



Final report on aircraft serious incident

Case no.: **17-042F012**

Date: **28. April 2017**

Location: **Keflavik Airport (BIKF)**

Description: **Runway excursion during landing**

Investigation per Icelandic Law on Transportation Accident Investigation, No. 18/2013 shall solely be used to determine the cause(s) and contributing factor(s) for transportation accidents and incidents, but not determine or divide blame or responsibility, to prevent further occurrences of similar cause(s). This report shall not be used as evidence in court.

1. FACTUAL INFORMATION

Location and time	
Location:	During landing on runway 19 at Keflavik Airport
Date:	28. April 2017
Time¹:	17:22

Aircraft	
Type:	Boeing 737-800
Register:	YL-PSH
Year of manufacture:	2005
Serial number:	34247
CoA:	Valid
Engines:	Two CFM56-7B26

Other information	
Type of flight:	Commercial flight
Persons on board:	144 (6 crew members and 138 passengers)
Injury:	None
Damage:	LH MLG wheel no. 2 damaged
Short description:	Runway excursion during landing

Commander (Pilot Flying)											
Age:	36 years										
Certificate:	ATPL(A) issued by United Kingdom CAA										
Ratings:	B737 300-900, IR										
Medical Certificate:	Class 1										
Experience:	<table border="1"><tbody><tr><td>Total flight hours:</td><td>4700 hours</td></tr><tr><td>Total hours as Commander</td><td>~ 400 hours</td></tr><tr><td>Total flight hours on type:</td><td>4400 hours</td></tr><tr><td>Last 90 days on type:</td><td>237:35 hours</td></tr><tr><td>Last 24 hours on type:</td><td>9:37 hours</td></tr></tbody></table>	Total flight hours:	4700 hours	Total hours as Commander	~ 400 hours	Total flight hours on type:	4400 hours	Last 90 days on type:	237:35 hours	Last 24 hours on type:	9:37 hours
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Total hours as Commander	~ 400 hours										
Total flight hours on type:	4400 hours										
Last 90 days on type:	237:35 hours										
Last 24 hours on type:	9:37 hours										

¹ All times in the report are Icelandic local times (UTC+0), unless otherwise stated. FDR and CVR were matched using the touchdown marker on the CVR. FDR and ATC timing were compared using the CVR (touchdown marker). There is a 3 second time difference between the FDR and the ATC (tower recordings), where the FDR timing is 3 seconds ahead. The report uses FDR timing.

First Officer (Pilot Monitoring)									
Age:	36 years								
Certificate:	CPL issued by Iceland CAA								
Ratings:	B737 300-900, IR								
Medical Certificate:	Class 1								
Experience:	<table border="1"> <tbody> <tr> <td>Total flight hours:</td> <td>1900 hours</td> </tr> <tr> <td>Total flight hours on type:</td> <td>1600 hours</td> </tr> <tr> <td>Last 90 days on type:</td> <td>229:18 hours</td> </tr> <tr> <td>Last 24 hours on type:</td> <td>9:37 hours</td> </tr> </tbody> </table>	Total flight hours:	1900 hours	Total flight hours on type:	1600 hours	Last 90 days on type:	229:18 hours	Last 24 hours on type:	9:37 hours
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Last 24 hours on type:	9:37 hours								

The flight crew of aircraft YL-PSH, from Keflavik Airport (BIKF) to Alicante Airport (LEAL), checked in at Keflavik Airport at 05:25, one hour before the scheduled departure at 06:25. The flight number for the flight to Alicante Airport was 6F107. The flight number for the aircraft's return leg back to Keflavik Airport was 6F108.

During the preflight preparation for the flight from Keflavik Airport in the morning, the flight crew noticed a very high number of NOTAMs² regarding restrictions and construction information for Keflavik Airport.

The First Officer was the Pilot Flying (PF) during the flight to Alicante Airport. Due to late boarding, there was a small delay of the flight and they departed at 06:42 using RWY³ 10.

During the flight to Alicante, the flight crew became aware that the weather in Iceland was deteriorating and there was a possibility that they might need to divert on their way back to Iceland.

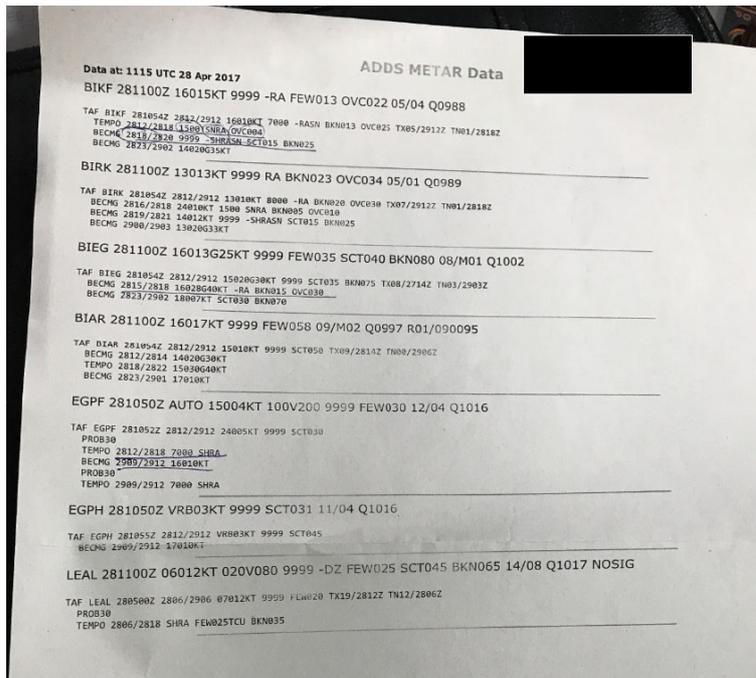
As the forecast was not favorable for the planned alternate airport, Egilsstaðir (BIEG), the Commander decided to change the alternate airport to Glasgow Airport (EGPF), resulting in a flight plan revision and additional fuel.

The scheduled time of arrival at Alicante Airport was at 11:00, but due to the delayed departure from Keflavik Airport, the aircraft landed at Alicante Airport at 11:30.

The aircraft was transporting an unusually high amount of bulk cargo, resulting in the cargo offloading of the aircraft taking longer than normal.

² Notice to airmen

³ Runway



The scheduled time of departure (STD) from Alicante was at 12:00. The late arrival in Alicante, the new flight plan, extra fueling and a lot of bulk cargo, resulted in a delay of the aircraft's departure from Alicante.

The actual block off time was at 12:34 and the takeoff time from Alicante was at 12:54.

Figure 1: Updated weather data the flight crew received during its turnaround in Alicante

The Commander was the Pilot Flying (PF) on the return leg to Keflavik Airport and the First Officer the Pilot Monitoring (PM).

According to the weather forecast from 10:54z, the lowest visibility and ceiling at Keflavik Airport was between 12:00 and 18:00:

TAF BIKF 281100Z 1015KT 9999 -RA FEW013 OVC022 05/04 Q0988

TEMPO 2812/2818 1500 SNRA OVC004

The visibility and the ceiling would then improve between 18:00 and 20:00:

BECMG 2818/2820 9999 -SHRASN SCT015 BKN025

As their scheduled time of arrival (STA) at Keflavik Airport (BIKF) had been 16:45, with over a half an hour delay, the flight crew hoped the weather conditions would have improved by the time they got to BIKF.

The flight to Iceland was uneventful. The flight crew used the time during the flight to get updated weather information at Keflavik Airport. At 15:02, they accessed updated weather

through the ACARS⁴. The weather forecast still included the TEMPO between 15:00 and 18:00.

```
.YL-PSH ---- PRW108      28APR17 1502Z
PRINTER MSG
.SINGMXS 281501
AGM
AN .YL-PSH/GL LEQ1
- /
FT 28/14:00
TAF BIKF 281349Z 2815/2915 16007KT 8000
-RASN BKN013 OVC025
TX06/2915Z TN01/2810Z
TEMPO 2815/2818 1500 SNRA OVC004
BECMG 2816/2820 9999 -SHRASN SCT015
BKN025
BECMG 2823/2902 14020G35KT=
FT 28/14:00
TAF BIEG 281349Z 2815/2915 15020G30KT
9999 SCT035 BKN075 TX08/2815Z
TN03/2903Z
BECMG 2815/2818 16028G40KT -RA
BKN015 OVC030
BECMG 2823/2902 18007KT SCT030
BKN070=
FT 28/11:15
TAF EGPF 281052Z 2812/2912 24005KT 9999
SCT030 PROB30
TEMPO 2812/2818 7000 SHRA
BECMG 2909/2912 16010KT PROB30
TEMPO 2909/2912 7000 SHRA=
SA 28/14:30
METAR BIKF 281430Z 11004KT 9000 -RASN
OVC011 02/01 Q0986=
SA 28/14:00
BIEG 281400Z 18016G27KT 9999 -RA FEW015
BKN027 BKN040 10/01
Q1001=
SA 28/14:50
EGPF 281450Z AUTO 23011KT 9999 SCT036 13
/05 Q1014=
```

With overcast at 400 feet AGL⁵ and the Decision Altitude (DA) at Keflavik Airport set at 440 feet⁶ above MSL⁷, the flight crew was concerned⁸ and well aware that the weather at Keflavik might require them to divert to Glasgow.

During the descent, the flight crew performed the descent checklist and amongst other things, set the Autobrake system to Autobrake 3 for the landing.

Figure 2: BIKF Airport weather TEMPO between 15:00 and 18:00

At 16:50, before the flight crew started the approach toward Keflavik Airport, they listened to the part of the broadcasted ATIS Information of Keflavik Airport containing the braking action measurement of the airport.

“..UTC measured 55-50-50 on Mu meter. Braking action ramp and taxiways medium-poor. Available runway length RWY 19 is 2182 meters.”

According to the flight crew, this ATIS did not cause any alarm concerning the braking action as it measured GOOD⁹.

⁴ Aircraft Communications Addressing and Reporting System

⁵ Above Ground Level

⁶ See Figure 6, LNAV/VNAV

⁷ Mean Sea Level

⁸ BIKF Airport elevation is about 169 feet, so 400 feet AGL is about 570 above MSL

⁹ Per ICAO Annex 14, measured braking action of 40 and above is GOOD

1.1. Keflavik Airport Runway Reconstruction Project

Keflavik Airport had been undergoing a Runway Reconstruction Project since the spring of 2016. The project was divided into ten phases, Phase 1A, 1B, 2, 3, 4, 5, 6, 7, 8 and 9. The project consisted of, amongst other, resurfacing of the runways. This required different partial closures of runways, throughout the project.

Details regarding the Runway Reconstruction Project had been issued in Icelandic AIP SUP 004/2017.

Day to day changes to the reconstruction project were then provided by NOTAMs. As the program had been delayed, numerous NOTAMs had been issued regarding the Runway Reconstruction Project.

According to AIP SUP 004/2017, Phase 3 of the Runway Reconstruction Project was scheduled to start on April 1, 2017. It was delayed, as Phase 2 of the Runway Reconstruction Project was not completed at the scheduled time.

Due to the delay, Phase 3 of the Runway Reconstruction Project did not start until April 26, two days prior to this serious incident.

In Phase 3 the threshold of RWY 19 had been displaced south of RWY 10/28, decreasing LDA¹⁰ for RWY 19 to 2182 meters, according to AIP SUP 004/2017. For navigation, RNAV approach had to be utilized for RWY 19, as the ILS was not operational during the reconstruction project of RWY 19.

For Phase 3, RNAV-X approach needed to be utilized for the displaced threshold.

This had replaced the earlier RNAV-Z, which had been used during Phase 2 of the Runway Reconstruction Project that ended two days prior to the serious incident.

According to AIP SUP 004/2017, RWY 10/28 was to be operational without restrictions during Phase 3 of the Runway Reconstruction Project. Regardless of this, when flight 6F108 started its descent, RWY 10/28 was closed and only RWY 19 was available.

¹⁰ Landing Distance Available

Áætluð áfangaskipting verksins og tiltækar flugbrautir verða eftirfarandi:

The estimated phases of work and the corresponding available runways are as follows:

2. Áætluð áfangaskipting / Estimated Phases

ATH: áfangar verða ekki unnir í númeraröð. Gert er ráð fyrir að röðin verði eftirfarandi: 3, 5, 4, 6, 7-8, 9

Note that the phases will not be processed in numerical order. It is assumed that the order will be: 3, 5, 4, 6, 7-8, 9

2.1 Áfangi 3: 1. apríl - 27. apríl 2017 (áætlun) / Phase 3: 1st April - 27th April 2017 (EST)

Framkvæmdasvæði:

- Flugbraut 01/19 - Nyrsti hluti flugbrautar
- Flýttirein 28 utan öryggissvæða flugbrautar 10/28 og akbrautar KILO

Construction area:

- RWY 01/19 - Northernmost part of RWY
- Rapid-exit taxiway (RET) 28 outside safety area of RWY 10/28 and TWY KILO

Lengd framkvæmdasvæðis á flugbraut 01/19: 613 m

Construction area length on RWY 01/19: 613 m

Flugbraut tiltæk:

- Flugbraut 01/19 - 2182 m
- Flugbraut 10/28 (11/29) - ÖLL

Runway available:

- RWY 01/19 - 2182 m
- RWY 10/28 (11/29) - FULL

(ÖLL þýðir: Engar takmarkanir á flugbraut)

(FULL means: RWY available in full length/width)

Hnit fyrir tímabundinn þröskuld flugbrautar 19:

635902.60N 0223619.58W

Coordinates for temporary THR RWY 19:

635902.60N 0223619.58W

Aðflug í boði:

- Flugbraut 01: RNAV(GNSS) Z, RNAV(GNSS) Y, RNAV(GNSS) X og VOR
- Flugbraut 19: RNAV(GNSS) X (fyrir tímabundinn þröskuld), LOC X (fyrir tímabundinn þröskuld) og VOR (einungis hringaðflugslágmörk)
- Flugbraut 10 (11): ILS or LOC Z, ILS or LOC Y, RNAV(GNSS), VOR, NDB
- Flugbraut 28 (29): ILS or LOC Z, ILS or LOC Y, RNAV(GNSS) Z, RNAV(GNSS) Y, RNAV(GNSS) X

Available approaches:

- RWY 01: RNAV(GNSS) Z, RNAV(GNSS) Y, RNAV(GNSS) X and VOR
- RWY 19: RNAV(GNSS) X (for temporary THR), LOC X (for temporary THR) and VOR (circling minima only)
- RWY 10 (11): ILS or LOC Z, ILS or LOC Y, RNAV(GNSS), VOR, NDB
- RWY 28 (29): ILS or LOC Z, ILS or LOC Y, RNAV(GNSS) Z, RNAV(GNSS) Y, RNAV(GNSS) X

Afturkölluð blindaðflug tilkynnt með NOTAM:

- Flugbraut 01: ILS or LOC Z og ILS or LOC Y
- Flugbraut 19: ILS or LOC Z og ILS or LOC Y

Suspension of instrumental approach procedures by NOTAM:

- RWY 01: ILS or LOC Z and ILS or LOC Y
- RWY 19: ILS or LOC Z and ILS or LOC Y

Tímabundinn ljósabúnaður:

- Flugbraut 19: kantljós, þröskuldsljós, endaljós, aðflugshallaljós og flugbrautaendaleifturljós

Temporary LGT:

- RWY 19: EDGE, THR, END, PAPI and REIL

2.1.1 Breytingar á tilgreindum viðmiðunarvegalengdum fyrir áfanga 3 / Changes to declared distances during Phase 3:

RWY Designator	TORA (M)	TODA (M)	ASDA (M)	LDA (M)
10	see AIP	see AIP	see AIP	see AIP
28	see AIP	see AIP	see AIP	see AIP
01	2182	2242	2382	2182
19	2182	2332	2182	2182

Figure 3: Phase 3 from Iceland AIP SUP 004/2017



Figure 4: RWY 19 displaced threshold south of RWY 10/28 (AIP SUP 004/2017)

In Phase 3 of the Runway Reconstruction Project, the part of RWY 19 that was north of RWY 10/28 was under reconstruction and no lights were on that portion of the RWY. Therefore, between the approach lights north of RWY 19 and the displaced threshold of the runway south of RWY 10/28, there was a long gap with no lights.

While RWY 19 had a reduced LDA of 2182 meters, according to AIP SUP 004/2017, the LDA of RWY/10/28 was 3065 meters.

RWY 10/28 had been closed earlier during the day of the incident (28th of April 2017), after flight 6F107 took off from RWY 10 in the morning, as the runway designators were being changed from 11/29 to 10/28 and the runway designators needed to be repainted.

This information had been published by the issue of NOTAMs A0216/17 and A0233/17:

A0216/17 - Movement and Landing Area 0000 28/04/2017 2359 09/05/2017

Page 31

IN AIRAC 003/2017 EFF 27 APR 2017 RWY 11/29 WHERE
CHANGED TO 10/28.
FROM THE 27TH OF APRIL UNTIL THE END OF KEFLAVIK - RUNWAY
RECONSTRUCTION PROJECT (RRP) FOR YEAR 2017, EXPECT
DISCREPANCY BETWEEN PAINTED RUNWAY DESIGNATORS
AND THE INFORMATION PUBLISHED IN AIP ICELAND
BIKF AD EFF 28 APR 2017.
FOR FURTHER INFORMATION SEE:
AIP SUP 004/2017 KEFLAVIK - RUNWAY RECONSTRUCTION
PROJECT (RRP) 2017 EFF 28 APR 2017

A0233/17 - Movement and Landing Area 0900 28/04/2017 2359 01/05/2017

RUNWAY 10/28 CLOSED DUE TO CONSTRUCTION WORK. REF AIP ICELAND SUP 004/2017
AND BIKF AD 2.14

When RWY 10/28 was closed on the day of the incident (28th of April 2017), NOTAM A0248/17 was also issued to advise that RWY 10 ILS would be available upon request in low visibility:

**A0248/17 - Instrument and Microwave Landing
system**

0900 28/04/2017 0800 01/06/2017

RWY 10 ILS CAT II IS AN AVAILABLE UPON REQUEST IN LOW VISIBILITY.

The flight crew of flight 6F108 never requested runway 10/28 to be re-opened prior to the serious incident. According to the Commander the First Officer inquired about the availability of RWY 10/28 in the morning, before the departure from Keflavik Airport and from that conversation the flight crew concluded afterwards that RWY 10/28 would not be available upon their return flight to Keflavik Airport.

