

TRANSPORTATION SAFETY BUREAU

# FINAL REPORT

Wizz Air Hungary Ltd., Airbus A320-232, HA-LYD  
Debrecen International Airport (LHDC), 04 January 2020

Incident

2020-0008-4

The sole objective of a safety investigation is to find the causes and circumstances of aviation accidents or incidents and to initiate the necessary safety measures; furthermore, to make recommendations in order to prevent similar cases in the future. It is not the objective of an investigation to apportion blame or liability.

## Introduction

### Synopsis

Occurrence class		Incident
Aircraft	Manufacturer	AIRBUS S.E.
	Model	Airbus A320-232
	Registration	HA-LYD
	Operator	WIZZ Air Hungary Ltd.
Occurrence	Date and Time	04 January, 2020, 19:30 LT
	Location	Debrecen International Airport (LHDC)
Fatalities / Severe Injuries		no personal injuries
Damage to Aircraft		none

On 4 January 2020, flight W67868 of Wizz Air Hungary Ltd., registration HA-LYD, from Debrecen to Paris, had completed pre-departure de-icing procedure, when the ground handling agent servicing the flight detected a light phenomenon on the left horizontal stabilizer of the aircraft. Identifying it as fire, he alerted the Aerodrome Fire Service for immediate assistance. Arriving at the scene, the fire service assessed the situation and decided to commence extinguishing the fire on the left stabilizer. By then the aircraft crew, following the Fire Captain's firm instructions, had made a decision to evacuate the aircraft. Every person on board disembarked without injury, using the emergency slides at the right and left front doors (Figure 1).

The on-site survey revealed that the logo light lit up de-icing/anti-icing fluid vapours rising from the stabilizer surface, which created an illusion of fire and smoke. No actual fire occurred during the event and the aircraft did not sustain any damage.

The Investigation Committee of the Hungarian Transport Safety Board established that the direct cause of the occurrence were human factors related to the Fire Captain. Furthermore, inadequate training of the ground handling staff and Fire Service personnel was also considered a contributing factor. The IC also exposed several other flight safety issues, albeit not in direct relation to the incident.

To address the identified problems, the IC has proposed several safety recommendations.



Figure 1. The aircraft during evacuation (source: Debrecen Airport)

## Table of Contents

<b>1. Factual information.....</b>	<b>12</b>
1.1 Flight History .....	12
1.2 Injury to Persons .....	14
1.3 Aircraft Damage .....	14
1.4 Other Damage.....	14
1.5 Personnel Information .....	14
1.5.1 Pilot-in-Command .....	14
1.5.2 First Officer .....	14
1.5.3 Senior Cabin Attendant .....	15
1.5.4 Ramp Agent .....	15
1.6 Aircraft Information .....	16
1.6.1 General Information .....	16
1.6.4 Aircraft Loading Data.....	17
1.6.5 Malfunctioning Systems or Equipment .....	17
1.7 Weather Information.....	17
1.8 Aids to Navigation .....	17
1.9 Communication .....	18
1.9.1 Airside Communication .....	19
1.9.2 Safety Critical Communication .....	19
1.10 Aerodrome Information.....	20
1.10.1 Aerodrome Firefighting Category; Rescue and Fire Protection Level .....	21
1.10.2 Apron Lights.....	21
1.11 Data Recorders .....	22
1.12 Wreckage and Impact Information.....	22
1.13 Medical and Pathological Information.....	22
1.14 Fire.....	22
1.14.1 Fire Detection by the Ramp Agent.....	22
1.14.2 Fire Detection and Preventive Action by the Fire Captain.....	22
1.14.3 Factual Details of the Fire Service Intervention Process.....	23
1.15 Survival Aspects.....	24
1.15.1 Emergency Evacuation .....	24
1.15.2 Post Evacuation .....	24
1.16 Tests and Research .....	24
1.17 Organizational and Management information .....	25
1.17.1 Aircraft Operator.....	25
1.17.2 Aerodrome Operator .....	25
1.18 Additional Information.....	25

1.18.2	Logo Light .....	26
1.18.3	Aircraft De-Icing .....	27
1.18.4	General Information Provided to Passengers .....	28
1.18.5	Requirements for Passengers Seated in Emergency Exit Rows.....	30
1.18.6	Regulations for Emergency Evacuation.....	32
1.18.7	Safety Briefing Card .....	32
1.18.8	Human Behaviour in an Emergency .....	33
1.18.9	Passengers' Tenacity to Carry-on Property .....	33
1.18.10	Regulations Pertaining to Aerodrome Fire Services.....	34
1.18.11	Regulations Pertaining to Flight Crew.....	34
1.19	Useful or Effective Investigation Techniques .....	35
<b>2.</b>	<b>Analysis .....</b>	<b>36</b>
2.1	Fire Detection.....	36
2.1.1	Light Beam Identified as Fire.....	36
2.1.2	Ramp Agent Activity .....	36
2.1.3	Fire Service Activity.....	37
2.1.4	Flight Crew Activity.....	37
2.2	Passenger Briefing.....	38
2.2.1	Safety Briefing Card .....	38
2.2.2	Language Issues.....	39
2.2.3	ABP Briefing at Emergency Exits .....	39
2.2.4	Passenger Briefing Summary.....	40
2.3	Communication .....	41
2.4	Evacuation .....	42
2.4.1	Passenger Behaviour .....	42
2.4.2	Cabin Crew Actions.....	44
2.5	De-Icing in LHDC .....	44
2.6	Training of Aerodrome Fire Service Personnel.....	45
<b>3.</b>	<b>Conclusions .....</b>	<b>46</b>
3.1	Findings .....	46
3.1.1	Aircraft .....	46
3.1.2	Flight and Cabin Crew, Ramp Agent and Fire Captain .....	46
3.1.3	Aircraft Operation .....	46
3.1.4	Operator.....	46
3.1.5	ATS, Airport, Aerodrome Fire Service .....	46
3.1.6	Data Recorders.....	47
3.1.7	Medical and Pathological Information.....	47

---

- 3.1.8 Survival Aspects.....47
- 3.1.9 Supervisory System .....47
- 3.2 Causes.....47
  
- 4. Safety Recommendations .....49**
- 4.2 Interim Safety Recommendation .....49
- 4.3 Concluding Safety Recommendations.....49
  
- APPENDICES .....52**
- Appendix 1: Safety Briefing Card of A320 .....52
- Appendix 2: Interim Safety Recommendation (BA2020-0008-4-1A) .....54
- Appendix 3: firefighting activity timeline .....58

## Definitions and abbreviations

ABP	<i>Able-Bodied Passenger</i>
AFIS	<i>Aerodrome Flight Information Service</i>
airport	<i>A defined area (including any buildings, installations and equipment) on land or water or on a fixed offshore or floating structure intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft</i>
APU	<i>Auxiliary Power Unit</i>
ARP	<i>Airport Reference Point</i>
ATC	<i>Air Traffic Control</i>
ATPL(A)	<i>Airline Transport Pilot Licence (Aeroplane)</i>
Avionics	<i>A collective term for aircraft electronics and computer systems</i>
BEA	<i>Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation civile / the French accident investigation body</i>
CA	<i>Cabin Attendant</i>
CAA	<i>Civil Aviation Authority</i>
CAM	<i>Cabin Attendant Manual</i>
CC	<i>Cabin Crew</i>
CCA	<i>Cabin Crew Attestation</i>
EASA	<i>European Union Aviation Safety Agency</i>
ECAM	<i>Electronic Centralized Aircraft Monitoring</i>
emergency exit <sup>1</sup>	<i>An installed exit-type egress point from the aircraft that allows maximum opportunity for cabin and flight crew compartment evacuation within an appropriate time period and includes floor level door, window exit or any other type of exit, for instance hatch in the flight crew compartment and tail cone exit</i>
FAA	<i>Federal Aviation Administration</i>
HOT	<i>Holdover Time</i>
IC	<i>Investigating Committee</i>
ICAO	<i>International Civil Aviation Organization</i>
IR(A)/E	<i>Multi Engine Instrument Rating (Aeroplane)</i>
Kbvt.	<i>Act CLXXXIV of 2005 on the safety investigation of aviation, railway and marine accidents and incidents and other transportation occurrences</i>
KöViM	<i>Közlekedési és Vízügyi Minisztérium / Ministry of Transport and Water Management (until 2002)</i>
LAPL	<i>Light Aircraft Pilot Licence</i>
LT	<i>Local Time</i>
MEP(land)	<i>Multi Engine Piston</i>

---

<sup>1</sup> Term defined in Implementing Regulation 2019/1384/EU

---

METAR	<i>Meteorological Terminal Air Report</i>
MTOM	<i>Maximum Take-Off Mass</i>
NFM	<i>Nemzeti Fejlesztési Minisztérium / Ministry of National Development</i>
NTSB	<i>National Transportation Safety Board</i>
NVFR	<i>Night VFR rating</i>
OAT	<i>Outside Air Temperature</i>
Operator	<i>Operator of aircraft involved in the incident (Wizz Air Hungary Ltd.)</i>
PA	<i>Passenger Address (System) or Passenger Address Announcement</i>
PF	<i>Pilot Flying</i>
PM	<i>Pilot Monitoring</i>
Ramp Agent	<i>An employee of the ground handling service provider based at a given aerodrome, whose job includes servicing aircraft of contracted airlines</i>
SCA	<i>Senior Cabin Attendant</i>
SEP(land)	<i>Single Engine Piston (land)</i>
TMG	<i>Touring Motor Glider</i>
TOWING / S+B	<i>Sailplane towing and banner towing ratings</i>
UTC	<i>Coordinated Universal Time</i>
VFR	<i>Visual Flight Rules</i>

## General information

All times indicated in this report are in local time (LT). LT at the time of the occurrence: UTC+1.

All geographical locations throughout this document are provided by WGS-84 standard.

The capitalised positions used throughout this document (e.g. Captain, Pilot, etc.) refer to the particular persons concerned in the event investigated.

The format and content of this report is in harmony with Chapter 6 of Annex 13 of Act XLVI of 2007 promulgating the Appendices to the Convention on International Civil Aviation, signed in Chicago on 7 December 1944. Appendix, as well as with the requirements set out in ICAO Doc 9756 Part IV.

## Reports and Notifications

The incident was reported to TSB Hungary by the police dispatcher on 4 January 2020 at 20:09.

TSB Hungary responded by the following course of actions.

- Notification of EASA and the investigating body of the State of design and manufacture (BEA) on 4 January 2020 at 23:04.

In response, BEA appointed an accredited representative and EASA appointed a consultant for the investigation.

## Investigation Committee

The Head of TSB appointed the following persons to the Investigating Committee (hereinafter: IC).

Investigator-in-Charge	Mr. Zsigmond Nagy	investigator
Member	Mr. Gábor Erdósi	investigator

## Overview of the Investigation Process

Receiving event notification, the on-duty manager of the TSB ordered an immediate dispatch to the site.

Pursuant to Article 5 of REGULATION (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/ECA the TSB is required to initiate an investigation in the following circumstances.

- 1. Every accident or serious incident involving aircraft other than specified in Annex II to Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency (6) shall be the subject of a safety investigation in the Member State in the territory of which the accident or serious incident occurred.*
- 2. When an aircraft, other than specified in Annex II to Regulation (EC) No 216/2008, registered in a Member State is involved in an accident or serious incident the location of which cannot be definitely established as being in the territory of any State, a safety investigation shall be conducted by the safety investigation authority of the Member State of registration.*
- 3. The extent of safety investigations referred to in paragraphs 1, 2 and 4 and the procedure to be followed in conducting such safety investigations shall be determined by the safety investigation authority, taking into account the lessons it expects to draw*



*from such investigations for the improvement of aviation safety, including for those aircraft with a maximum take-off mass less than or equal to 2 250 kg.*

4. *Safety investigation authorities may decide to investigate incidents other than those referred to in paragraphs 1 and 2, as well as accidents or serious incidents to other types of aircraft, in accordance with the national legislation of the Member States, when they expect to draw safety lessons from them.*

Based on the site survey findings, with regard to Article 5 (4) of Regulation (EU) No 996/2010 of the European Parliament and of the Council, the head of the TSB decided that an investigation is required and will be launched.

The IC has taken the following steps in the course of the investigation.

- Conducted a primary survey on the day of the incident, inspected and photo documented the scene and the aircraft,
- interviewed the occurrence aircraft's Captain and First Officer, as well as the Fire Captain in charge of the Fire Squads acting on the scene,
- reviewed aerodrome surveillance camera footage on the spot and collected the footage,
- obtained radio transmission records of all communication conducted between the tower and ground service units at the time of the incident,
- interviewed the Senior Cabin Attendant and the ramp agent servicing the occurrence flight (hereinafter "Ramp Agent"),
- photo documented the flight crew's credentials, licences and flight documents,
- procured aerodrome operation documents and the Aerodrome Fire Services Manual,
- obtained the Flight Operator's Operation Manuals (OM's), the Cabin Attendant Manual (CAM), and the passenger safety cards,
- acquired cabin attendants' statements,
- collected Hungarian Meteorology Service weather reports for the time of incident,
- consulted a specialist in psychology to understand human behaviour,
- conducted several discussions with the Operator,
- consulted Hungarian CAA in regard to aerodrome fire service requirements,
- acquired information from the organisation that had trained the concerned fire personnel.

