Aircraft incident at Helsinki-Vantaa airport on 12.10.2000

Micro-summary: **Ground proximity incident between a taxiing MD-81 and departing airplane MD-83 taking off.**

Event Date: **2000-10-12 at 0850 local**

Investigative Body: **Finland Accident Investigation Board (AIB), Finland**

Investigative Body's Web Site: **http://www.onnettomuustutkinta.fi/**

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Tutkintaselostus

C 15/2000 L

Aircraft incident at Helsinki-Vantaa airport on 12.10.2000

OH-LMU DC-9-83

OY-KHN DC-9-81

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ABBREVIATIONS

ATC	Air traffic control
FLEX	Flexible take off thrust
GND	Ground control
ICAO	International Civil Aviation Organization
JAR	Joint aviation requirements
LJKK	Air traffic controllers handbook (Finnish)
LPOM	Orders and regulations given by the Chief of ATC
MHz	Megaherz
MP	Monitoring pilot
PHI	Confidential observation and reporting system
PP	Piloting pilot
QNH	Corrected mean sea level pressure
TWR	Tower control
TWY	Taxiway
UTC	Co-ordinated universal time

SYNOPSIS

On Thursday 12th October 2000 at 08.50 local time (Finnish time is used in this report) at Helsinki-Vantaa airport a commercial aircraft MD-83 registered OH-LMU used by Finnair with call sign FIN841Q was performing takeoff from runway 15. At the same time MD-81 registered OY-KHN commercial aircraft with call sign SK700 used by Scandinavian Airlines Systems (SAS) was at the area between the runway and holding position markings of connecting taxiway YF. Taxi sequence of SK700 was after Fokker 27 with call sign H22 owned by the Air Force, which was taxiing on taxiway Y.

In the commercial aircraft there were 166 passengers and 13 crew members on total. Nobody was injured and the incident caused no damage.

The Accident Investigating Board received the incident report made by commander of FIN841Q on 13th October 2000.

On 13th November 2000 the Accident Investigating Board decided on to perform an investigation by letter C 15/2000. Airline pilot mr Jussi Haila and air traffic controller mr Erkki Kantola were appointed investigators.

The investigation was conducted in accordance with Finnish legislation (Act 373/1985) and the Decree (79/1996), ICAO Annex 13 and Council of European Union Directive 1994/56/EC.

The ground controller gave his statement concerning the incident on 27th November 2000, tower controller on 30th November 2000, first officer of FIN841Q on 30th November 2000 and the commander on 04th December 2000. The commander of SK700 could not recall anything special on their flight in question. The pilots of H22 were interviewed by telephone on 22nd November 2000.

The final draft of this aircraft incident report was sent to the Finnish Flight Safety Authority for comments according to ICAO Annex 13 on 20th February 2001. The comments received have been enclosed as appendix.

The investigation was closed on 5th April 2001.

1. FACTUAL INFORMATION

1.1 Course of events

On 12th October 2000 in the morning only runway 15 was in use at Helsinki-Vantaa airport because of the wind conditions.