After the serious incident, snowplows started clearing RWY 10/28, so it could be re-opened.

1.2. The weather

The following TAF were issued for Keflavik Airport on this day:

TAF BIKF 281054Z 2812/2912 16010KT 7000 -RASN BKN013 OVC025
TX05/2912Z TN01/2818Z
TEMPO 2812/2818 1500 SNRA OVC004
BECMG 2818/2820 9999 -SHRASN SCT015 BKN025
BECMG 2823/2902 14020G35KT=

TAF BIKF 281349Z 2815/2915 16007KT 8000 -RASN BKN013 OVC025
TX06/2915Z TN01/2818Z
TEMPO 2815/2818 1500 SNRA OVC004
BECMG 2818/2820 9999 -SHRASN SCT015 BKN025
BECMG 2823/2902 14020G35KT=

The following METAR were issued between 16:00 and 17:30 for Keflavik Airport:

METAR BIKF 281600Z 02001KT 0900 R19/1200N -SN OVC007 00/00 Q0985=

METAR BIKF 281630Z 29002KT 1200 R19/1300D -SN BKN007 OVC015 00/00 Q0983=

METAR BIKF 281700Z 24006KT 0800 R19/0800U SN VV005 M00/M00 Q0983
R19/590137=

The following ATIS were issued between 16:00 and 17:30 for Keflavik Airport:

17.04.28 16:01:24
BIKF ATIS XRAY, 1600 Z.
RWY 19 IN USE. EXP RNAV APCH, RWY 19.
BIKF 281600Z 03001KT 0900 R19/1200N -SN OVC007 00/00 Q0984 A2909=
TRANSITION LEVEL 80.
RWY 19 WET AND CLRED OF SN 30 M WIDE. BA RWY 19 AT TIME 1530 UTC
MEASURED 55 50 50 ON MU METER. AVAILABLE RWY LENGTH, RWY 19 IS 2182
METERS. THRESHOLD SOUTH OF INTERSECTION. RWY 10/28 CLOSED DUE TO
CONSTRUCTION WORK.
NOVEMBER TWY CLOSED FROM EAST EXIT TO RWY 28 DUE TO CONSTRUCTION
WORK. SIGMET ALPHA 03 VALID UNTIL 1800 UTC.
ADZ ON INITIAL CTC YOU HAVE INFO XRAY.

17.04.28 16:11:51
BIKF ATIS YANKEE, 1610 Z.
RWY 19 IN USE. EXP RNAV APCH, RWY 19.
BIKF 281600Z 03001KT 0900 R19/1200N -SN OVC007 00/00 Q0984 A2909=
TRANSITION LEVEL 80.
RWY 19 WET AND CLRED OF SN 30 M WIDE. BA RWY 19 AT TIME 1530 UTC
MEASURED 55 50 50 ON MU METER. BA RAMP AND TWYS MEDIUM POOR.
AVAILABLE RWY LENGTH, RWY 19 IS 2182 METERS. THRESHOLD SOUTH OF
INTERSECTION. RWY 10/28 CLOSED DUE TO CONSTRUCTION WORK.
NOVEMBER TWY CLOSED FROM EAST EXIT TO RWY 28 DUE TO CONSTRUCTION
WORK. SIGMET ALPHA 03 VALID UNTIL 1800 UTC.
ADZ ON INITIAL CTC YOU HAVE INFO YANKEE.

17.04.28 16:16:31
BIKF ATIS ZULU, 1616 Z.
RWY 19 IN USE. EXP RNAV APCH, RWY 19.
BIKF 281600Z 03001KT 0900 R19/1200N -SN OVC007 00/00 Q0984 A2909=
TRANSITION LEVEL 80.
RWY 19 WET AND CLRED OF SN 50 M WIDE. BA RWY 19 AT TIME 1530 UTC
MEASURED 55 50 50 ON MU METER. BA RAMP AND TWYS MEDIUM POOR.
AVAILABLE RWY LENGTH, RWY 19 IS 2182 METERS. THRESHOLD SOUTH OF
INTERSECTION. RWY 10/28 CLOSED DUE TO CONSTRUCTION WORK.
NOVEMBER TWY CLOSED FROM EAST EXIT TO RWY 28 DUE TO CONSTRUCTION
WORK. SIGMET ALPHA 03 VALID UNTIL 1800 UTC.
ADZ ON INITIAL CTC YOU HAVE INFO ZULU.

17.04.28 16:30:30
BIKF ATIS ALFA, 1630 Z.
RWY 19 IN USE. EXP RNAV APCH, RWY 19.
BIKF 281630Z 30002KT 1200 R19/1300D -SN BKN007 OVC015 00/00 Q0983 A2903=
TRANSITION LEVEL 80.
RWY 19 WET AND CLRED OF SN 50 M WIDE. BA RWY 19 AT TIME 1530 UTC
MEASURED 55 50 50 ON MU METER. BA RAMP AND TWYS MEDIUM POOR.
AVAILABLE RWY LENGTH, RWY 19 IS 2182 METERS. THRESHOLD SOUTH OF
INTERSECTION. RWY 10/28 CLOSED DUE TO CONSTRUCTION WORK.
NOVEMBER TWY CLOSED FROM EAST EXIT TO RWY 28 DUE TO CONSTRUCTION
WORK. SIGMET ALPHA 03 VALID UNTIL 1800 UTC.
ADZ ON INITIAL CTC YOU HAVE INFO ALFA.

17.04.28 17:06:27
BIKF ATIS BRAVO, 1700 Z.
RWY 19 IN USE. EXP RNAV APCH, RWY 19.
BIKF 281700Z 25006KT 0800 R19/0800U SN VV005 M00/M00 Q0983 A2903 =
TRANSITION LEVEL 80.
CHECK TWR FOR BA. SN REMOVAL OPS INPR. BA RAMP AND TWYS MEDIUM
POOR. AVAILABLE RWY LENGTH, RWY 19 IS 2182 METERS. THRESHOLD SOUTH
OF INTERSECTION. RWY 10/28 CLOSED DUE TO CONSTRUCTION WORK.
NOVEMBER TWY CLOSED FROM EAST EXIT TO RWY 28 DUE TO CONSTRUCTION
WORK. SIGMET ALPHA 03 VALID UNTIL 1800 UTC.
ADZ ON INITIAL CTC YOU HAVE INFO BRAVO.

1.3. The first RWY sweep

At 16:52, five snowplows drove in a formation onto RWY 19 from the RWY 10/28 intersection and cleared a combined width of 25 meters on the west side of RWY 19. They then exited RWY 19 at 16:59 using taxiway E-1 at the far end of RWY 19, where they turned around. A brake-measuring vehicle followed the five snowplows.

At 17:00, the formation of the five snowplows moved back onto RWY 19 and cleared another combined width of 25 meters on the east side of RWY 19.

At 17:06, the ATCO¹¹ in BIKF tower directed the snowplows to exit RWY 19.

The snowplows exited RWY 19 at 17:06 using the RWY 10/28 intersection.

Therefore, between 16:52 and 17:06 a combined width of 50 meters around the centerline of RWY 19 was cleared of snow, all the way from RWY 10/28 and to the far exit at taxiway E-1.

This meant the complete length of RWY 19 (2182 meters) was cleared of snow, just before the flight crew of flight 6F108 finished the landing checklist, after having passed through 2500 feet on its first final approach.

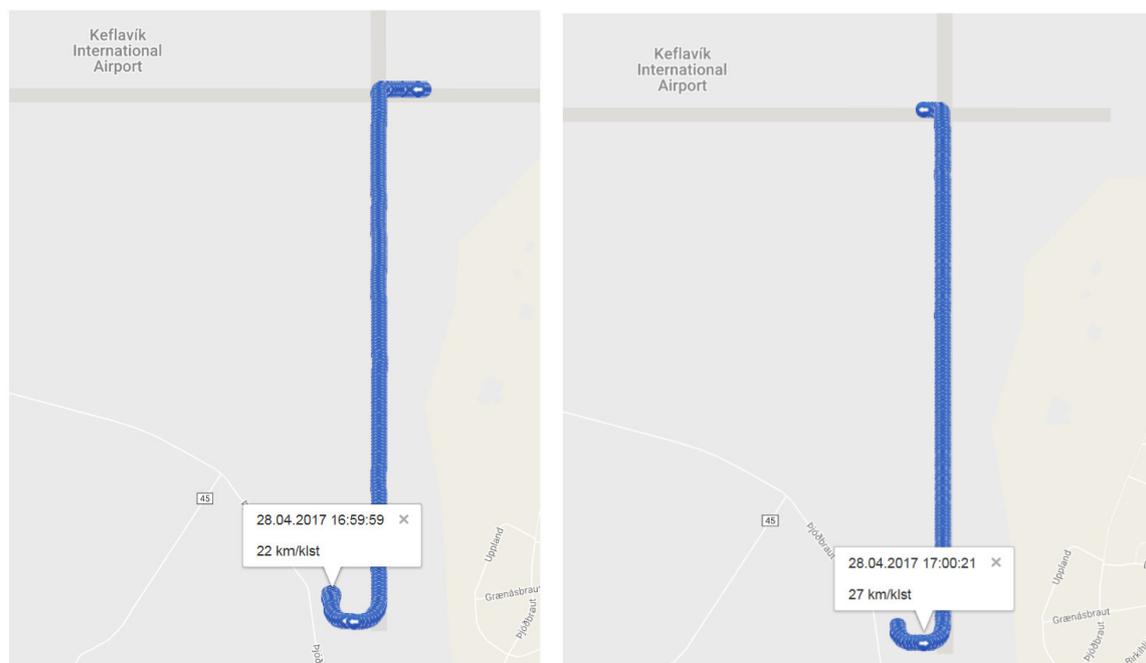


Figure 5: Snowplows cleared RWY 19 between 16:52 and 17:06

¹¹ Air Traffic Control Officer

1.4. The first approach

Once the flight crew of flight 6F108 got in touch with Approach Control, descending to FL100, they received clearance down to 5000 feet, they were told that the QNH for Keflavik Airport was 983 HPa and to expect RNAV-X approach for RWY 19.

The flight crew had expected and already set the aircraft up for RNAV-Z approach.

The flight crew performed comparison check between the two approaches and then reconfigured the aircraft for RNAV-X approach to RWY 19.

According to the RNAV-X chart in Figure 6, for RWY 19 at BIKF, the Decision Altitude (DA) was 440 feet for LNAV/VNAV approach and the minimum Runway Visual Range (RVR) was 1300 meters.

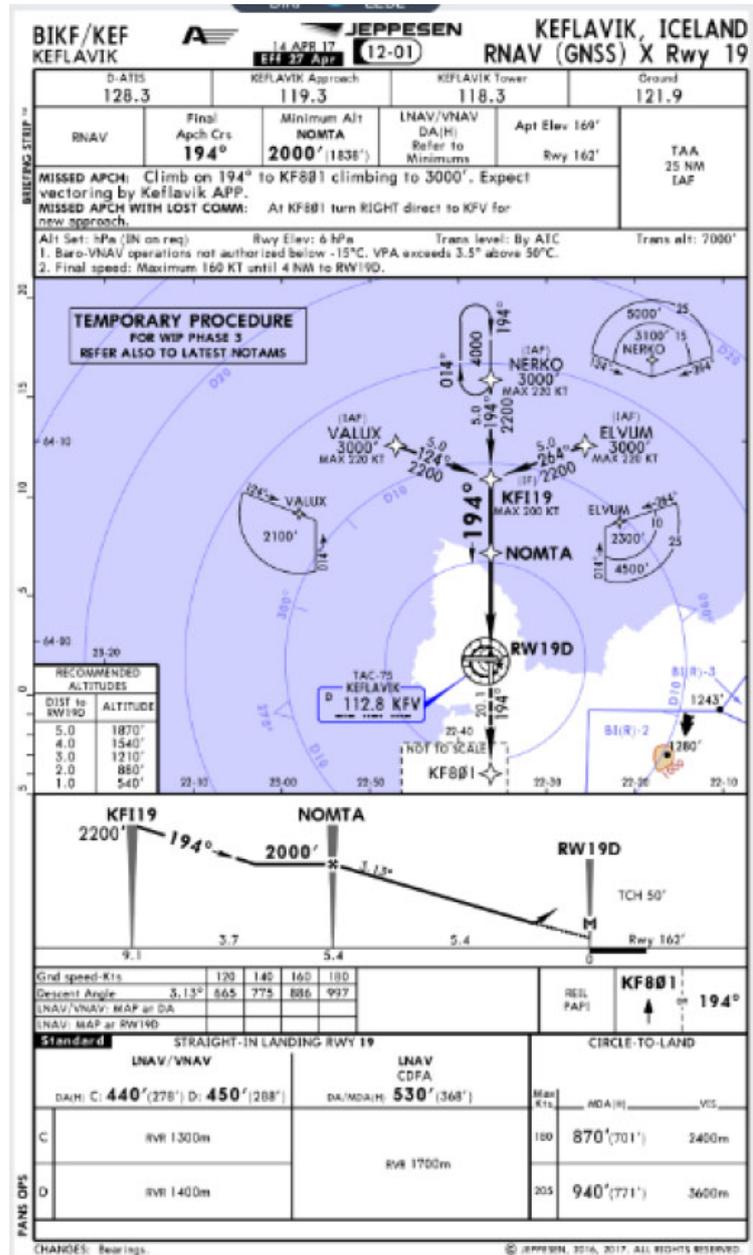


Figure 6: BIKF RNAV-X Approach chart for RWY 19

At 16:56, the flight crew listened to the ATIS for Keflavik Airport:

“..Visual range RWY 19 1300 meters, decreasing – Light snow – Cloud ceiling broken at 700 feet - Overcast at 1500 feet - Temperature 0 - Dew point 0 - QNH 0983 HPa 29,03 inches - Transition level 80 - RWY 19 wet and cleared of snow 50 meters wide - Braking action RWY 19 at time 15:30 UTC measured 55..”

This was ATIS information Alfa, which had been released at 16:30:30.

The flight crew noted that the braking measurement in the ATIS was from 15:30, or almost 1.5 hour old.

At 16:58, Approach contacted the flight crew and asked them to reduce their indicated airspeed to 250 or less, as snowplows were clearing snow off the runway. The flight crew acknowledged and reduced the speed.

At 16:58, the flight crew listened again to the ATIS for Keflavik Airport:

*“..issued at 16:30 UTC – RWY 19 in use – Expect RNAV approach RWY 19 –
Weather at 16:30 UTC – Wind calm – Visibility 1200 meters – RWY visual range
RWY 19 1300 meters, decreasing – Light snow – Cloud ceiling broken at 700 feet
- Overc..”*

The flight crew discussed that this was the same ATIS (issued at 16:30) and therefore decided to call Approach to get an update on the ceiling and the visibility.

At 17:00, Approach Controller informed the flight crew that the ceiling was at 1100 feet and that the visibility was about 600 to 700 meters.

The flight crew discussed that the visibility needed to be 750 meters or above, or they would have to perform a go-around. They decided to continue and get an update later in the approach.

At 17:03, they rechecked the ATIS, which was unchanged and still provided Runway Visual Range of 1300 meters.

Then, also at 17:03, the flight crew switched over to Keflavik Tower:

Approach ATC: Jet bird 108 contact tower 18.3 bye bye

F/O: 18.3 jet bird 108 bye

F/O: Tower, jet bird 108 with you on RNAV X-ray RWY 19

BIKF Tower: Jet bird 108 Keflavik Tower continue number one RWY 19 wind 270/7 the braking action being measured behind the sweepers around 40 meters.. Correction around 40 on the Omni-meter¹²

F/O: Ok roger that and do you have an update on the ceiling and visibility?

BIKF Tower: Visibility approximately 7 or 800 meters from the tower its overcast at 1100 feet

The flight crew decided that the updated visibility allowed them to continue the approach and extended the flaps to FLAP 15.

The flight crew calculated the landing performance based on this updated information. Measured braking coefficient of 40 Mu-meter, meant that the braking action was GOOD (40 and above).

According to the landing performance calculations (see Figure 7); they would require 1692 meters for Max Manual braking, 1799 meters for Max Auto braking and 2168 meters for Autobrake 3. During the descent phase, Autobrake 3 had been set.

The landing distance available for RWY 19 was 2182 meters, so it was sufficient but very close to the required runway length for the selected Autobrake 3.

The aircraft passed through 2500 feet at 17:05:08.

The review of the landing checklist was finished at 17:05:46.

The flight crew did not set the altitude for the missed approach in the altitude window during the final approach.