## **Investigation Principles**

**This investigation is being carried out by Transportation Safety Bureau on the basis of the following disciplines.**

- Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC,
- Act XCVII of 1995 on aviation,
- Annex 13 identified in the Appendix of Act XLVI. of 2007 on the declaration of the annexes to the Convention on International Civil Aviation signed in Chicago on 7th December 1944,
- Act CLXXXIV of 2005 on the safety investigation of aviation, railway and marine accidents and incidents (referred to as Kbvt. throughout the document),

- NFM (Ministry for National Development) Regulation 70/2015 (XII.1) on safety investigation of aviation accidents and incidents, as well as on detailed investigation for operators,
- In matters not covered by Kbt., Act CL of 2016 on General Public Administration Procedures

The competence of the Transportation Safety Bureau of Hungary is based on Government Regulation № 230/2016. (VII.29.) on the assignment of a transportation safety body and on the dissolution of Transportation Safety Bureau with legal succession.

**Pursuant to the aforesaid legislation,**

- Transportation Safety Bureau of Hungary shall investigate aviation accidents and serious incidents.
- Transportation Safety Bureau of Hungary may investigate aviation and incidents which – in its judgement – could have led to accidents of more severe consequences in different circumstances.
- Transportation Safety Bureau of Hungary is independent of any person or entity that may have interests in conflict with the objectives of the investigating body.
- In addition to the aforementioned legislation, TSB of Hungary shall conduct safety investigations in line with ICAO Docs 9756 and 6920 Manual of Aircraft Accident Investigation.
- This Report shall not be binding, nor shall an appeal be lodged against it.
- The original of this report was written in Hungarian.

No conflict of interest has been identified between safety investigators appointed to the IC. No investigator assigned with a safety investigation has been involved as an expert in any other procedure pertaining to the same case and shall not do so in the future.

The IC shall retain all data and information having come to their knowledge in the course of the safety investigation. Furthermore, the IC shall not be obliged to make such data and information available to other authorities, whose disclosure could have been legally refused by their original owner.

This Final Report is based on the Draft Report prepared by the IC and shall be sent to all involved parties for comments, as set forth by the relevant regulations.

Within legal deadline in response to the Draft Report, comments have been received articulating alternative opinions or interpretations. The IC has made several modifications in the wording of the Final Report to reflect these views.

No feedback or comments have been received from the aircraft operator and EASA on the draft report.

**Copyright**

This report has been issued by

Transportation Safety Bureau

2/A. Kőér St. Budapest H-1103, Hungary

[www.kbsz.hu](http://www.kbsz.hu)

[kbszrepules@tim.gov.hu](mailto:kbszrepules@tim.gov.hu)

With the exceptions stipulated by law, this report or any part thereof may be used in any form, provided that context is maintained and clear references are made to the cited source.

**Translation**

This document has been translated from Hungarian. Although efforts have been made to provide a translation as accurate as possible, discrepancies between the versions might occur. In such eventuality, the Hungarian version shall prevail.

# 1. Factual information

## 1.1 Flight History

The crew checked in for duty on 4 January 2020 at 11:50 at Debrecen Airport for Wizz Air flight W67867 to Paris, and completed preparations for the 4-sector flight scheduled for them on the day. The aircraft assigned for this flight was an Airbus A320-232 medium-range passenger airliner, registration HA-LYD.

The Ramp Agent who was to service this aircraft commenced his duty at Debrecen Airport at 07:30, he was to get off work at 20:15. His job for the day comprised of administration duties, runway checks, and servicing two flights throughout the day, including the Wizz Air flight concerned in the occurrence.

The first flights of the day from Debrecen to Eindhoven and back passed without event for HA-LYD's crew. Departure from Debrecen was at 13:37, delayed by 37 minutes. Upon return at 18:25, the delay had increased to 35 minutes, leaving a mere 10 minutes before the next scheduled departure of 18:35 to the next planned destination. Scheduled turnaround in Debrecen was 30 minutes.

Before departure to Paris Beauvais, the next destination in the crew's rotation, the Debrecen ground crew commenced de-icing the aircraft at 19:09 with passengers on board. In the process a total of 123 litres of de-icing fluid and 167 litres of anti-icing fluid was used to treat aircraft surfaces, including the stabilizers.

Once all 180 passengers, including 4 infants, boarded the aircraft, cabin attendants started their safety demonstration in English and Hungarian, informing passengers of safety actions to do in case of an emergency. After boarding, CA3<sup>2</sup> and CA4<sup>3</sup> visited the 4 passengers in the overwing emergency exit seats (ABP's) and, in line with the Operator's protocol, briefed them in Hungarian and English about their required duties in case of an emergency evacuation. As recalled by CA3 and CA4, each of these passengers had flown with the airline before – one of them had even been seated in an emergency seat before.

After right engine start, the Ramp Agent removed the chocks from the nose gear. Flight crew then started up the left engine and shut down the APU. During left engine start the Ramp Agent spotted a light phenomenon over the left side of the stabilizer that he interpreted as fire and smoke (Figure 2). He immediately informed the flight deck of this observation on the aircraft's intercom system that his wireless headset was connected to. The pilots, as they later stated, did not experience any signs of fire and no fire warning had gone off in the cockpit.

The Captain requested the Ramp Agent to call the aerodrome fire service (Fire Watch) to confirm the fire. In their prompt response the Fire Watch confirmed immediate dispatch to Stand 1. The Captain then called the senior cabin attendant (SCA) to the cockpit and verbally informed her of the situation at hand.

Two minutes after the alert call the Fire Watch units arrived at the scene in two fire engines and a Fire Command vehicle. In the course of their visual reconnaissance they found the light phenomenon on top of the left stabilizer and identified it as fire. Before starting spraying, the Fire Captain firmly instructed the Ramp Agent to tell the flight crew to shut down the engines and commence passenger evacuation.

---

<sup>2</sup> CA3: cabin attendant assigned to station 3

<sup>3</sup> CA4: cabin attendant assigned to station 4



Figure 2. The light phenomenon spotted (source: Ramp Agent)

The Captain ordered an emergency evacuation and the cabin crew opened the left and right front doors. When the emergency slides inflated, 180 passengers, including 4 infants and 34 children, disembarked in 3 minutes and 48 seconds.

The two cabin attendants in the aft (CA3, CA4), witnessing the fire personnel's activity outside, decided against opening the aft cabin doors. Throughout the evacuation neither CA3, nor CA4 smelled smoke or any smell indicative of fire. The ABP's in the overwing area did not open the emergency exits.

The cabin attendants strictly instructed disembarking passengers to leave their luggage behind. Despite, many of them showed up at the doors with their handbags and carry-on luggage. Looking to preserve slide integrity, the cabin attendants initially took these items away from the disembarking passengers and piled them up in the front rows and in the galley area. After a while, weighing evacuation efficiency against time lost and efforts spent on struggling with passengers showing up with their bags, they gave up confiscating hand luggage and conceded to allow passengers through and out with their carry-on items. Making this decision cabin crew also considered the increasing number of carry-on items stacked up around the exits, beginning to form a physical obstruction restricting passenger flow.

A megaphone had not been used throughout the evacuation.

## 1.2 Injury to Persons

	Crew		Passengers	On the Aircraft	Others
	Flight Crew	Cabin Crew			
Fatal					
Serious					
Minor					
Not injured	2	4	180	186	<del>0</del>
<b>Summary</b>	<b>2</b>	<b>4</b>	<b>180</b>	<b>186</b>	<b>0</b>

## 1.3 Aircraft Damage

The aircraft was not damaged in the occurrence.

## 1.4 Other Damage

The IC was informed of no material damage until the conclusion of the investigation.

## 1.5 Personnel Information

### 1.5.1 Pilot-in-Command

Age, Nationality, Gender	37, Hungarian, Male	
	Type	ATPL(A)
Flight Licence	Validity	30 Nov 2020
	Ratings	A320, IR(A) / ME
Certificates	Airline Pilot, Captain	
Medical Class and Validity	1 / 2 / LAPL, 15 May 2020	
	last 24 hours	4:30 / 2 T/O
Flight Hours / Take-Offs	last 7 days	13:45 / 6 T/O
	last 90 days	191:50 / 80 T/O
	Total	6,224:44 minutes / unknown
Aircraft Types Flown	A320 <sup>4</sup>	
Pilot Flying (PF) / Pilot Monitoring (PM)	PF	
Route and Airport Familiarity	Home Base	

### 1.5.2 First Officer

Age, Nationality, Gender	43, Hungarian, Male	
	Type	ATPL(A), FCL (Aeroplane)
Flight Licence	Validity	29 Feb 2020
	Ratings	A320, IR(A)/ME, MEP(land), NVFR, SEP(land), TMG, TOWING S+B
Certificates	Airline Pilot, First Officer	

<sup>4</sup> Valid for the A320 family (319 to 321)

Medical Class and Validity	1 / 2 / LAPL, 08 April 2020	
	last 24 hours	6:20 / 2 T/O
Flight Hours	last 7 days	15:26 / 6 T/O
/ Take-Offs	last 90 days	221:16 / 90 T/O
	Total	2,832:21 / unknown
Aircraft Types Flown	A320 <sup>5</sup>	
Pilot Flying (PF) / Pilot Monitoring (PM)	PM	
Route and Airport Familiarity	Home Base	

### 1.5.3 Senior Cabin Attendant

Age, Nationality, Gender	32, Hungarian, Female	
	Type	CCA
Cabin crew attestation	Validity	27 October 2020
	Ratings	A320, A321
Certificates	Senior Cabin Attendant (SCA)	
Medical Class and Validity	CCA, 05 October 2020	
	last 24 hours	0 / 0
Flight Hours	last 7 days	unknown / 4
/ Flight Legs	last 90 days	158:25 / 62
	Total	3,312:09 / unknown
Aircraft types flown:	A320, A321	

### 1.5.4 Ramp Agent

Age, Nationality, Gender	36, Hungarian, Male	
	Type	Flight Operations Officer
Licence	Validity	31 October 2021
	Ratings	Ramp Agent
Rest Time / Duty Time (last 48 hours)	On duty from 07:30 to 20:15, following 4 days off.	
Date of Latest Training	October 2018	
Check/Exam Dates and Results	Ramp Agent's Theory, 16 October 2018: Passed. Ramp Agent's Proficiency Check, 20 December 2018: Passed.	
Experience in Position	1 year	

<sup>5</sup> Valid for the A320 family (319 to 321)

## 1.6 Aircraft Information

### 1.6.1 General Information

Class	Fixed Wing Aeroplane (MTOM > 5,700 kg)
Manufacturer	Airbus S.E.
Model	A320-232
Year of Manufacture	2014
Serial Number	6115
Registration	HA-LYD
State of Registration	Hungary
Date of Registration	2 June 2014
Owner	HG6115 Aircraft Leasing Limited
Operator	WIZZ Air Hungary Ltd.
Call Sign / Flight Number	Wizz Air 5AM / W67868

	Flight Hours	Take-offs
Total	22,051	11,246
Since Overhaul	4,125	2,108
Since Last Check	252	123

### 1.6.2 Certificate of Airworthiness

Certificate of Airworthiness	Number	FD/LN/NS/A/1636/3/2014.
	Date of Issue	2 June 2014
	Validity	until withdrawn
	Restrictions	none

Airworthiness Review Certificate	Number	LFH/31385-1/2017-NFM
	Date of Issue	22 May, 2017
	Validity	2 June 2020
	Last Check	9 May 2019

### 1.6.3 Engines

Category	Turbofan Engine	
Manufacturer	IAE	
Type	V2527-A5	
Position on the Aircraft	<u>Engine 1</u>	<u>Engine 2</u>
Serial Number	V16710	V17255
Date of Installation in the Given Position	18 February 2018	16 April 2014



	<u>Hours / cycles flown</u>	
Total	26,325 / 12,759	22,071 / 11,255
Since Overhaul	7,431 / 3,727	N/A
Since Last Inspection	153 / 74	209 / 103

#### 1.6.4 Aircraft Loading Data

Empty Weight	42,232 kg
Fuel on Board	8,500 kg
Ramp Weight	64,265 kg
Maximum Take-Off Mass	71,500 kg
Maximum Landing Mass	64,500 kg

Aircraft loading was not a factor during the incident; further details are not provided.

#### 1.6.5 Malfunctioning Systems or Equipment

The investigation revealed no indication to any structural, flight control or systems related failure with effect to the occurrence outcome.

#### 1.7 Weather Information

Conditions on the incident day were overcast and foggy in the east with intermittently dispersing coverage in the rest of Hungary. After a period of no significant precipitation, intensifying rain and sleet followed in the late afternoon with snow and temporary freezing drizzle in the northeast. Temperature peaks were -3 to 0°C in the foggy and overcast areas and 2 to 7°C in the sunny regions.

Debrecen Airport METAR issued for the time of the incident was as follows.

