 m	1.80 m
Passenger door (6)	1.77 x 0.74 m	1.25–1.72 m (depends on load)
Service door (5)	1.27 x 0.69 m	1.25–1.72 m (depends on load)

2.1.5 Passenger Door

Passengers enter and leave the airplane via the outward opening passenger door that is hinged at the bottom to fuselage structure with bolts and can be opened from the outside or inside the airplane. Its operating mechanism consists of an internal and external handle and a control lever. The door incorporates integral steps and two handrails.

Figure 4. Outside and inside view of the passenger door (Photos: ATR, annotations: SIAF)

To open the door from the outside, the handle (1) is pulled down, and the locking indicator (2) changes from green to white with orange stripes. The spring-assisted door is rather heavy and should be opened slowly, restraining the movement by hands.

The door is opened from the inside by raising the yellow handle (3) to the marked position (4) and restraining movement with the control lever on the left side of the doorway as seen from the inside (not shown). This makes the door open slowly and under control.

2.1.6 Passenger Door Handrails

Of the door handrails, the right-hand or aft handrail, when viewed from the outside, is fixed and forms a rigid structure, whereas the left-hand or forward handrail is collapsible, and it should remain upright or stowed depending on the location of a quick release locking pin.

Before opening the door for normal disembarkation, the cabin crew member (CCM) must move the pin into a locating hole in the "ground/disarmed" stanchion to lock the handrail upright. Before beginning of disembarkation, the CCM must verify that the pin is correctly positioned, and the handrail is firmly upright. The CCM needs to move the pin between the stanchion and a stowage bracket both before opening and immediately after closing the door.

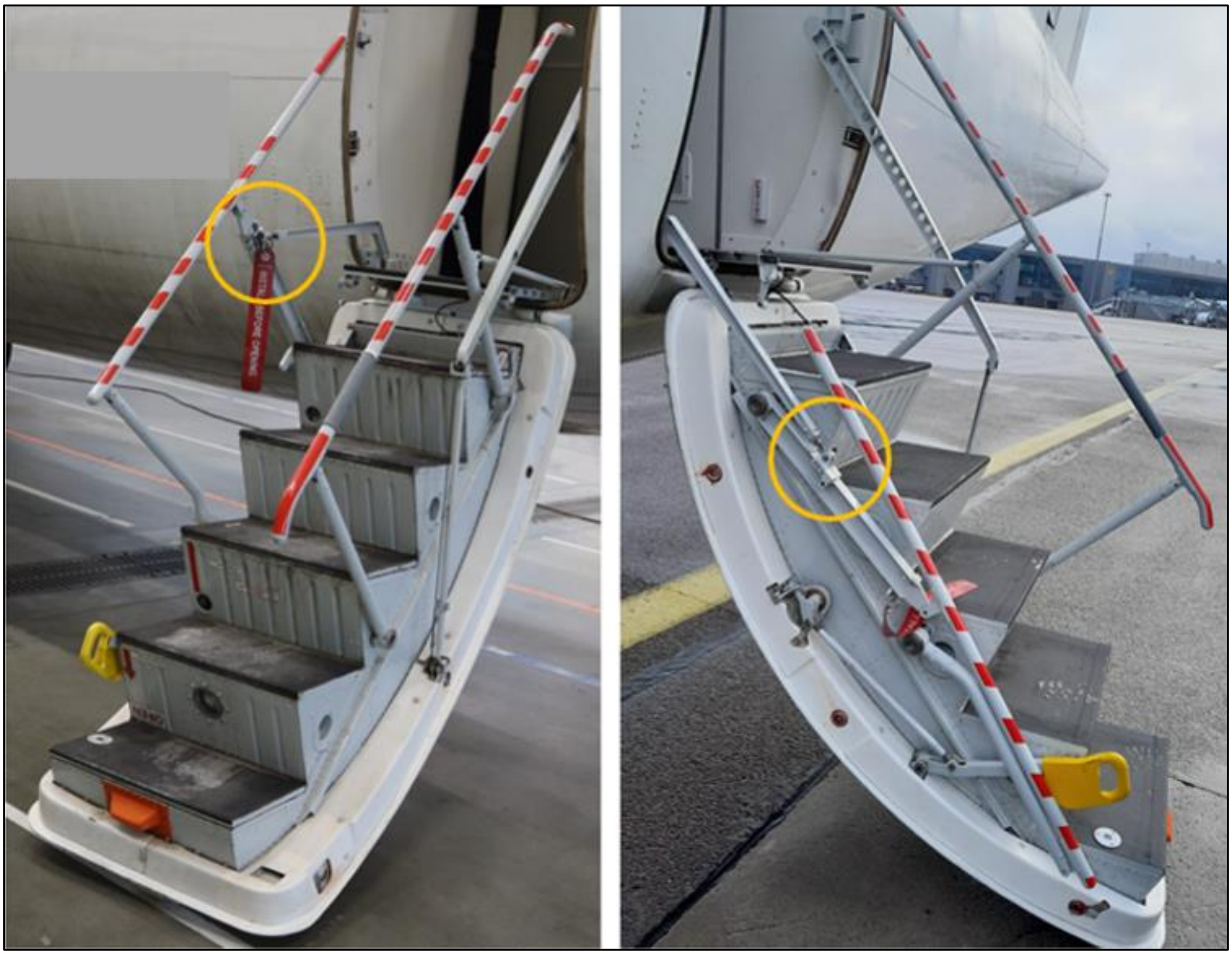

Figure 5. The passenger door handrails. On the left, the collapsible handrail is locked upright with the quick release pin for normal disembarkation. On the right, the handrail is stowed, and the pin has not been moved ("empty" circle). The handrail is unlocked. It would be in this position during emergency evacuation. (Photos: SIAF)

In flight, the pin is in the "flight/armed" stowage bracket. In the event of an emergency, it would be left in the bracket, and the handrail would remain stowed when the door is opened to allow expeditious and unhindered disembarkation.

The above-described normal procedure was followed at all airports in Norra's network except Kuusamo, where the handrail was left stowed to allow disembarkation via a mobile ramp[12].

[12] The ramp was used for field testing and has since been withdrawn from use.

Figure 6. At Kuusamo, passengers boarded and disembarked via a mobile ramp. (Photo: Jussi Väätäinen, Koillissanomat, enlargement: SIAF)

2.1.7 Handrail Quick Release Pin Locations

According to ATR, the collapsible handrail quick release pin ensures the safe use of the handrail during boarding and disembarkation.

The pin can be fitted either in a stanchion to lock the handrail upright when the door is open, or in a stowage bracket, where the handrail is unlocked in stowed position during flight. In the event of an emergency, the door would be opened with the handrail unlocked.

Because the distance between the two locations with the door open is only a few centimeters, visual verification of the locked or unlocked condition of the handrail is difficult.

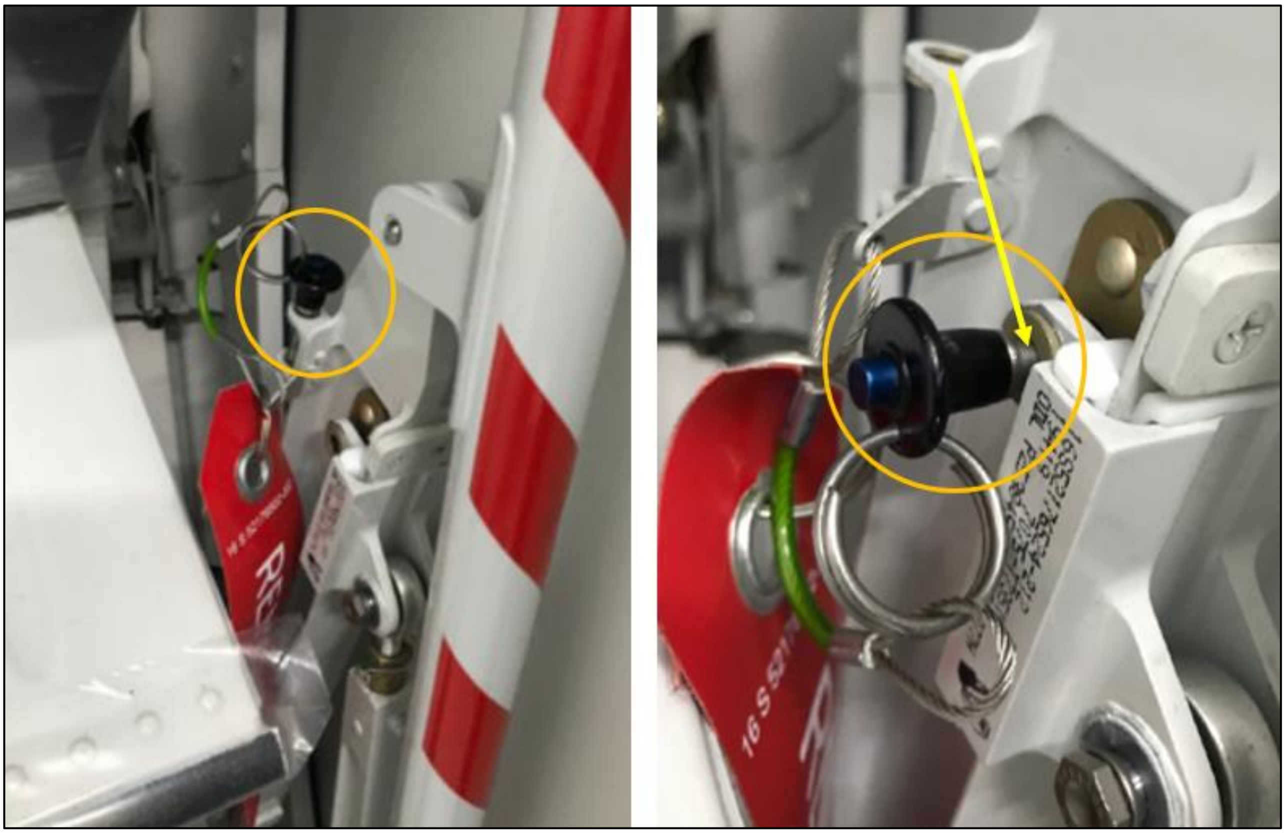

Figure 7. Quick release pin locations. On the left, the pin is in in-flight ("flight/armed") location. On the right, it has been moved (yellow arrow) to the "ground/disarmed" location. (Photos: SIAF)

2.1.8 Handrail Quick Release Pin Construction

The quick release pin consists of a barrel containing a plunger. The pin is locked in place and released by applying a force on the head of the plunger, which is spring-loaded to locked position. When the plunger is inserted sufficiently far, i.e., as far the attachment collar permits, into a locating hole, two ball bearings protrude from the barrel to lock the pin in place. Locking is verified by pulling on the ring of attached to the plunger head and ensuring that the pin remains firmly in place.