¹² This should have been Mu-meter, not Omni-meter

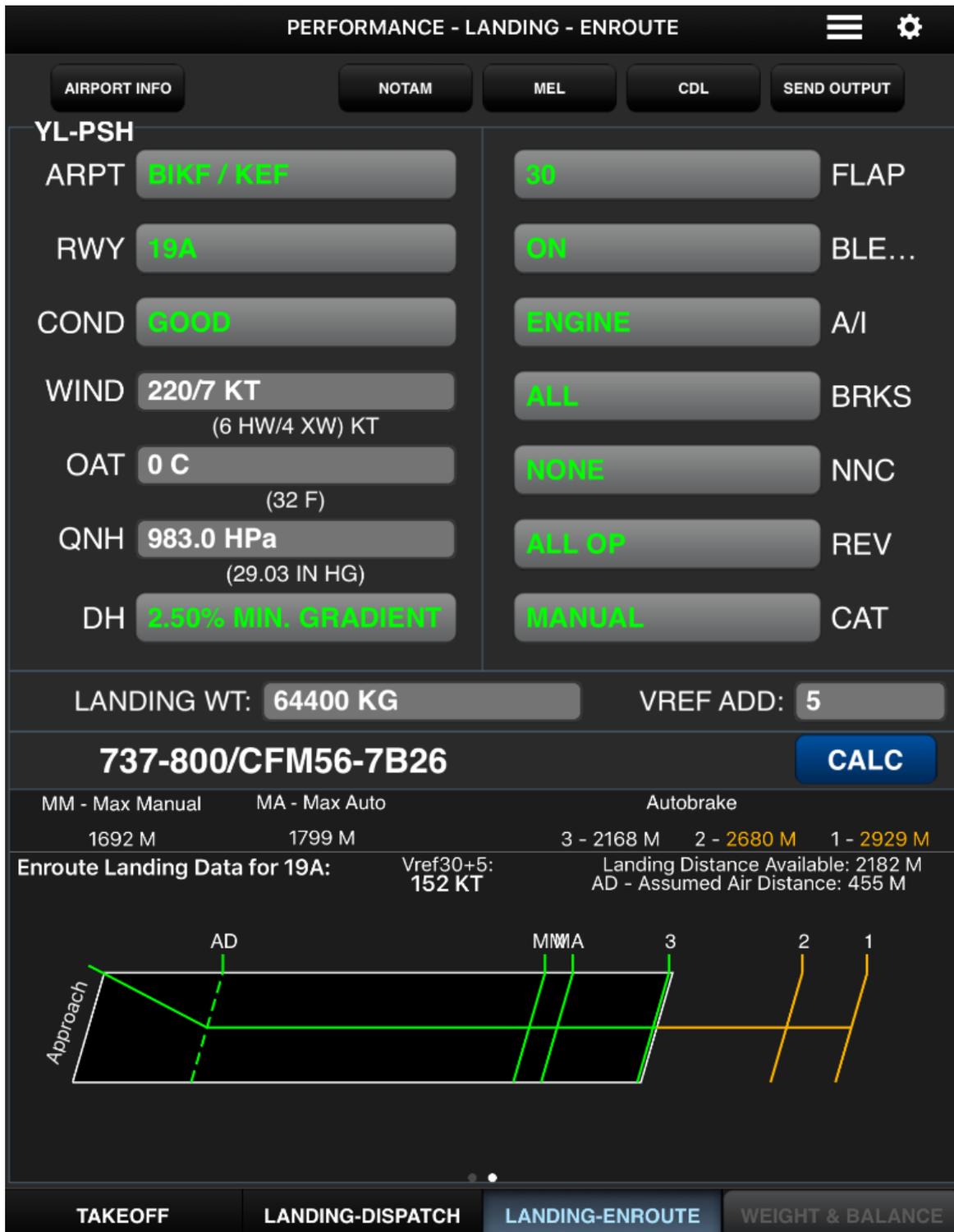


Figure 7: Landing performance calculations

The aircraft passed through 1000 feet AGL at 17:06:49 and was determined stabilized.

The aircraft then passed through 500 feet AGL at 17:07:23 and was again determined stabilized.

According to the CVR, the flight crew had the approach lights in sight at 17:07:26, but they were having difficulty seeing the runway.

According to the FDR, at 17:07:38 the autopilot disengaged. The PF continued to follow the flight director with the autothrottle engaged.

According to the CVR, at 17:07:41 the aircraft announced MINIMUM and the aircraft had started to level off.

According to the CVR, the PF still did not have visual contact with the runway at 17:07:44. Two seconds later, according to the CVR, at 17:07:46 the PM saw the PAPI lights, four white.

Due to Phase 3 of the Runway Reconstruction Project, after the approach lights north of the RWY, there was a long gap (the part of RWY 19 that was north of RWY 10/28) with no lights until the displaced threshold of the runway, south of RWY 10/28.

The flight crew forgot to set the 3000 feet missed approach (go-around) altitude during the final approach. This resulted in the PF starting to level off, after the autopilot disengaged and the aircraft passed through MINIMUM, as he followed the flight director.

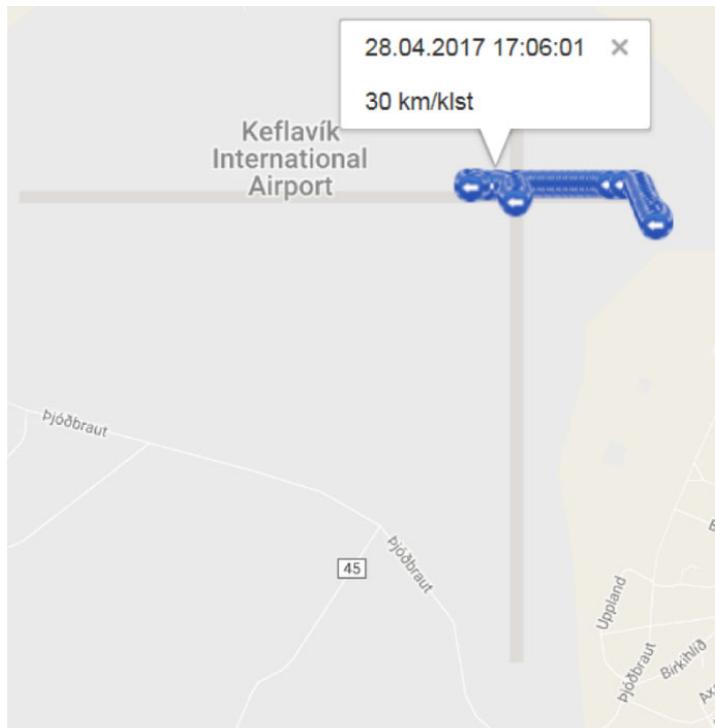
According to the CVR, at 17:07:52 the Commander called a go-around.

According to the FDR, this was followed by a go-around selection when the TO_GA switch was engaged at 17:07 56.

At 17:07:58 the aircraft reached the lowest altitude of the approach, 163 feet AGL.

1.5. Traffic at the airport between the two approaches

When the flight crew of flight 6F108 attempted a landing on RWY 19 during the first approach, the five snowplows had moved onto RWY 10/28 at 17:06.



At 17:07, the Keflavik tower ATCO inquired the snow removal supervisor¹³, operating a brake-measuring vehicle behind the snowplows, of their intentions.

The supervisor stated that they would wait on RWY 28, where they cleared RWY 28 of snow between 17:06 and 17:10.

Figure 8: Snowplows cleared RWY 28 between 17:06 and 17:10

After the flight crew of flight 6F108 had initiated go-around, at 17:08:01 the Keflavik tower ATCO instructed the flight crew to contact Approach on 119.3 [MHz], with which the flight crew complied.

At 17:08:10, the Keflavik tower ATCO instructed flight FI454, which was an aircraft that had been waiting on the ground for takeoff permission, to line up RWY 19 via RWY 28. The flight crew of flight FI454 read the instructions back.

Between 17:08:22 and 17:08:37 there was a telephone call between the Keflavik tower ATCO and Keflavik Approach, where they discussed that flight 6F108 had executed a go-around.

At 17:09:35, the Keflavik tower ATCO advised the snow removal supervisor that a single aircraft would be taking off and then the snowplows could proceed south on taxiway Echo.

¹³ Snjóköngur in Icelandic

The supervisor replied that they could also go down the centerline [of the RWY], if the ATCO preferred that, which the ATCO approved.

At 17:09:56, the Keflavik tower ATCO instructed aircraft Blue Cargo 6809 to hold short RWY 28 on Echo. The flight crew of flight Blue Cargo 6809 read the instructions back.

Between 17:10:14 and 17:10:26, there was a telephone call between the Keflavik tower ATCO and Keflavik Approach, where they discussed flight FI454 and flight 6F108 that had executed a go-around.

The Approach Controller informed the Keflavik tower ATCO that flight 6F108 had not been stabilized and would be returning for another approach.

At 17:10:27, the Keflavik tower ATCO provided a takeoff clearance for flight FI454 from RWY 19. The flight crew of aircraft flight FI454 read the clearance back.

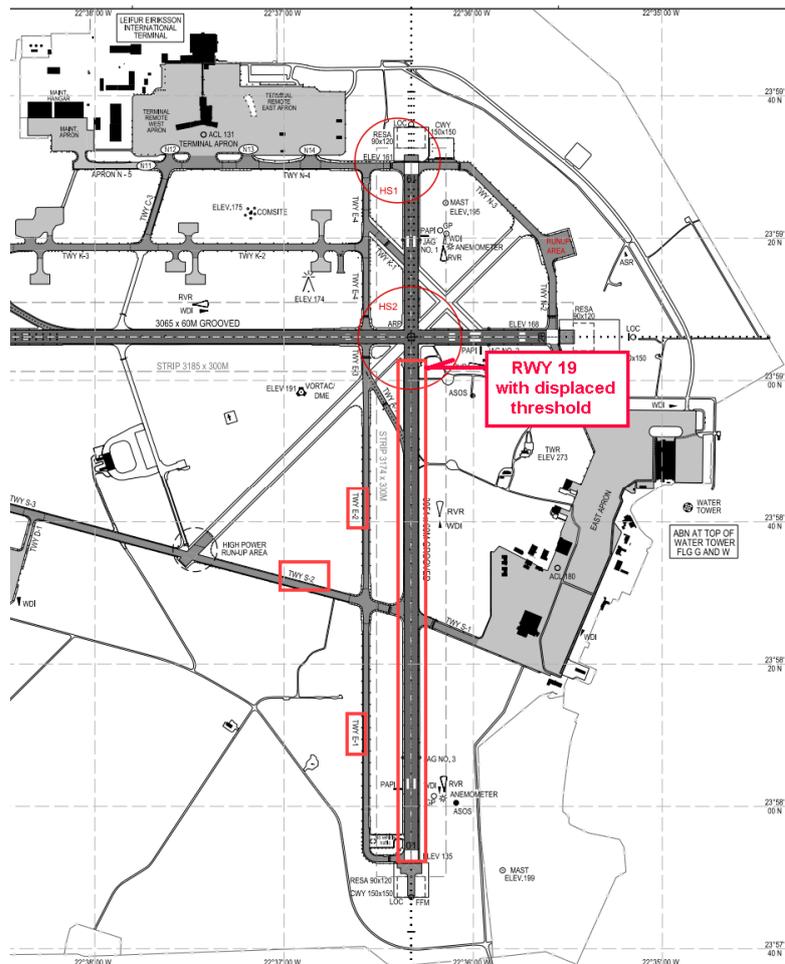


Figure 9: RWY 19 with displaced threshold and its taxiway

Then, flight FI454 started its takeoff roll from RWY 19.

1.6. The second, partial, RWY sweep

As it was snowing, RWY 19 got contaminated very quickly.

At 17:10:51, the Keflavik tower ATCO provided the snow removal supervisor with approval to enter RWY 19 behind aircraft flight FI454 [that was taking off on RWY 19], with the instructions to notify once they would exit at taxiway Echo. The supervisor read back these instructions. Then, the snowplows moved back onto RWY 19 from RWY 10/28 and started sweeping RWY 19 again.

At 17:11:18, the Keflavik tower ATCO advised the flight crew of aircraft Blue Cargo 6809 that they could expect a few minutes delay as the runway was being cleared of snow and there was one aircraft inbound [flight 6F108 in go-around] as well. The flight crew of Blue Cargo 6809 acknowledged the radio call.

At 17:13:42, the Keflavik tower ATCO instructed the flight crew of Blue Cargo 6809 to line up and wait RWY 19, via RWY 28. The flight crew of Blue Cargo 6809 replied that they would need to go back for another de-icing due to the heavy snow. This was followed with a detailed discussion between the ATCO and the flight crew of flight 6809 on the best way to turn around to the apron for de-icing until 17:14:41.

At 17:14:42 the snow removal supervisor contacted the Keflavik tower ATCO to inform that the snowplows had vacated the RWY and were now on taxiway Echo heading south [taxiway Echo-1].

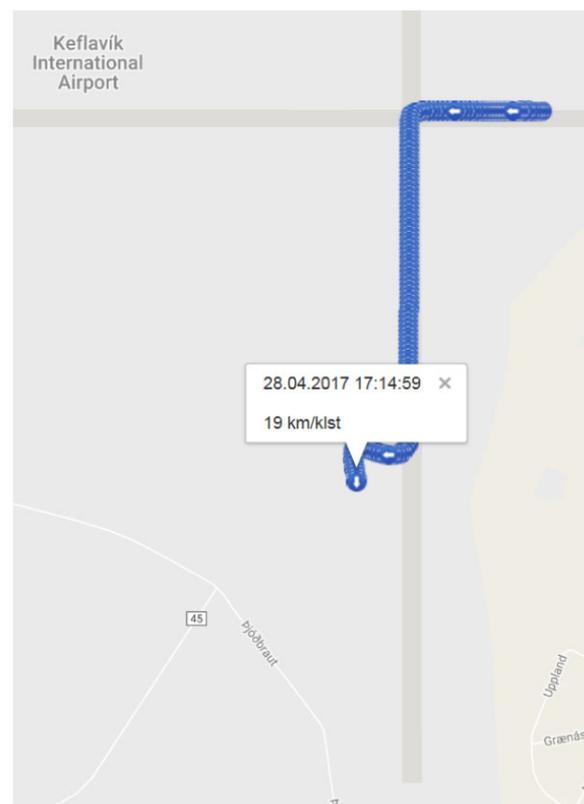


Figure 10: Partial clean of RWY 19 to taxi S-2

The five snowplows therefore only managed to clean a combined width of 25 meters around the centerline of RWY 19 after the first landing attempt, before vacating RWY 19 at taxiway S-2 at 17:14.

At 17:14:49, the ATCO confirmed that the snowplows were off the RWY and inquired if the supervisor meant that they were heading north on Echo. The snow removal supervisor advised that they would turn around.

At 17:14:55, the flight crew of flight 6809 contacted the ATCO again and advised that they would be turning around on RWY 19. The ATCO acknowledged that they would be making 180° turn [on RWY 19] and instructed them to report back when on [taxiway] Echo-4.

Meanwhile, the snowplows had turned around on taxiway Echo, just south of taxiway Sierra-2, and continued clearing taxiway Echo to the north.

At 17:15:25, the ATCO inquired the snow removal supervisor if they were now clearing taxiway Echo to the north.

The supervisor confirmed that and inquired if there would be just a single takeoff.

The ATCO advised that the aircraft [flight 6809] was going back [for extra de-icing]. The ATCO also informed the snow removal supervisor that the aircraft that had executed a go-around earlier [flight 6F108] was coming back for another approach and would be landing in few minutes.

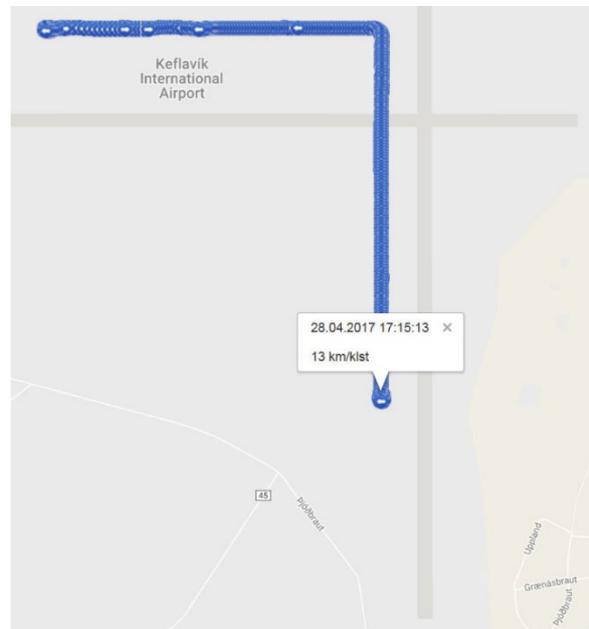


Figure 11: Clearing Echo and Kilo taxiways

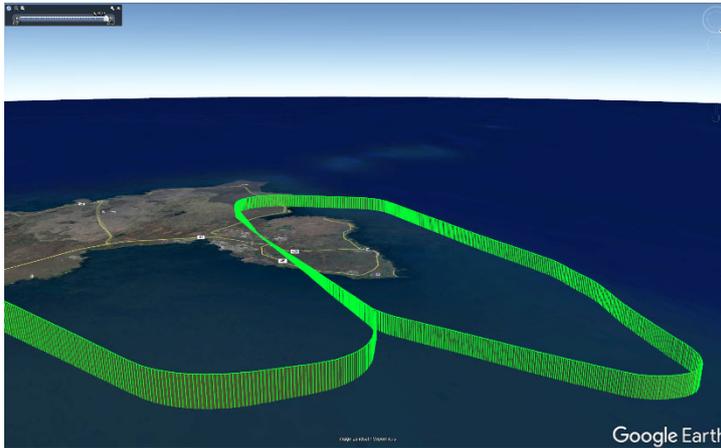
The supervisor and the ATCO then agreed on that the snowplows should continue clearing taxiway Echo towards the north.

Between 17:14 and 17:25, the snowplows continued clearing taxiway Echo to the north and then entered taxiway Kilo and cleared it of snow to the west.

1.7. The second approach

After the go-around, the flight crew of flight 6F108 requested to come in for another approach.

After the go-around, when climbing to 3000 feet the flight crew performed a right traffic pattern and asked for initial clearance to waypoint VALUX. On their heading towards



VALUX, the flight crew then asked to be re-cleared to waypoint NERKO for their second landing attempt to RWY 19 via RNAV-X.

At 17:13, Approach ATC re-cleared flight 6F108 direct to NERKO and for RNAV-X approach to RWY 19.