*LHDC 041815Z AUTO 17004KT 140V210 1800 -SN BR BKN001 M02/M02 Q1019  
REFZRA NOSIG*

*LHDC 041838Z AUTO 17003KT 150V210 2700 -SN BR NCD M02/M02 Q1019  
REFZRA,*

This report says that weather data were collected on 4 January 2020 at 18:15 and 18:38 UTC, general wind direction was 170°, varying between 140 and 210 degrees, wind speed 3 and 4 knots; visibility 1,800 and 2,700 meters, respectively, with light snow and mist; Temperature and dew point -2°C, atmospheric pressure 1,019 hPa, with recent freezing rain both times.

#### 1.8 Aids to Navigation

The aircraft was equipped according to type certificate requirements; the IC found no discrepancy in terms of on-board navigation equipment or its operation.

The IC found no discrepancy in terms of ground-based navigation equipment or its operation.

No navigation equipment had any effect on the course of the incident; further details are not provided.

### 1.9 Communication

The aircraft was equipped according to type certificate requirements; the IC found no discrepancy in terms of on-board communications equipment or its operation.

The IC found no discrepancy in terms of ground-based communications equipment or its operation – all communications equipment were in good working order.

The Airbus A320/321 communications system comprises four main components: flight deck and cabin crew intercom system, passenger address system and an external service jack port for ground crew communications.

The cockpit communications system’s primary function is to provide voice contact between flight deck occupants, while also granting each of them access to cabin intercom and passenger address systems, as well as to devices connected via the external jack port (Figure 3).

Cabin attendants can talk to each other and the flight deck through the cabin intercom system, by means of the handsets installed by the front and aft galleys and, in A321 aircraft, at the centre station. Pressing a designated button on the handset, passenger address system is also available.

System configuration allows the flight deck direct access to any other communication component, while cabin crew can only signal the flight deck, in response to which the pilots can establish communication with them, workload permitting. Passenger Address is directly accessible from each station.

The flight deck had been in radio contact with AFIS on Debrecen Info’s designated frequency (“VHF radio” in Figure 3). The Ramp Agent’s wireless headphone was hot wired to the cockpit’s intercom through the service port, connecting him to the pilots. With the Fire Watch, AFIS and other ground based units he maintained contact via his handheld radio transceiver.

The Captain kept cabin attendants and passengers informed using the PA (“Passenger Address System” in Figure 3).

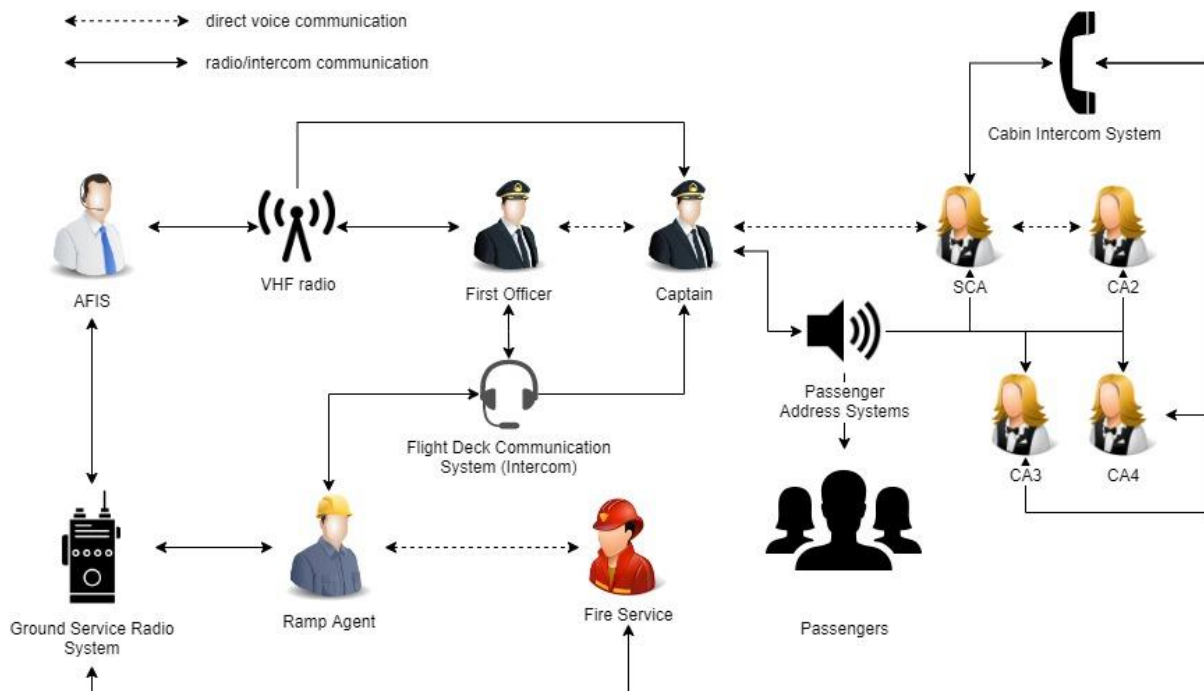


Figure 3. Way of communication during the occurrence

### 1.9.1 Airside Communication

Debrecen Airport's ground handling and service units, such as AFIS, Ramp, Airport Fire Service, Security, etc., maintained contact and communicated via their handheld radio transceivers.

Both ATC's and Debrecen Airport service units' communication systems were functioning and operational; the recorded conversations were obtained and used in the investigation. Due to a peculiarity in the ground services transceiver system, the conversations between these units were recorded back to back, omitting the pauses, rather than in real time.

As set forth in the *LHDC Aerodrome Manual, Chapter 14.3 – Engine Start Up and Pushback*, engine starts are initiated by each flight deck personnel, maintaining two-way radio contact with AFIS personnel.

### 1.9.2 Safety Critical Communication

Upon the flight deck's request, the Ramp Agent alerted the Aerodrome Fire Service (*Fire Watch*) on his handheld radio. Conversation transcript, translated into English, is provided below.

Time	Ramp Agent	Fire Watch
T	<i>"Fire Watch, Fire Watch, Ramp! Come to Stand 1 at once!"</i>	
T+13 s		<i>"Fire Watch, roger. On our way."</i>
T+25 s	<i>"Fire Watch, get over here."</i>	
T+29 s		<i>"What's the problem?"</i>
T+41 s	<i>"Fire Watch!"</i>	
T+47 s		<i>"Fire Watch, copy."</i>
T+49 s	<i>"Could you please come to Stand 1, because I can see a small flame on the rear wing of the plane and I was told to call you immediately. Please come!"</i>	
T+59 s		<i>"Roger. Moving out."</i>

As the voice recording of the aerodrome radio transmissions revealed, the first bit of sound and practical information the Ramp Agent gave the Fire Service of his perception was not until 49 seconds after his initial radio call to them.

At T+71s in the voice recording of the Ramp Agent and the Fire Captain's communication, a call is registered from another ground handling employee, explaining that the light phenomenon is caused by a light unit. This information, however, had been ignored for the time being, both by the Ramp Agent and the Fire Captain.

The Fire Captain's communication throughout the entire audio recording shows signs of increasing stress as the incident was progressing.

According to *LHDC Fire Services Manual, Chapter 4.1*, alert calls to Aerodrome Fire Service can only be made by AFIS and never directly by the Ramp.

*"In the event of an aircraft incident, AFIS shall alert on duty Fire Staff in each case. The Fire Chief shall acknowledge notification, plan the course of intervention and carry out preventive action as required."*

### 1.10 Aerodrome Information

The incident occurred at Debrecen Airport, Stand 1, on 4 January 2020, approximately at 19:30, prior to Wizz Air flight’s departure to Paris-Beauvais, France.

The aerodrome concerned in the occurrence had valid operation certificate.

Name of Aerodrome	Debrecen International Airport
ICAO Designation	LHDC
Airport Operator	Debrecen International Airport Ltd.
Aerodrome Reference Point (ARP)	47°29'20"N 021°36'55"E
Aerodrome Altitude	110 m
Runway Direction	04R-22L
Runway Dimensions	2,500x40 m
Runway Surface	Concrete

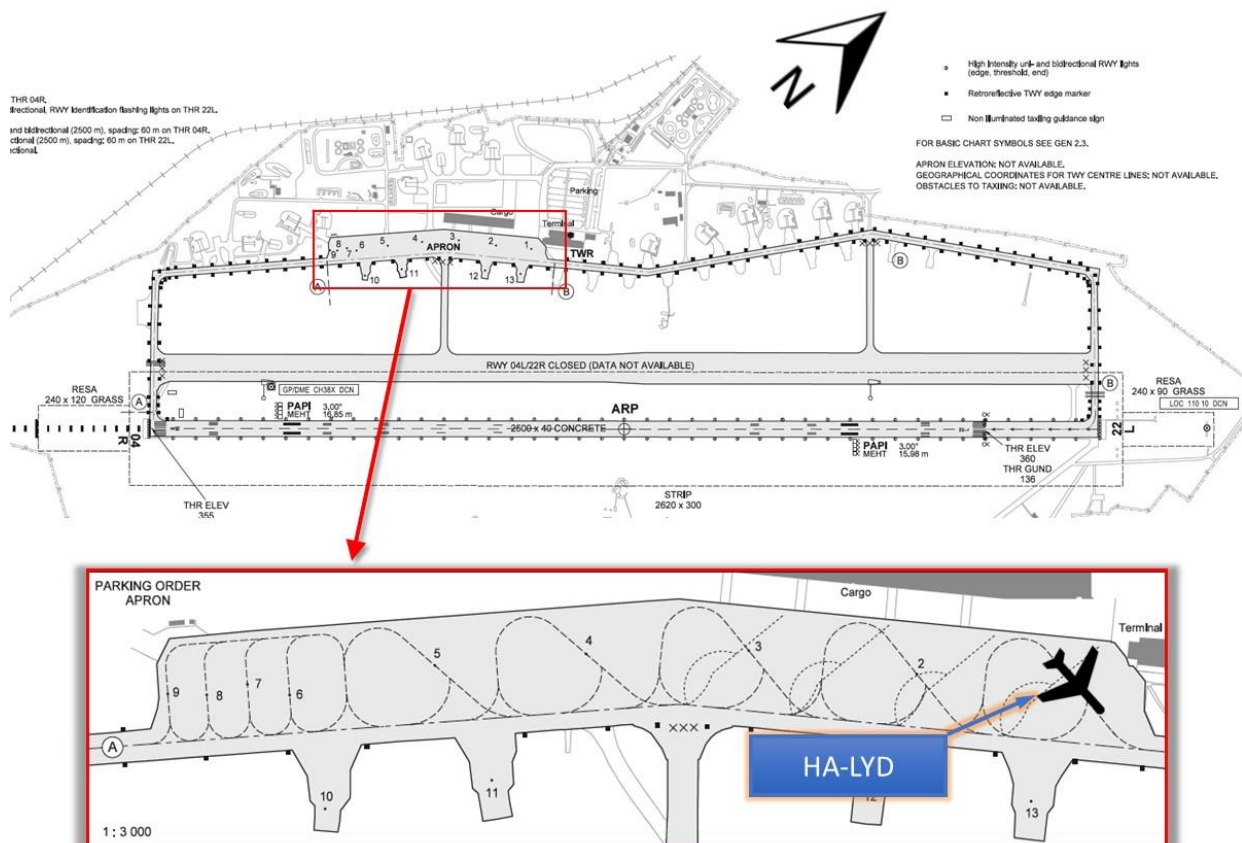


Figure 4. Location of the occurrence (chart: HUN AIP)

Airport characteristics had no effect on the occurrence; further details are not provided.

### 1.10.1 Aerodrome Firefighting Category; Rescue and Fire Protection Level

Debrecen Airport is classified to fall subject to *Regulation 1139/2018/EU*<sup>6</sup> (“*Basic Regulation*”) pursuant to Article 2 thereof<sup>7</sup>. Annex VII of this regulation sets forth essential requirements for aerodromes falling within its scope, and for their rescue and firefighting services. In order to ensure uniform implementation and compliance with the prescribed principal requirements, the European Commission has adopted *Regulation 139/2014/EU* pertaining to aerodromes and aerodrome safety equipment. This regulation and, particularly, paragraph ADR.OPS.B.010 thereof, stipulates detailed measures for aerodrome rescue and firefighting services (e.g. rescue and firefighting services achieve a response time not exceeding three minutes, and be in a position to apply foam at a rate of, at least, 50 % of the discharge rate). Additionally, based on the listed regulations, the Agency (EASA) has drafted and published guidelines that outlines acceptable means of compliance with relevant regulations. These Guidelines were accepted and published by *Decisions 2014/012/R* and *2016/009/R*. According to this publication, aerodrome firefighting categories, rescue and firefighting protection levels, as well as general protection level to be provided at the aerodrome are to be determined on the basis of aircraft size (overall length and fuselage diameter) regularly serviced at each aerodrome.

By the legislation cited above, Debrecen Airport is classified into *Rescue and Firefighting Category 7*.

The level of protection/category established according to the above determines the necessity and number of rescue and firefighting personnel, need of equipment, supplies and resources, etc. at each aerodrome. Detailed measures are provided in the cited regulations.