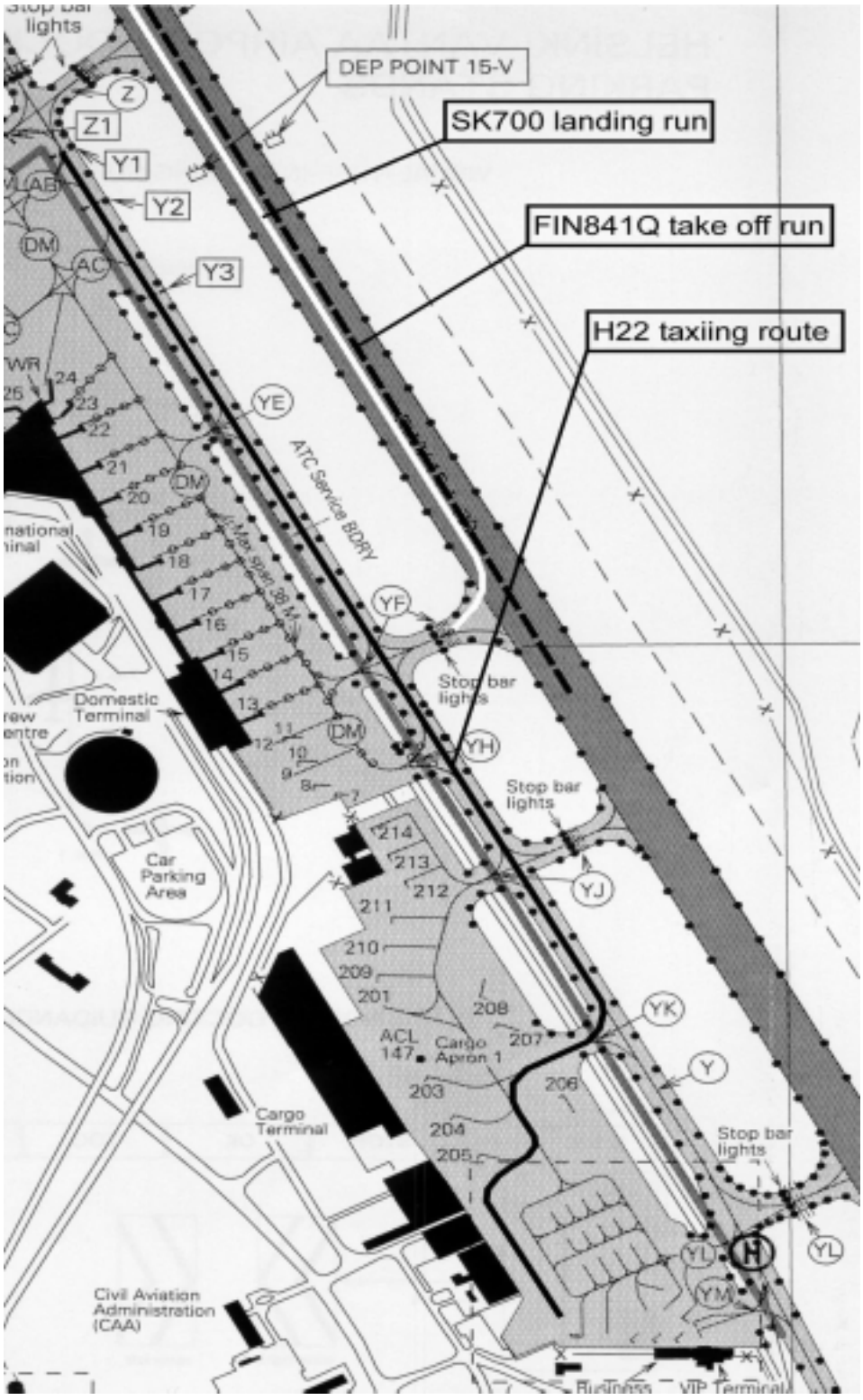
SAS airliner with call sign SK700 landed on the runway 15, turned off to the connecting taxiway YF and informed Helsinki Ground at 08.50.30 to have vacated the runway: *"…Scandinavian 700 vacated 15".*

Finnair airliner with call sign FIN841Q was at the holding position 15 and was cleared by Helsinki Tower to taxi into takeoff position 15 immediately after SK700 had landed. The Tower cleared FIN841Q for takeoff at 08.50.25: "*Finnair 841 Quebec, cleared for takeoff runway 15, wind 120 degrees 13 knots*". Before the take-off clearance the tower controller had seen SK700 turning off the runway 15 and to moving on. Then he paid attention to FIN841Q at take-off position and did not observe the SK700 anymore. In order to see the runway 15 on the whole length the tower controller had to stand up and bend over. His visibility was restricted by three persons at clearance delivery position and structures of the control tower.

FIN841Q commander was the piloting pilot (PP) and first officer the monitoring pilot (MP). Takeoff weight of the aircraft was 58 640 kg. The pilots used 50 FLEX takeoff thrust. They were concentrating on takeoff, but noticed, during take-off run at high speed close to V1 (about 140 knots), that SK700 had not left the runway area, but was standing at the connecting taxiway YF on the runway side of holding position markings, nose towards taxiway Y.

When SK700 had contacted Helsinki ground, the controller issued taxi clearance: "*Scandinavian 700, behind Fokker from left to right, taxi via Yankee and Alfa Charlie to stand 26*". SK700 acknowledged this clearance at 08.50.30. The Fokker mentioned in the clearance was F27 using Air Force call sign H22. It was taxing on taxiway Y from the Business Flight Center to Y1. Compared to SK700 H22 was taxiing from left to right and was passing YH at a distance of about 150 m, when the arriving SK700 was turning off the runway. The H22 crew observed SK700 taxiing from right and slowed down their speed. According to the statement of H22 first officer SK700 was so far enough that there was no need for continuous look at the right wingtip of H22. During FIN841Q takeoff SK700 was waiting for the passing H22 on YF.

The FIN841Q commander informed Helsinki Approach Control that he would fill in an incident report.



Picture 1. Taxiing routes of the aircraft

1.2 Basic information

1.2.1 The aircraft

FIN841Q:

DC-9-83 (MD-83), twin engine commercial jet aircraft with a passenger configuration of 142 seats.

Nationality and registration: Finnish, OH-LMU

Operator: Finnair

SK700:

DC-9-81 (MD-81), twin engine commercial jet aircraft with a passenger configuration of 130 seats,.

Nationality and registration: Danish, OY-KHN

Operator: Scandinavian Airlines Systems

Technical details of the aircraft were not relevant to the incident.

1.2.2 Type of the flights

FIN841Q and SK700 were on scheduled flights.

1.2.3 Persons on board

FIN841Q had 82 passengers and 6 crew members.

SK700 had 84 passengers and 7 crew members

1.2.4 Injuries to persons

No one was injured.