Figure 12: The track of flight 6F108

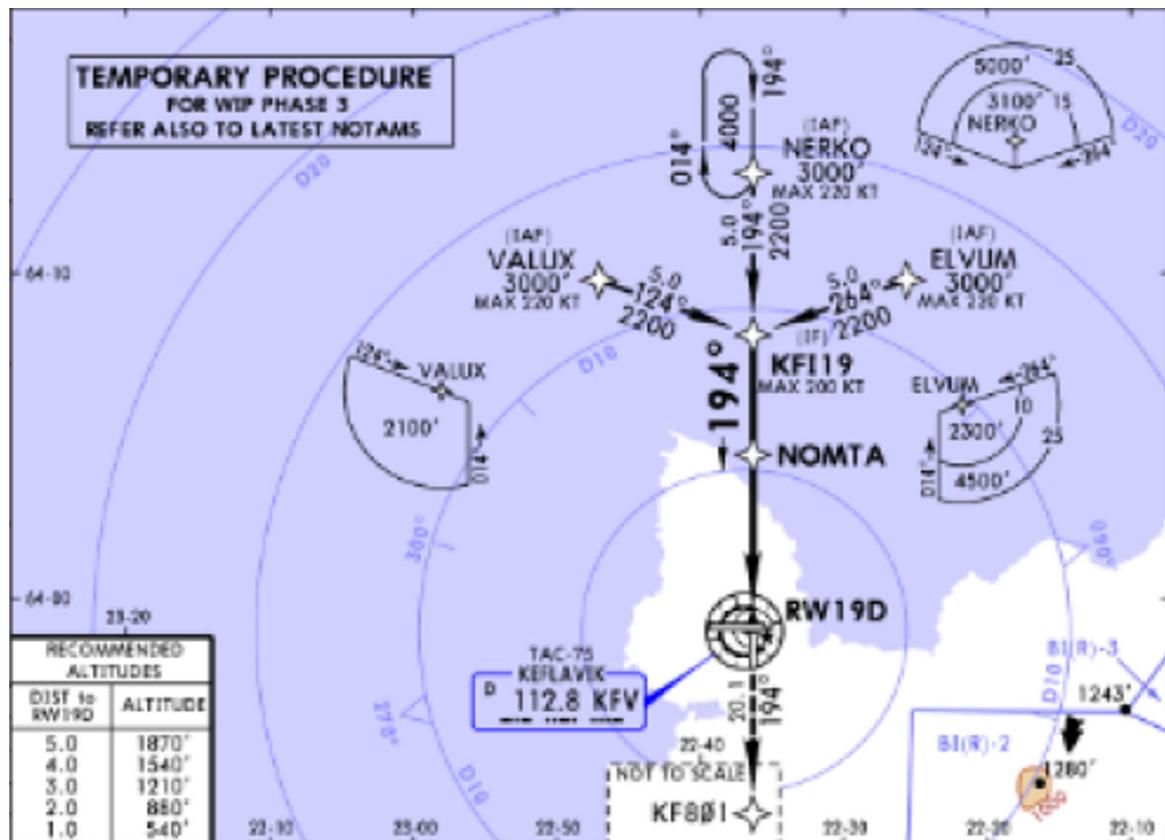


Figure 13: Approach points VALUX and NERKO

At 17:15, the PM verified that the Autobrake system was still set, which it was, but it had been set to Autobrake 3 during the descent phase of the flight.

At 17:17, the flight crew asked Approach for an update on the ceiling and the visibility. ATC provided the following response:

Approach ATC: "Ceiling is 1200 feet [and] visibility 700-900 meters"

Subsequently Approach asked the flight crew to contact the Tower on 118.3 MHz.

About 17:18:30, the aircraft entered the final approach at waypoint NERKO and started descending, following the VNAV profile down to the runway.

At 17:18:33, the Tower gave the flight crew a landing clearance:

Tower ATC: "Jet bird 108 – Wind 260/5 – Cleared to land RWY 19"

The flight crew continued down the final approach, performing the landing checklist and at 17:19:04, the aircraft passed through 2500 feet.

The flight crew was aware of the need to set the go-around altitude, which they had forgotten to do on the first approach. The go-around altitude of 3000 feet was set at 17:19:09.

According to the FDR, the aircraft passed through 1000 feet AGL at 17:20:53 and the PM confirming that the approach was stable.

According to the FDR, the aircraft passed through 500 feet AGL at 17:21:29.

According to the PF, they saw the approach lights at an altitude of approximately 600 feet MSL.

According to the CVR, the aircraft announced MINIMUM at 17:21:35.

According to the CVR, the PF had not seen the runway lights 7 seconds after having passed through the MINIMUM.

According to the CVR, the PM saw the PAPI lights (three red and one white), 13 seconds after the aircraft had passed through the MINIMUM.

According to the FDR, the aircraft passed through 100 feet AGL at 17:21:49.

According to the CVR, the PF confirmed seeing the PAPI lights 15 seconds after having passed through the MINIMUM, or at 17:21:50.

According to the PF, when he saw the runway, he noted that it was completely white and covered with snow.

The Main Landing Gear touchdown was at 17:22:07 and Autobrake 3 engaged at 17:22:08.

According to the PF, the aircraft started drifting sideways on the runway, which was corrected by the PF. The aircraft decelerated normally in the beginning and for the first 3-4 seconds the flight crew was not concerned.

The visibility was limited due to heavy snowing. About five seconds after touchdown the flight crew became aware that their deceleration had reduced and that the braking was insufficient with the end of the runway approaching.

Figure 14 shows the limited visibility during the landing.



Figure 14: Flight 6F108 barely visible after landing on RWY 19

According to the PF, he realized about 300 meters before the end of the runway that they would not be able to stop on the RWY. The aircraft passed the runway end lights, at a Computed Air Speed of 48 knots according to the FDR.

Once passed the end of the runway, the PF became aware that they would not be able to stop before hitting the localizer structure at the end of RWY 01. The PF noticed the soft clearance on the left side of the tarmac and made a quick decision to veer the aircraft left onto the soft gravel. The left Main Landing Gear sank down into the soft gravel, slowing the aircraft faster, until it came to rest with its nose on the left side and just short of the localizer structure.

At 17:23, the following communications took place between the flight crew and ATC:

F/O: Tower, jet bird 108
ATC: Jet bird 108 go ahead
F/O: Yeah, we have slid off the RWY, jet bird 108
ATC: Say again
F/O: We slid off the RWY, jet bird 108
ATC: Roger ok I will call somebody to help you out



Figure 15: The aircraft stopped next to the localizer structure for RWY 01

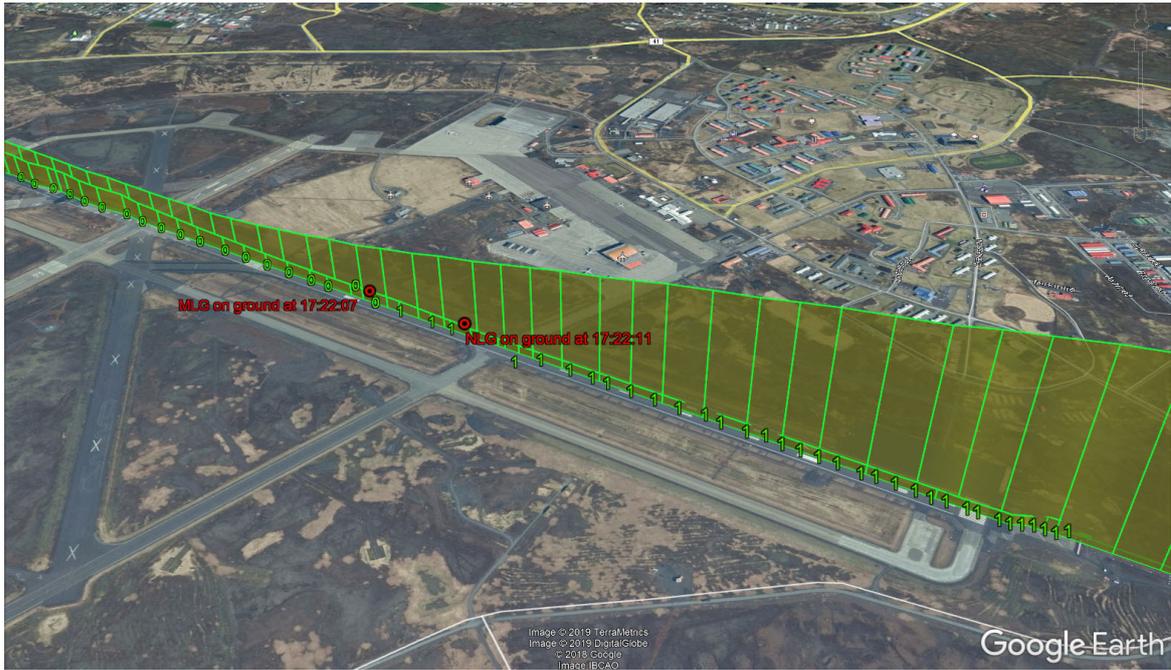


Figure 16: Aircraft profile during landing

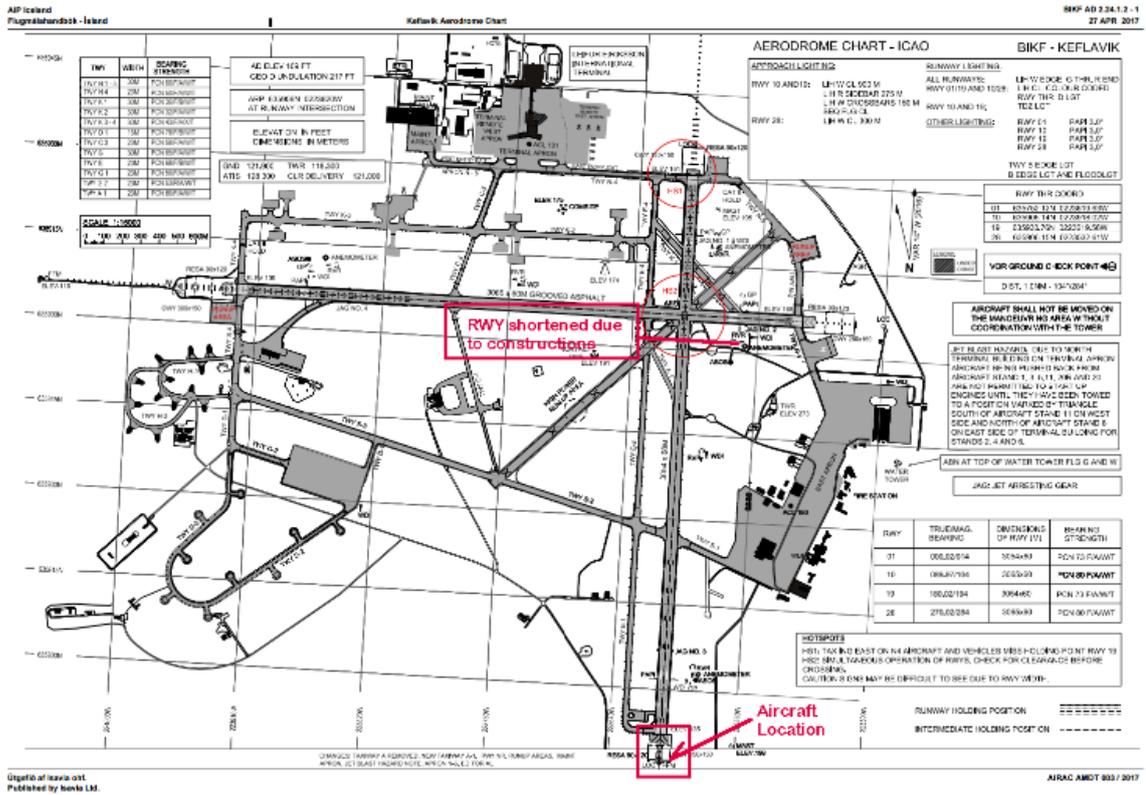


Figure 17: The aircraft stopped next to the localizer structure for RWY 01

2. ANALYSIS

2.1. Flight crew experience

The Commander (PF) had 4700 total flight hours, of which 4100 were on the Boeing 737. The Commander's experience as Commander was only about 400 hours as he had become a Commander only the year before, or in 2016.

According to the Commander, he had never landed on a snow covered (white) runway before.

The First Officer (PM) had 1900 total flight hours, of which 1600 were on the Boeing 737.

2.2. Flight crew rest

According to the flight crew's rosters, the pilots had both flown the same flight routes on Tuesday April 25, 2017 and were off duty at 17:18.

The Commander had been off duty since then, with a rest time of 60 hours and 7 minutes, until he checked in at Keflavik Airport at 05:25 in the morning on Friday April 28, 2017.

The First Officer was off duty on Wednesday April 26, 2017, with a rest time of 35 hours and 42 minutes. On Thursday April 27, 2017, the First Officer was standby for a flight, after which he had 16 hours and 25 minutes of rest until he checked in at Keflavik Airport at 05:25 in the morning on Friday April 28 2017.

According to both pilots, they slept well the night before the flight.

The flight crew checked in at Keflavik Airport at 05:25, before their flight from Keflavik Airport (BIKF) to Alicante Airport (LEAL) in the morning. On their return flight to Keflavik Airport, the aircraft touched down at 17:22 and at that time their flight duty time was already 11 hours and 57 minutes. The maximum time of their flight duty period per OPS 1.100 in regulation 1043/2008 is 13 hours.

2.3. Weather

During the approaches to RWY 19, the ceiling and visibility were close to the approach minimums.

At 17:06:27, the following ATIS information Bravo was issued:

17.04.28 17:06:27
BIKF ATIS BRAVO, 1700 Z.
RWY 19 IN USE. EXP RNAV APCH, RWY 19.
BIKF 281700Z 25006KT 0800 R19/0800U SN VV005 M00/M00 Q0983 A2903 =
TRANSITION LEVEL 80.
CHECK TWR FOR BA. SN REMOVAL OPS INPR. BA RAMP AND TWYS
MEDIUM POOR. AVAILABLE RWY LENGTH, RWY 19 IS 2182 METERS.
THRESHOLD SOUTH OF INTERSECTION. RWY 10/28 CLOSED DUE TO
CONSTRUCTION WORK.
NOVEMBER TWY CLOSED FROM EAST EXIT TO RWY 28 DUE TO
CONSTRUCTION WORK. SIGMET ALPHA 03 VALID UNTIL 1800 UTC.
ADZ ON INITIAL CTC YOU HAVE INFO BRAVO.

The flight crew was not aware of ATIS information Bravo, as the last time they checked the ATIS before landing was at 17:03, three minutes before ATIS Bravo was issued.

Following is the difference between ATIS information Alpha (which the flight crew had) and ATIS information Bravo (which the flight crew did not have):

ATIS ALFA

BIKF 281630Z 30002KT 1200 R19/1300D -SN BKN007 OVC015 00/00 Q0983
A2903=
TRANSITION LEVEL 80.
RWY 19 WET AND CLRED OF SN 50 M WIDE. BA RWY 19 AT TIME 1530 UTC
MEASURED 55 50 50 ON MU METER. BA RAMP AND TWYS MEDIUM POOR.

ATIS BRAVO

BIKF 281700Z 25006KT 0800 R19/0800U SN VV005 M00/M00 Q0983 A2903 =
TRANSITION LEVEL 80.
CHECK TWR FOR BA. SN REMOVAL OPS INPR. BA RAMP AND TWYS
MEDIUM POOR.

The Runway RVR value had therefore dropped from 1300 meters down to 800 meters, preventing the use of the RNAV-X approach for RWY 19, as it required a minimum RVR value of 1300 meters.

In addition, the tower was to be contacted for the braking action (BA).

ATC did not inform the flight crew in their subsequent communications after 17:06, that the flight crew did not have the latest ATIS information.

The ITSB determined that ATIS information Bravo was uploaded late (17:06), or six minutes past the time when it should have been uploaded (17:00). This was 3 minutes after the flight crew checked the ATIS for the last time before landing.

2.4. Fuel

According to the FDR, there were 7334 kg of fuel on board the aircraft when it touched down at 17:22.

The Minimum Diversion Fuel (for the diversion flight to Glasgow) was 6514 kg.

The aircraft therefore had ample fuel for a diversion to Glasgow, if the second approach had been discontinued and the flight diverted.

2.5. RWY 19 in Phase 3 of the Runway Reconstruction Project

When the runway excursion occurred, Phase 3 of the Runway Reconstruction Project was in effect. During Phase 3, RNAV-X was in use for RWY 19. The Landing Distance Available (LDA) for RWY 19 was 2182 meters, with a displaced threshold just south of RWY 10/28.