The pin is removed by applying pressure on the plunger head, gripping the attachment collar and simultaneously pulling the pin out of the locating hole.

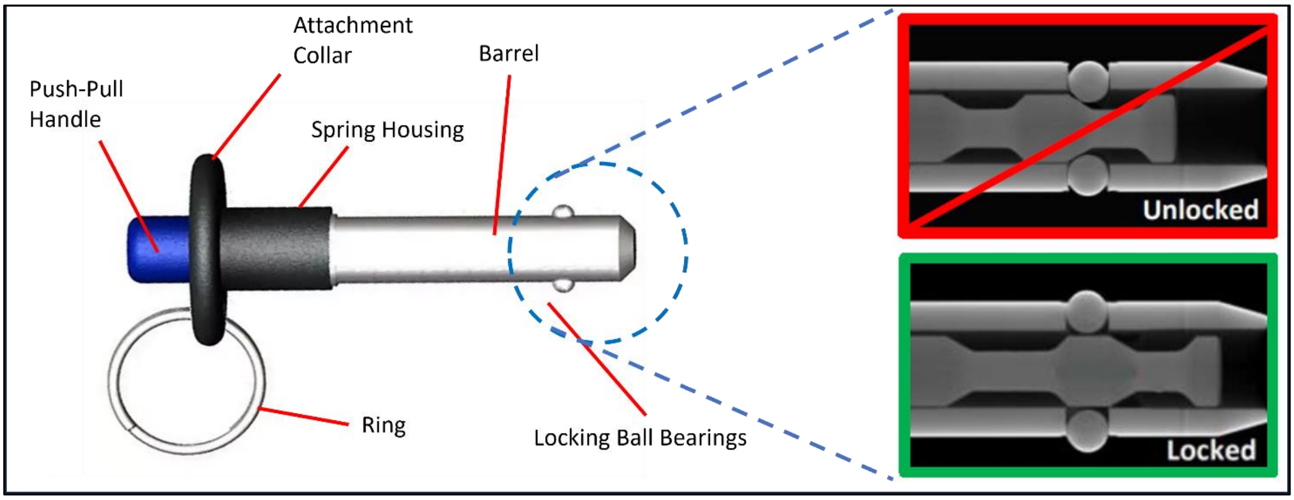

Figure 8. Construction and operation of quick release pin (Photo: ATR, SIAF)

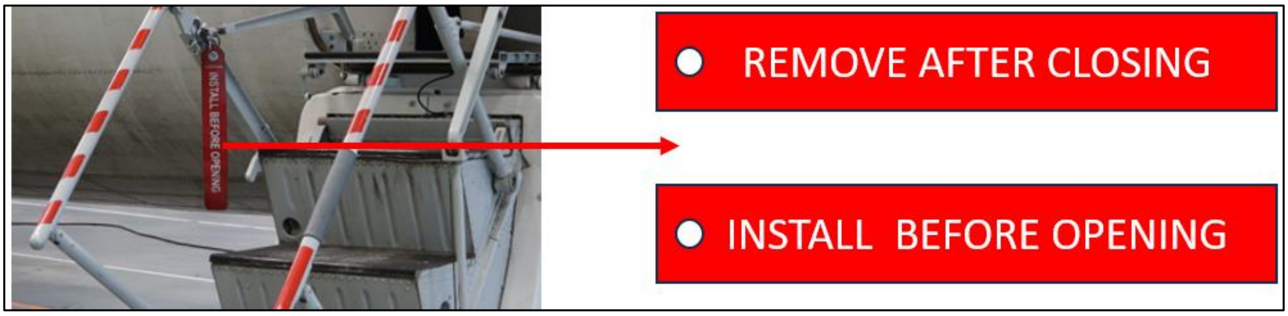

Figure 9. Quick release pin warning flag (Photo: Norra, annotations: SIAF)

A red warning flag with a caution on both sides is attached to the pin to remind the operator to change pin position before opening and after closing the door during normal operation.

The pin locking mechanism on the airplane was serviceable, and the cautions were legible.

2.1.9 Door Functional Check

During the evening of the day of the accident, Norra's technicians performed a functional check of the passenger door, stairs, collapsible handrail and quick release pin. This was done on the apron when air humidity level was high, and rain was present.

The report indicated that the general condition of the mechanical systems of the door was good, and no anomalies were noted in their operation. Both handrails deployed correctly, and no faults were found in pin operation.

An additional test was performed on the collapsible handrail by pulling the pin slowly out of the locating hole. As a result, the handrail remained upright and collapsed only after sufficient force was applied. The report explained that oil or any form of moisture may cause swelling of sliding PTFE parts, and resulting friction may cause the handrail to remain upright. The report also suggested that if the handrail gets stuck upright, the operator may not realize that it is unlocked, maybe due to a lapse on his or her part.

2.2 Conditions

Meteorological conditions at the airport on November 12, 2024, were typical of late fall[13]. At 1400, air temperature was +4 °C, wind was from the west at 3.5 m/s, sky was overcast, and the apron was still damp after recent rain. Drizzle continued in the movement area approximately 10 min after the accident.

2.3 Personnel, Organizations and Safety Management

2.3.1 Crew

The flight crew consisted of the captain, copilot, purser and CCM.

The purser had overall responsibility for the cabin, and her duties included the operation of the passenger door. The CCM, positioned in the front of the cabin during landing and disembarkation, assisted the purser in passenger service and safety-related tasks during flight.

2.3.2 Purser's Experience and Key Events during Assignment

The purser had over seven years of experience with Norra and was regularly rostered on both the ATR 72 and Embraer 190. She had last attended scheduled training in October 2024, when training had included a review of the ATR passenger door procedure.

Door opening is a routine and repetitive task for the cabin crew. The instructions in effect at the time of the accident were that the purser carried out the procedure independently. One step in the procedure was to move the quick release pin to "ground/disarmed" location as soon as the seat belt signs were switched off, but the door should not be opened until a ground staff member was heard knocking on the door.

Correct door operation requires concentration, but the operator may be distracted by rush, general commotion, passengers' movement in the aisle, passengers asking questions and communication with ground staff. The instructions require that during landing each cabin crew member memorizes the actions required for safe disembarkation.

The first sector of the crew's three-day flight assignment was from Helsinki to Kuusamo, where passengers disembarked and boarded via a mobile ramp. This meant that the the quick release pin was not removed from its "flight/armed" location. During the pre-flight crew briefing earlier in the morning, the captain had pointed out that the handrail should remain stowed and unlocked at Kuusamo. The normal door procedure should be followed after landing at Helsinki, but no specific mention was made of handrail locking.

Immediately after the accident, the captain contacted Norra's Operations Control Centre (OCC)[14] suggesting that the cabin crew's assignment should be terminated. However, after discussion between the OCC and the cabin crew members, it was decided that the assignment would be continued. The flight crew then departed to resume their duties on other airplanes as planned. A debriefing[15] session for the crew did not take place although it is required in the Operations Manual (OM). The purpose of a debriefing is to ensure that the crew will be able to continue their duties and crew members share a common picture of the accident situation.

---

13 Data: Finnish Meteorological Institute observation station, Helsinki-Vantaa November 12, 2024

14 An Operations Control Centre is a 24/7/365 facility that manages an airline's day-to-day activities. Its primary task is to monitor and ensure that operations run efficiently and on schedule.

15 Debriefing is a meeting led by a trained specialist after a sudden and shocking occurrence, in which the persons involved participate.

The crew was left with a belief that the passenger had simply tripped and sustained no serious injuries.

Before the cabin crew members resumed the assignment, their supervisor asked the purser to file a safety report and assess her ability to continue the assignment, and the purser responded that she was fit and well and ready to continue performing her duties. The crew's last sector of the day was followed by overnighting in Kokkola. The next day's schedule called for spending the second night of the assignment in Vaasa, where the purser reported to the OCC that she felt unable to continue her duties any longer. After the OCC had deployed a cabin crew member on standby duty to Vaasa, the purser deadheaded to Helsinki on board the same airplane. The following day, she contacted occupational health care services on her own initiative and informed the supervisor accordingly. The supervisor ensured that the purser was receiving all help she needed to maintain her work capacity and functional ability.