1.2.5 Damage to aircraft

There was no damage to the aircraft.

1.2.6 Other damage

There was no other damage.

1.2.7 Personnel information

Commander of FIN841Q:	Male, 36 years
Licenses:	Airline transport pilot, valid until 10.8.2005.
Medical certificate:	JAR 1, valid until 19.11.2001.
Ratings:	Instrument flight certificate, valid until 12.5.2001
Type rating:	DC-9-80 commander, valid until 12.5.2001

Commanders total flying experience was about 8000 hrs.

First officer of FIN841Q:	Male, 32 years
Licences:	Commercial pilot, valid until 11.6.2005
Medical certificate:	JAR 1, valid until 11.6.2001
Ratings:	Instrument flight certificate, valid until 27.3.2001.
Type rating:	DC-9-80 co-pilot, valid until 11.6.2001.

First officers total flying experience was about 3000 hrs.

Commander of SK700:	Male
Licences:	Airline transport pilot
Medical certificate:	Valid until 10.7.2001
Type rating:	M8M9
First officer of SK700:	Male
Licences:	Commercial pilot
Medical certificate:	Valid until 1.5.2001
Type rating:	M8
Tower controller:	Male, 27 years
Licences:	Air traffic controller, valid until 29.3.2001
Medical certificate:	FIN 1, valid until 29.3.2001, private licence, glider pilot, power glider pilot, valid until 9.8.2005.
Certificates:	Tower control EFHK and tower and approach, control EFVA, valid until 29.3.2001.
Ground controller:	Male, 36 years
Licences:	Air traffic controller, valid until 29.11.2001.
Certificates:	Tower control, EFHK.

1.2.8 Meteorological information

Weather at Helsinki-Vantaa airport was almost cloudy when the incident took place. Visibility was good. Because of moderate east-south eastern wind, only runway 15 was in use for takeoffs and landings.

Helsinki-Vantaa weather 08.50 on 12.10.2000:

Wind 120 degrees 15 knots, gusts 25 knots, visibility more than 10 km, clouds few 2200 feet, bkn 2500 feet, temperature +10 C, dew point +6 C, QNH 1017, no significant changes.

1.2.9 Weight and balance

Takeoff weight of FIN841Q was 58640 kg and landing weight of SK700 was 52600 kg. Weight and balance of aircraft were on permitted area.

Total fuel of both aircraft was 16200 kg.

1.3 Investigations

1.3.1 General

Investigation material consists of the incident report of FIN841Q commander, extract from Helsinki-Vantaa Tower log, recorded radio traffic of Tower and Ground control, information of aircraft and their crews and tower control personnel, statements of the persons concerned, meteorological information from Helsinki-Vantaa airport at the time of incident and information from documents, manuals and instructions.

In addition there investigators have interviewed the instructors of Aviation College concerning tower controllers basic training. On-the-job instructors of Helsinki-Vantaa Tower have been interviewed concerning on-the-job training aimed for tower control rating and particularly tower and ground control co-operation as well as training for ground traffics special situations.

The voice and data recorders aircraft were of no significance in the investigation and were not used.

1.3.2 Radio communication

Radio communication was listened to from recordings of Helsinki-Vantaa Tower. The audibility was good and radio communication procedures were followed properly.

Helsinki Ground issued start-up permission as well as taxi and en route clearances to FIN841Q and ordered it to switch to Helsinki Tower frequency at 08.44.20.

SK700 contacted Helsinki Tower 08.48.30: "*Good morning Tower, Scandinavian 700 on final 15".* Tower acknowledged and cleared the aircraft to continue approach. At 08.49.00 Tower gave landing clearance to SK700: *"Scandinavian 700, cleared to land runway 15, wind 120 degrees 13 knots*". SK700 read back the clearance and Tower acknowledged.

At 08.49.30Helsinki Tower cleared FIN841Q to line-up after landing aircraft: *"Finnair 841 Quebec, behind landing Scandinavian line-up runway 15 and wait behind*". Tower gave takeoff clearance at 08.50.25: *" Finnair 841 Quebeck, cleared for takeoff runway 15, wind 120 degrees 13 knots".* FIN841Q read back the clearance: "*Cleared for takeoff runway 15, Finnair 841 Quebec*".

At 08.50.30 SK700 contacted Helsinki Ground: *"Good morning, Scandinavian 700 vacated 15"*. Ground gave an instruction to SK700*: "Good morning, Scandinavian 700 behind Fokker from left to right, taxi via Yankee Alfa Charlie stand 26"*. SK700 read back the instruction: *"Behind the Fokker Yankee and Alfa Charlie, Scandinavian 700"*. Ground acknowledged: *"Ground".* At 08.51.20 Ground ordered H22 to change over to Helsinki Tower frequency: *"Hotel 22 contact Tower on 118.6".*

After takeoff FIN841Q informed Helsinki Approach Control that it would fill in an incident report, because during their takeoff SK700 was standing at the connecting taxiway YF between the holding position markings and the runway. There were no other radio traffic concerning the incident.