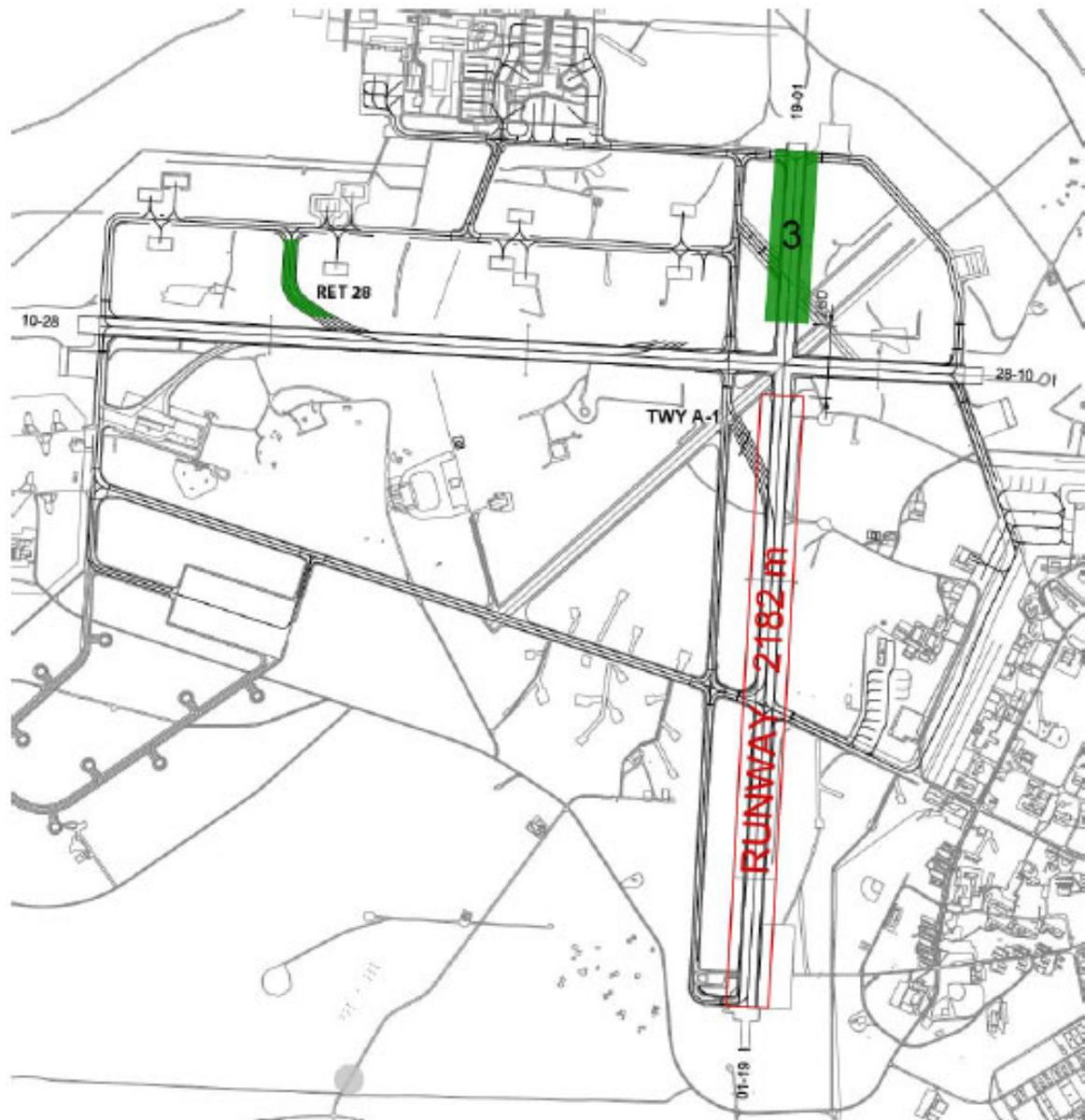


Figure 18: RWY 19 had a displaced threshold and LDA of 2182 meters

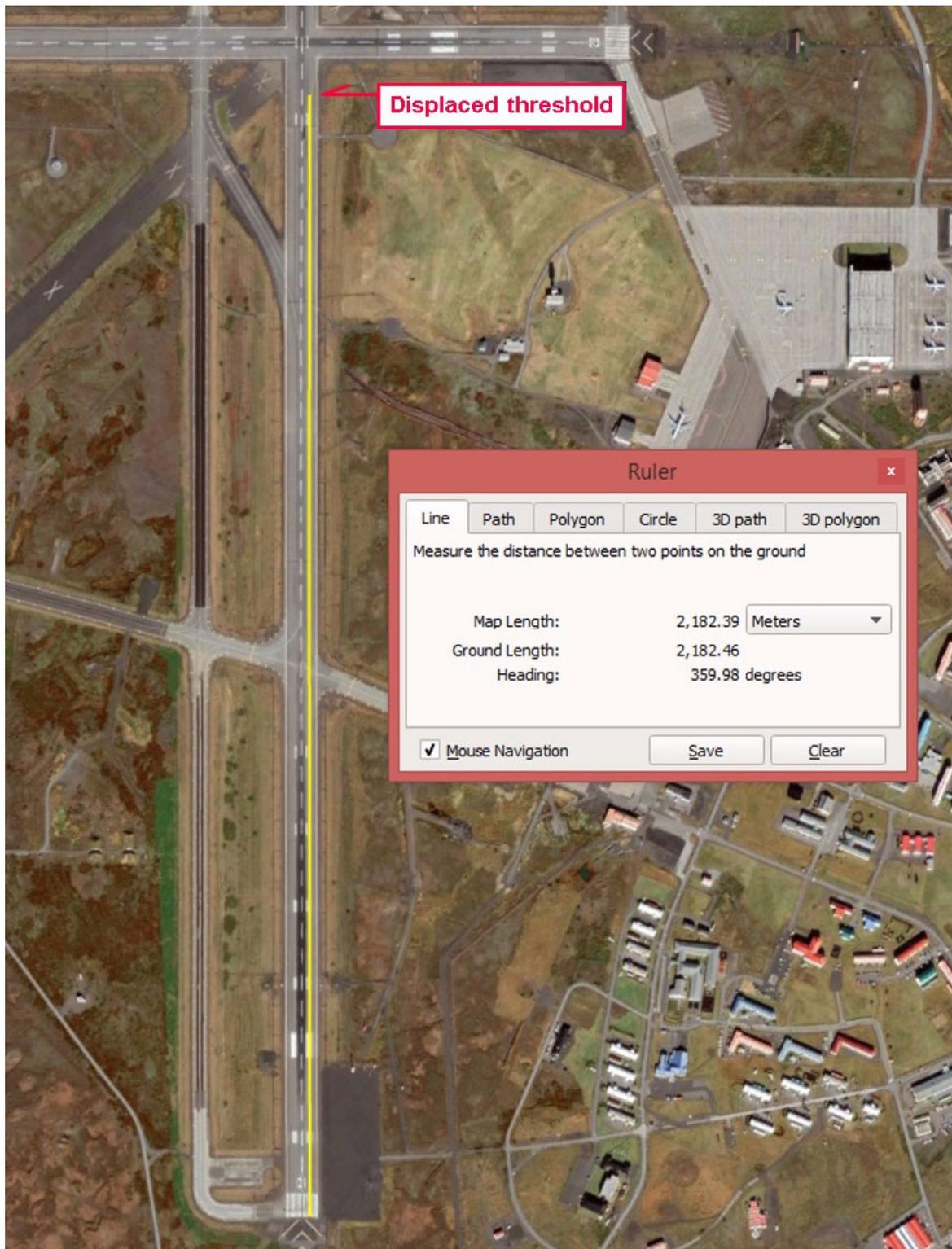


Figure 19: Satellite image (Google Earth) of RWY 19 showing its 2182 meters length

2.6. NOTAMs

According to the Commander, he normally would find few NOTAMs per airport, while on this particular day there were 58 NOTAMs for Keflavik Airport.

Most of these NOTAMs had been issued due to the Runway Reconstruction Project.

The Commander further described that during the preparation for this flight and in general, there is limited time for the briefing before the flight. He also stated that some of the NOTAMs issued for Keflavik Airport required time for in depth study. Some of the NOTAMs had multiple abbreviations, which he had to research to determine their meaning. Furthermore, the Commander stated that many of the NOTAMs were disorganized.

The Commander stated that in a particular NOTAM, he would find partial information regarding a particular runway and then the NOTAM would discuss something else not relating to that particular RWY. Then, somewhere else in the NOTAM list, there would be another NOTAM again with more information on the particular RWY, but that NOTAM then also moved on to something else. This would occur repeatedly throughout the NOTAM list, which made difficult getting a complete picture of the relevant information concerning a particular RWY in the short time available for briefing before the flight.

According to the pilots, data regarding the active runway (RWY 19) had to be picked out of multiple NOTAMs, going back and forth between the 58 active airport NOTAMs. This was confirmed by the ITSB investigation.

This made it hard for the flight crew to build a quick mental picture of the landing conditions on the active runway at the airport. This was largely due to the very extensive and unstructured NOTAMs being issued for the Runway Reconstruction Project of the airport.

The ITSB believes that although Isavia has provided very detailed and thorough information regarding the Runway Reconstruction Project in its list of NOTAMs, it was not done in an effective manner. This caused the NOTAMs to become counterproductive in their tasks of alerting pilots of potential hazards or safety issues.

2.7. The first approach

According to the CVR, at 16:50:25 the following communications took place on the flight deck:

PF: LNAV, make sure it is engaged, put the autopilot back in, arm the autothrottle, make sure go-around 3000 is set

PM: Checked

At 16:51:57, when descending through FL100, the flight crew received clearance down to 5000 feet. At the same time, the flight crew was told to expect RNAV-X approach for RWY 19. This caused additional workload on the flight deck, as the flight crew had expected and already set the aircraft up for RNAV-Z approach.

The flight crew's last flight before the serious incident had been three days earlier (on Tuesday April 25), during which they had flown the same route; Keflavik Airport – Alicante Airport and Alicante Airport – Keflavik Airport.

A day later, on Wednesday April 26, Phase 3 of the Runway Reconstruction Project at Keflavik Airport had begun and the approach for RWY 19 was changed from RNAV-Z to RNAV-X.

The flight crew was not aware of the changed active RNAV approach.

NOTAM A0236/17, issued on April 26, advised that Phase 3 of the Runway Reconstruction Project had started. None of the active NOTAMs, including NOTAM A0236/17, stated which RNAV approach was available for RWY 19.

NOTAM A0236/17 referred to AIP Supplement 004/2017 for additional details and according to that, the available approaches for RWY 19 were:

- RNAV (GNSS) X (for temporary threshold)
- LOC X (for temporary threshold)
- VOR (circling minima only)

The flight crew performed comparison check between the RNAV-Z and RNAV-X approaches and then reconfigured the aircraft for RNAV-X approach to RWY 19.

According to the RNAV-X chart in Figure 6, the minimum Runway Visual Range (RVR) to start the approach was 1300 meters and the Decision Altitude (DA) was 440 feet.

For the first approach, at 16:58 the flight crew listened to the ATIS for Keflavik Airport, which gave a Runway Visual Range (RVR) of 1300 meters for RWY 19, decreasing, light snow and a broken cloud ceiling at 700 feet.

At 17:01, Approach Controller informed the flight crew that the ceiling was at 1100 feet and that the visibility was about 600 to 700 meters. The flight crew discussed that the visibility needed to be 750 meters or above. They decided to continue and get an update later, during the approach.

At 17:03, the ATIS was still the same (issued at from 16:30), providing a RVR of 1300 meters.

The ITSB could not determine how the flight crew decided that the visibility needed to be 750 meters or above. According the RNAV-X chart the Runway Visual Range needed to be 1300 meters or above for the approach. It is possible to convert visibility to RVR using a factor of 1.5 during daylight¹⁴. To obtain the required 1300 meter RVR the visibility would have had to be around 900 meters¹⁵.

Light elements in operation	RVR/CMV = reported meteorological visibility x	
	Day	Night
HI approach and runway lights	1.5	2.0
Any type of light installation other than above	1.0	1.5
No lights	1.0	not applicable

There is also a limitation of using visibility, i.e. it should not be used when Runway Visual Range (RVR) is available¹⁶.

Taking into consideration that the ATCO was providing the flight crew with constant update to the visibility while the ATIS information that the flight crew had was more than half an

¹⁴ EASA AMC10 CAT.OP.MPA.110 Aerodrome Operating Minima, part (c)

¹⁵ 1300 meters (RVR) / 1.5 (factor) = 867 meters = 900 meters of minimum visibility

¹⁶ EASA AMC10 CAT.OP.MPA.110 Aerodrome Operating Minima, part (a)

hour old, the ITSB determined the visibility reported by the ATCO gave a more realistic value than the older RVR value on the ATIS.

At 17:03, the flight crew requested an update on the ceiling and the visibility from Keflavik Airport Tower and was informed by the ATCO that the visibility was approximately 7 or 800 meters from the tower and an overcast at 1100 feet.

The flight crew thought that the updated visibility allowed them to continue the approach.

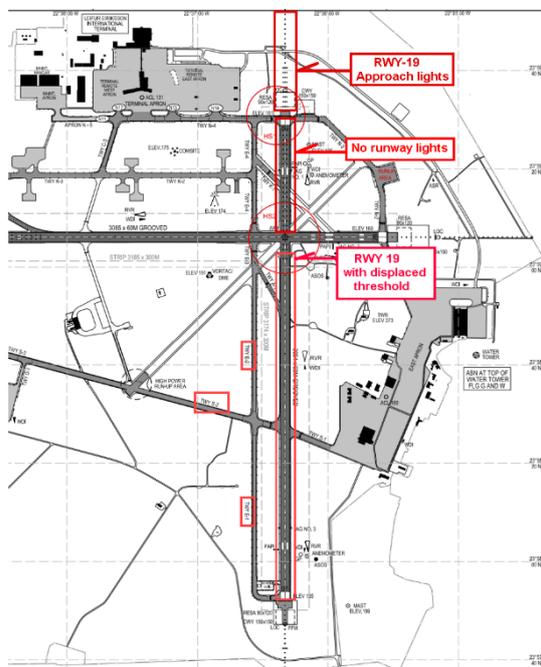
The ITSB determined that a minimum of 900 meters visibility was however required.

The aircraft passed through 1000 feet AGL at 17:06:49 and was determined stabilized.

The aircraft then passed through 500 feet AGL at 17:07:23 and was again determined stabilized.

According to the CVR, the flight crew had the approach lights in sight at 17:07:26, but they had difficulty seeing the runway.

During Phase 3 of the Runway Reconstruction Project, the part of RWY 19 that was north of RWY 10/28 was under reconstruction and no lights were on that portion of the RWY.



Therefore, after the approach lights north of the RWY, there was a long gap with no lights until the displaced threshold of the runway south of RWY 10/28. This resulted in the flight crew losing visual sight of the approach lights, after passing over them, without having the runway yet in sight.

At 17:07:41, the aircraft announced MINIMUM.

At 17:07:41, the aircraft announced MINIMUM.

Figure 20: Gap in RWY 19 lights between the approach lights and the displaced threshold

According to the RNAV-X chart in Figure 6, the Decision Altitude (DA) was 440 feet MSL for LNAV/VNAV approach.

According to the CVR, the PF had still not seen the runway at 17:07:44, despite of having had the approach lights in sight earlier.

Two seconds later, at 17:07:46, the PM saw the PAPI lights, four white. This was 5 seconds after passing through MINIMUM at 17:07:41. The flight crew had however previously seen the runway approach lights at 07:07:26 or 15 seconds before reaching MINIMUM, which allowed the flight crew to continue the approach below the Decision Altitude (DA).

The investigation revealed that the flight crew had not set the 3000 feet missed approach (go-around) altitude, during the approach.

According to the FDR, at 17:07:38 the autopilot disengaged. The PF continued to follow the flight director with the autothrottle engaged. The PF started leveling the aircraft off, after the autopilot disengaged. This resulted in the aircraft being above the glide path onto the runway and the PAPI lights being all white when they came into sight.

According to the FDR, this was followed by a go-around when the TO_GA was engaged at 17:07 56. Then, at 17:08:20, the autopilot was re-engaged.

2.8. Clearing of snow from the runway

The last reported braking action (BA) coefficient of 40 was measured after the snowplows had cleared the runway between 16:55 and 17:06. This was just prior to the first landing attempt of flight 6F108. The ITSB determined the snow removal prior to the first approach was per the procedures.

Then, as it continued snowing, the braking action most likely deteriorated quickly.

At 17:09:35, the Keflavik tower ATCO advised the snow removal supervisor that one aircraft [flight FI454] would be taking off and then the snowplows could proceed south down taxiway Echo. The snow removal supervisor replied that they could also go down the centerline [of the RWY], if the ATCO preferred that, which the ATCO approved.

At 17:10:51, the Keflavik tower ATCO provided the snow removal supervisor with approval to enter RWY 19 behind the aircraft [flight FI454] which was taking off on RWY 19, with the instructions to notify once they had vacated the RWY at taxiway Echo.

At 17:14:42 the snow removal supervisor contacted the Keflavik tower ATCO to inform that the snowplows had vacated the RWY and were on taxiway Echo heading south [taxiway Echo-1].

The investigation determined that the snow removal supervisor did not inform the tower at which taxiway [Sierra-2] they vacated RWY 19.

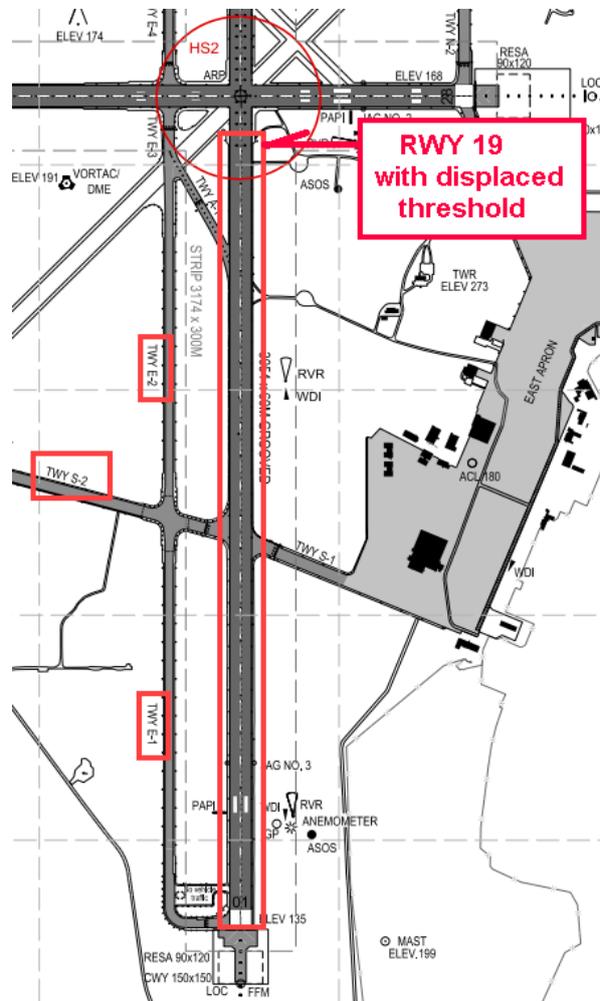


Figure 21: RWY 19 and its taxiways

After the first landing attempt, the five snowplows only managed to clear 25 meter width around the centerline of about 1070 meter length of the runway 19 from the runway threshold to taxiway Sierra-2, before vacating the runway at taxiway S-2 at 17:14.