The LHDC Fire Services Manual states the following (translation):

#### *“2.5 Arrival time*

*Under optimal visibility, weather and surface conditions, fire service staff are capable of reaching even the most distant point of the runway, where the fire engine, set up on its station assigned by the Fire Captain, will have sprayed one half of the extinguishing agent carried no later than 180 seconds from the alert.*

*After the initial intervention, a rescue squad is set up within 240 seconds from the alert and will commence action by the instructions of the rescue squad commander.*

*The Fire Captain shall aim to arrive at the occurrence location as fast as possible to commence action efficiently, even in poor visibility.*

*Land survey data confirm that the aerodrome territory, including the location of the fire station, conforms to requirements set forth in relevant regulations.”*

### 1.10.2 Apron Lights

Aerodrome lighting was modernised in 2019, including the replacement of the apron lights with brighter LED lights.

The Ramp Agent’s signed declaration, testifying he had studied and was familiar with the operation of the new apron light system, is dated 11 December 2019.

---

<sup>6</sup> Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91;

<sup>7</sup> Pursuant to Article 1 of Regulation 216/2008/EC and subsequently Article 2 of Regulation 1139/2018/EU replacing the former.

### 1.11 Data Recorders

The IC did not seize any of the aircraft on-board data recorders. The aircraft is equipped with a communication and data transfer system that supports voice communication between the crew and ground station(s) (e.g. operation control centre) and, in specific flight phases, such as climb-out for instance, autonomously transmits key flight parameters to ground based receiver stations. The IC has procured these recorded data directly from the Operator. The Operator informed the IC that no data exchange had taken place between the flight deck and Operator's HQ via this system and, taken that the incident happened right after engine start, no flight data were transmitted either.

One of several surveillance cameras installed at the aerodrome recorded the incident. The IC reviewed the footage on the spot during their survey and procured the data in digital format. The footage time stamp showed though that the recorder's clock had been several minutes off. The IC could not pinpoint the actual time difference between the time stamps and real time.

### 1.12 Wreckage and Impact Information

There was no wreckage caused by the occurrence.

### 1.13 Medical and Pathological Information

No forensic medical examination was conducted. No evidence implied that physiological factors or other influence may have affected those involved in their mental or physical capacity.

### 1.14 Fire

No actual fire occurred during the incident. The chain of events ending with the fire personnel's intervention can be summarised as follows.

#### 1.14.1 Fire Detection by the Ramp Agent

Engines were started in right-to-left sequence (No. 2, then 1). The Ramp Agent accounted for an unusually thick smoke coming from the left engine after engine start, so he did not clear the flight deck crew to move as yet. With the thick smoke on the left letting up, the Ramp Agent, standing about 5 to 8 metres ahead of the aircraft, spotted a light phenomenon on top of the left stabilizer that looked like fire and smoke to him. He stepped closer to have a better look and, believing he saw real flames, he called the flight crew to shut down both engines at once. While the engines were spooling down, the Ramp Agent approached the left side of the fuselage. With the stabilizer blocking his view now, he walked right behind the aircraft to take a closer look. From this position he also took a phone camera footage of the apparent fire (Figure 2).

#### 1.14.2 Fire Detection and Preventive Action by the Fire Captain

In his statement the Fire Captain attested that the Aerodrome Fire Service was alerted to intercept an occurrence that happened on the ramp at 300 to 500 metres from their station. While moving out to the site they were informed on the radio that "*an aircraft's left stabilizer is on fire*". The Fire Captain therefore sent one of the intercepting fire engines equipped with a water cannon and another one (HAB1) with a foam gun to take position behind the aircraft. Next, he instructed the Ramp Agent to tell the pilots to shut down the auxiliary power unit as well. When challenged by the flight deck crew, the Fire Captain positively confirmed there was a fire and firmly called for immediate emergency evacuation of the aircraft. He then ordered the operator in HAB1 fire engine to start foam blasting the fire. As he later explained,

he made this decision because he saw a 40-something-centimetre orange “flame” with a bluish hue on the horizontal stabilizer, about a metre outboard from the fuselage axis. Furnished with the Ramp Agent’s information on the fire, corroborated by his own visual perception, the Fire Captain had no hesitation in concluding it was actual fire he was dealing with. The use of a thermal image camera, readily available in each fire engine, had not been considered.

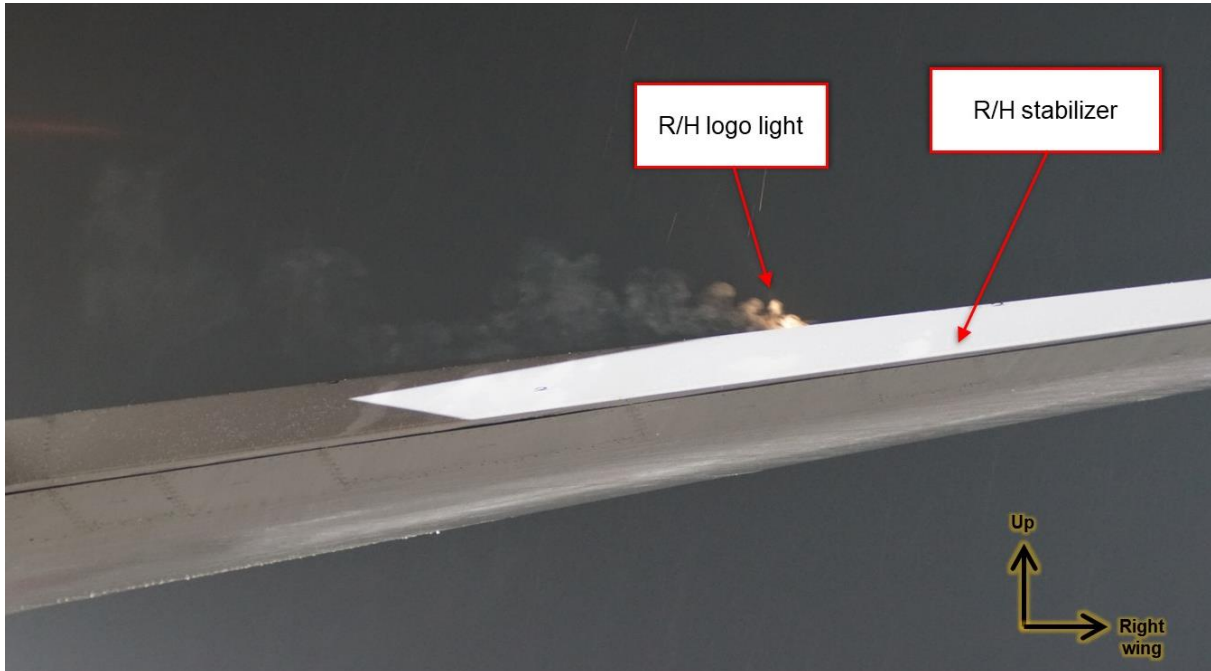


Figure 5. Right stabilizer during TSB’s survey

### 1.14.3 Factual Details of the Fire Service Intervention Process

Following the Ramp Agent’s initial alert, Fire Service acknowledged deployment to the site 13, then 59 seconds later. After 1 minute 11 seconds of the initial alert, the HAB1 driver inquired from the Ramp Agent where exactly they should take position with the fire engine. By the Fire Captain’s instructions, HAB1 was set up right behind the aircraft empennage.

HAB1 started foam blasting 2 minutes and 9 seconds after the Fire Captain arrived at the aircraft. The Fire Captain’s area of movement during his activity is marked in yellow in Figure 6.

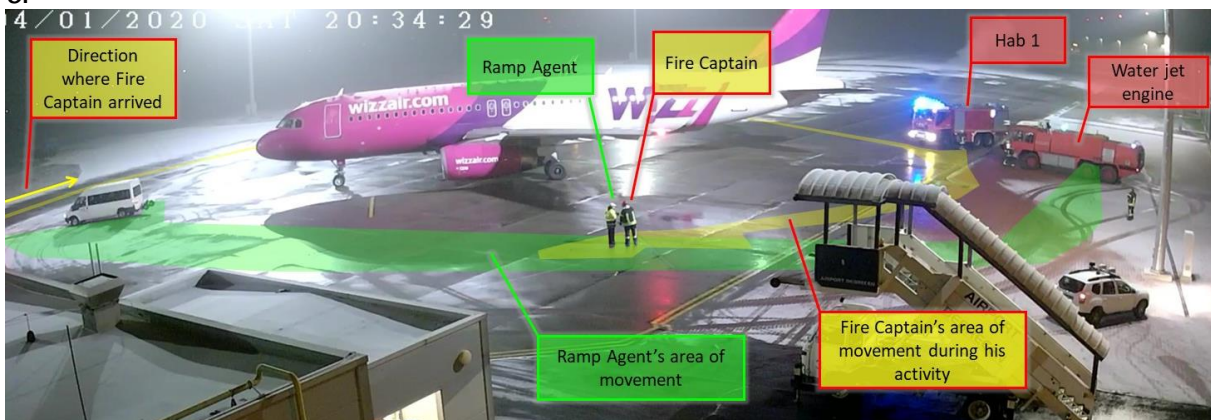


Figure 6. The Ramp Agent’s and Fire Captain’s area of movement before fire activity (picture’s source: Debrecen Airport)



## 1.15 Survival Aspects

### 1.15.1 Emergency Evacuation

The flight was commenced with 180 passengers on board, including 4 infants<sup>8</sup>. The aircraft was evacuated in 3 minutes and 48 seconds using the left and right front door emergency slides, while 50 of the 180 passengers (28 percent) left the aircraft with their hand baggage. The cabin crew managed to confiscate many more carry-on items from a number of other disembarking passengers. Without the cabin crew's efforts, the number of passengers leaving with their luggage would have been a lot higher, despite firm and clear instructions for them to leave their luggage behind.

From the flight crew's aspect, the presence of actual fire was neither substantiated by on-board fire warning systems, nor by aircraft occupants' physical perception. However, since two independent and supposedly qualified professionals (the Ramp Agent and the Fire Captain) had stated with certainty that the light phenomenon was actual fire – with the latter specifically and firmly calling for an emergency evacuation as well –, the commander had no other option than go along and issue this order for passenger safety. The evacuation was performed without event or personal injury.

By crew accounts, the captain's instructions were carried out according to protocol, whereby cabin crew took their assigned positions and saw to doing their job according to CAM instructions. This involved shouting out prescribed commands in Hungarian and English for the passengers, while directing them to the usable exits. These commands include the instruction "*LEAVE YOUR LUGGAGE*", which a large number of passengers chose to disregard. They, as recalled by the cabin attendants, "leisurely" started collecting their carry-on items placed in the overhead compartments and under the seats and started lining up for the two forward exits that the cabin crew assigned for evacuation and opened for them. Cabin crew ruled out opening the rear doors due to the proximity of the suspected fire and the apparent commotion and foam blasting going on outside. The use of the overwing exits had also been decided against. On the one hand, cabin crew deemed it hazardous, taken the slides would inflate toward the rear and send the passengers into the fire battle. On the other hand, with the situation within still calm and no signs of panic or fire had occurred yet, cabin crew expected to be able to delay overwing opening until the situation escalates and calls for a more expeditious evacuation. Therefore, they opted for not instructing overwing ABP's, for the time being, to open their assigned exits.

All 180 passengers disembarked within 3 minutes 48 seconds from the opening of the doors. The crew then completed the required flight deck and cabin checks and left the aircraft using the left forward chute. The first cabin attendant leaped out 3 minutes 13 seconds after the last leaving passenger and, having completed a last cabin check for anyone left behind, the Captain, the last one to leave, slid down 5 minutes and 3 seconds after the last passenger.

### 1.15.2 Post Evacuation

The ground staff began rounding up passengers hovering on the apron as late as 19 seconds after the first of them appeared at the bottom of the chute, and only when the Captain, seeing people roaming around, opened his side window panel and shouted at the ground crew to start engaging in passenger coordination. Subsequently, disembarked passengers were directed into a terminal building.

## 1.16 Tests and Research

No additional test or examination have been required in the course of the investigation.

---

<sup>8</sup> Definition criteria set forth in Regulation 965/2012/EU, Annex I / (5) (c)



## 1.17 Organizational and Management information

### 1.17.1 Aircraft Operator

The Operator had a valid certificate to engage in commercial air transport.

In an internal incident report of 2 March 2020 issued on this case, the Operator's air safety department has exposed several instances of non-compliance. The IC intends to point out two of them as follows.

- The Operator's procedures do not comply with EASA CAT.OP.MPA., paragraph 170(a)(3) *Passenger Briefing*, as passenger familiarisation with CC commands to be used in an emergency is not ensured.
- The Operator's procedures do not fully comply with AMC1 CAT.OP.MPA., paragraph 170(a)(1)(iii), which emphasises the necessity of passenger education about the importance of leaving their baggage behind in an evacuation.

In their internal safety review, the Operator's quality and safety department formulated a 9-point action plan. In August 2022, the Operator stated the following.

- One of the nine points that pertained to the use of common language (for details see 1.18.4) was dropped, because it had been dealt with incorporated into another safety measure.
- Most of the remaining 8 points were implemented.