1.3.3 Taxiing procedures given in the AIP Finland

Taxiing procedures at Helsinki-Vantaa airport are given in the Finnish Aeronautical Information Publishing, *AIP SUOMI/FINLAND* in chapter *EFHK AD 2.2* paragraphs 2 and 3*, LOCAL REGULATIONS*. Instructions concerning incoming traffic are given in the following paragraphs:

2.MINIMUM RUNWAY OCCUPANCY TIME

2.1 Incoming traffic
Pilots are reminded that rapid exiting from the runway enables ATC to apply minimum spacing on final approach, that will achieve maximum runway utilization and will minimize the occurrence of go-a-rounds.

3.TAXIING PROCEDURES

3.1 Taxi clearances and instructions are given by ATC units:
0400-2200 UTC

HELSINKI GROUND/ HELSINKI RULLAUS 121.800 MHZ 2200-0400 UTC

HELSINKI TOWER/ HELSINKI TORNI 118.600 MHZ

3.2 Taxiing on the apron

Taxiing on the apron is always subject to instructions given by the appropriate ATC unit.
Note: the ATC issues clearances for taxiing only within the ATC Service Boundary presented on the aerodrome chart. For taxiing on the apron ATC does not issue clearances but taxi instructions.

3.3 Arriving aircraft

Unless preceding instructions to change the frequency have been received the aircraft shall
contact HELSINKI GROUND 121.800 immediately after vacating the runway for taxi clearance within the ATC Service Boundary, taxi instructions on the apron and for the aircraft stand assigned.

For the procedures at low visibility additional instructions are given.

The SAS Route Manual in Helsinki-Vantaa paragraph ASIR Page 1, B. ARRIVAL 2. gives instruction: *"After runway vacated, immediately contact GND 121.800.*

1.3.4 Air traffic controllers instructions

Pre-conditions for issuing takeoff clearance are given in Air Traffic Controllers Manual (LJKK) in chapter 2 paragraph 3.1.5.2:

Runway is considered to be clear when the following conditions are filled:

Another aircraft:

1) *Is neither on the runway nor closer than 50 meters distance from the runway, when the length of the runway is 900 meters or more.*
2) *Has vacated the runway after landing or crossed the runway and is moving away from it, or*
3) *Is waiting on the marked holding position.*

In the Helsinki-Vantaa co-operation letter chapter 2.1.6 *OTHER INSTRUCTIONS* gives an instruction:

Handling of the flight strip

TWR marks landing time and stand on the flight strip of the landing aircraft and hands it immediately over to GND ***when the aircraft has vacated the runway****. Regarding taxi procedures the AIP EFHK AD 2.2-3 directions are followed.*

After this incident Helsinki-Vantaa has published on 17.10.2000 *LPOM 62/00 (ORDERS AND REGULATIONS GIVEN BY THE HEAD OF AIRTRAFFIC CONTROL UNIT):*

CO-ORDINATION OF TAXI CLEARANCE

Referring to the appendices of incidents 360 and PHI 4086 (reports of incidents concerning this investigation) shall the aircraft vacating the runway be granted the priority to continue taxiing to taxiway parallel to the runway (TWYs Z/Y), so that TWR controller has valid conditions to issue takeoff clearance (LJKK chapter II paragraph 3.1.5.2).

Another aircraft

1) is neither on the runway and nor closer than 50 meters distance from the runway or

2) has vacated the runway after landing and is moving away from it or

3) is waiting on the marked holding position

If GND is forced to stop taxiing right after the aircraft vacating the runway, shall this action be authorized by TWR, especially when runway 15 is in use and there is taxiing traffic on TWY Y.

The instruction above has been supplemented 8.11.2000 by LPOM 69/00 (low visibility instructions).

The same situation emphasizes when runway 22 is in use and incoming aircraft are executing CAT II approach. In this case aircraft is required either to pass CAT II marked holding position or to be already on taxiway Z.

1.3.5 On-the-job training of air traffic controllers

Prior to EFHK TWR qualification air traffic controllers have to complete a qualification training period, which lasts about 56 shifts. In addition to practical training shifts the training period includes theory instruction, written examinations and five checking shifts.

Time wise the qualification training period fulfils the minimum requirements of ICAO (one month). Maximum duration for the training period has not been defined. In practice in some cases one years maximum time has been applied.

When rating the trainees progress he/she is compared to the performance model of licensed air traffic controller with appropriate qualification. Since the performance model is difficult to define the rating method is not necessarily standard. The rating is based on a personal opinion of the on-the-job instructor and for this reason the rating is not necessarily standard. According to the statements of the instructors the ratings are however, few exception excluding, quite identical.

The trainees progress is followed by a defined scale. This is complemented by a written report. All appraising material is open to both other instructors and trainees.

The progress is also being followed and compared in instructor meetings. If the trainee does not show adequate progress within 50 working shifts, there will be a special negotiation between the chief of ATC and the instructor in charge for further measures.