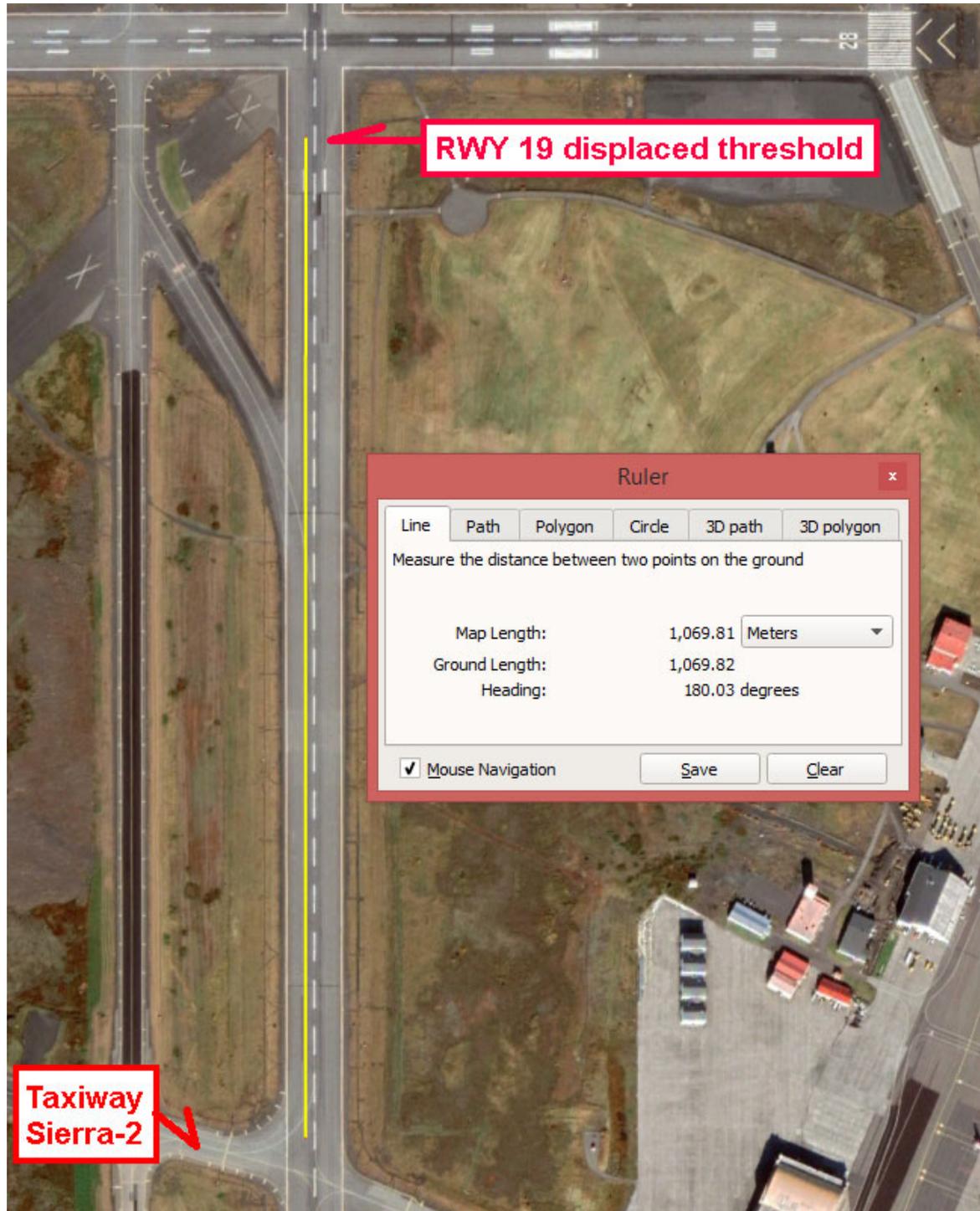


Figure 22: Partial runway clearing between threshold and Sierra-2 (Google Earth)

According to Keflavik Airport Operation, the snow removal supervisor thought the Keflavik tower ATCO had instructed him to vacate the runway at taxiway Sierra.

The ITSB determined that there were no communications from the ATCO requiring the snowplows to vacate at taxiway Sierra.

The ATCO had presumed the snowplows would clear one way around the centerline of RWY 19 all the way down to the end of the runway and then vacate at the end and continue clearing taxiway Echo to the north.

At 17:14:49, the ATCO confirmed that the snowplows were off the RWY and inquired if the supervisor meant that they were heading north on Echo. The snow removal supervisor advised that they would turn around. The snowplows then turned around on taxiway Echo, just south of taxiway Sierra-2, and then continued clearing taxiway Echo to the north. Then, the snowplows cleared taxiway Kilo, towards the terminal.

According to the Isavia procedures for snow removal¹⁷ at Keflavik Airport, the first order of priority for snow removal is the runway in use and its high-speed taxi exit. These shall be worked on continuously until a braking action over 38 is achieved on the 45 meter wide cleared runway width, along with full width of the high-speed taxi exit.

Only after the first priority is done, shall the second highest priority task be worked on, which includes the taxiway from the runway in use and the aprons at the terminal.

It had been snowing extensively and snow had accumulated on the runway, contaminating it very quickly. This made it particularly difficult to maintain the braking action (BA) over 40, or as GOOD.

The ITSB therefore determined that the snow removal procedure was not adhered to when the snowplows vacated the runway at taxiway Sierra-2 to start snow removal at taxiway Echo, after having only cleared 25 meter wide runway around the centerline of the first 1070 meters of the 2182 meter long runway.

At the time between the first and second approach of flight 6F108, the ITSB determined that there was a clear need for a complete snow removal of RWY 19, followed by a new braking action measurement due to the extensive snowing. There were seven snowplows available at Keflavik Airport on the day of the runway excursion. Five snowplows were required to clear 25 width of the runway. Therefore, with the equipment available, two runs

¹⁷ VR710 19-5

were required to clear the required runway width of 45 meters, at the time of the runway excursion.

The ITSB determined that it was the snow removal supervisor, which was in the best strategic position to determine the conditions of the runway and the need for additional snow removal before another aircraft movement on the runway. In practice, it was also the job of the snow removal supervisor to inform the Keflavik tower ATCO if the runway conditions were falling below the minimum braking action of 38 and to request permission to enter the runway to clear the runway.

The ITSB determined that the communication between the snow removal supervisor and the Keflavik tower ATCO was lacking discussion of the runway conditions between the first and second approach of flight 6F108.

The ITSB determined that the flight crew of flight 6F108, which had executed a go-around, could have requested updated braking action prior to the second approach.

The ITSB determined that the Keflavik tower ATCO could also have been more proactive in providing the flight crew of flight 6F108 with an update of the runway conditions.

The lack in discussion of the runway conditions between the snow removal supervisor and the ATCO partly explains this, i.e. the ATCO did not have updated information of the runway conditions himself.

The ITSB determined that another contributing factor to why the Keflavik tower ATCO was not being proactive in providing the flight crew of flight 6F108 with an update of the runway conditions, was because the ATCO was quite busy at the time. Review of the workload in the tower, revealed that the Keflavik tower ATCO was also controlling Keflavik Airport ground movements at the time prior to and around the serious incident. This would normally would have been done by the Ground ATCO.

The ITSB therefore reviewed the position log of BIKF tower ATC personnel, to determine if there was a lack of ATC personnel.

There were four certified Air Traffic Controllers on duty when flight 6F108 performed the two approaches as well as when the runway excursion occurred.

Tower controller (TWR):

- On duty between 10:00 and 22:00
- In position between 16:40 and 19:30
- Certified since June 2014

Ground Controller (Ground):

- On duty between 10:00 and 22:00
- In position between 15:55 and 20:10 per worksheet
- Certified since October 1989

Data Controller (Data):

- On duty between 15:00 and 24:00
- In position between 16:50 and 20:10, supplemented from 17:24 by 2nd controller
- Certified since October 2016

Due to the incident, the controllers remained in their positions for an unusually long time.

The fourth Controller (certified since November 2011) was resting, after having turned over the Tower Controller position at 16:40, but then supplemented the Data Controller after the runway excursion from 17:24.

The ITSB determined that all the necessary ATC positions were filled at the time of the two approaches, per the BIKF tower position log.

The investigation revealed that prior to the serious incident the same ATCO was taking care of the tower, ground and snowplows communications, while there were four Air Traffic Controllers on duty.

2.9. The second approach

During the second approach, at 17:17, the flight crew requested an update of the ceiling and the visibility. Approach Control informed about a ceiling of 1200 feet and visibility of 700-900 meters.

According to the RNAV-X chart in Figure 6, the Decision Altitude (DA) was 440 feet for LNAV/VNAV approach and the required runway visual range (RVR) was 1300 meters, or a minimum visibility of just under 900 meters.

The flight crew did not inquire about, nor did ATC offer, any information regarding the runway conditions during the second approach.

Go-around altitude of 3000 feet was set 17:19:09.

According to the FDR, the aircraft passed through 1000 feet AGL at 17:20:53 and according to the CVR it was determined stabilized.

According to the FDR, the aircraft passed through 500 feet AGL at 17:21:29.

There was no stabilized callout by the PM on the CVR, when passing through 500 feet AGL.

According to the PF, they had the approach lights in sight at an altitude of approximately 600 feet MSL.

According to the FDR, the autopilot disengaged at 17:21:30.

At 17:21:34 the PM advised the PF to keep 700 feet/min descent rate.

At 17:21:35, the aircraft announced MINIMUM and 8 seconds later, or at 17:21:43, the aircraft announced SINK RATE - SINK RATE.

At 17:21:45, the PF inquired the PM if he saw the profile.

At 17:21:48, the PM asked the PF if he saw the PAPI lights and stated that there were three red and one white. PF confirmed this with a positive answer at 17:21:50.

According to the CVR, the PF confirmed seeing the PAPI lights 15 seconds after having passed through the Decision Altitude (DA). The flight crew had however previously seen the runway approach lights at approximately 600 feet MSL.

According to the FDR, the aircraft passed through 100 feet AGL at 17:21:49.

According to the FDR:

- The aircraft passed through 50 feet AGL at 17:21:57
- The aircraft passed through 40 feet AGL at 17:21:58
- The aircraft passed through 30 feet AGL at 17:21:59
- The aircraft passed through 20 feet AGL at 17:22:01
- The aircraft passed through 10 feet AGL at 17:22:03
- The Main Landing Gear touchdown was at 17:22:07

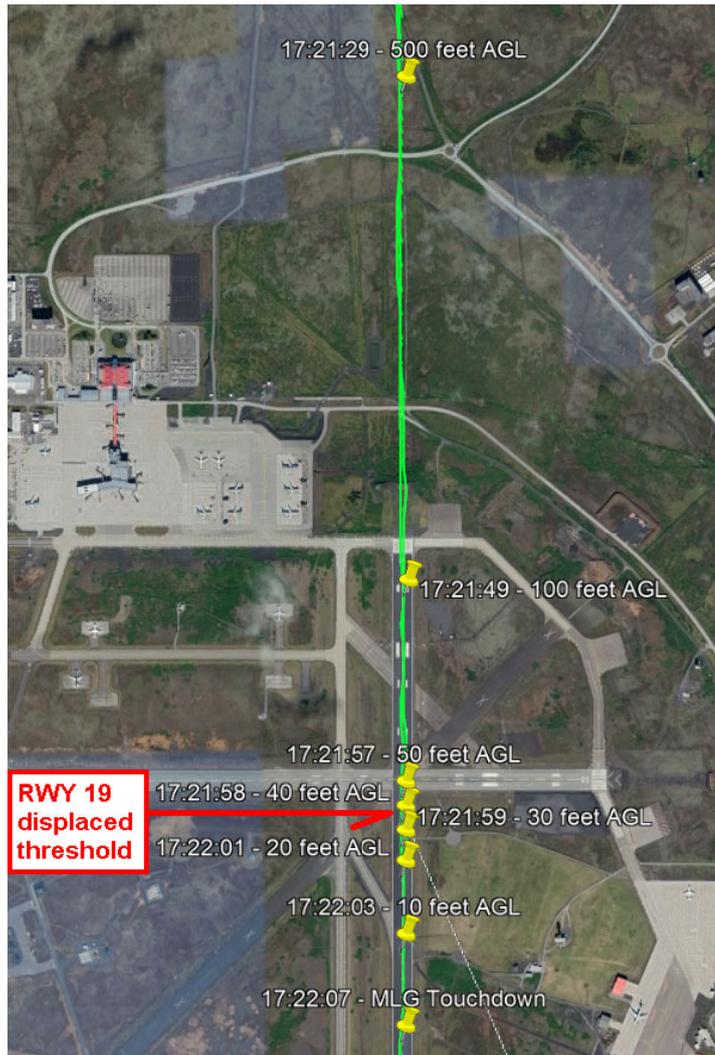


Figure 23: The Final approach (Google Earth+FDR data)

According to the landing performance calculations, the airspeed during the landing ($V_{ref30+5}$) was supposed to be 152 knots.

The ITSB therefore reviewed the airspeed and the vertical speed during the landing, from 500 feet AGL at 17:21:29 and until touchdown at 17:22:07. The airspeed during the landing

was within +/- 10 knots for the selected landing speed of 152 knots, as can be seen in Figure 24.

The descent rate fluctuated during the landing, explaining both the SINK RATE at 17:21:43 and the float in the last few seconds prior to landing, as can be seen in Figure 25.

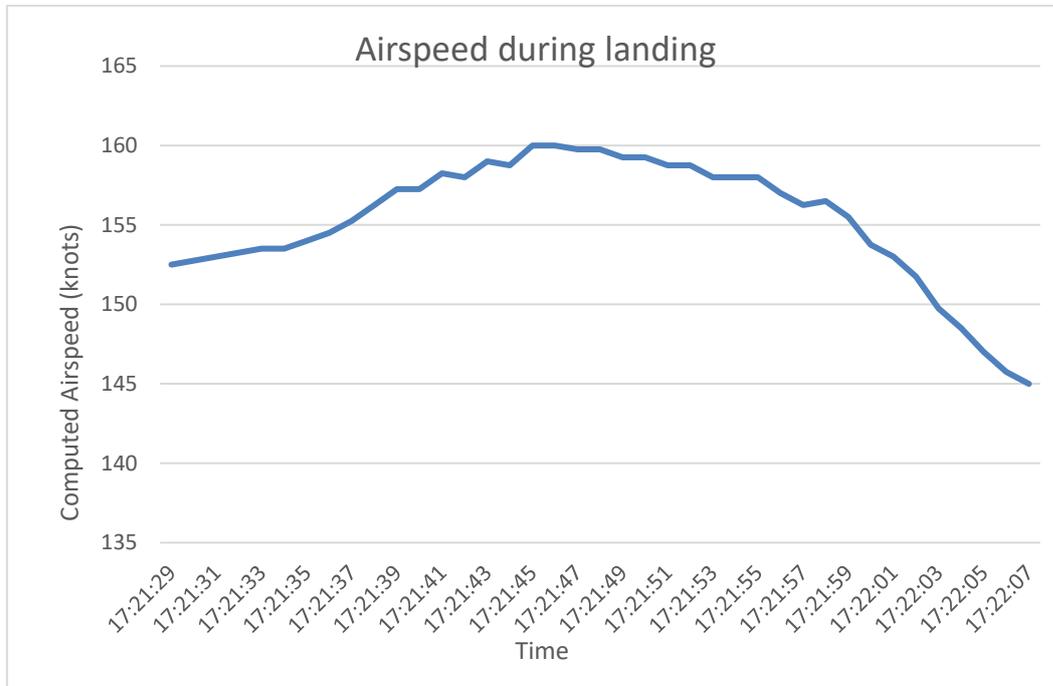


Figure 24: Flight 6F108 - Airspeed during the landing

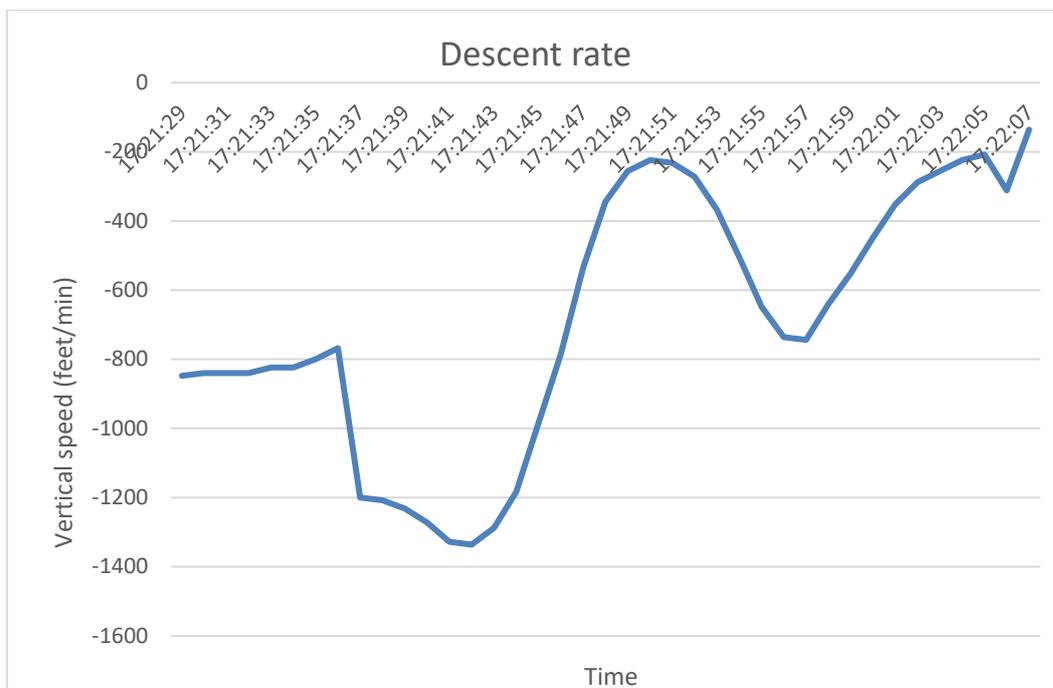


Figure 25: Flight 6F108 – Vertical speed during the landing

2.10. Landing

According to the landing performance calculations, the landing distance using Max Manual braking was 1692 meters, 1799 meters for Max Auto braking and 2168 for Autobrake 3. These calculations were based on uncontaminated runway.

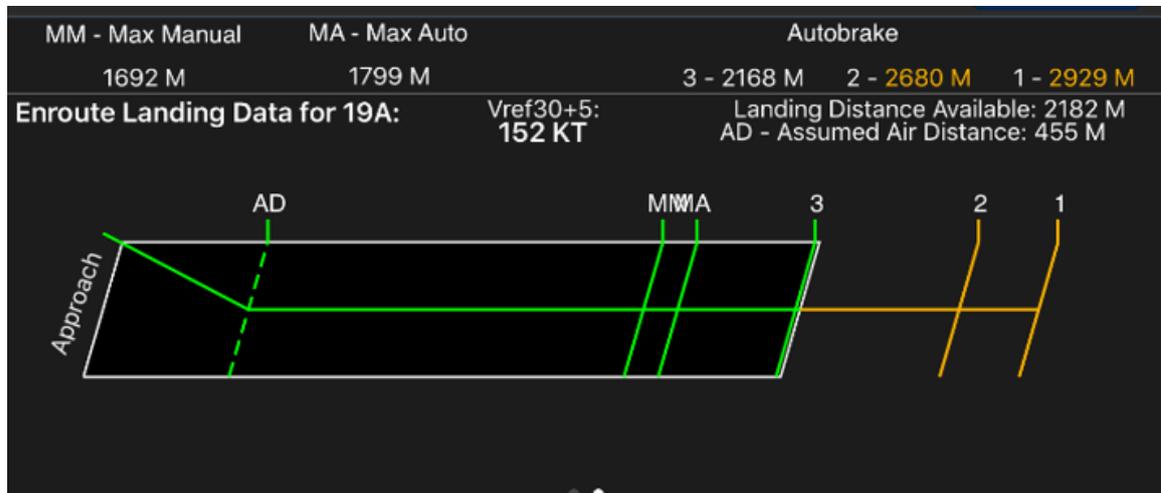


Figure 26: Landing distances required¹⁸ according to the performance calculations

According to the flight crew, as the required runway length for autobrake 3 (2168 meters) was very close to the published Landing Distance Available (2182 meters), the PF then intended to change over to Max Manual braking during the landing. This would reduce the required landing distance to a value in between the Max Manual braking (1692 meters) and Autobrake 3 (2168 meters).