Among the action points to be introduced is an action plan regarding safety briefing cards, by which the dimensions, location and layout of the pictograms used would be reviewed. On 15 December 2022, the Operator stated that introduction of a modified A320 passenger safety briefing card was planned for January 2023. For more detailed information about passenger safety briefing cards see section 1.18.7.

### 1.17.2 Aerodrome Operator

The aerodrome operator concerned had valid licences to operate the aerodrome and provide ground handling services. The latter allows the aerodrome operator to provide ramp services, including activity described in chapter "6.3 *Communication between the aircraft and the service provider on the departure side*".

## 1.18 Additional Information

### 1.18.1 Ground Handling Personnel Training Regulations

On grounds of Act XLVI of 2007 promulgating the Annexes to the Convention on International Civil Aviation, signed on 7 December 1944 in Chicago (hereinafter "ICAO Act"), pursuant to Annex 1<sup>9</sup> of the Convention, to obtain their licence, ground handling personnel applicants shall have demonstrated a level of knowledge appropriate to the privileges granted to the holder of a flight operations officer licence, in at least the following subjects.

- a) Air law
- b) Aircraft general knowledge
- c) Flight performance calculation, planning procedures and loading
- d) Human performance
- e) Meteorology
- f) Navigation
- g) Operational procedures
- h) Principles of flight
- i) Radio communication

---

<sup>9</sup> ICAO Annex 1, Personnel Licensing / paragraph 4.6 – Tenth Edition July 2006 (22/11/07)

Pursuant to Section 68(2) of Decree No. 53/2016 (XII. 16.) of the Ministry of National Development<sup>10</sup>, a flight operations officer licence applicant is required to go through theoretical training in the following subjects.

- a) *air law and human factors*
- b) *fundamental aviation and technical knowledge*
- c) *flight meteorology*
- d) *operational knowledge – commercial (dangerous goods),*
- d) *operational knowledge – commercial (passenger handling),*
- f) *aerodrome knowledge and emergency procedures, and*
- g) *a professional subject according to licence type”*

The IC sought Hungarian CAA’s opinion to understand the reason for the difference between national and international requirements cited above, posing the following questions.

- *In the course of their training in Hungary, do flight operations officers undergo training in radio communication?*
- *Is such a training prerequisite for getting licenced?*

In their response of 15 January 2021, Hungarian CAA gave the following explanation.

- Before NFM Decree No. 53/2016 came into effect, radio communication training had been part of the training curriculum;
- In the experience of Hungarian CAA, personnel employed in ground handling positions will undergo basic radio communication training offered in internal courses, if it is necessary for their position. Ground handling providers are lawfully required to have obtained a licence as stipulated in KöViM (Ministry for Transport and Water Management) Decree No. 7/2002, Annex 1, Section 6.3, ‘*Communication between aircraft crew and airside service providers*’. To get this licence, appropriate communications equipment and valid licences required for their operation are prerequisite. This, by default, comprises documented radio operator trainings that the providers are required to be able to present, if requested.

In KöViM (Ministry for Transport and Water Management) Decree No. 7/2002, ‘*Provisions of Ground Handling Service and Licensing Procedures*’, Annex 1, ‘*Ground handling service activities*’, Section 6.3, ‘*Communication between aircraft crew and airside service providers*’ is listed as a licensed privilege.

Based on information provided by the National Authority of Media and Info-communications, Department of Frequency and Identification Management, Department of Frequency Licensing (hereinafter “FEO”), in the course of licensing VHF mobile service stations and fixed-base service stations, radio operator qualifications are not checked. According to FEO’s official position, radio licences issued by them include the provision for radio operators to have undergone relevant training and examination. Therefore, providing this training and examination for radio operators is the responsibility of the licensed service provider.

Upon request, the training organisation that trained and checked out LHDC ramp personnel has submitted their communication training material for the IC.

### **1.18.2 Logo Light**

The logo light’s purpose is to light up an aircraft’s tailfin, and also illuminate the Operator’s name or logo placed thereon, while the aircraft is on the ground or in flight at low altitudes (Figure 7).

---

<sup>10</sup> Decree No. 53/2016 (XII. 16.) of the Ministry of National Development on the training, examination and licensing of aircraft crew and flight operations officers, and on the licensing of training provider organisations.

One logo light is installed in each side of the stabilizer to light up both sides of the tailfin with upward beams. The light switch is located in the flight deck overhead panel, marked NAV&LOGO.

This switch also doubles as a navigation light switch<sup>11</sup>. In the ON position, the nav lights continuously operate, but the logo lights will illuminate in function of slats/flaps position and the landing gear struts' compressed or decompressed status.

On ground, when the landing gear shock absorbers are compressed with the NAV&LOGO in ON (1 or 2) position, logo lights will illuminate. After take-off, when the absorbers decompress, logo lights will remain lit until flaps retract to less than 15 degrees.

During approach logo lights come on when flaps extend beyond 15 degrees. As the landing gear shock absorbers compress on landing, the logo lights will stay on even after flap retraction, as long as the NAV&LOGO switch is the ON (1 or 2) position.



Figure 7. Logo lights of A320

### 1.18.3 Aircraft De-icing

Debrecen Airport Ground handling offers up to two-step aircraft de-icing/anti-icing, according to needs. In the de-icing step hot water or a mixture of hot water and ISO Type-I fluid is used to wash off ice, slush or snow contaminants from critical aircraft surfaces, such as wings and stabilizers, for instance; as required.

In the second step at this airport, ISO type II anti-icing fluid is applied on treated surfaces to prevent refreezing and further icing for a limited time in sub-zero precipitation conditions. This window of anti-ice protection is called 'holdover time'. Anti-icing fluid concentration is adjusted to match prevailing ambient conditions to provide required holdover time. In chapter *Aircraft de-icing and anti-icing* in manual *Airport Procedures* published and in use at Debrecen Airport (further on referred to as "*Document E17*"), the following is specified. "*Anti-icing should be performed no later than 3 minutes after commencement of the first step treatment*".

There is no uniform regulation within the European Union detailing ground handling services, particularly de-icing activity. Ground handling providers develop procedures and they carry out their activities according to the demands of airlines, taking into account industry standards and recommendations. In terms of aircraft operation, de-icing is governed by EU regulations<sup>12</sup>; and ground handling procedures, by reference of ICAO Doc 9640<sup>13</sup>, are referenced in documents SAE AS6285 and FAA Holdover Time Guidelines.

Holdover time, by industry standards, is the period of time during which an anti-icing fluid provides protection against frozen contamination to the treated aircraft surfaces. It depends,

<sup>11</sup> Navigation lights on this aircraft comprise a white tail light, a green right wingtip light and red left wingtip light; all three emitting continuous light when turned on.

<sup>12</sup> EASA Easy Access Rules for Air Operations

<sup>13</sup> ICAO Doc 9640, Manual of Aircraft Ground De-icing/Anti-icing Operations, Third Edition, 2018 / Part III – Chapter 4, to which the Annex 14 of Act XLVI of 2007 promulgating the Appendices to the Convention on International Civil Aviation, signed in Chicago on 7 December 1944 is directly referenced.

among other variables, on the type and intensity of the precipitation, OAT, wind, the particular fluid (or fluid Type) and aircraft design and aircraft configuration during the treatment. Required holdover time is determined by the air crew, with regard to the applied de-icing/anti-icing fluid type and concentration as well as prevailing weather and traffic conditions.

According to aviation standards, the second step will be applied before the first step fluid freezes (typically within 3 minutes but severe conditions may shorten this) and, if necessary, area by area.

According to CCTV footage, de-icing and anti-icing steps on the concerned aircraft were done in succession, in about nine and a half minutes overall.

*Document E17* stipulates that ground crew providing aircraft de-icing shall undergo periodic recurrent training before the de-icing season begins, but not later than 31 October each year. The ground crew who provided de-icing for the occurrence aircraft completed their recurrent de-icing training in November and December 2019.

#### **1.18.4 General Information Provided to Passengers**

##### **1.18.4.1 ICAO Regulations**

According to Annex 6<sup>14</sup> promulgated by ICAO Act, 4.2.11.1, an aircraft operator shall ensure that passengers are made familiar with the location and use of:

- a) seat belts;
- b) emergency exits;
- c) life jackets, if the carriage of life jackets is prescribed;
- d) oxygen dispensing equipment, if the provision of oxygen for the use of passengers is prescribed;
- e) other emergency equipment provided for individual use, including passenger emergency briefing cards.

In 2018, after the above ICAO Act has come into effect, ICAO issued *ICAO Doc 10086 "Manual on Information and Instructions for Passenger Safety"* (First Edition, 2018). In absence of effective national legislation, the IC considers the cited document as professional guidelines and further on will refer to them as *ICAO Doc 10086*. In paragraph 2.14 thereof, concerning language requirements, operators should consider the following when selecting language requirements related to safety briefings on international flights, in order to cover the largest percentage of passengers on board:

- a) the use of English;
- b) official language(s) of the State of departure; and
- c) official language(s) of the State of destination.

The document also recommends that operators should verify that emergency exit-row occupants comprehend the language spoken by the crew. Paragraph 5.5.2 states that unstaffed exit row briefing may be conducted in any language that is mutually understood by both the cabin crew member and the passenger. Paragraph 2.4.2 c) stipulates that prior to each flight, cabin crew should brief passengers seated at unstaffed exit rows on the signal/command that would instruct the passengers to open exits.

##### **1.18.4.2 EU Regulations**

Paragraph CAT.OP.MPA.170 of Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air

---

<sup>14</sup> ICAO Annex 6 Part I, International Commercial / Air Transport — Aeroplanes / 4.2.11 Passengers (July 2001)

operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (hereinafter “965/2012/EU”) stipulates the following.

*“The operator shall ensure that passengers are:*

*(a) given briefings and demonstrations relating to safety in a form that facilitates the application of the procedures applicable in the event of an emergency; and*

*(b) provided with a safety briefing card on which picture-type instructions indicate the operation of emergency equipment and exits likely to be used by passengers.”*

A guidance material<sup>15</sup> issued for 965/2012/EU is rather succinct and offers little information on details concerning passenger safety briefing cards. The publication only says that safety briefing cards should be picture-type and easy to understand.

#### **1.18.4.3 Operator’s Procedures**

Flight attendants will do their passenger safety demonstration after boarding. In an A-320 model this entails CA2 in front of row 1, CA2 and CA4 between rows 13 and 14 demonstrating emergency procedures with the SCA delivering verbal explanations on the PA.

Passenger safety demonstration comprises the following elements.

- number and location of emergency exits/doors
- use of safety belts
- use of oxygen masks
- use of life vests
- location and brief content of safety briefing cards

A relevant chapter<sup>16</sup> in CAM specifically requires that the emergency exit part of the safety demo must include a reminder for passengers to leave their hand luggage behind in case of an evacuation.

In addition, a tête-à-tête briefing is delivered for passengers occupying the emergency exit rows as described below in 1.18.5. c).

As mandated in Wizz Air CAM, 1.9.2., passengers in the occurrence flight were to be briefed in English and Hungarian, the language of the state of departure and crew home base. It has been revealed that in some cases (e.g. an unforeseen stop in a third country is involved or the flight duty includes legs that both originate and terminate in a country other than the crew’s home base) crew and most passengers do not share a common language, which leaves efficient safety briefing questionable.

#### **1.18.4.4 Global Experience**

According to a study<sup>17</sup> conducted by NTSB in 2000, 13 percent of polled passengers would completely disregard on-board safety demonstrations on a regular basis, while 48 percent would listen to at least 75 percent of the demonstration. The study has also revealed that most people seated in the emergency exit rows do not read the safety briefing card and almost half of all passengers (44 percent) would purposely ignore both the safety demonstration and the safety briefing card as well (Figure 8).

---

<sup>15</sup> GM2 CAT.OP.MPA.170 Passenger briefing

<sup>16</sup> CAM 1.9.2.1 Passenger safety demonstration A320 (REV 20, 27 FEB 2019)

<sup>17</sup> Safety Study – Emergency Evacuation of Commercial Airplanes, NTSB, NTSB/SS-00/01, Washington, D.C., p. 64.

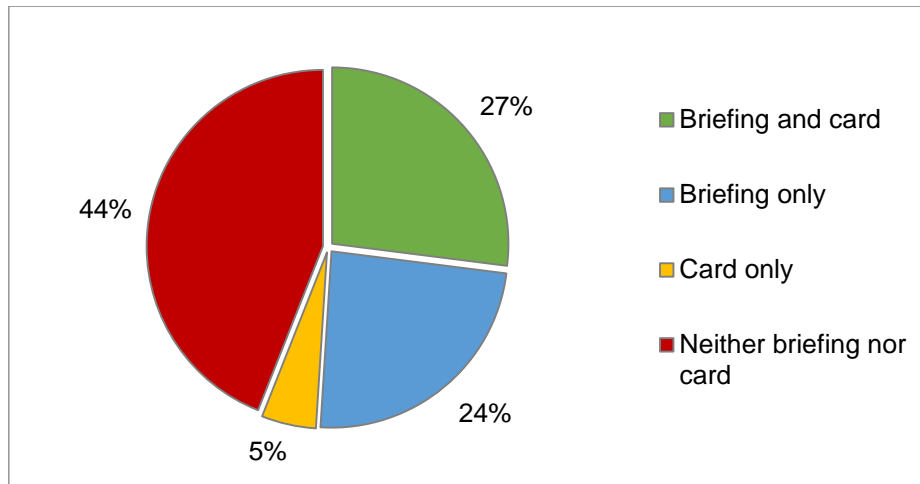


Figure 8.