During the training the roster is tried to prepare into consideration the availability of the on-the-job instructors so that the instructors would not change during training period. Because of other duties, vacations or other reasons this does not always work.

General pedagogical education has been tried to arrange for the on-the-job instructors at the Aviation College. This education has not been adequate due to lack of personnel and financial resources. There has not been proper professional training for instructors despite of one days familiarization to rating systems and forms.

The co-operation pattern like in Helsinki-Vantaa Tower Control (TWR/GND) is not included in ATC basic training programme. However such co-operation is not difficult for the trainees to adapt according to the instructors.

1.3.6 Action of the flight crews

FIN841Q was instructed by Ground Control to contact Tower before reaching Y1. The Tower cleared it first to the holding position and then to line-up runway 15 behind landing SK700.

The commander piloted the aircraft (PP) and the first officer was MP. When the aircraft was lined-up runway 15 a low hillock restricted visibility on the right side of the runway towards taxiway Y. The Tower cleared FIN841Q was for take-off. When commencing the takeoff run neither of the crewmembers noticed anything particular or unusual.

Only after passing the low hillock, when the speed was approaching V1, the crew noticed that the landed SAS aircraft was still on taxiway YF and according to their observation did not move. Both FIN841Q pilots have the recollection that SAS aircraft had stopped and its nose was on the runway side of the YF holding position markings. Although the tail of the aircraft was outside the runway edge lights the aircraft was on the runway area.

Since the commander estimated that there is no immediate danger of collision and abortion of takeoff run was not possible before connecting taxiway YF, he continued the takeoff run normally.

The commander and the first officer have different opinions of the lift-off point of FIN841Q. According to the commander the rotation took place approximately abeam of taxiway YJ, which is 300 meters after YF. According to the first officer the aircraft was airborne abeam YF. He remembers to have thought, that if SAS aircraft had been on the runway at YF, they would have barely flown over its tail. They also observed Air Force F27, which was on the taxiway Y and approaching YF.

The AIP Finland instructs the landing traffic to contact "*Helsinki Ground*" once the aircraft has vacated the runway. Following instructions given in the AIP or Jeppesen manual can lead to a situation where the aircraft enters GND service boundary without a proper instructions or permission. This occurs particularly between runway 15 and taxiway Y. If the AIP instruction is followed the aircraft has to pass the holding position

markings. This leads in practice to a situation where nose of the most aircraft types is already on taxiway Y and inside GND service boundary without radio contact to Helsinki Ground and without a taxi clearance.

In practice the point where the pilots change from Tower to Ground frequency varies a lot. Some pilots change to GND frequency already on the runway the others only after passing holding position markings. The general practice seems to be that the frequency is changed while the aircraft is still on the runway area.

At Helsinki-Vantaa airport the Chief of Air traffic Control has published two instructions (LPOM 62/00 17.10.2000 and LPOM 69/00 8.11.2000) which specify the co-ordination of taxi clearances and the priority of the aircraft vacating the runway to continue taxiing to the taxiway parallel to the runway. The instructions are delivered to the use of the ATC, but the AIP instructions have not been changed.

1.3.7 Action of the air traffic controllers

Both air traffic controllers were in their morning shift at Helsinki-Vantaa Tower according to the roster. During the incident the volume of the traffic was normal and pointed on departures. Runway 15 was in use for takeoffs and landings. Weather was good and there were no visibility restricting meteorological factors.

The ground controller followed incoming traffic partly from radar monitor but mainly by visually observing and by the flight strips, which tower controller handed over to him after each landing aircraft. From these strips the ground controller got the call signs and standing positions of the aircraft. On ground of these he was able to plan the taxi routes and give necessary instructions.

The ground controller had handed FIN841Q over to the Tower before it had reached the intersection F1, so that it could without delay continue taxiing to holding position 15. SAS MD80, with call sign SK700, landed before takeoff of FIN841Q.

When SK700 still was on final 15 had Air Force F27, with call sign H22, requested and was cleared to taxi from the Business Flight Center. According to the ground controllers statement H22 had rather fast taxiing speed and he estimated that it would have time to pass taxiway YF before SK700 would taxi into the apron. The ground controller noticed that SK700 slowed down taxiing speed when vacating the runway and he presumed that it would give way to H22 coming from left. Simultaneously he noticed that H22 also slowed down.

When SK700 turned to taxiway YF it came on Ground frequency and reported: *"Vacated 15"*. Ground controller instructed SK700 to taxi as number two behind H22. He decided the taxiing sequence when H22 was, according to his statement, approximately at YH, about 150 m from YF. Whereas the ground controller did not give to H22 any instructions concerning taxi speed or taxi sequence. According to the ground controllers statement he gave to H22 sequence number one, but this does not appear in the radio recordings.