The purser explained that after the accident she had initially been in a state of shock of some sort and had only belatedly recognized that her strength and energy had depleted to such an extent that she was unable to perform her duties. After the purser had contacted occupational health care, she was reminded of an option to seek counseling support offered by a company Special Assistance Team (SAT), but she did not find this necessary because she had already received help from occupational health care.

Norra’s emergency manual states that an SAT is convened if necessary to support flight and cabin crews and other staff members in a psychologically stressful situation such as may be experienced after an accident. The process is initiated after a staff member contacts the team or the team contacts the persons involved, but in the latter case only if the team has been notified an event. In the accident under investigation, the team received no immediate information of the occurrence, and it was only two days later that a team member informed the crew members via the supervisor that they could contact the SAT if they so desire and if they feel they need support.

2.3.3 Norra’s Safety Management System

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.

Norra uses company intranet for safety reporting. Reports are automatically forwarded in an electronic format to designated responsible staff members who decide on the initiation of appropriate actions. The staff member who submitted the report is always informed of the decision.

Each report is processed and classified in the Safety and Compliance Department, which does not change the contents of the report but may make clarifications that it considers necessary. The report, complete with comments, is distributed to the persons and organizations involved. All reports are sent to the Finnish Transport and Communication Agency Traficom and Finnair. Norra has also in place a contract for exchange of information with Fintraffic Air Navigation Services and Finavia. The reporting system is highly automated.

If necessary, an operator can initiate a limited investigation procedure called assessment, as Norra did after the accident under investigation. The assessment focused on Norra’s continuing airworthiness management organization and the company’s Flight Operations Department, which is also responsible for cabin crew operations.

Norra had the option of initiating an internal investigation, but this was not done in this case because an internal investigation had been carried out previously on a similar event that had occurred at Jyväskylä. The internal report of the Jyväskylä accident recommended the following (the items are direct quotes):

1. *Special call out concerning entrance door opening when seat belt sign is switched off should be considered.*
2. *Minimum recent experience should be considered when person is rostered to SCCM duties.*
3. *Safe operation of handrail when safety pin is in storage location ("armed position") should be verified at regular basis.*

All filed reports and the findings of internal investigations are issued monthly in company intranet.

2.3.4 Norra's Risk Management Policy

Norra operates approximately 36,000 ATR flights each year. The company's risk management policy is a continuous and comprehensive process intended to identify hazards that threaten the objectives and viability of the company.

Norra's Safety Review Board (SAB) is a high-level committee that gives directions to five Safety Action Groups (SAG) tasked with overseeing five operational areas that are flight operations, continued airworthiness, cabin safety, ground operations and training. The Flight Operations SAG normally convenes monthly to discuss safety data of the previous month and related reports. In addition to decision-making, the group assesses the impact of earlier corrective and mitigating actions and protective barriers.

The Head of Safety and Compliance is responsible for the development of the safety management system (SMS), monitoring of hazard identification processes and oversight of corrective actions. In this role, he also participates in accident and incident investigations.

One SMS method is the use of occurrence reports to monitor safety performance indicators. The flight operations operational area alone receives between 50 and 70 reports every month, and the number of monthly reports rises to approximately 200 when reports submitted by technical staff, ground staff and safety staff are included. Approximately 5,000 safety and quality reports are filed every year.

For long-term hazard identification, Norra uses the event risk classification (ERC) method. In addition to following a general risk level, attention is paid on high-risk occurrences and events that are related to type rating changes and the number of reports submitted by ground handling service providers. Assessments from subject matter experts are used to identify events that are on the rise.

In this method, each received report is processed. Each safety report is given a numerical value, or ERC points, representing its risk level before the report is published and forwarded to the staff of the applicable operational area for vetting. The final value is agreed in a monthly SAG meeting. If it is over 20, the company will initiate an assessment. The initiation of an internal investigation will be decided on a case-by-case basis.

The value is determined by answering two questions:

1. If the event had escalated into an accident, what would have been the most probable outcome?
2. What was the effectiveness of the remaining barriers between this event and the most probable accident scenario?

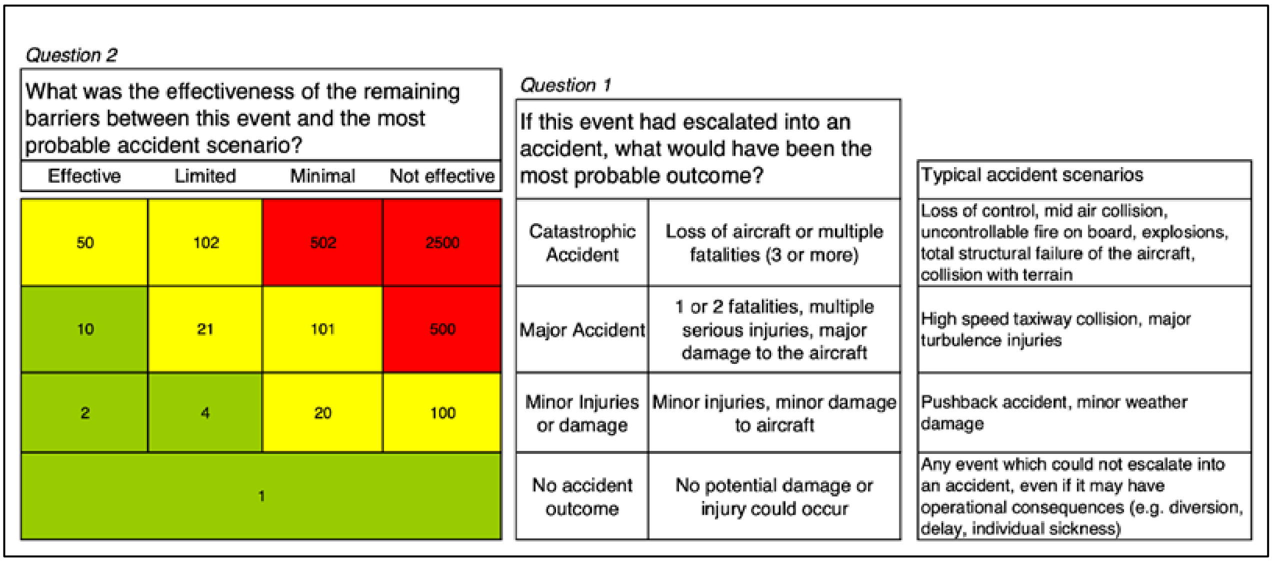

Figure 10. Event risk classification matrix (Figure: EASA)

The sum of values thus obtained can be used to identify monthly differences, among other purposes. This approach will highlight a large number of low-risk events, and similarly, a small number of high-risk events, and thus enable expeditious action.

ERC values are color-coded. Green represents low-risk events that provide data primarily for continuous safety improvement. Yellow boxes represent higher-risk events that require a safety investigation and more refined risk assessment. Red boxes represent high-risk events that require an immediate investigation and resulting corrective actions. Systematic risk assessment is also carried out in conjunction with management of change and in the event of various threats.

Norra monitors risk levels of safety occurrences by comparing the average risk value of the preceding 12 months (blue line in the figure below) against an alert level set by the company (red line). If the average value exceeds the alert level, corrective actions will be initiated.

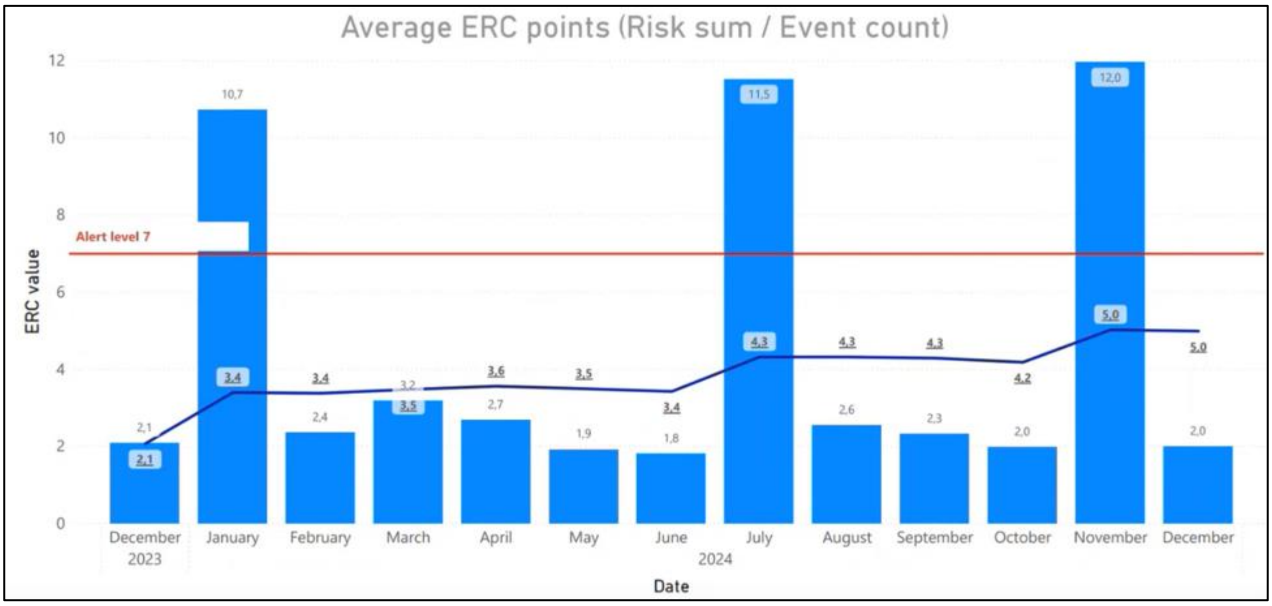

Figure 11. Diagram of safety occurrence risk level monitoring, cabin operations (Figure: Norra)

Norra's aims are, on the one hand to make the alert level more sensitive, and on the other, to avoid situations where the alert level is excessively high and will therefore not be exceeded.