### 1.18.5 Requirements for Passengers Seated in Emergency Exit Rows

#### 1.18.5.1 ICAO Regulations

Pursuant to of *ICAO Doc 10086, 2.4.2 c)*, cabin crew in their ABP briefing should inform passengers seated at unstaffed exit rows on the specific signal/command that would instruct them to open the emergency exits. In order to prevent uncommanded opening, cabin crew should also emphasize the need for ABP's to strictly follow all instructions and to closely listen to crew commands.

Paragraph 5.3.1 of the above document also requires operators to make passengers aware of the responsibility they assume in an emergency by occupying an emergency exit row seat.

The cited ICAO regulation obliges crew to make sure that their ABP briefing for unstaffed exit row passengers meets each of the following requirements.

- must verbally accept the responsibility to operate the exit;
- must be able to locate the emergency exit;
- must be able to comprehend the instructions for operating the exit;
- must know when and how to open the exit;
- must follow all instructions given by a crew member, including the signal or command to evacuate;
- must be able to check for hazards before opening the exit; and
- must be able to stow (or otherwise dispose of) the exit hatch, if removable, so that it will not impede the use of the emergency exit.

#### 1.18.5.2 EU Regulations

By a document<sup>18</sup> in EASA Easy Access Rules, "*the Operator should make provisions so that a passenger occupies a seat at least on each side in a seat row with direct access to an emergency exit (not staffed by a cabin crew member) during taxiing, take-off and landing unless this would be impracticable due to a low number of passengers or might negatively impact the mass and balance*".

The cited document<sup>19</sup> defines 'direct access' as "*a seat from which a passenger can proceed directly to the exit without entering an aisle or passing around an obstruction*".

According to *EASA AMC1 CAT.OP.MPA. 170*, "*before take-off all passengers should be briefed on required safety items and passengers occupying seats with direct access to*

<sup>18</sup> Easy Access Rules for Air Operations, AMC1 CAT.OP.MPA.165 Passenger seating

<sup>19</sup> Easy Access Rules for Air Operations, GM1 CAT.OP.MPA.165 Passenger seating / ED Decision 2014/015/R

*emergency exits not staffed by cabin crew members should receive an additional briefing on the operation and use of the exit*<sup>20</sup>.

As defined in EASA GM1 CAT.OP.MPA. 170(a), “the emergency exit briefing should contain instructions on the operation of the exit, assessment of surrounding conditions for the safe use of the exit, and recognition of emergency commands given by the crew. Cabin crew should verify that the passenger(s) is (are) able and willing to assist the crew in case of an emergency and that the passenger(s) has (have) understood the instructions”.

### 1.18.5.3 Operator’s Procedures

According to the Operator’s procedure in effect for the A320 variant, the rear cabin attendants (CA3, CA4) perform the briefing of ABP’s. According to paragraph 1.7.7.2 of the Operator’s CAM, passengers on seats adjacent to exits will receive ABP briefing. The basis of the briefing is a common language shared the cabin attendants and the concerned passenger, allowing crew members to make sure the passenger meets ABP requirements (e.g. age over 16 or physical ability to open the door, etc.). The cabin attendant will then seek verbal acknowledgement from the passenger of the duties associated with the given seat position. A CAM<sup>20</sup> checklist itemises the steps cabin crew should follow preparing ABP’s.

*„You are sitting in an emergency exit row.*

*In case of an emergency you might need to operate this exit.*

*Please study the exit operation placards, but please do not touch the exit.*

*Please remove the safety instruction card from your seat pocket and study it prior to departure.*

*Do you understand? Are you willing to help? Do you have any questions?*

*Thank you.”*

CAM, however, does not require cabin crew to verbally instruct ABP’s after boarding how to operate emergency exits; they are supposed to learn their duties in emergency studying the pictograms on the safety briefing cards and the placards displayed next to the exits. ABP’s will also not receive verbal briefing of the commands cabin crew use in an emergency. Similarly, the Operator does not require cabin attendants to make sure during training ABP’s, whether they have understood the pictographic instructions or, for that matter, whether they have seen the safety briefing card at all, let alone studied it.

As set forth in CAM section 1.7.7.1<sup>21</sup>, emergency exit row seats provide “direct access” to emergency exits. In the A320 model, these are rows 12 and 13. As required by CAM section 1.7.7.2<sup>22</sup>, cabin crew will only train one ABP for each exit, of passengers seated next to it.

In their explanation, the Operator has justified this practice saying that the criteria of *direct access seats* only apply to each window seat next to the an exit. To resolve this predicament, the IC has consulted with EASA experts. EASA, in their statement declared that in A320 models, as set forth in a relevant EASA rule<sup>23</sup>, the term *direct access* applies to each seat in an emergency exit row.

On 2 June 2020, following the incident, the Operator introduced CAM *Revision 21*, in which each passenger seated in an emergency exit row has now been required to receive ABP briefing prior to departure (CAM 1.7.7.2, Rev. 21).

Additional updates include mandatory information to ABP’s of commands used instructing them to open doors. Yet, aspects and circumstances concerning decisions, including criteria

<sup>20</sup> CAM (REV 20, 27 FEB 2019)

<sup>21</sup> CAM 1.7.7.1 Emergency exit rows; Chapter 1 / page 109 (REV 20, 27 FEB 2019)

<sup>22</sup> CAM 1.7.7.2 Emergency exit row briefing in normal operation; Chapter 1 / page 109 (REV 20, 27 FEB 2019)

<sup>23</sup> Easy Access Rules for Air Operations, GM1 CAT.OP.MPA.165 Passenger seating

of door opening will only be discussed with them during actual emergencies, and then only if there is enough time until landing. Of all CAM sections discussing emergency procedures, only section 4.2.5.4 *ABP briefing to the over-wing exits (2L/3L/2R/3R)* in 4.2 *Prepared emergency on land* allows ABP's to open emergency exits either on the "EVACUATE, EVACUATE" command; or on their own initiative after full stop, in case of "big" structural damage or there is "big" fire, dense smoke in the cabin, and after careful consideration of outside conditions and making sure it is safe to do so. To verify understanding, cabin attendants must ask ABP's to repeat the instructions.

In ordinary uneventful flights, crew will still not share the above information with ABP's, unless in actual emergency. On the other hand, there is not always sufficient time in an emergency to pass all this information on to ABP's.

On 8 December 2020, the IC had a board meeting with the Operator's representatives. They explained that in the Operator's views, a direct, in-detail discussion of emergency duties with ABP's would have detrimental effect on their sense of safety. Therefore, to spare them from anxiety, detailed emergency instructions for ABP's are saved for actual emergency situations.

## 1.18.6 Regulations for Emergency Evacuation

### 1.18.6.1 EASA Regulations

A320 models conform to relevant EASA passenger airliner construction standards<sup>24</sup>, which stipulate that aircraft designs must allow complete evacuation in no more than 90 seconds in simulated test conditions.

According to EASA requirements,<sup>25</sup> aircraft Operators shall establish procedures and a checklist system for the safe operation of each aircraft type for all types of operation on the ground and in flight, including evacuation.

### 1.18.6.2 Operator's Procedures

In addition to CAM Section 1.18.5.3, Chapter 4 and its subsections discuss cabin crew evacuation duties and commands in detail.

Whenever an evacuation becomes likely, flight deck crew will alert cabin crew using the command "ATTENTION CREW AT STATIONS, ATTENTION CREW AT STATIONS!". As the situation unfolds, emergency status will either be cancelled ("CANCEL ALERT, CANCEL ALERT!"), or emergency evacuation is ordered by the command "EVACUATE, EVACUATE!". This command is the cue for cabin crew to open the emergency exits and, as worded in CAM, "initiate and maintain a steady flow of passengers leaving the aircraft, using strong positive commands". These commands are the following.

*"EMERGENCY, EMERGENCY!"*

*"OPEN YOUR SEAT BELTS, OPEN YOUR SEAT BELTS!"*

*"GET OUT, GET OUT"*

*"LEAVE YOUR LUGGAGE, LEAVE YOUR LUGGAGE!"*

### 1.18.7 Safety Briefing Card

The Operator's safety briefing cards on the A320-200 fleet (attached in *Appendix 1*) are a 20 by 25 cm plastic sheets that display the EASA required elements in pictographic form.

<sup>24</sup> EASA Certification Specifications and Acceptable Means of Compliance for Large Aeroplanes CS-25 / CS 25.803 Emergency evacuation / (c), Amendment 24, 10 January 2020

<sup>25</sup> EASA Easy Access Rules for Air Operations AMC1 ORO.GEN.110(f)(h) "Operator responsibilities"



Following the incident the IC interviewed, at random, several Wizz Air cabin attendants and individuals with aviation experience, testing them whether they can correctly decipher and understand the pictograms in a safety briefing card. More often than not, the test subjects were either unable to perceive the intended meaning or gave incorrect interpretations.

On 11 February 2020, the IC drafted a Safety Recommendation concerning the interpretation of pictograms and instructions in the safety card in use on A320 aircraft at the time of the incident (Section 4.2). For further details, refer to Sections 1.17.1 and 4.1.

ICAO Doc.10086, paragraph 4.3.3 stipulates that pictograms should be designed to be readable and comprehensible even in a monochrome style.

A specialist TSB Hungary appointed to the case articulates the following.

*“Pictograms efficiency to accurately convey messages can be improved by augmenting visibility and clarity of meaning by means of portraying less detail and providing 2D images with contrasting colours and no shadows (Tojts, 2006).”*

The specialist pointed out that in terms of passenger compliance to evacuate, people will only follow pictographic instructions in a familiar environment, otherwise they tend to follow a leader they consider competent.

Relevant EU legislation does not render the issue and modification of safety briefing cards in the purview of national supervisory authorities for approval. It is the operators' prerogative to design and modify safety cards as they see fit according to their needs. Without national coding in each member state, supervisory authorities have the opportunity to address apparent safety briefing card non-conformity disclosed in the course of CAA inspections and audits.

In an explanatory comment to Decision No. 2017/008/R, EASA points out that US and Canadian aviation authorities have detailed directives in effect, concerning the layout and content of safety briefing cards, as well as verbal safety briefing given to passengers. In their circular *“Passenger Safety Information Briefing and Briefing Cards”* of 3 May 2019, FAA provided detailed instructions to operators as to the form and content of verbal information given and safety briefing cards handed out to passengers.

#### **1.18.8 Human Behaviour in an Emergency**

In their analysis, an expert in psychology specialised in human factors appointed to the case by Hungarian TSB has concluded that individual responses given in emergencies show a wide variation by education, cultural background and age. Research conducted by *Wang et al. (2016)* and *Pauchard (1988)* indicate that human individual responses in unexpected disasters include uncontrollable emotions, panic and fear in about 75 to 80 percent of the populace, while 2 to 3 percent will experience psychological symptoms so severe as requiring medical care, and only 20 percent of the public will remain calm enough, with a capacity to act.

#### **1.18.9 Passengers' Tenacity to Carry-on Property**

Experience shows that the overwhelming majority of passengers will go to great lengths trying to bring their carry-on luggage and personal valuables with them during evacuation, even at the expense of endangering lives of their fellow-passengers; notwithstanding state legislation, the 90-second rule of evacuation, or firm cabin crew instructions received on the spot. This was particularly visible throughout the incident concerned, where, as confirmed by witness testimonies, passengers construed the evacuation as more of a safety precaution than a real emergency and, apparently, they did not experience the stress of acute threat associated with an immediate, life-threatening situation.

### 1.18.10 Regulations Pertaining to Aerodrome Fire Services

The departments of Hungarian National Fire Service, supervised by the National Disaster Management Service comprise of local fire stations, municipal self-government fire stations, facility fire services and volunteer fire services.

Pursuant to Act XXXI of 1996 on Fire Protection, Technical Rescue and Fire Services (hereinafter referred to as Ttv), firefighting and technical rescue operations lay within national responsibility. The basic purpose of the Ministry of Home Affairs National Disaster Management (hereinafter referred to as HA NDM) is to preserve the safety of life and property, to protect the safe operation of the national economy and critical infrastructure elements. HA NDM is a national law enforcement agency, its county level body is the county/capital Disaster Management Directorate, while its local body is the disaster management branch and professional fire brigades.

In Hungary, rescue fire protection tasks are performed by Professional Fire Brigades (PFB), Municipal Fire Brigades (MFB), Volunteer Fire Brigades (VFB) and Facility Fire Brigades (FFB). The state fire service consists exclusively of the Professional Fire Brigades. The MFBs, VFBs and FFBs do their activities under a cooperation agreement, under supervision of the local body of professional disaster management. In accordance with Ttv, the fire watch operating at LHDC is classified as '*fire-fighting service*', whose procedures, technical rescue activities and the order of cooperation with the professional disaster management bodies are determined by the head of HA NDM. According to the information of HA NDM, the fire-fighting service operating at LHDC was neither supervised by the Hajdú-Bihar County Disaster Management Directorate, nor did a cooperation agreement exist between them.