According to his statement the ground controller was watching H22, but does not recall SK700 to have stopped, but perceived, that it would have all the time been moving away from the runway. Based on ground controllers sequencing SK700 was on taxiway YF waiting for H22 to pass while FIN841Q was taking-off. Due to short distance between runway 15 and taxiway Y SK700 had no change to taxi out of runway area. Therefore the ground controller did not inform the tower controller, that the runway was not yet vacated. Nor did he follow the departing traffics (FIN841Q) position.

The tower controller followed the landing of SK700 and cleared FIN841Q to line-up runway 15 behind the landing SK700. He followed the landing roll of SK700 and noticed, that it was turning off from runway 15 to taxiway YF. Since the tower controller observed SK700 moving away from the runway and to his opinion nothing restricted its taxiing onwards, he cleared FIN841Q for takeoff (LJKK chapter 2 paragraph 3.1.5.2). The tower controller no longer watched SK700 neither did he notice when giving the takeoff clearance, that it had stopped between the holding position markings and the runway. Taxiway YF is situated slightly back right from the tower controllers position. He was paying attention to incoming traffic and to the next departing aircraft (SK713), which he cleared to line-up after the departure of FIN841Q.

When the incident occurred, the tower and ground controllers were working at temporary working station placed at the upper deck of the tower. From ground controllers position the view was almost unrestricted to runway 15/33 and to the beginning of runway 22 as well as to taxiways Y,YH and YF. Visibility to the beginning of the runway 04 was restricted by the tower controllers position. At the tower controllers position one could not without standing up and bending forward see the runway 15/33 nor taxiway Y of its whole length neither taxiways YH and YF.

When the incident occurred there were three persons on the right hand side placed Clearance Delivery position due to ongoing rating check. These persons restricted the ground controllers visibility to YH and YF to some extent.

2 ANALYSIS

2.1. Following the AIP instructions

In the AIP Finland EFHK AD 2.2.1 chapter 2.1 *Arrivals* is published a reminder to pilots of rapid exiting from the runway after landing, so that ATC would be able to apply minimum separations and the runway utilization would improve. In chapter 3 Taxiing Procedures is in paragraph *3.1 The appropriate ATC units for taxi clearances and instructions* is said that *clearances and instructions are given between 0400 and 2200 UTC by HELSINKI GROUND/HELSINGIN RULLAUS 121.800 MHz and between 2200 and 0400 by HELSINKI TOWER/HELSINGIN TORNI 118.600 MHz.*

In chapter 3.3 arriving aircraft is given an instruction of radio contact after landing*: Unless preceding instructions to change frequency have been received the aircraft shall contact HELSINKI GROUND 121.800 MHz immediately after vacating the runway for taxi clearance within the ATC Service Boundary, taxi instructions on the apron and for the aircraft stand assigned.*

According to the statements in connection with the investigation the instructions mentioned above have not led to uniform practice of the arrived aircraft when contacting Helsinki Ground. Both amongst pilots and controllers there are different interpretations at which point the contacting should take place. Especially when runway 15 is used for both landing and takeoff. Some contact when still on the runway or just turning away from it. Some contact only when turning from connecting taxiway to taxiway Y, others between these. Some pilots, particularly those who are not familiar with Helsinki-Vantaa airport, may stop at connecting taxiway and change there to the Ground frequency. In that case the landed aircraft is, due to the shortness of connecting taxiway YF, still on the runway area, which must be clear if there is another aircraft taking off from the same runway.

In the AIP Finland EFHK AD 2.2.1 chapter 4.4.2 is an instruction given in connection with low visibility procedures: Pilots must inform *"RUNWAY VACATED"* only when the aircraft has either fully passed holding position marked with CAT II signs or is on the taxiway parallel to the runway. A corresponding procedure instruction in good visibility would minimize the runway occupancy time of landing aircraft, if the reporting limits were the holding position markings. This way the landed aircraft would come into Grounds service boundary before radio contact. From pilots point of view vacating runway is similar action in CAT II or other circumstances and the markings on taxiway are similar, the CAT II lines are only further away from the runway and are marked with signs on the sides as well. Therefore similar instructions in both cases would standardize the procedure.

Some controllers have criticized pilots who have contacted the Ground only after passing the holding position markings. The reason for their criticism has been the aircraft coming into Grounds service boundary without clearance. The pilots who frequently fly to Helsinki-Vantaa seem to have a common opinion, that contacting Ground should take

place only when the aircraft has fully passed the holding position markings. Since the distance between runway and taxiway Y is 120 m and Y is 25 m wide, the aircraft is practically already on taxiway Y when contacting the Ground after passing the holding position markings completely.

The airport has tried to solve this problem by publishing 17.10.2000 and 8.11.2000 *ORDERS AND REGULATIONS GIVEN BY THE CHIEF OF HELSINKI AIR TRAFFIC CONTROL (LPOM).* In the instruction the priority to continue taxiing to the taxiway parallel to the runway is given to the traffic that is vacating the runway after landing. The Ground must have the permission from the Tower, if it has to stop the aircraft taxiing right after leaving the runway.