Alongside the ERC method, Norra uses the bow-tie – the shape of the diagram resembles a bow tie, after which it is named – risk assessment method to visualize relationships between the causes and consequences of a safety occurrence along with the required barriers. Because a bow-tie analysis shows a logical relationship between the causes and consequences, it helps to identify a hazard and its cause and consequences.

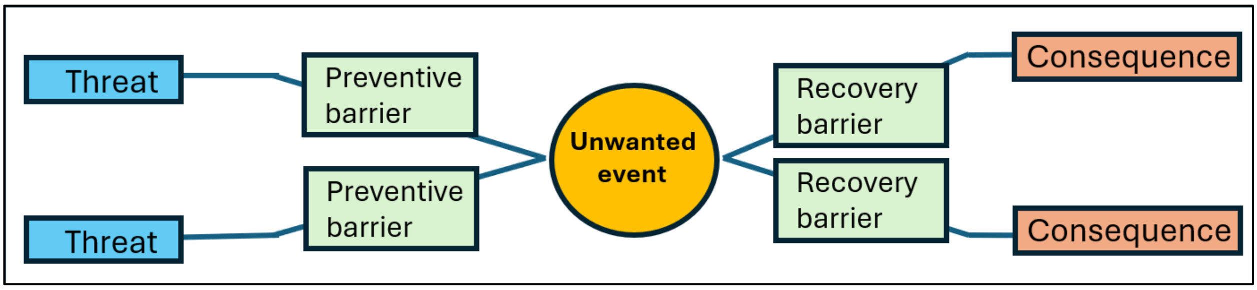

Figure 12. Bow-tie diagram (Figure: SIAF)

Norra has used the bow-tie method to assess risks associated with ATR door operation. The first assessment was conducted on April 5, 2024, after the Jyväskylä accident, and risk assessment was reviewed on November 25 after the accident under this investigation.

The first assessment had noted the possibility of handrail collapse and the effects of friction as a contributory factor, but in practice mitigating actions consisted of increased training on the use of the quick release pin and mandating additional door-related call-outs between the cabin crew members. Norra was at that time unaware of similar door-related accidents.

After the accident under this investigation, Norra reviewed risk assessment related to the passenger door. As a mitigating action, door opening instructions were revised to include communication between the cabin crew members, and a weekly inspection of handrail operation was introduced.

2.4 Preventive Actions of Authorities

2.4.1 Finnish Transport and Communications Agency Traficom

After being notified of the Jyväskylä accident that had occurred on January 12, 2024, Traficom requested additional information on January 26.

Norra had initiated an internal investigation into the accident on January 17 and completed a report on January 22. On January 31, it was sent to the Flight Operations and Training section of Traficom’s Transport Safety and Services sector, which considered Norra’s flight safety report, and the safety recommendations contained therein sufficient.

On July 5, Traficom received from Norra a report of an event that had occurred at Vaasa on the previous day. The quick release pin of the collapsible handrail had not been moved to its correct location after landing, but no injuries had resulted because none of the disembarking passengers had grabbed the unlocked handrail, which had jammed upright. Traficom assessed the incident but did not find further actions necessary.

On November 12, Traficom received a notification of the accident under this investigation, and on November 13, Norra issued a Safety Alert Bulletin that reviewed step-by-step the door opening and closing procedure and the key points of handrail operation. Traficom found this insufficient and requested that Norra take further action.

Norra's response, dated November 14 and issued as a bulletin on November 15, included a review of immediate pre-emptive actions and mandated a revised door opening procedure including call-outs between the cabin crew members. Norra also explained that it would cooperate with Finnair to find out whether staff of ground handling service providers could verify the operation of the collapsible handrail during door opening. In addition, Norra stated that it would investigate a possibility of maintaining the handrail locked throughout the flight during normal operation. And finally, Norra added that it would continue discussion with the airplane manufacturer with the aim of improving the handrail mechanism.

Traficom considered the actions listed in Norra's response sufficient but added that it was also expecting the airplane manufacturer to come up with a better technical solution to the problem. Traficom stated that it would carry out audits to monitor the implementation of the listed actions. Audits consist of on-site inspections, interviews and familiarization with essential technical solutions, procedures and instructions.

2.4.2 Rescue Services and Their Preparedness

Finavia maintains regulatory rescue service at Helsinki-Vantaa airport to provide 24/7 response to aviation accidents and incidents and first response. The minimum staffing of a shift is one fire on-duty chief, and six rescuers assigned to three rescue stations.

The rescue service has in place a contract with Vantaa-Kerava Wellbeing Services County. During a rescue or paramedic operation, a rescue chief or paramedic field supervisor assumes the incident commander's role.

HUS Group provides paramedic services within Uusimaa region. In accordance with a joint agreement, Central Uusimaa rescue department conducts paramedic tasks within Vantaa-Kerava and Central Uusimaa wellbeing services counties. For this purpose, the department has thirteen 24-hour paramedic units and two units in part-time readiness. Tasks are conducted under the direction of paramedic field supervisor.

In accordance with the provisions of a decision on the standard of services, Vantaa-Kerava Wellbeing Service County provides rescue and paramedic services in Central Uusimaa region. It 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 alert. Medical response assets include twelve 24-hour advanced life support level paramedic units and one paramedic unit in part-time readiness.

HUS Group is tasked with paramedic response planning and social and crisis emergency services, while Finavia is charged with response planning at the airport. Central Uusimaa rescue department executes response planning in the capacity of a competent authority.

2.4.3 Revamp of Helsinki-Vantaa Airport Rescue Service

Finavia launched in early 2025 a project to revamp Helsinki-Vantaa airport rescue service. The aim is to improve the alerting system to enable expeditious transmission of alerts and critical information that the service needs to respond to an accident or incident. In addition to this, rescue service personnel will be increased to ensure that each shift is sufficiently staffed and has an adequate command and control capability.

The alert system to be replaced had several overlapping sub-systems, some of which were technically obsolete. Alerting increased air traffic controllers' workload and enabled only voice transmission of location data, which led to delays in alerting local authority emergency services. On the technical side, the aim is to integrate separate alerting systems in a single control panel. This improvement is expected to speed up the transmission of location data from ATC facilities to the applicable operators in the event of an accident, and thereby to reduce the need for voice communications via VIRVE network.

As part of the revamp, a revised minimum response directive for the airport rescue service became effective on January 1, 2025. The minimum planned staffing of a shift was amended to consist of one fire chief, one fire officer and six rescuers, which means that staffing was augmented by one fire officer compared with what it was on the day of the accident under investigation. In March 2025, staffing was increased further by allocating one additional rescuer, and in September the staff is scheduled to be increased by one more rescuer.

The still ongoing revamp will affect the duties and operational control of the rescue service. The on-duty fire chief (AR30) exercises operational-level command and control and is responsible for the maintenance of regulatory readiness. The rescue team leader (AR40) is the incident commander and participates in all tasks conducted by the first response unit (AR101). During category A and B paramedic tasks, he also assists paramedic units in providing prehospital care. In category C and D tasks AR101 crew carries out these tasks without outside assistance. A paramedic unit will be involved in all tasks, including category C and D alerts.

2.4.4 Ministry of Transport and Communications Joint Action Plan for Civil Aviation Accidents

On November 7, 2013, the Ministry of Transport and Communications issued a policy[16] to support administrative management in emergency preparedness covering civil aviation accidents. The document explains the roles of various actors together with the main collaboration models to be followed should a civil aviation accident take place. The obligation to prepare the plan was based on Article 21 of Regulation (EU) No 996/2010 on the investigation and prevention of accidents and incidents in civil aviation. The plan has not been revised and is outdated in several ways.

The plan does not address, among other things, the need of psychosocial support to accident victims and their families. Requirements for the planning of this support and assistance are laid down in two International Civil Aviation Organization (ICAO) documents[17]. A European Network of Civil Aviation Safety Investigation Authorities (ENCASIA) leaflet issued in 2021[18] also contains guidance for providing assistance to air accident victims and their relatives.

2.5 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. Airport surveillance camera footage and ATC recordings were received from Finavia and Fintraffic Air Navigation Services, respectively.

2.6 Regulatory Framework

2.6.1 Norra's Instructions for Passenger Door Operation

In February 2024, Norra selected airplane door operation as a safety theme for cabin crews, and in May the company prepared a bulletin that contained both written and pictorial

---

[16] Ministry of Transport and Communications publication series 30/2013 *Joint Action Plan in the Event of Civil Aviation Accidents*

[17] Doc 9998-AN/499 *ICAO Policy on Assistance to Aircraft Accident Victims and their Families* and Doc 9973-AN/486 *Manual on Assistance to Aircraft Accident Victims and their Families*

[18] *A Practical Guide on Safety Investigations for Air Accident Victims and their Relatives*

instructions for the operation of the passenger door. The bulletin was issued on the company's internal website.

Current manuals and their revision data complete with dates are accessible on the website. Norra's procedures are incorporated in the operations manual[19]s of ground handling services providers.

Instructions for the opening and closing of the passenger door are in Cabin Attendant Manual (CAM). The most recent version was dated on November 11, 2024, replacing the previous version, issued on January 31 of the same year.