In accordance with Commission Regulation (EU) No 139/2014 laying down requirements and administrative procedures for aerodromes pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council, the aerodrome operator shall ensure that the rescue and firefighting personnel are properly trained, equipped and qualified to operate in the aerodrome and its environment.

In Section 10.1 of the *Fire Services Manual of Debrecen Airport* it is stipulated that aerodrome management need to make certain that fire service personnel have completed a specialty fire training as prescribed in Regulation 139/2014/EU, and will continuously offer this training opportunity to fire service personnel, as well as the opportunity to take recurrent trainings each 12 months.

In line with Articles 76 and 115 of Regulation 1139/2018/EU, and Regulation 139/2014/EU, in their Decision No. 2014/012/R, EASA drafted and issued a guidance material<sup>26</sup> setting out acceptable means of compliance with the a.m. rules. This guidance material requires that aerodrome fire service personnel undergo training specialised in General Aircraft Knowledge.

The IC obtained the training certificate of the Fire Captain involved in the incident from the training organisation, which provided the basic aerodrome fire training and periodic courses for Debrecen Airport fire service personnel. The training organisation also submitted their training material in General Aircraft Knowledge. It has been revealed that this training material does not include information on aircraft lights. The training organisation is not required to be licensed to provide service (including firefighter training) and there is no supervisory body overseeing their activity. This information was also confirmed by involved training organisation.

### 1.18.11 Regulations Pertaining to Flight Crew

The Operator's Operation Manual B (OMB), paragraph 4.6 lists flight crew duties in the event of an evacuation (Figure 9). The relevant section specifies that all available information should be considered when a decision to evacuate is made, except when aircraft structural

---

<sup>26</sup> GM1 ADR.OPS.B.010(a)(3) Rescue and fire services

damage has occurred. OMB goes on to say that evacuation may not be initiated until the aircraft has come to a complete stop, and the pilot seated on the right (usually the first officer) is responsible to read and do the evacuation checklist items. The final decision, however, belongs with the captain. The order of duties after aircraft stop are the following.

- the first officer makes sure the aircraft's parking brakes are on
- air traffic services need to be notified, if it has not happened yet
- the captain should notify cabin attendants of a possible evacuation through the passenger address system
- the first officer checks and, if necessary, equalises cabin pressure
- the first officer shuts down and isolates engines and the APU
- if necessary, the first officer will operate the fire extinguisher
- all along, the captain has been building up his decision about the necessity of an evacuation and either orders it at this time or calls off the distress status

<b>A318/A319/A320/A321</b> 	<b>EMERGENCY PROCEDURES</b>	REV 40 SEQ 001	<b>7.00</b>
<b>EMERGENCY EVACUATION</b>			
<ul style="list-style-type: none"> <li>- AIRCRAFT/PARKING BRK ..... STOP/ON</li> <li>- ATC (VHF 1) ..... NOTIFY</li> <li>- CABIN CREW (PA) ..... ALERT</li> <li>- ΔP (only if MAN CAB PR has been used) ..... CHECK ZERO  <i>If not zero, MODE SEL on MAN, V/S CTL FULL UP.</i></li> <li>- ENG MASTERS (ALL) ..... OFF</li> <li>- FIRE Pushbuttons (ALL : ENG and APU) ..... PUSH</li> <li>- AGENTS (ENG and APU) ..... AS RQRD</li> </ul> <p>■ <b>If Evacuation required :</b></p> <ul style="list-style-type: none"> <li>- EVACUATION ..... INITIATE</li> </ul> <p>■ <b>If Evacuation not required :</b></p> <ul style="list-style-type: none"> <li>- CABIN CREW and PASSENGERS (PA) ..... NOTIFY</li> </ul>			

Figure 9. Flight crew duties in the event of an evacuation

### 1.19 Useful or Effective Investigation Techniques

A case analysis presented by a specialist appointed by Hungarian TSB gave significant insight into cognitive processes and human behaviour aspects observed during the occurrence.

For flight safety risk analysis and the laws of cause and effect in the incident, the IC applied the analytical model developed by ATSB, Australian Transport Safety Bureau.

## 2. Analysis

### 2.1 Fire Detection

#### 2.1.1 Light Beam Identified as Fire

In human perception the brain automatically clusters incoming stimuli into configurations and attributes meaning to sensory information. In this procedure the human mind processes information and forms an individual interpretation of it, rather than storing a perfect mirror image of the surrounding world. To code information into these interpretations humans use their memories, personality, experience, knowledge and motivation, and all of these will introduce a certain level of bias into the final product. While processing sensory information, ground staff in this particular occurrence compared visual information to data, memories and knowledge stored in their minds, filtered by experience. Lacking previously encountered information of aircraft logo lights and the physics of fluid vapours along with the light phenomenon these can create, the closest hit to this visual information in their minds, and therefore the most likely explanation, was 'fire', turning the play of lights into a very real emergency. This is how contextual information (light beams from the logo light shining up de-icing fluid vapours) become a perception error, which, missing specific knowledge or experience, will create the misconception of fire for the beholder. This perception error, however, was called out on by a ramp co-worker, who keyed her radio to tell the Ramp Agent straight away that the 'fire' they were looking at was in fact an aircraft light (1.9.2). Both the Ramp Agent and the Fire Captain ignored this key information throughout the occurrence. Her challenging this judgment goes to show that ramp workers' knowledge and individual experience is not always on the same level, the reasons of which is to be found in training, primarily.

The expert psychologist appointed by the IC states the following.

*“Overall, the decision to commence fire extinguishing was presumably determined by perception error, previous experience, personal motivation, peculiarities of the occurrence, cognitive bias, time pressure, insistence on rules, and was probably influenced by a number of personality, situational and background factors.”*

NFM decree No. 53/2016 (16/XII) only defines the topics of training, without detailing their content. The detailed construction of specific training topics is the responsibility of the training organizations, which is supervised and approved by the civil aviation authority. According to the IC, Section 68 (2) (b) *Fundamental Aviation and Technical Knowledge* should explain the interaction of aircraft lighting fixtures with environmental factors. Once outlined, the supervisory authority may require this topic to be included in the current curriculum as compulsory training material. With detailed aircraft familiarization training and/or regular internal experience exchange, the likelihood of a similar detection error to occur can be significantly reduced for both ground handling services and firefighters. In order to reduce the risks associated with lacking training, the IC made safety recommendations.

#### 2.1.2 Ramp Agent Activity

The Ramp Agent stated that he had not quite been accustomed to the new LED apron lighting that had been installed shortly before the occurrence. In the given the weather conditions, the de-icing and anti-icing fluid was heavily evaporating over the logo light.

The IC presumes that the strong ramp illumination that was somewhat unusual for the Ramp Agent may have contributed to the erroneous assessment and misinterpretation of fluid vapours lit up by the logo light.

### 2.1.3 Fire Service Activity

Based on the ground distance accounted for by the Fire Captain (1.14.2), on the speed of the vehicles seen in CCTV footage (1.11) and on radio communication details,<sup>27</sup> the IC estimates that the Aerodrome Fire Service units started deployment to the scene about 1 minute from the first call and covered the distance of no more than 500 metres to the scene in another minute. Actual intervention was not started until yet another 2 minutes and 9 seconds passed after arrival (1.14.3). This comes to a total response time of 4 minutes and 9 seconds, which significantly exceeds the LHDC Fire Services Manual's required intervention time of 180 seconds. Stipulating that 50 percent of the extinguishing agent carried needs to have been sprayed within this 180-second timeframe (1.10.1), this manual sets even stricter limits than the relevant EU regulations<sup>28</sup>. For details concerning the firefighting activity timeline see Attachment 3.

The analysis of CCTV footage reveals that on arrival at the scene the Fire Captain took 2 minutes and 9 seconds to walk around the empennage, talk to the Ramp Agent and return to HAB1 and order intervention (1.14.3). While driving to the scene, the Fire Captain was presented with all available information concerning location, and rather than visiting the Ramp Agent to double check information and encircling the tail several times, he could have directly concentrated forces around the empennage for more detailed intelligence. Delayed fire intervention is attributable, on the one hand, to the Ramp Agent's ungainly and inefficient way to pass on information to the fire personnel by bits at a time and, on the other hand, to the Fire Captain's unreasonably lengthy decision making. All the time wasted could have been used to make a more thorough site survey and a more informed decision. Consideration given to all available information, such as the use of high-tech equipment, including a thermal image camera, or making use of the mind pool around and listen to the information given by a ramp co-worker (Section 1.9.2, "*That's a light!*") could have saved the day, or at least significantly reduce the likelihood of making an erroneous decision – even with the Fire Captain in charge of the operation lacking specific aircraft knowledge or previous experience thereof.

A confirmation bias occurs when specific evidence supporting a particular hypothesis is being sought after. The IC believes that in this case this is what happened to the Fire Captain and the responding fire personnel, resulting in a poorly founded, rash decision, where all additionally available information (cited in Section 1.9.2) was rejected, along with the consideration of further alternatives.

The IC is of the view that the Fire Captain took his decision hastily and under multiple sources of pressure, such as peer pressure, overcompliance, intense emotions associated with the emergency (1.9.2) and failed to consider all available resources and circumstances.

### 2.1.4 Flight Crew Activity

Both pilots stated that there were no signs of fire, including any fire warning in the cockpit (1.1). If an on-board fire occurs on board where no fire detection is installed, the crew will not receive an ECAM warning leading them through the steps of the fire drill. In such a case the commander has to fall back on common sense supported by knowledge and experience, and decide on the necessity of emergency evacuation using the available information. It is not easy to take a decision of such magnitude, unsupported by either a fire warning or any signs of a fire such as smoke, system failure or human perception in the cabin, and so on. Furthermore, fire was reported from an aircraft section where it is utterly unlikely to occur, which made the crew challenge the report and seek confirmation from all available sources. These comprise multiple calls to the Ramp Agent (who did confirm the fire), input from the

---

<sup>27</sup> During moving out to the scene, Fire Service received location details when HAB1 driver was inquiring where to deploy for fire response (1.14.2 and 1.14.3)

<sup>28</sup> Easy Access Rules for Aerodromes (Regulation (EU) No 139/2014) / AMC5 ADR.OPS.B.010(a)(2) Rescue and firefighting services

tower staff (who did not confirm visual of any fire), and from the Fire Captain, who not only did confirm the fire, but went as far as urging immediate evacuation. It is important to note here that while a number of on-board failures allow ample time for investigating and sorting out the problem, timely decision making is paramount in case of a suspected fire on board. Time pressure plays a decisive role in the captain's final decision to evacuate. The IC corroborates that heeding passenger safety, the flight crew – however suspicious of a false alarm – had no other sensible choice but evacuate, even though only outside observers – and not all of them, at that – confirmed seeing flames on top of the stabilizer. Adding to the complexity of the situation, it is worth mentioning that during their basic and recurrent simulator training, pilots typically encounter emergency fire drills of a more obvious nature. That is to say, either a fire warning is set off to indicate a fire, or there are clear visible and perceptible signs thereof, such as flames or smoke; or a cabin crew report confirms fire in the cabin – and all of that would typically come with ensuing system failures consistent with the fire at hand. Additionally, these simulator drills would predictably involve fires originating in aircraft parts more prone to igniting, such as an engine or fuel line, electric system, air packs, avionic bay, cargo compartment, toilets, landing gear bay – to name but the most typical areas. The occurrence at Debrecen Airport, beside the compelling time pressure and the overwhelming responsibility on the crew, bore hardly any similarity with simulator fire drills known to the crew. The Captain, therefore, found himself in uncharted territory having to decide whether or not to evacuate. The fire source was not accessible for visual checks from the aircraft interior, so all the crew had for decision making was the information from the ground crew, who – especially the Fire Captain – must have been trained and experienced to be able to tell it was a fire they were facing. For this reason, the flight crew had to take the ground crew's assessment of the situation at face value and make their decision accordingly.

Considering all the above, the Captain eventually called for emergency evacuation, which the crew performed and completed by the Operator's emergency drill directives.

The flight crew might have had a chance to avoid the evacuation that, in retrospect, turned out to be unnecessary, by falling back on their knowledge of aircraft systems, realising that the suspected fire is in fact an illusion caused by the logo light shining up the evanescent de-icing fluid vapours passing off the stabilizer. With this bit of knowledge at hand, they could have turned the logo light off for a minute and check with the ground crew whether they could still see flames at the back. Since this exact specific scenario has never been addressed during their training, in the given circumstances it is not a realistic expectation from airline pilots to be able to dig up this minute detail from the back of their heads and, connecting the dots, overrule ground staff perception and pinpoint the fallacy they have been presented. Without knowing what they know now, the only sensible decision they could make was the one that would provide the highest level of safety. Suspected fires on board or any signs thereof need to be taken seriously and handled with the utmost precaution. These situations are extremely time critical, leaving very little time to spare, which certainly exclude checking working theories or experimenting with trial-and-error approaches, as each minute wasted can significantly compromise survival chances for aircraft occupants.