These instructions give the ground controller the basics to determine the order of his traffic. Though it does not eliminate the situation where the pilot due to strangeness of the airport or other reason spontaneously stops the aircraft on the runway area before contacting the ground. It is to be noted that LPOM is internal instruction of ATC and does not come to the pilots knowledge. The pilots use manuals based on AIP material. On ground of these instructions the pilots can not determine the priority of taxiing traffic before contacting ground.

2.2 Determining the taxiing sequence

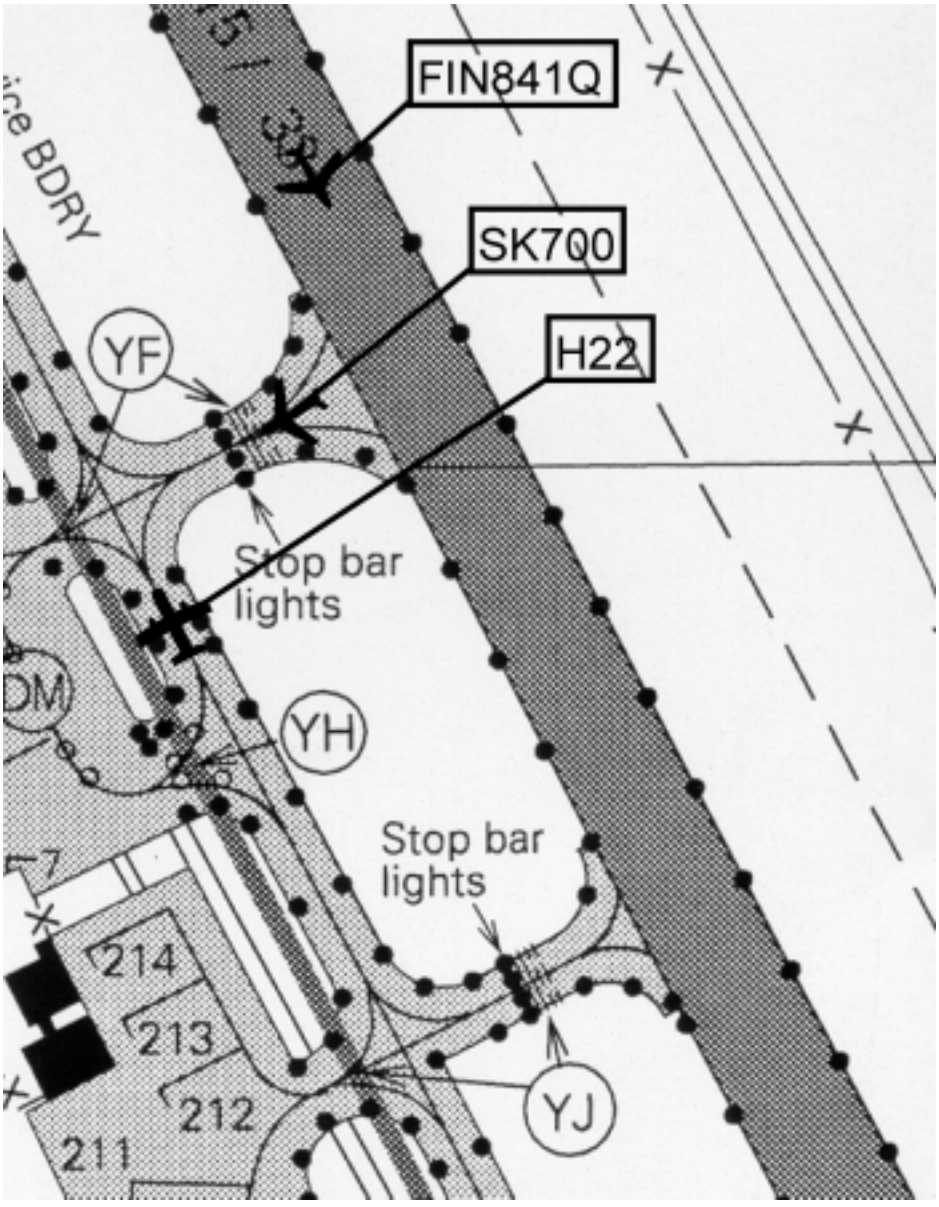
The tower controller cleared SK700 for landing at 08.49.00 and cleared FIN841Q to line-up runway 15 at 08.49.30 behind the landing SK700. The tower controller cleared FIN841Q for takeoff at 08.50.25, since he had seen, before this clearance, SK700 turning off from the runway and moving forward. The tower controller had not after this followed SK700 taxiing but his attention was paid to FIN841Q taking-off and to SK713 at holding position, which he was planning to clear for takeoff before next landing traffic.