According to the PF, he initially set the aircraft up for Autobrake 3, as the automatic braking system is much quicker to start braking after touchdown than the pilot.

According to the PF, when he finally saw the runway, he noted that the runway was completely white and covered with snow. The ITSB determined that the fact that the runway was completely covered in snow, along with the fact that it was snowing during the approach and landing, explains why the flight crew had such difficulties seeing the runway.

This, along with the fact that the temperature was 0°C, for an experienced pilot landing on snow covered runways, should have been an indication that the landing performance

¹⁸ According to chapter 10.3.5.1.3 of the flight operator's Electronic Flight Bag, the performance calculations use the actual settings with a factor of 1.15

calculations, which were based on uncontaminated runway, were not valid for the a runway covered in snow.

The investigation revealed that the Commander (PF) did not have experience landing on snow covered runways.

The FDR data revealed that the aircraft was down to 50 feet AGL just after having crossed RWY 10/28, about 50 meters prior to reaching the displaced threshold.

The investigation also revealed that the Actual Air Distance travelled, between 50 feet AGL and Main Landing Gear touchdown, was 765 meters.

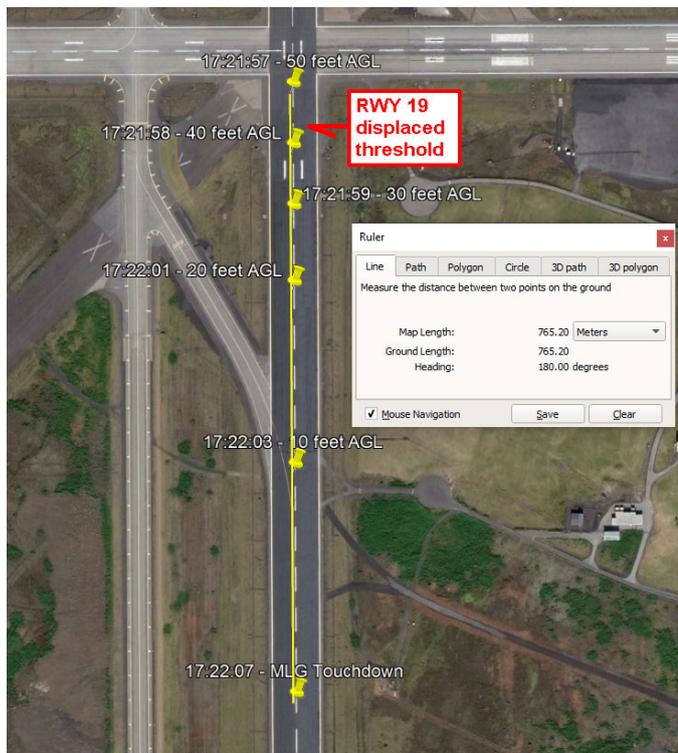


Figure 27: Actual Air Distance (50 ft to touchdown)

The Assumed Air Distance (AD) from 50 feet AGL (above threshold) and until touchdown was 455 meters according to the landing performance calculations (see Figure 7 and Figure 26), or 310 meters¹⁹ less than the Actual Air Distance.

The ITSB determined that there was a very slow descent rate during the last 20 feet AGL until touchdown, due to float.

According to the FDR, the aircraft touched down on its main landing gear at 17:22:07.

Of the 2182 meters long runway, when the main landing gear touched down, 765 meters of the runway were already behind the aircraft and only 1417 meters of runway length remained for the landing roll.

According to the FDR, Autobrake 3 engaged at 17:22:08, or one second after Main Landing Gear touchdown.

¹⁹ Actual Air Distance – Assumed Air Distance = 765 meters – 455 meters = 310 meters

The float had therefore reduced the available runway after touchdown by 310 meters, from the expected per the landing distance calculations.

It was snowing extensively during the landing of flight 6F108. The ITSB therefore suspects that the depth perception of the PF was most likely degraded due to illusion during the landing, which may have contributed to the extended float.

According to the landing performance calculations (which assumed uncontaminated runway), the following length of runway would be required for the landing roll after touchdown:

- $1692 - 455 = 1237$ meters for MM – Max Manual braking
- $1799 - 455 = 1344$ meters for MA – Max Auto braking
- $2168 - 455 = 1713$ meters for Autobrake 3
- $2680 - 455 = 2225$ meters for Autobrake 2
- $2929 - 455 = 2474$ meters for Autobrake 1

At the actual touchdown point, 1417 meters remained of the runway.

Therefore based on the actual touchdown point, assuming the GOOD²⁰ braking condition used in the landing performance calculation as well as uncontaminated runway, this should have allowed the airplane to stop on the runway if either Max Manual braking (MM) or Max Auto braking (MA) were used.

The runway was however contaminated, covered in snow, and the landing performance calculations used were therefore not valid.

Autobrake 3 activated at 17:22:08. The thrust reversers deployed at idle reverse.

According to the PF, the aircraft decelerated normally in the beginning and for the first three to four seconds the flight crew did not have too much concern.

Then, at 17:22:15, the PF applied Max Manual braking (MM) and deployed maximum thrust reversers.

²⁰ Measured braking coefficient of 40 Mu-meter = GOOD

At that time, the aircraft had already travelled 555 meters down the runway from the Main Landing Gear touchdown point.

The aircraft had passed the Sierra-2 exit at 17:22:15, when the Max Manual brakes were engaged, and there the aircraft was in the runway area that had not been cleared of snow since prior to the first landing attempt of the aircraft.

The aircraft exited the end of the runway at 17:22:37.

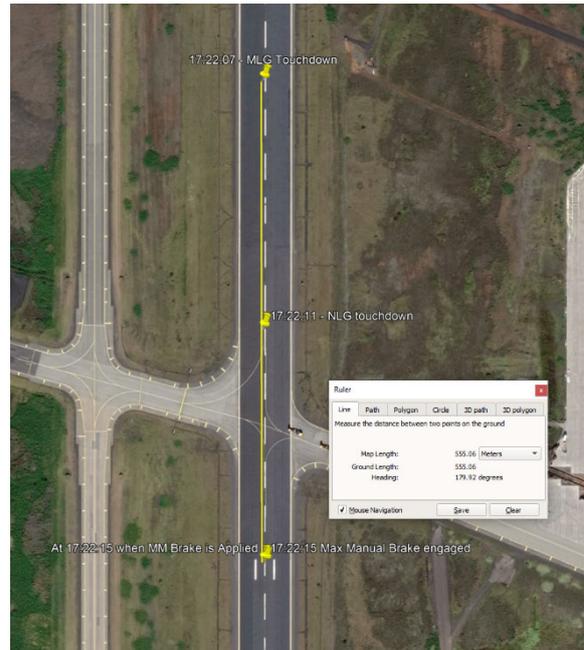


Figure 28: 555 meters from touchdown to MM

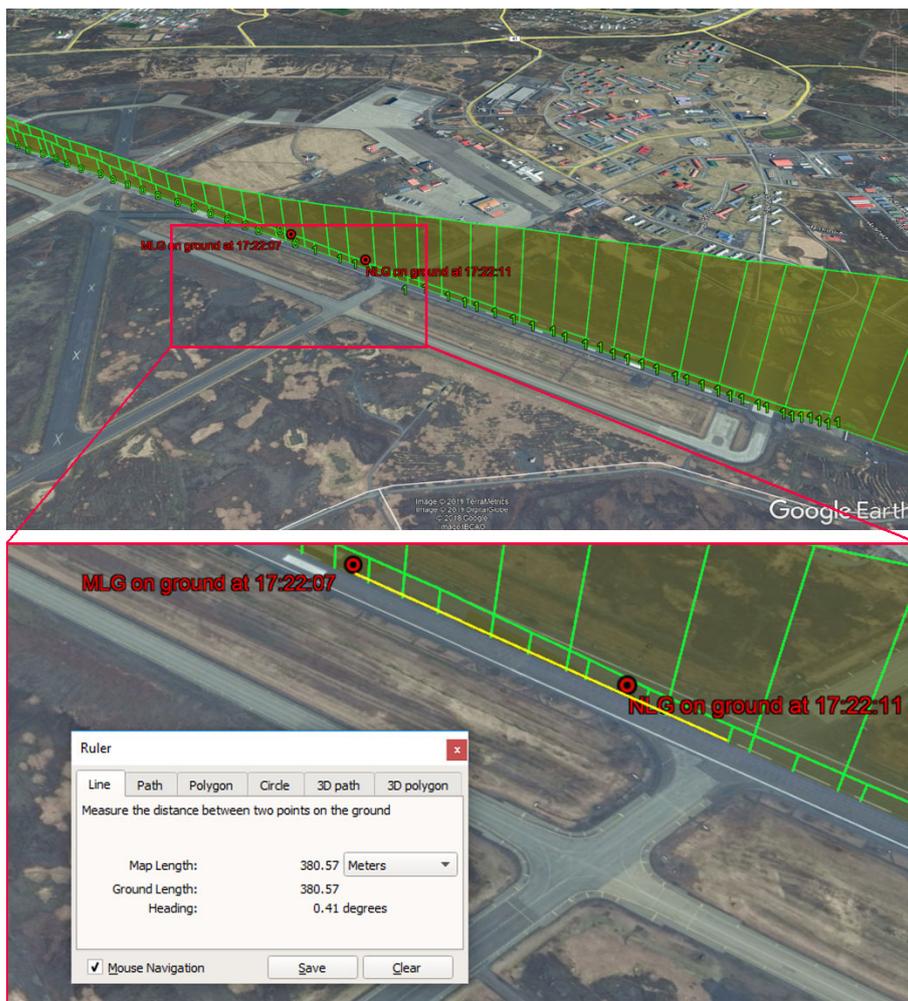


Figure 29: About 380 meters from MLG touchdown to S-2 exit

2.11. Safety Actions already taken

Now, in the year 2021, there are eleven snowplows available at Keflavik Airport. So, it is possible to clear the 45 meter wide runway in one run.

The need of snow clearance, or other actions to maintain runway surface condition, is determined based on:

- Runway condition forecast
- Surface temperature
- Air temperature
- Precipitation
- Water film
- Relative humidity
- Cloud cover

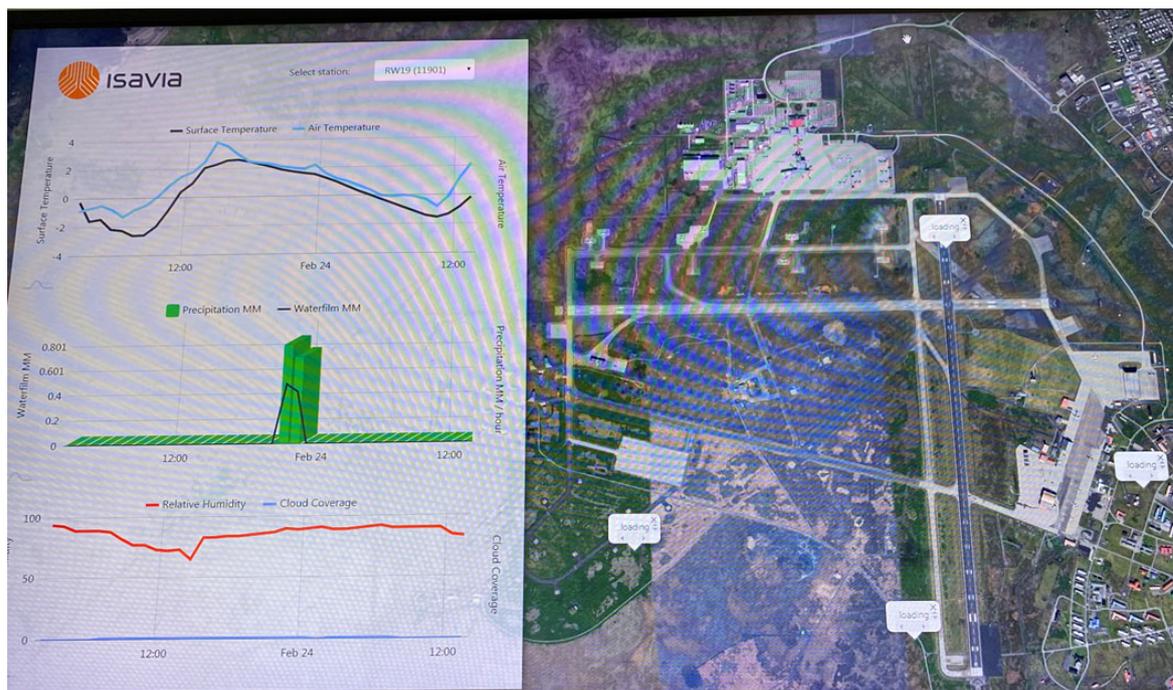


Figure 30: In the year 2021, runway condition forecast has been implemented on BIKF

3. CONCLUSION

The causes of the runway excursion were:

- 1) Deviation from snow removal procedures
- 2) The runway conditions had degraded since the last braking action measurement
- 3) The runway not being fully cleared of snow
- 4) The landing performance calculations not being valid for the actual runway condition
- 5) The aircraft float during the last 20 feet AGL down to the runway, resulting in the aircraft touchdown being further down the runway than planned

Contributing factors were:

- 1) New braking action had not been measured

4. SAFETY RECOMMENDATIONS

The ITSB issues the following safety recommendation to Isavia:

17-042F012 T01

The ITSB recommends that Isavia considers implementing a formal procedure between snow removal supervisors and the ATCOs.

The ITSB issues the following safety recommendation to Isavia ANS:

17-042F012 T02

The ITSB recommends that Isavia ANS reconsider the construction of NOTAMs and list of NOTAMs, with the aim of grouping relevant NOTAM information together to simplify the task of pilots.

The ITSB identified points of interests in the operation of the flight operator, which has ceased operation, resulting in the ITSB not issuing safety recommendations:

- Landing in adverse weather conditions versus the decision to divert
- Training regarding landing performance and brake margins
- Training in Visibility versus Runway Visual Range (RVR)
- Request for updated braking measurements



The following board members approved the report:

- Geirprúður Alfreðsdóttir, chairman
- Bryndís Lára Torfadóttir, board member
- Gestur Gunnarsson, board member
- Hörður Arilíusson, deputy board member
- Tómas Davíð Þorsteinsson, deputy board member

Reykjavík, 27. May 2021

On behalf of the Icelandic Transportation Safety Board

Ragnar Guðmundsson
Investigator-In-Charge

5. APPENDIX I – AERODROME OPERATING MINIMA

AMC10 CAT.OP.MPA.110 Aerodrome operating minima

CONVERSION OF REPORTED METEOROLOGICAL VISIBILITY TO RVR

- (a) A conversion from meteorological visibility to RVR/CMV should not be used:
- (1) when reported RVR is available;
 - (2) for calculating take-off minima; and
 - (3) for any RVR minima less than 800 m.
- (b) If the RVR is reported as being above the maximum value assessed by the aerodrome operator, e.g. 'RVR more than 1 500 m', it should not be considered as a reported value for (a)(1).
- (c) When converting meteorological visibility to RVR in circumstances other than those in (a), the conversion factors specified in Table 8 should be used.

Table 8

Conversion of reported meteorological visibility to RVR/CMV

Light elements in operation	RVR/CMV = reported meteorological visibility x	
	Day	Night
HI approach and runway lights	1.5	2.0
Any type of light installation other than above	1.0	1.5
No lights	1.0	not applicable

6. APPENDIX II – ACTIVE NOTAMS FOR BIKF

DEPARTURE/ARRIVAL AIRPORT : KEFLAVIK (KEF) / BIKF

A0249/17 - Instrument and Microwave Landing system

0900 28/04/2017 2359 28/07/2017

RWY 28. ILS IKW 108.5 MHZ INOP REF: AIP ICELAND BIKF AD 2.19

A0248/17 - Instrument and Microwave Landing system

0900 28/04/2017 0800 01/06/2017

RWY 10 ILS CAT II IS AN AVAILABLE UPON REQUEST IN LOW VISIBILITY.

A0247/17 - Instrument and Microwave Landing system

0900 28/04/2017 0800 01/06/2017

RWY 10. ILS IKF 109.5 MHZ INOP REF: AIP ICELAND BIKF AD 2.19

A0245/17 - Instrument and Microwave Landing system

1129 27/04/2017 0800 01/06/2017

RWY 19. GP 335.0 MHZ INOP REF: AIP BIKF AD 2.19

A0244/17 - Instrument and Microwave Landing system

0900 28/04/2017 0800 01/06/2017

DME 'IKO' 110.3 MHZ INOP REF: AIP ICELAND BIKF AD 2.19

A0243/17 - Instrument and Microwave Landing system

1121 27/04/2017 0800 01/06/2017

Page 30

IKN ILS 111.3 MHZ RWY 01 INOP DUE TO CONSTRUCTION WORK. REF: AIP BIKF AD 2.19

S0730/17 - Movement and Landing Area 0445 27/04/2017 0445 28/04/2017

C) 01 F) NIL/NIL/NIL H) 5/5/5 N) NIL B) 04270440 C) 10 F) NIL/NIL/NIL H) 5/5/5 N) NIL R) NIL

A0242/17 - Movement and Landing Area 0000 28/04/2017 2359 05/05/2017

REF: AIP ICELAND SUP 004/2017 AND BIKF AD 2.24.1.2-1. DUE TO CONSTRUCTION WORK, TWY N-4 IS CLOSED BETWEEN EAST ENTRY ON TERMINAL APRON AND TWY E-4.

A0241/17 - Movement and Landing Area 0000 27/04/2017 2359 05/05/2017

REF: AIP ICELAND SUP 004/2017 AND BIKF AD 2.24.1.2-1. DUE TO RECONSTRUCTION WORK TWY A-1 IS CLOSED.