Both versions contained detailed instructions for door opening, but the sequence of the steps was different. The earlier version told the operator to check that the handrail was securely locked upright before letting passengers disembark, but this sequence was not logical. Therefore, in the later version, the check was moved in its correct position as the last item in the sequence. Both versions contained a note warning that a defective or incorrectly placed quick release pin may cause handrail collapse and injuries to passengers. The manuals do not contain instructions for door opening when a boarding ramp is used or in other situations where the normal procedure is not followed. Ramp operating instructions were available via the company's crew information system (CIS) only[20].

2.6.2 Passenger Door Safety – Revised Procedure and Check

On the day following the accident, on November 13, Norra issued a Safety Alert Bulletin on passenger door operation to cabin crews. The bulletin reviewed the sequence of actions during door opening and closing and instructions for the use of the quick release pin.

As a response to Traficom's request for further action, the company issued on November 15 a bulletin that described an amended door opening procedure. The revised instructions required that the cabin crew members use call-outs to ensure that the handrail is firmly locked upright and the pin is in the correct place.

A video in the training material explained the reasons and purpose of the amended procedure.

[19] Ground Operations Manual, (GOM)
[20] Crew Information System

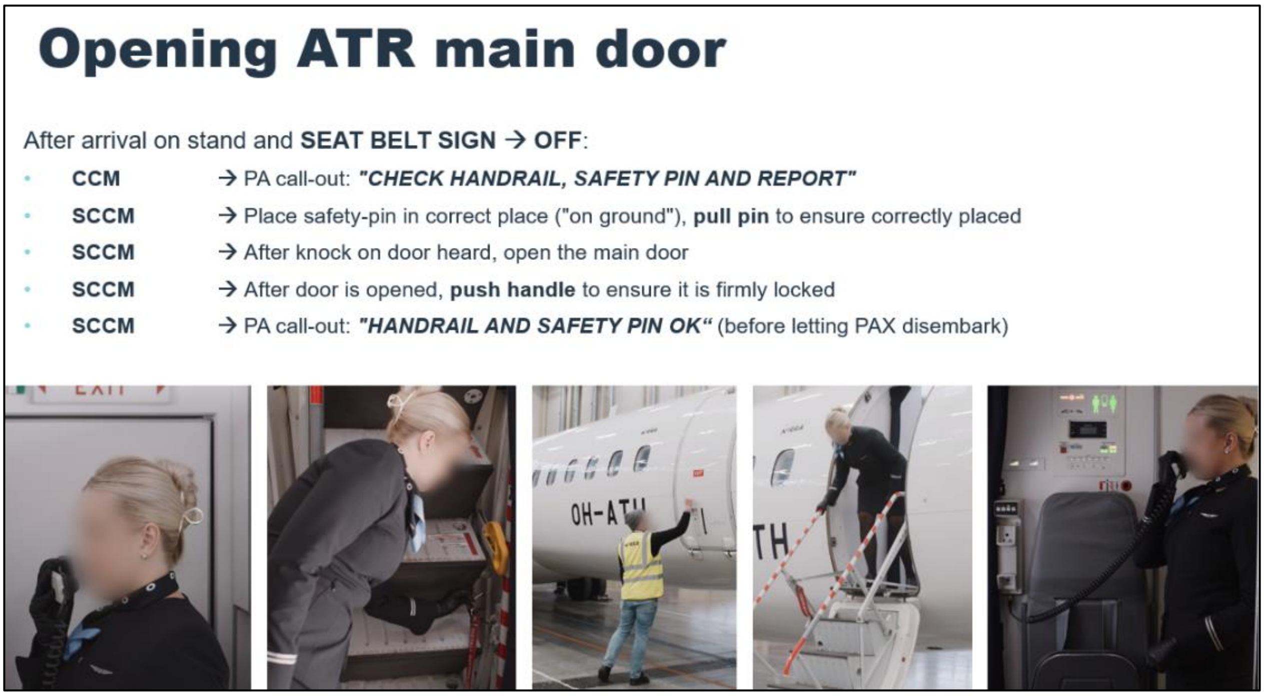

Figure 13. Screen grabs from Norra's door training material (Photos: Norra, annotations: SIAF)

The new procedure was fielded as online training that all cabin crew members had to complete by December 31.

The plan was to deliver subsequent training as classroom instruction during annual refresher training sessions and at three-year intervals as part of refresher training in actual airplane.

2.6.3 Maintenance and Inspection Procedure for Handrail

The airplane manufacturer's passenger door maintenance requirements[21] do not contain specific instructions for the maintenance or inspection of the collapsible handrail. Neither can they be found in the applicable sections of the manufacturer's maintenance planning document[22].

On the other hand, handrail inspection is included in Norra's Weekly Inspection Summary. According to Norra's instructions, the door is opened, and the quick release pin is then removed. The handrail shall collapse immediately to stowed position. If this does not happen, the fault is entered in the technical log and the handrail must be repaired.

The inspection was carried out across the fleet for the first time in September 2024. The accident airplane was inspected on September 23, and no anomalies were found in handrail operation. In the next inspection, performed during the evening of the day of the accident, on November 12, the handrail remained upright after quick release pin removal. The report explained that oil or any form of moisture may cause swelling of the PTFE spacer of the mechanism, and resulting friction may jam an unlocked handrail in upright position.

Norra mandated the weekly inspection procedure on December 17.

---

21 ATR Maintenance Review Board Report (MRBR), ATR-A-12-22-52-00ZZZ-240Z-A - Lubrication of the Aft Passenger/Crew Door Internal-Mechanisms)

22 ATR 72-212A Maintenance Planning Document (MPD), 122252-LUB-10000-1 (AIRSTAIR DOOR (LH AFT) - LUBRICATION OF SHOOT BOLTS AND HINGES)

Figure 14. PTFE spacer in collapsible handrail (Photo: SIAF)

2.7 Other Investigations

2.7.1 Preliminary SIAF Investigation into Passenger Falling Accident at Jyväskylä

The SIAF conducted an assessment[23] into the accident that occurred at Jyväskylä airport on January 12, 2024. It was found that the cabin crew member stationed at the rear of the airplane forgot to lock the handrail mechanism while opening the passenger door, leaving the quick release pin in the stowage bracket.

It was also discovered that the position of the pin is nearly identical in both configurations; i.e., in the stowage bracket or in the stanchion. Therefore, visual observation of the warning flag does not give a reliable indication of the safe or unsafe condition of the handrail. In addition to the abovementioned, cabin crew instructions for door operation and the use of the quick release pin do not follow a practical sequence.

The SIAF decided not to initiate a safety investigation into the event but advised that

- *the airplane manufacturer (ATR) should establish requirements for the maintenance and the verification of the correct function of the handrail*[24]
- *airplane operators should amend maintenance schedules to ensure that the forward handrail mechanism is continuously maintained in the correct operating condition and operates without undue stiffness*
- *the awareness of airplane crew members and maintenance staff of the possibility of stiffness that could appear in the mechanism is increased, and any such occurrences should be reported as a defect*
- *the reporting threshold should be further lowered in order to ensure comprehensive dissemination of information of various safety occurrences also to aircraft manufacturers*
- *cabin crew instructions for door operation and the use of the quick release pin should be reviewed and clarified.*

---

23 Report L2024-E1 – SIAF publication of April 18, 2024

24 Following the SIAF report of April 18, 2024, ATR recorded the actions with SMS 2024-0007.

2.7.2 Passenger Falling Accident at Dublin on September 30, 2015

The Air Accident Investigation Unit Ireland (AAIU) issued a synoptic report[25] on a passenger falling accident that occurred at Dublin airport, Ireland, in September 2015. The accident airplane was an ATR 72 of an Irish operator.

The investigation found that a cabin crew member installed the quick release pin in its correct location in the collapsible handrail, which was upright when disembarkation began. During the initial stages of disembarkation, movement of the handrail assembly allowed the pin to become dislodged, allowing the handrail to collapse. As a passenger placed her hand on the handrail for support, she lost her balance and fell to the ground, fracturing her wrist.

Examination of the quick release pin revealed damage that had prevented the pin from returning to the locking position and allowed it to migrate from its location. At the time of the event, there was no documented requirement for cabin crew members to check if the pin was locked correctly, nor was the pin subject to regular maintenance inspection.

The operator subsequently amended the passenger door procedures by introducing additional text, which stated that cabin crew must check the serviceability and locking following each installation of the pin. The operator also introduced a weekly maintenance inspection consisting of a visual inspection and functionality check of the pin.

The AAIU found these safety actions sufficient and did not issue any safety recommendations.

2.7.3 Passenger Falling Accident at Cork on May 26, 2017

The Air Accident Investigation Unit Ireland (AAIU) issued a factual report[26] on a passenger falling accident that occurred at Cork airport, Ireland, in May 2017. The accident airplane was an ATR 72 of an Irish operator.

During disembarkation a passenger fell from the top of the passenger door stairs to the ground and sustained head, knee and shoulder injuries. The operator's maintenance staff carried out an inspection of the stairs and handrails and did not identify any faults. The non-slip covering on the stairs was in a satisfactory condition. The door was later inspected by AAIU inspectors who found the condition of the stairs and handrails fully satisfactory.

The report contains a number of general industry-wide considerations. Some of them are listed below.