At 08.48.10 the ground controller had cleared Air Force Fokker 27 with call sign H22 for taxiing from Business Flight Center parking position to Y1. At 08.50.30, when turning off from the runway, SK700 contacted Helsinki Ground: *"Good morning, Scandinavian 700 vacated 15*". When reporting this SK700 apparently expected to continue taxiing without stopping. The tower controller had cleared FIN841Q for takeoff five seconds earlier. When SK700 contacted the Ground H22 was at YH about 150 meters from YF, to which SK700 had turned. The ground controller estimated that H22 was taxiing so fast that it would have time to pass YF before SK700. When SK700 contacted the Ground the controller replied: "*Good morning Scandinavian 700, behind Fokker from left to right, taxi via Y and AC, stand 26*". At the same time H22 pilots had noticed SK700 coming on their right hand side and had slowed their taxiing speed. The ground controller did not say anything to H22 and the aircraft continued taxiing, but with slower speed. SK700 had to wait for H22 to taxi from left and for this reason it stopped at runway area.

The pilots of FIN841Q had concentrated on their own takeoff and did not observe SK700 until in the short distance. They found out that they had space enough to pass SK700 without an evasive action. The commander of FIN841Q had no possibility to abort take-

off when he observed SK700 standing too close to the runway. In an aborted take-off FIN841Q should have passed SK700 anyway.

According to the co-operation letter of Helsinki-Vantaa airport the ground controller gets the strip of the landed aircraft from the tower controller when the aircraft has vacated the runway. When planning the control of taxiing traffic the ground controller have to follow landing traffic visually and from the radar display. This is the way the controller told he had acted also in this case. He did not however succeed in determining the taxiing order of his traffic correctly, because the landed SK700 had to stop on connecting taxiway YF to wait for taxiing of departing H22. Due to the short distance of runway 15/33 and taxiway Y SK700 stopped at the runway area.



Picture 2: Position of the aircraft while FIN841Q was taking off

2.3 On–the-job training of tower controllers

The working method like in Helsinki-Vantaa Tower between Tower and Ground positions is not included in the basic training programme of air traffic controllers. Training to these tasks take place during qualifying training period that lasts about. 56 work shifts. This period includes besides practical training both theoretical instruction and written examinations and finally five check shifts. Progress of the trainees is followed by a form specially made for that purpose.

In spite of the number (about 56) of the practical work shifts, the contents of practice does not become totally uniform and cover all cases based only on practical training. For example winter conditions make different demands upon Tower Controls working than summer conditions . For this reason the training should include enough practice situations which the trainees solve, so that in their independent work there would be a trained solution for normally occurring situations. Problems for Ground Control when using runway 15 are frequent and come out during the practice period.

Training of the on-the-job instructors of Helsinki ATC is neither thoroughly planned nor systematically carried out. At the Aviation College general pedagogic training has been carried out as far as possible, but this has not always come true due to the lack of resources. Particular professional instructor training has not been organized despite one day long familiarization events for valuation methods and forms. (The working order of Aviation Board 5.5.1.1 paragraph 6).

2.4 The structural factors of the airport and taxiing instructions of AIP

Due to the short distance between runway 15/33 and taxiway Y MD-80 or another just as long airliner does not have space enough to stand on the connecting taxiways YL, YJ, YF, or Z without disturbing the traffic on runway 15/33 or taxiway Y. For this reason it is not easy to make overall instructions for the traffic vacating the runway. In order to carry out the LPOM 62/00 and 69/00 principles, …*for the aircraft vacating the runway must be given the priority to continue taxiing to the taxiway Y parallel to the runway (TWYs Z/Y),* the AIP instruction that is meant for pilots should be supplemented. The instructions should order the landed aircraft to taxi continuously to the taxiway Y parallel to the runway without a special clearance, so that the runway would be ready for new operation as soon as possible after the landed aircraft. The present instructions lead to different actions depending on the interpreter. The instructions should be in a kind of form that both pilots and air traffic controllers would understand the instructions for taxiing traffic uniformly and act in the same way.

3 CONCLUSIONS

3.1 Findings

1. The pilots of the aircraft had valid licenses and qualifications.
2. The air traffic controllers had valid licenses and qualifications.
3. The weather did not restrict the visibility to the runway or taxiway.
4. The volume of the air traffic was normal and pointed on departures.
5. Both tower and ground controllers were working in temporary positions.
6. From the ground controllers position the view was nearly unrestricted to Y, YF and YH.
7. The ground controller overestimated the taxiing speed of H22 and determined the taxiing sequence so that SK700 could not continue taxiing from YF.
8. When the tower controller issued take-off clearance to FIN841Q the conditions determined for takeoff clearance in LJKK fulfilled.
9. The ground controller did not inform the tower controller that SK700 waited on the runway area for passing of H22 .
10. The ground controller did not give H22 instructions concerning the taxiing sequence.
11. Helsinki ATC has published LPOM 69/00 in which the priority of taxiing aircraft is specified.

3.2 Cause of the incident

The incident occurred when the ground controller ordered the taxiing sequence of H22 and SK700 so that SK700 had to wait on taxiway YF when FIN841Q was simultaneously performing take-off from the same runway.

4 SAFETY RECOMMENDATIONS

In to the AIP Finland should be formulated specifying instructions of the priority of taxiing aircraft vacating runways at Helsinki-Vantaa.

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