A0236/17 - Facility and Service 0000 28/04/2017 2359 01/05/2017

RWY RECONSTRUCTION WORK PHASE 3 ACTIVATED RWY 01/19 TORA (M) 2182, LDA (M) 2182 REF: AIP ICELAND SUP 004/2017

A0233/17 - Movement and Landing Area 0900 28/04/2017 2359 01/05/2017

RUNWAY 10/28 CLOSED DUE TO CONSTRUCTION WORK. REF AIP ICELAND SUP 004/2017 AND BIKF AD 2.14

A0232/17 - Air Traffic Procedure 1737 26/04/2017 2359 31/05/2017

REF AIP ICELAND BIKF AD 2.24.10.5-29/30 RNAV (GNSS) R RWY 28 EFF 27 APR 2017 IS NOT IN USE

A0231/17 - Air Traffic Procedure 1734 26/04/2017 2359 08/05/2017

REF AIP ICELAND BIKF AD 2.24.10.5-25/26 RNAV(GNSS) T RWY 28 EFF 27 APR 2017 IS NOT IN USE

A0230/17 - Air Traffic Procedure 0000 27/04/2017 2359 02/05/2017

REF AIP ICELAND BIKF AD BIKF AD 2.24.10.5-27/28 RNAV(GNSS) S RWY 28 EFF 27 APR 2017 IS NOT IN USE.

Z1129/17 - Facility and Service 0001 28/04/2017 PERM

(JEPPESEN TERMINAL CHART CHANGE NOTICE) ADDITIONAL APPROACH FREQUENCY ESTABLISHED. KEFLAVIK APPROACH 119.150.

A0228/17 - Air Traffic Procedure 0000 27/04/2017 2359 02/05/2017

REF: BIKF 2.24.10.7-1 NDB RWY 10 EFF 27 APR 2017

DUE TO TEMPORARY OBSTRUCTION

CHANGE CAT A NDB-DME OCA(H) 370 (261) TO READ 480 (371)

CHANGE CAT B NDB-DME OCA(H) 370 (261) TO READ 510 (401)

CHANGE CAT C NDB-DME OCA(H) 380 (271) TO READ 530 (421)

CHANGE CAT D NDB-DME OCA(H) 400 (291) TO READ 550 (441) .

A0226/17 - Air Traffic Procedure 1047 25/04/2017 2359 02/05/2017

REF AIP ICELAND BIKF AD BIKF AD 2.24.10.5-15/16 RNAV(GNSS) T RWY 19 EFF 30 MAR 2017 IS NOT IN USE.

A0220/17 - Air Traffic Procedure 0000 27/04/2017 2359 02/05/2017

REF: BIKF 2.24.10.6-8 VOR RWY 10 EFF 27 APR 2017

DUE TO TEMPORARY OBSTRUCTION

CHANGE CAT A VOR-DME OCA(H) 360 (251) TO READ 460 (351)
CHANGE CAT B VOR-DME OCA(H) 360 (251) TO READ 490 (381)
CHANGE CAT C VOR-DME OCA(H) 360 (251) TO READ 510 (401)
CHANGE CAT D VOR-DME OCA(H) 380 (271) TO READ 530 (421) .

A0218/17 - Air Traffic Procedure 0000 27/04/2017 2359 02/05/2017

REF: BIKF 2.24.10.5-9 RNAV(GNSS) RWY 10 EFF 27 APR 2017

DUE TO TEMPORARY OBSTRUCTION

CHANGE CAT A LNAV/VNAV OCA(H) 320 (211) TO READ 440 (331)
CHANGE CAT B LNAV/VNAV OCA(H) 330 (221) TO READ 450 (341)
CHANGE CAT C LNAV/VNAV OCA(H) 350 (241) TO READ 470 (361)
CHANGE CAT D LNAV/VNAV OCA(H) 380 (271) TO READ 490 (381)
CHANGE CAT A LNAV OCA(H) 410 (301) TO READ 540 (431)
CHANGE CAT B LNAV OCA(H) 410 (301) TO READ 560 (451)
CHANGE CAT C LNAV OCA(H) 420 (311) TO READ 590 (481)
CHANGE CAT D LNAV OCA(H) 440 (331) TO READ 610 (501) .

A0216/17 - Movement and Landing Area 0000 28/04/2017 2359 09/05/2017

Page 31

IN AIRAC 003/2017 EFF 27 APR 2017 RWY 11/29 WHERE
CHANGED TO 10/28.

FROM THE 27TH OF APRIL UNTIL THE END OF KEFLAVIK - RUNWAY
RECONSTRUCTION PROJECT (RRP) FOR YEAR 2017, EXPECT
DISCREPANCY BETWEEN PAINTED RUNWAY DESIGNATORS
AND THE INFORMATION PUBLISHED IN AIP ICELAND

BIKF AD EFF 28 APR 2017.

FOR FURTHER INFORMATION SEE:

AIP SUP 004/2017 KEFLAVIK - RUNWAY RECONSTRUCTION
PROJECT (RRP) 2017 EFF 28 APR 2017

A0214/17 - Airspace Organisation 0000 27/04/2017 0000 23/05/2017

CHANGES OF ATS LANGUAGES AT KEFLAVIK AIRPORT
(BIKF) AND WITHIN THE CONTROL ZONE OF BIKF IS DELAYED
UNTIL MAY 23 2017.

ATS LANGUAGES WILL BE BOTH IN ENGLISH AND ICELANDIC
UNTIL MAY 23 2017

REF: AIP ICELAND AIC 003/2017, ENR 2.1 AND BIKF AD 2.17

A0207/17 - Air Traffic Procedure 0000 27/04/2017 2359 24/05/2017

OMNI-DIRECTIONAL DEPARTURES RWY 01/10/19/28 OMNI 3A, OMNI 3B, OMNI 3C AND OMNI
3D NOT AVAILABLE. REF: AIP AD 2.24.7.1-1

A0206/17 - Facility and Service 0000 27/04/2017 2359 21/06/2017

REF: AIP BIKF AD 2.24.1.2-1

RUNUP AREA NORTH OF RWY 28 AND SOUTH OF RWY 10 WILL BE
USED FOR PUSH AND HOLD PROCEDURES.

RUNUP AREA NORTH OF RWY 28 IS LIMITED FOR AIRCRAFT CODE A-D.

RUNUP AREA SOUTH OF RWY 10 IS LIMITED FOR AIRCRAFT CODE A-C.

PUSH AND HOLD WILL BE OFFERED BASED ON CAPACITY AND AVAILABILITY.

Z0213/17 - Facility and Service WIE 2359 26/07/2017

(JEPPESEN TERMINAL CHART CHANGE NOTICE)

(10-2, 10-2B, 10-2D, 10-2F, 10-2H, 10-2K, 10-2M, 10-2P,
10-2A, 10-3C, 10-3D, 10-3F, 10-3H) RNAV SIDS AND RNAV STARS
RWYS 10 AND 28 SUSPENDED UNTIL 26 JUL 17.

A0200/17 - Movement and Landing Area 0000 28/04/2017 2359 01/06/2017

REF: AIP ICELAND SUP 004/2017 AND REF: AIP ICELAND BIKF AD 2.24.1.2-1. DUE TO
RECONSTRUCTION WORK TWY N AT INTERSECTION
WITH RWY 19 IS CLOSED.

A0198/17 - Movement and Landing Area 0000 28/04/2017 2359 01/06/2017

REF: AIP ICELAND SUP 004/2017 AND REF: AIP ICELAND BIKF AD 2.24.1.2-1. DUE TO
RECONSTRUCTION WORK TWY K-1 IS CLOSED.

A0193/17 - Movement and Landing Area 0000 27/04/2017 2359 01/06/2017

DUE TO GLIDESLOPE INTERFERENCE FOR RWY 10, TWY K-4 HOLDING POSITION WILL BE
AT CAT II. REF: AIP BIKF AD 2.24.1.2-1.

Z1095/17 - Facility and Service WIE 2359 21/06/2017

(JEPPESEN TERMINAL CHART CHANGE NOTICE) (10-2A, 10-2E, 10-2J, 10-2N, 10-3B, 10-3G)
RNAV SIDS AND RNAV STARS RWY 19
SUSPENDED UNTIL 21 JUN 17.

A0189/17 - Air Traffic Procedure 0000 27/04/2017 2359 26/07/2017

EFFECTIVE DATE OF RNAV SID FOR RWY 10 POSTPONED. REF AIP BIKF AD 2.24.6.2-1/2,
2.24.6.2-3/4, 2.24.6.2-5/6

A0188/17 - Air Traffic Procedure 0000 27/04/2017 2359 26/07/2017

EFFECTIVE DATE OF RNAV SID FOR RWY 28 POSTPONED. REF AIP BIKF AD 2.24.6.4-1/2,
2.24.6.4-3/4

A0187/17 - Air Traffic Procedure 0000 27/04/2017 2359 26/07/2017

EFFECTIVE DATE OF RNAV STAR FOR RWY 28 POSTPONED. REF: AIP BIKF AD 2.24.8.4-1/2,
2.24.8.4-3/4

A0186/17 - Air Traffic Procedure 0000 27/04/2017 2359 26/07/2017

EFFECTIVE DATE OF RNAV STAR FOR RWY 10 POSTPONED. REF: AIP BIKF AD 2.24.8.2-1/2, 2.24.8.2-3/4.

A0185/17 - Air Traffic Procedure 0000 27/04/2017 2359 21/08/2017

EFFECTIVE DATE OF RNAV SID FOR RWY 19 POSTPONED. REF: AIP BIKF AD 2.24.6.3-1/2, 2.24.6.3-3/4

Page 32

A0184/17 - Air Traffic Procedure 0000 27/04/2017 2359 21/08/2017

EFFECTIVE DATE OF RNAV STAR FOR RWY 19 POSTPONED. REF: AIP BIKF AD 2.24.8.3-1/2, 2.24.8.3-3/4

A0176/17 - Lighting Facility 0813 12/04/2017 2359 12/07/2017

CENTERLINE LIGHTS ON RWY 01/19 NOT AVAILABLE. REF: AIP BIKF 2.14

A0175/17 - Lighting Facility 0811 12/04/2017 2359 12/07/2017

TOUCHDOWN LIGHTS ON RWY 19 NOT AVAILABLE. REF: AIP BIKF 2.14

A0174/17 - Movement and Landing Area 0759 12/04/2017 2359 12/07/2017

RWY 01/19. RWY 01 TDZ MARKINGS PARTLY IN PLACE. RWY 01/19 EDGE MARKINGS IN PLACE BUT MISSING ON RWY 01 THE FIRST 150M

FROM THR ON BOTH SIDES. REF AIP ICELAND BIKF AD 2.9

A0172/17 - Movement and Landing Area 1538 10/04/2017 2359 10/07/2017

COORDINATES FOR AIRCRAFT STAND NUMBER 64 CHANGED TO: 635936N, 0223803.07W.

COORDINATES FOR AIRCRAFT STAND NUMBER

65 CHANGED TO: 635934.29N, 0223801.55W. REF: AIP ICELAND BIKF AD 2.24.2.1

A0160/17 - Instrument and Microwave Landing

system

1400 07/04/2017 2359 31/05/2017

RWY 19. DME IKO 110.300 MHZ UNSERVICEABLE. REF: AIP BIKF AD 2.19

A0158/17 - Air Traffic Procedure 1400 07/04/2017 2359 29/05/2017 EST

BIKF AD 2.24.10.3-3 ILS OR LOC Y RWY 19 NOT IN USE.

A0157/17 - Air Traffic Procedure 1400 07/04/2017 2359 29/05/2017 EST

REF AIP ICELAND BIKF AD 2.24.10.3-1/2 ILS OR LOC Z RWY 19 NOT IN USE.

A0156/17 - Air Traffic Procedure 1800 06/04/2017 2359 29/05/2017 EST

REF AIP ICELAND BIKF AD 2.24.10.5-13/14 RNAV Z RWY 19 NOT IN USE.

A0154/17 - Undisclosed or Trigger report 1119 06/04/2017 2359 22/06/2017

REF: AIP AD BIKF 2.25.1-5 EFF 03 MAR 2017. CODING TABLES NOT IN USE.

A0153/17 - Air Traffic Procedure 1016 06/04/2017 2359 03/07/2017

VALIDITY PERIODS : DAILY 0800-0900

FLIGHT PLANNING FOR EASTBOUND DEPARTURES FROM KEFLAVIK

WITH ETD BETWEEN 0600 AND 0900 AND ENTERING SHANWICK

OCA SHALL BE FILED VIA:

1. PIXUM PETUX 61N01330W ORTAV ODPEX OR

2. RIMUM RUMUX AND THEN VIA 61N01730W ERAKA ETSOM OR

A MORE SOUTHERLY ROUTE.

REF: AIP ENR 1.8.4.1.3.7

A0149/17 - Movement and Landing Area 1536 04/04/2017 2359 03/07/2017

DUE TO CONSTRUCTION WORK EAST OF TERMINAL APRON, SIGNS BY EAST ENTRY ARE NOT ILLUMINATED.

A0148/17 - Movement and Landing Area 1534 04/04/2017 2359 03/07/2017

COORDINATES FOR AIRCRAFT STAND NUMBER 5. CHANGED TO: 635939.20N

0223728.75W. REF: AIP ICELAND BIKF AD 2.24.2.1 - 1

A0147/17 - Movement and Landing Area 1532 04/04/2017 2359 03/07/2017

DUE TO CONSTRUCTION WORK ON MAINTENANCE APRON.

WINGWALKER WILL GUIDE AIRCRAFT IN CODE D

USING STAND 62, 63 AND HANGER, WHEN AIRCRAFT

ARE PARKED ON STAND 64 AND 65.

NOSE-IN PARKING ON STAND 62 AND 63.

REF AIP ICELAND BIKF AD 2.24.2.1 - 1

A0146/17 - Air Traffic Procedure 1522 04/04/2017 2359 31/05/2017

FOR ALL BIKF APPROACHES, REF: AIP ICELAND BIKF AD. 2.24 DUE TO TEMPORARY

OBSTRUCTION CHANGE CAT A CIRCLING OCA(H)

600(431) TO READ 670(501).

A0138/17 - Movement and Landing Area 1704 03/04/2017 2359 13/05/2017

A TEMPORARY BLUE TWY LINE IS IN USE ALONG AIRCRAFT STANDS 110 AND 111 ON

EAST APRON. REF AIP ICELAND BIKF 2.24.1.2-1

A0137/17 - Movement and Landing Area 1702 03/04/2017 2359 13/05/2017

Page 33

AIRCRAFT STANDS 138, 139, 140 AND 141 CLOSED. REF AIP ICELAND BIKF AD 2.24.2.2-1

A0136/17 - Movement and Landing Area 1700 03/04/2017 2359 13/05/2017

AIRCRAFTS WITH LARGER WINGSPAN THAN 61 M ARE NOT ALLOWED TO TAXI S-1 TO

AND FROM EAST APRON. REF AIP ICELAND BIKF

2.24.1.2-1

A0113/17 - Movement and Landing Area 1441 29/03/2017 2359 10/05/2017

DUE TO CONSTRUCTION WORK WEST OF AIRCRAFT STAND 1 AND 3, FOLLOW ME CAR

WILL LEAD AIRCRAFT IN CODE D/R AND LARGER

FROM WEST ENTRY TO STAND 3. REF: AIP ICELAND BIKF AD 2.24.2.1-1

Z0486/17 - Facility and Service 0001 30/03/2017 UFN

(JEPPESEN TERMINAL CHART CHANGE NOTICE)
TEMP PROCEDURES ESTABLISHED (12-02) RNAV (GNSS) T RWY 19,
(12-03) RNAV (GNSS) T RWY 28, (12-04) RNAV (GNSS) S RWY 28,
(12-05) RNAV (GNSS) R RWY 28 . FOR DETAILS REFER TO TEMP
CHARTS AND LATEST NOTAMS.

A0109/17 - Facility and Service 0000 25/03/2017 2359 22/06/2017

AD CATEGORY FOR FIRE FIGHTING IS CAT 9 FROM HRS. 04:00-19:00. AD CATEGORY FOR
FIRE FIGHTING IS CAT 7 FROM HRS. 19:00-04:00.

REF AIP BIKF AD 2.6.

A0102/17 - Movement and Landing Area 1506 17/03/2017 2359 19/06/2017

JET BLAST HAZARD

DUE TO CONSTRUCTION. FOLLOWING STARTUP PROCEDURES APPLY:

AIRCRAFT AT STAND 62: TOW AND STARTUP AT ENTRANCE TO THE APRON

AIRCRAFT AT STAND 63: TOW AND STARTUP AT ENTRANCE TO THE APRON

REF BIKF AD 2.24.2.1-1

Z1018/16 - Facility and Service 0001 28/04/2016 UFN

(JEPPESEN TERMINAL CHART CHANGE NOTICE) TEMP PROCEDURES ESTABLISHED (11-
01) LOC X RWY 19, (12-01) RNAV (GNSS) X RWY

19. FOR DETAILS REFER TO TEMP CHARTS AND LATEST NOTAMS.

A0035/17 - Facility and Service 0800 08/02/2017 2359 08/05/2017

DUE TO RUNWAY RENOVATIONS AT BIKF FLIGHT CERTIFICATION TESTS WILL NOT BE
AUTHORISED.

A0034/17 - Facility and Service 1334 07/02/2017 2359 07/05/2017

TO EXPEDITE AND MAINTAIN AN ORDERLY FLOW OF AIR TRAFFIC,

PILOTS ARE URGED TO TAKE NOTE OF THE FOLLOWING:

1) DO NOT REQUEST PUSH BACK UNTIL FULLY READY FOR START UP.

2) CLEARANCES VIA SID WILL NORMALLY NOT BE ISSUED, IF SID IS
REQUIRED REQUEST SID FROM ATC.

3) BE PREPARED FOR TAKEOFF WHEN REACHING THE RUNWAY, EXPECT
ROLLING DEPARTURE.

4) DURING PEAK HOURS A FINAL CONTROL POSITION WILL NORMALLY
BE RESPONSIBLE FOR FINAL SEQUENCING USING SPEED CONTROL
AND VECTORING WITH ON DEMAND FREQUENCY 119.150 MHZ.

5) INITIAL CALL ON 119.150 MHZ STATE CALLSIGN ONLY.

6) KEFLAVIK APPROACH HAS SPEED LIMITATIONS OF 250 KTS IAS
BELOW F100. PILOTS ARE TO FOLLOW THAT RESTRICTION UNLESS
OTHERWISE CLEARED BY ATC.

7) MINIMUM SPEED, OF 160 KTS IAS UNTIL APROX. 4 NM, IS PUBLISHED
FOR ALL ILS Z AND RNAV (GNSS) APPROACHES AT BIKF.

8) AFTER LANDING EXPEDITE VACATING THE RUNWAY