- *Aviation management systems will capture details of stair falls only if they are reported by flight crew or ground staff at an airport.*
- *Slips and trips which do not cause serious injury might not be reported.*
- *A consequence of such non-reporting is that the aviation industry as a whole cannot assess the full extent of the risk posed to passengers by aircraft stairs.*
- *Passengers are often rushing to disembark, carrying luggage while using hand-held devices, which requires good concentration whilst using aircraft stairs.*
- *During a flight passengers are seated for long periods of time, and they may find normal movements more difficult, which increases risk of injury whilst using aircraft stairs.*

[25] ATR 72-212A Accident Report 2016-008 – Air Investigation Unit Ireland
[26] ATR 72-212A Accident Report 2017-018 – Air Investigation Unit Ireland

3 ANALYSIS

3.1 Analysis of Occurrence

A SIAF-developed format of the AcciMap approach[27] was used to support the analysis of the occurrence. The following text is arranged in accordance with an AcciMap diagram created during the investigation. The occurrence is depicted as a chain of events along the bottom of the diagram. Contributing factors at various levels can be examined by moving up and down the diagram.

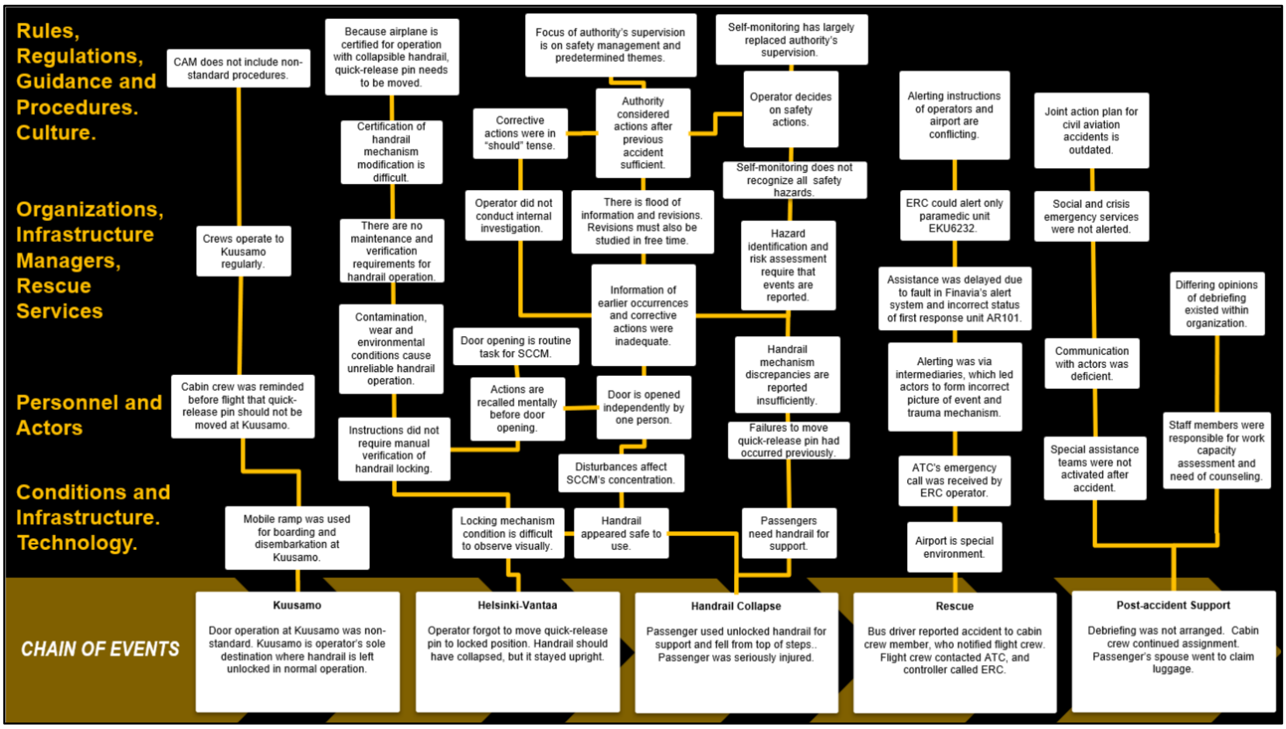

Figure 15. AcciMap diagram (Figure: SIAF)

3.1.1 Non-standard Door Operation at Kuusamo

The collapsible handrail was intentionally left unlocked after landing at Kuusamo because the passengers disembarked via a mobile ramp, and the handrail had to remain stowed to allow positioning of the ramp next to the airplane.

This deviation from the standard procedure may have been a factor in using the same method on arrival at Helsinki. It is essential that non-standard procedures, such as those followed when a ramp is used, are clearly documented and included in operating instructions.

The ramp procedure was not included in the CAM and was available via the CIS only.

3.1.2 Door Operation at Helsinki

Before opening the door, the purser forgot to move the collapsible handrail quick release pin to a position where it would have locked the handrail upright. She did not recognize this lapse because the handrail stayed upright, although in unlocked condition it should have remained stowed when the door was opened. Therefore, the cabin crew, ground staff and passengers had an incorrect impression that the handrail was locked.

---

[27] Rasmussen, J. & Svedung, I. (2000) *Proactive Risk Management in a Dynamic Society*: Swedish Rescue Services Agency.

Norra's cabin crews do not use check lists during door opening. Neither does the company have a separate abbreviated check list for the door procedure when a ramp is used.

Door opening is a routine and repetitive task for the purser. The door is opened and closed several times during a flight assignment, and the procedure is not particularly demanding. However, it is usual from the standpoint of human factors and functional performance that a person performing a routine task is easily distracted by other factors and may skip a step in the sequence. Therefore, it is important to ensure that cabin crew members can perform their tasks uninterrupted.

Prior to the accident, the purser had undergone a mentally stressful experience. Although she felt able to continue performing her duties, it may be assumed that pressures in personal life affected her ability to concentrate on the task at hand.

Human activities are always susceptible to errors, and every individual's functional performance varies. Therefore, particularly in safety-critical tasks, human performance should be supported by providing not only consistent work instructions but also by technical solutions and procedures that include necessary safeguards, such as check lists and workmate support as necessary.

An SMS and associated procedures should withstand the impact of single errors without allowing the situation to escalate into an immediate danger or accident. An airplane cabin is an environment that gives rise to many factors that can lead to slips and lapses that may go unnoticed, and this applies to every individual involved.

The locking mechanism of the collapsible handrail has no technical safeguard against a lapse on part of the operator. The locations and appearance of the quick release pin do not draw attention to the condition of the mechanism particularly well, because the position of the pin and of the red warning flag is nearly identical in both configurations, i.e., regardless of whether or not the handrail is locked, and the flag's caution texts that advise to move the pin as applicable are not an adequate barrier in a familiar and repetitive task.

The door and handrail mechanisms have design deficiencies in terms of technical solutions, operability and conceptual ergonomics. These can be traced to certification history and recertification policies, which render the incorporation of subsequent technical improvements difficult.

The door opening procedure and related instructions were inadequate from a safety management viewpoint. Barriers in the form of workmate support, and no other safeguards were in place to guard against the effects of human lapses.

Memorizing the steps of a procedure before the action will not eliminate the possibility of some disturbance or interruption attracting the operator's attention while the task is in progress, and as a result he or she may skip a step in the sequence.

Handrail locking instructions were amended in a CAM revision dated on the day before the accident, because the sequence of steps in the earlier version had been found illogical in that, for example, it did not tell the operator to manually check that the handrail is locked upright before allowing the passengers to use the steps.

3.1.3 Handrail Collapse and Passenger Fall

Safety reports indicate that a cabin crew member had failed to move the quick release pin into its correct location on at least two occasions before the accident under investigation, at Jyväskylä on January 12, 2024, and at Vaasa on July 4 of the same year. One passenger was injured in the Jyväskylä accident, whereas the Vaasa incident did not cause injuries. An earlier quick release pin related accident had taken place on an airplane of another operator at Dublin on September 30, 2015.

Essential safety recommendations in Norra's internal report of the Jyväskylä accident were related to cabin crew call-outs to ensure correct door operation and to increased training. The report did not address the establishment of protective barriers to a sufficient degree, although an earlier bow-tie analysis had revealed risks associated with door operation. Neither did the preliminary SIAF assessment into the accident lead to effective action on part of Norra.

The Vaasa incident was discussed in Norra's Flight Operations SAG, which raised its ERC value but took no other action.

Norra notified the airplane manufacturer of the Jyväskylä accident and asked the manufacturer to consider improvements to the handrail mechanism. Internal discussion was meanwhile ongoing to determine what maintenance inspections of the mechanism could be carried out on the company's own initiative. The process was complicated by the fact that the manufacturer's manuals did not contain instructions for a handrail operational test, and the fielding of the weekly inspection procedure was therefore delayed and not mandated on company decision until December 2024.

However, regular maintenance inspections will not guarantee problem-free function of the handrail. Moisture causes swelling of the PTFE spacers, and resulting friction may lead to an unlocked handrail jamming in upright position and cause an accident.

All lapses and incidents related to the handrail mechanism have not been reported. Slips and trips which do not cause serious injury to passengers may go unnoticed and therefore unreported, and the same may apply to cases where the operator forgets to verify correct quick release pin location. It is, however, important to report also occurrences where an established procedure is not adhered to, even though no-one is injured as a result.

As far as risks related to the passenger door operation and the use of the passenger steps are concerned, the focus of Norra's SMS is on the processing of accidents, incidents and other safety occurrences with the purpose of recognizing and assessing hazards. Proactive risk assessment was primarily carried out in conjunction with management of change, otherwise risk assessment mostly took the form of post-occurrence reactive actions.

Each reported event was given an ERC value, and the focus of assessment and monitoring was on the average of these ERC points, i.e., a general risk level derived from a large mass of reports. This approach may lead to a situation where risks related to single events, combinations of hazards or indications of potential future events may not be recognized.

Although the investigated event, that was related to handrail locking, was given a high ERC value, it was an isolated occurrence and did no trigger corrective actions commensurate with the severity of the risk. The recommended actions were carried out either partially or after a protracted delay, and only after another similar event occurred and the Traficom request for further action was received, were more tangible measures taken.

More refined risk assessment of door operation did not bring to the fore the fact that the number of handrail-related safeguards was small, and the existing barriers were inadequate.

After the earlier accident at Jyväskylä, Norra strove to reduce the possibility of human errors by increasing training and communication. However, the reasons of every lapse cannot be traced to insufficient skills and knowledge. Disturbances in an operating environment may affect concentration regardless of an individual's knowledge and skills.

No technical, structural or procedural safeguards that would have prevented or made the operator recognize a human lapse existed in the door environment. One of the few barriers was the function designed to drop to an unlocked handrail to stowed position, in which case a possible lapse would be noticed, and passengers could not use the handrail for support. Although undisputed defects in handrail operation had been discovered during the investigation into the Jyväskylä accident, corrective actions had remained inadequate.

In Norra's SMS, the recommended corrective actions were allocated to several functional areas, which contributed to their ineffectiveness and lead to a situation that no single entity assumed full responsibility for their implementation and follow-up. Furthermore, actions that would have required the airplane manufacturer's involvement were found cumbersome or even impossible to accomplish. Sufficient and comprehensive safety improvements can only be achieved through cooperation between all organizations and operators involved. Changes to aircraft maintenance procedures and/or technical documentation initiated by an aircraft manufacturer require authority approval. The whole process can take years.

3.2 Analysis of Rescue Operation

3.2.1 Alerting and Rescue

According to the Aerodrome Emergency Plan (AEP) of Helsinki-Vantaa airport, the person who observes an emergency or a hazardous situation should make an emergency call. The reason for this is that the caller would be in the immediate vicinity of the person involved and therefore able to answer the ERC operator's clarifying questions and receive instructions for the administration of medical care. In the accident under investigation, the caller was in the ATC facility and could only pass information that had already been given to the ERC twice.

Norra's OM A states that a medical emergency related to airplane ground operations is handled together with ground staff in accordance with local aerodrome instructions, which means the AEP. The company's Ground Operation Manual also directs that local instructions shall be followed in the event of an accident. The CAM explains that should be taken if a passenger or crew member becomes seriously ill during flight, the flight crew shall first report the event to ground staff, who will be responsible for alerting an ambulance to meet the airplane in its parking position. The CAM does not contain a procedure in case a person becomes ill or is injured while the airplane is parked.

Norra's manuals contains instructions for summoning assistance are inadequate and, in some places, conflicting, although ambulance alerting procedures in particular should be described in an identical manner in the flight and cabin crew manuals, which would also support the ERC operator in assessing emergency response categories.

The first response unit of airport rescue service could neither be alerted nor contacted over VIRVE network. Finding out why the unit was still engaged in the previous task although it had already been called off would help ensure the availability of rescue service.

It is also noteworthy that that the rescue service duty officer was not alerted to respond to the accident by an appropriate authority. Response planning in Central Uusimaa Rescue Department should therefore determine authorities that receive airport-related alerts.

The fire chief's overall picture of the situation was incomplete, and he was not correctly informed of the level of trauma energy to which the passenger had been subjected. This did not become evident during the interview and the assessment of the passenger's condition. Only after the situation was over did the fire chief learn that the passenger had not tripped but fallen to the ground. Taking the passenger to hospital would not have been safe until the paramedics had completed an initial assessment[28].

Because also the paramedics were uninformed of trauma energy level, they could not take into account the possibility of serious injuries, and the need to contact the social and crisis emergency services team was not brought up.

3.2.2 Post-accident Support to Persons Involved

The purser assessed her condition after the accident and reported that she was able to continue the flight assignment.

However, after completing the last sector of the following day, she felt unable to carry out her duties and reported this immediately to the OCC in accordance with Operations Manual.

Mental processing of a shocking occurrence and personal reactions often begin to manifest themselves gradually until some time has passed. It is likely that recent pressures in personal life added to the feelings experienced by the purser.

Since everyone reacts to abnormal situations in his or her own way, a direct link cannot be established between the nature or extent of a recent accident or dangerous situation and the need of counseling support. This need and each individual's capacity to continue in his or her duties should preferably be monitored actively and for an extended period, and it should be noted that an individual in need of support may not have strength and energy to assess his or her work capacity or seek counseling without a helping hand.

The crew of the accident airplane did not talk out the events and possible post-accident reactions in a debriefing session. The supervisor inquired about the purser's work capacity and relied on the latter's own assessment. After a delay of two days, company SAT reminded via the supervisor that the persons involved had an option of contacting the team if any one of them felt this was necessary. However, it remained up to every individual to assess his or her need for support. Although participation in crisis counseling is voluntary, the employer shall take care of the procedures, actively assist staff members and keep them informed of counseling options.

In the accident under investigation, paramedics should have contacted the social and crisis emergency services to evaluate the need of psychosocial support to the persons involved. As a rule, these services are not deployed to assist paramedic units in all lower-category tasks such as tripping, chest pain and breathing difficulty. They are only called to help in category A and B multi-agency tasks and alerted automatically to respond to major accidents to give urgent and necessary assistance. Because the persons who provided medical care on the accident scene did not have a true picture of the severity of the passenger's injuries, they did not find counseling support necessary. Currently, medical care providers do not have access to patient records after the event, which deprives them of a possibility of passing information to social and crisis emergency services, and the need of psychosocial support must therefore be evaluated on the scene.

Ministry of Transport and Communications publication *Joint Action Plan in the Event of Civil Aviation Accidents* discusses psychosocial support arrangements, but the document does not meet the requirements of Regulation (EU) No 996/2010. Moreover, arrangements for providing assistance to accident victims and their families are not described adequately.

---

28 An initial assessment includes a check of vitals including breathing, circulation and level of consciousness. The chest and head are also examined for injuries.

3.3 Analysis of Authorities’ Action

3.3.1 Finnish Transport and Communications Agency Traficom

According to Finnish Aviation Safety Programme 2024[29], aviation operators and service providers are responsible for the safety of their own operations, while Traficom’s primary mission is to ensure that actions required to maintain the high level of safety of aviation in Finland are conducted in a timely manner.

Norra initiated an internal investigation into the passenger falling accident at Jyväskylä and sent the report to Traficom on January 31, 2024. Traficom considered all three safety recommendations given in the report sufficient although they were written in a conditional tense (“*Call out concerning – – should be considered*,” “*Minimum recent experience should be considered*” and “*Safe operation – – should be verified at regular basis.*”)

The SIAF conducted a preliminary investigation into the same accident and advised in its report of April 18, 2024, that, among other actions, that “*the airplane manufacturer (ATR) should establish requirements for the maintenance and the verification of the correct function of the handrail*,” and “*cabin crew instructions for door operation and the use of the quick release pin should be reviewed and clarified.*” The report was sent to Traficom for information.

On July 5, 2024, Traficom received a report of a quick release pin related occurrence at Vaasa but did not require Norra to take any action.

Only after the accident under this investigation and the receipt of Norra’s Safety Alert Bulletin dated November 13, 2024, did Traficom find Norra’s earlier actions insufficient and requested the company to take further action.

Traficom’s actions have been delayed to an excessive degree. Operators’ responsibility for the safety of their activities is based on trust bestowed on them by an authority, which means that the authority presumes that corrective actions will be taken without active supervision and involvement on the authority's part.

Trust on the management of self-monitoring is solid, and the involvement threshold is high, which is understandable, but when problems are identified and the operator fails to correct them, the supervising authority must be able to take timely action.

[29] Appendix 1 to Finnish Aviation Safety Programme, Traficom April 9, 2024

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. The location of the quick release pin, or any other solution based on visual observation, does not draw adequate attention to the locked or unlocked condition of the collapsible handrail. An unlocked handrail may inadvertently remain upright during door opening.

    Conclusion: *The handrail mechanism has design deficiencies in terms of technical solutions, operability and conceptual ergonomics. These defects may lead to a situation where the unlocked condition may go unnoticed.*

2. The purser opened the door in an environment that may have affected concentration. Cross-checks by another crew member or other safeguards were not in place to guard against the effects of a human lapse.

    Conclusion: *The door opening procedure and related instructions were inadequate from a safety management viewpoint.*

3. Norra had experienced a similar event in previous January. As a result, the company had increased communication on correct door operation and improved training. In June, a similar lapse that did not result in injuries was reported. No further action was taken.

    Conclusion: *The company's safety management policy did not respond adequately to a safety hazard that had been recognized in conjunction with isolated occurrences. Insufficient attention was paid on the implementation and follow-up of corrective actions.*

4. The Cabin Attendant Manual did not contain an alerting procedure in a case where the airplane is parked.

    Conclusion: *First response units were not alerted in accordance with the aerodrome emergency plan. The airplane's crew and airport ground staff assumed that the plan is not applicable to a parked airplane, and the emergency call was therefore made via several intermediaries. Because the call was not made from the immediate vicinity of the person involved, the caller was not in a position to answer clarifying questions and receive instructions for the administration of medical care.*

5. The need of psychosocial support to the injured passenger was not evaluated. Guidelines on psychosocial support arrangements to organizations and operators in the event of aviation accidents are available but their focus is on major accidents.

    Conclusion: *A minor aviation accident, incident or hazardous situation will not necessarily initiate appropriate psychosocial support arrangements.*

6. Finnish Transport and Communications Agency Traficom received the report of Norra's internal investigation in January 2024 and considered the safety recommendations contained therein sufficient. Neither did the preliminary SIAF report of the accident lead to effective action. In July, Traficom received a report of the incident at Vaasa but did not request Norra to take action.

    Conclusion: *The competent authority did not take timely action to maintain the level of safety. The operator's responsibility for the safety of its activities was based on excessive trust bestowed on it by the authority, which meant that the authority* *presumed that corrective actions would be taken without active supervision and involvement on the authority's part.*

5 SAFETY RECOMMENDATIONS

5.1 Prevention of Collapsible Handrail Jamming in Upright Position

An unlocked collapsible handrail of the ATR passenger door may remain upright even though it should drop to stowed position. Failure to move the quick release pin must not lead to a situation where the handrail stays upright and causes a hazard.

The airplane manufacturer (ATR) establishes requirements for the maintenance and verification of the correct function of the collapsible handrail. [2025-S20]

5.2 Location and Visibility of Collapsible Handrail quick release pin

The location of the quick release pin and the warning flag are not adequate visual cues to draw attention to the locked or unlocked condition of the collapsible handrail.

The airplane manufacturer (ATR) improves the observability or location of the quick release pin with the aim of drawing full attention to the condition of the collapsible handrail. [2025-S21]

5.3 Endorsement of Door Opening Procedure

The passenger door was opened independently and relying on a memorized procedure. The company manual did not tell the operator to check manually or in other means that the handrail was locked upright before allowing the passengers to use the steps.

The airplane operator (Norra) endorses a revised procedure requiring that the passenger door shall be opened using support from the other cabin crew member, and/or prepares a door opening checklist. [2025-S22]

5.4 Improvement of Norra's Safety and Risk Management System

Norra's corrective actions and safeguards related to the collapsible handrail were primarily enforced by increasing communication. Insufficient attention was paid on the implementation and follow-up of actions.

The airplane operator (Norra) pays increased attention on the implementation and follow-up of corrective actions in Safety and Risk Management. [2025-S23]

5.5 Updating of Joint Action Plan

The need of psychosocial support was assessed inadequately on part of the airplane operator, paramedic units and the emergency department, because the event was not considered an accident. Article 21 of Regulation (EU) No 996/2010 obliges the member states to maintain a policy that would ensure cooperation between authorities, airports and air carriers in the event of aviation accidents, and provision of assistance to air accident victims and their relatives.

> *The Ministry of Transport and Communications updates its Joint Action Plan in the Event of Civil Aviation Accidents (publication series 30/2013), adds to the plan a description of provision of support to accident victims and their families and informs stakeholders accordingly. [2025-S24]*

A direct link cannot be established between the nature or extent of a recent accident and the need of counseling support.

5.6 Harmonizing of Alerting Instructions

The Cabin Attendant Manual did not contain an alerting procedure in a case where the airplane is parked. The airplane's crew and airport ground staff assumed that the aerodrome emergency plan is not applicable to a parked airplane, and the emergency call was therefore made via several intermediaries.

> *The airplane operator (Norra) harmonizes flight crew and cabin crew procedures regarding alerting instructions when the airplane is parked. [2025-S25]*

An emergency call shall be made from the immediate vicinity of the person involved, because only then would the caller be in a position to answer clarifying questions and receive instructions for the administration of medical care

5.7 Safety Actions

1. On the day following the accident, on November 13, 2024, Norra issued a Safety Alert Bulletin on passenger door operation to the cabin crews.
2. On November 15, 2024, Norra issued a bulletin that described an amended door opening procedure. The revised instructions require that the cabin crew members use call-outs to ensure that the collapsible handrail is firmly upright and the quick release pin is in the correct place before allowing the passengers to use the steps.
3. Norra mandated a weekly inspection of the collapsible handrail on December 17, 2024.
4. Norra issued a Safety Alert Bulletin (SAB 03-24) to all ground handling service providers. The bulletin directs that a ground handling service provider checks the collapsible handrail after the door is opened.
5. Norra discontinued the field testing of the mobile ramp at Kuusamo airport.
6. Finavia launched in early 2025 a project to revamp rescue services at Helsinki-Vantaa airport with the aim of improving the alerting system to enable expeditious transmission of critical information that the rescue services need to respond to an accident or incident. The revamp also augmented the minimum staffing of the airport rescue service.
7. After the Jyväskylä accident, the airplane manufacturer (ATR) started to prepare preliminary maintenance procedures for passenger door handrail (SMS 2024-0007). ATR has released an Air Operators Message (AOM 42/72/2016/11 issue 3) in August 2025. A scheduled maintenance task related to this new operational test is also being prepared for incorporation in the Maintenance Plan (MP) and Maintenance Planning Document (MPD).

REFERENCES

Written Material

Air Investigation Unit Ireland (2017). ATR 72-212A Accident Report 2017-018

Air Investigation Unit Ireland (2016). ATR 72-212A Accident Report 2016-008.

Ministry of Transport and Communications (2013). *Joint Action Plan for Civil Aviation Accidents*. Publication series 30/2013.

Finnish Transport and Communications Agency Traficom (2024). Appendix 1 to Finnish Aviation Safety Programme.

Safety Investigation Authority Finland (2024). *Preliminary Investigation into Passenger Falling Accident at Jyväskylä Airport*. L2024-E1.

Peräjoki, K., & Taskinen, T. (2017). *Trauma Patient Paramedic Care* (p. 546). Sanoma Pro.

Rasmussen, J. & Svedung, I. (2000). *Proactive Risk Management in a Dynamic Society*: Swedish Rescue Services Agency.

Investigation Material

1) Meteorological data
2) Air traffic control recordings of radio communications
3) Emergency Control Center emergency call recordings
4) VIRVE network radio communications recordings
5) Helsinki-Vantaa airport surveillance camera footage
6) Emergency Response Center event logs
7) Central Uusimaa Rescue Department paramedic report
8) Flight safety reports from ECCAIRS database
9) Norra's bow-tie analyses
10) Norra's operation manuals, bulletins and documents
11) Airplane manufacturer's maintenance planning documents and Aircraft Operator Messages.

SUMMARY OF COMMENTS TO DRAFT FINAL REPORT

The draft final report was submitted for comments to Airpro, Finavia, Nordic Regional Airlines, Securitas, the Ministry of Transport and Communications, the Finnish Transport and Communications Agency Traficom, Vantaa-Kerava Wellbeing Services County, Central Uusimaa Rescue Department, the airplane manufacturer, the Bureau of Enquiry and Analysis for Civil Aviation Safety of France, the European Union Aviation Safety Agency, the Transportation Safety Board of Canada, and individuals involved in the occurrence. Pursuant to the Safety Investigation Act, no comments given by private individuals are published.

The Finnish Transport and Communications Agency Traficom states that the agency's mission is to ensure that actions required to maintain overarching aviation safety are carried out and adds that aviation operators and service providers are responsible for the safety of their own operations. Traficom maintains that all occurrence reports and other safety-related information are taken into consideration during the planning and focusing of supervisory actions, although every single occurrence will not necessarily lead to immediate actions targeted at a single operator.

Nordic Regional Airlines (Norra) proposed amendments related to the sequence of events, terms used in the report, the company's safety management system and risk assessment policy, and the arrangements of counseling support.

Finavia presented clarifying information on the operation of airport rescue and paramedic services and pointed out that the mobile ramp was in use at Kuusamo airport only. Finavia also stated that while examining the injured passenger the fire chief was unable to establish a clear picture of the level of trauma energy to which the former had been subjected, but he concluded that no immediate medical treatment was required. The emergency response center had classified the alert as a category C task, and the target response time for this category was met. Finavia concluded that the alert was not received at every facility within the airport area and noted that the alerting system is scheduled for a revamp during 2025.

Central Uusimaa Rescue Department provided clarifying information on the policies, procedures, cooperation arrangements and sharing of responsibilities between the department, Central Uusimaa Wellbeing Service County, HUS Group and Finavia. The department emphasized its view that the department is responsible neither for paramedic response planning nor internal response planning conducted by Finavia. HUS is tasked with paramedic response planning and social and crisis emergency services. The department executes response planning in the capacity of a competent authority. It was not notified of the accident under investigation, which was in line with the agreed policy in the department's view. The department asked that information of paramedic service arrangement be added to the report.

The airplane manufacturer (ATR) and the Bureau of Enquiry and Analysis for Civil Aviation Safety of France (BEA) provided in their joint statement specific information of the maintenance requirements of the ATR passenger door and maintenance requirements that are in work for the collapsible handrail and reminded of the extended duration of a certification procedure. ATR and BEA do not consider the construction of the handrail deficient and see that the current positioning of the quick release pin is justified. ATR pointed out that it had started to plan and and prepare a revised handrail maintenance procedure after receiving the Safety Investigation Authority Finland report on the Jyväskylä accident.

The European Union Aviation Safety Agency (EASA) stated that no defects were found in the collapsible handrail itself, and it operated correctly with the quick release pin in the correct location.

Airpro, Securitas, the Ministry of Transport and Communications, Vantaa-Kerava Wellbeing Services County and the Transportation Safety Board of Canada did not comment on the draft report.