## **2.2 Passenger Briefing**

### **2.2.1 Safety Briefing Card**

The applicable rules and guidelines cited in *Section 1.18.4* provide but a broad outline concerning the form and content of safety briefing cards, leaving it entirely to operators to come up with illustrations that are clear and easy to understand. The IC has found that cabin attendants do not get involved in passenger interpretation of pictograms in the safety briefing cards, so it is particularly important that these pictograms are absolutely clear and unambiguous about the operation of emergency exits and ABP duties in an emergency. ICAO Doc 10086, section 4.3.4 mandates that *“each pictogram needs to be clearly*

*understood by a broad population of different educational and cultural backgrounds. Therefore, comprehension tests should be conducted to ensure that pictograms are well understood’.*

As cited in *Section 1.18.7*, a statement from a psychological analysis saying that the use of contrasting colours in pictograms will enhance comprehension, seems to be in contrast with *ICAO Doc.10086, paragraph 4.3.33*, stipulating that pictograms should be designed to be readable and comprehensible even in a monochrome style (*ibid.*). The IC considers that these statements are not contradictory and operators, while allowed to print colour safety cards, also need to comply with ICAO’s more stringent guidelines concerning pictogram design. In the case concerned, however, safety card pictograms were not clear enough even in colour.

The IC has studied a number of safety briefing card designs in use with several airlines across Europe and found that the level of pictogram intelligibility spreads over a broad range. Detailed analysis also revealed that standardisation of these illustrations is contrary to reason, because variations are based on difference of aircraft models and diverse livery styles, as well as cultural backgrounds of each operator. The IC has proposed safety recommendations for EASA to elucidate requirements relating to safety briefing cards, including verification of intelligibility as set forth in *ICAO Doc 10086, paragraph 4.3*.

### **2.2.2 Language Issues**

For time constraint and logistical reasons airlines and operators cannot realistically be expected to provide safety demos and passenger briefings in the native language of each passenger on board. As a generally accepted alternative, English and the main languages of the country of origin and destination will be used for the above purposes.

The IC has found that the Operator’s procedures and practice do not comply with the guidelines cited in *Section 1.18.4*, because the airline operates flights across several countries. In certain combination of destinations, crew duties will include flight legs that both originate and terminate in a country other than the crew’s home base, where the local language will not be spoken by crew members (*Section 1.18.4.3*).

As being prepared for every possible eventuality is not quite feasible, English is considered the primary means of communication during flight. Crew will sort out communication issues and bridge language barriers according to their experience, using means momentarily available for them, such as involving other passengers they share a common language with. Since this is less than ideal in terms of safety, clarity and unambiguity of pictograms in the safety cards or any printed passenger information is paramount.

### **2.2.3 ABP Briefing at Emergency Exits**

As referred to in *Section 1.18.5.3*, the Operator’s procedures require that passengers seated next to an emergency exit are to receive ABP briefing and no other passengers need to be prepared to open emergency exits in case of an emergency.

*CAM Section 4.1*.<sup>29</sup> states the following.

*“History shows that most accidents occurred during take-off, initial climb, approach and landing, leaving very little or no time for preparation”.*

The IC fully agrees with the Operator’s statement as quoted above and therefore opines that the Operator’s current practices call for modifications, inasmuch as door operation should be explained to emergency exit row passengers during their ABP briefing, as cited in *Section 1.18.5.3*. On a side note, in the Operator’s current practice, ABP’s will only get this extra bit

---

<sup>29</sup> CAM REV 22 (31 MAY 2021)

of information on door operation in real emergencies, time permitting. To address this issue, the IC proposes a safety recommendation.

The IC believes that ABP's should be trained prior to departure in a fashion that gives them functional knowledge to act efficiently in an emergency and fulfil their ABP duties according to expectations. In the practice of the Operator in effect at the time of the incident, however, the level of pre-departure training of ABP's did not meet this expectation for the following reasons.

1. Verbal pre-flight information provided for ABP's does not detail duties expected from them in an emergency. Cabin crew will merely ask ABP's to study the pictograms and information provided in the safety briefing cards and in placards on the door post next to emergency exits. The clarity and intelligibility of these pictograms fall short of expectations, as detailed before in *Section 1.18.5.3*.
2. The command for emergency evacuation and the ABP's subsequent evaluation of cabin and outside conditions to verify safe opening is not mentioned at all.
3. The flight crew's PA command "*Evacuate, evacuate!*" ordering cabin crew to start the evacuation protocol is not the word cabin attendants use when they train ABP's (which would be "*emergency*"), and also not the command, "*Emergency, emergency!*" cabin crew would use to tell passengers to evacuate. Consequently, it may confuse ABP's to hear a different command "*Evacuate, evacuate!*" on the PA and they might not be sure whether to wait for the cabin crew command "*Emergency, emergency!*" as they were trained, or go ahead and open the exits straight away. To address this matter, the IC issues a safety recommendation.

#### 2.2.4 Passenger Briefing Summary

The IC needs to contest the Operator's statement given in response to our inquiry, saying that ABP passengers receive adequate information. Although these issues are addressed in various sections throughout the CAM, only *Section 4.2 "Prepared Emergency on Land"* contains comprehensive information on emergency evacuation, which information, by default, will not be passed on during uneventful daily flights. The IC sustains that simplified ABP briefings tailored to suit fast paced everyday routine are deficient in real life. ABP's are not presented with detailed information that furnish them with adequate insight concerning the decision making they will need to go through in a real emergency. Likewise, they are not coached to make informed decisions when to open the exits on their own initiative and when to wait for crew commands to do so. It is also not explained to them in clarity who is it that will instruct them, cabin or flight crew, and what commands will be used to order or prohibit exit opening.

The fact that the crew's daily routine ABP briefing, as described in CAM General (*CAM 1.7.7.2 Emergency exit row briefing in normal operation*) includes the least information and provides the most vague description of ABP duties, falls short of an ideal preparation, as mentioned in *Section 1.18.5.3. CAM Section 11.16.2. (A321 Differences)* list somewhat more of useful information for ABP's, but according to the logic of OM, anything listed here would only apply to procedures used on A321 models. As said before, *CAM Section 4.2 "Prepared Emergency on Land"* provides the most comprehensive list, but this protocol applies to a rather limited range of emergencies, and it is not used in daily practice.

Based on the above, the IC opines that the requirements stipulating that ABP's must be told which commands to expect ordering exit opening, as cited in *Sections 1.18.4 and 1.18.5*, are not fulfilled for procedures used in A320 models. It is rather confusing that the newly coined command added to CAM since the incident<sup>30</sup>, "*If anytime on ground you hear the crew shouting 'emergency' you will need to open the exits*", the word "*emergency*" is still different from command words used in other parts of the document, namely, in section *Prepared*

---

<sup>30</sup> CAM REV 21 (02 JUNE 2020)



*emergency on water* and in certain cases of *unprepared emergencies*<sup>31</sup>. Furthermore, the crew do not clearly explain to ABP's when and under what circumstances they need to take the initiative and open the exits on their own – despite that section *Prepared Emergency on Land* contains an elaborate description of this process. The IC would also like to point out that the word “*emergency*” is too vague for a command compared to “*Evacuate!*” and also not assertive and descriptive enough to make ABP's open the exits.

As discussed in sections 2.2.1 and 2.2.2, not every passenger spoke the language of the safety demonstration. Since the images in the safety briefing card also fell short of conveying the intended meaning, requirements set forth in *EASA CAT.OP.MPA.170*, “*the operator shall ensure that passengers are given briefings and demonstrations relating to safety in a form that facilitates the application of the procedures applicable in the event of an emergency*” was not met.

Air transport today is readily available to a wide range of the population and the number experienced passengers has significantly increased since the research referred to in *Section 1.18.4.4* was published in 2000. This means that the conclusions of the study have likely been outdated and passenger discipline has presumably become a great deal more wayward over the past 20-odd years. The IC is of the view that verbal passenger briefings should cover all the information a passenger will need in an emergency, rather than just lay out the basics, with the ABP's having to study the safety card and decipher its pictograms to get to the missing bits that complement the initial verbal guidance. Safety cards should only serve as a summary to reinforce verbal information and a reminder for further reference. Simplified, minimalistic verbal briefing given to ABP's during the incident concerned was not sufficient to prepare them in an adequate manner.

The IC believes that training provided for passengers along with appropriate safety briefings will bring sufficient results in reducing risks associated with the cited issues, and thereby a decrease should be expected in the number of passenger noncompliance, such as taking their carry-on luggage with them during an evacuation.

The Operator's procedure applied at the time of the incident (1.18.5) did not meet EASA requirements<sup>32</sup> stipulating that ABP briefing must be provided for every passenger seated in emergency exit rows. To address this issue, the Operator issued a CAM revision, effective of 2 June 2020, with the requirement of all passengers seated in emergency exit rows are to receive pre-departure ABP briefing.

## 2.3 Communication

Prompt and efficient communication is essential in an emergency to ensure that appropriate response is achieved to help save lives and control further damage as far as possible.

In the concerned incident the Ramp Agent made a direct call the Airport Fire Service to alert them, which is not compliant with *Debrecen Airport Firefighting Services Manual, Chapter 2.6 'Communication and alarm systems'* (referred to in *Debrecen Airport Manual*), saying that “*in the event of aircraft incidents, AFIS staff shall notify response personnel on duty in each case*”. In this particular case, however, this non-compliance accelerated the flow of information.

Following his first alarm call to the Fire Service, the Ramp Agent took another 49 seconds to give details to the Fire Captain about the cause of the alert (1.9.2). The IC believes that the Ramp Agent's tardiness in providing useful information to the Fire Service fell short of effective communication principles. In a real fire emergency, the IC opines, such slow and unproductive communication could put the fire squads in further delay in their emergency response, and therefore may have incurred more dire consequences.

<sup>31</sup> E.g. in relation to CAM 3.6 Rejected take-off (Rev 20, 27 FEB 2019 and Rev 21, 02 JUNE 2020)

<sup>32</sup> Easy Access Rules for Air Operations, AMC1 CAT.OP.MPA.165 Passenger seating

By current national legislation, flight operations officer licence applicants are not required to undergo radio communication training (1.18.1), which has created a conflicting legislative environment. Licensed service providers that employ flight operations officers are required to obtain station licences for transceivers their employees are to use (1.17 and 1.18.1). These station licenses, on the one hand, include the prerequisite for operators to have been trained to use these units, but on the other hand, flight operations officers, who are entitled to operate radio units by default, are not required by licensing authorities to undergo such training in order to get their professional licence (1.18.1).

As per available information, ground handling service providers will regularly offer radio communication training courses for employees (1.18.1). Without standardisation though, such self-organised tutelage secure no guarantee towards each ground handling staff member getting the same training in terms of content and quality. The IC has reviewed the communication training material used by the ground handling company, as mentioned in Section 1.18.1. The course material contained a basic summary of areas such as the importance of communication, the information transfer process and an overview of communication equipment, but did not discuss practical bits like radio phraseology or communication procedures in detail, for that matter. The IC deems that the reviewed training material is not solid enough to guarantee proficiency in safety-critical communication.

In summary, licensed flight operations officers, such as the Ramp Agent in this particular case, operating within the current contradictory legislative environment, cannot realistically be expected to conduct efficient radio exchange in lack of proper standardised training. Therefore, the IC proposes a safety recommendation aimed at clearing up these inconsistencies in prevalent legislation.

## 2.4 Evacuation

### 2.4.1 Passenger Behaviour

Beyond reasons explained in Section 2.2.3, why emergency exit row passengers chose not to open emergency exits, the IC would list the occupants' apparent lack of perceiving immediate threat. According to witness accounts, passengers remained calm throughout and did not feel their lives were at any point in danger.

It is in human nature that individuals in a state of emergency-induced narrow focus can only be responsive in actions they are so familiar with that they are their second nature. Otherwise, they often need a sharp stimulus to snap them out of this stunned state of mind. Such stimuli may include, among others, a strong visual impulse or a loud, sharp verbal command with clear instructions.

The TSB-appointed expert states the following.

*“One of the reasons people will take their hand luggage with them in spite of all the prohibitions and constant reminders, may be found in the anatomy of an emergency, which is a situation demanding fast action that people will respond to, mostly by instinctive, automatic individual responses.*

*Another motif may be the fear of loss of property. To understand this, we need to comprehend human attachment to objects, the sense of possession and the threat of losing one's personal property. Possession is a powerful psychological experience, because it comes with a sense of control and command (Belk, 1988a, quoted by Dúll, 2009). Sense of control reinforces the self-concept, boosts self-confidence and creates a sense of security. Therefore, individuals will find it extremely difficult to detach from their property. Emotional attachment to objects, particularly to objects in one's home may be particularly important for the individual, either by being associated with pleasant memories of the past or evoking long gone inclinations one used to cherish. This attachment can be so strong that certain objects may become*

*part of the self, complete with individual qualities and characteristics, act as an extension of the self. Their importance in the possessor's eyes may even overshadow living beings. Oftentimes, attachment to objects may be so strong that it can interfere with human contacts, and the loss or damage thereof can put the possessor's personal identity in danger (Belk, 1992, quoted by Dúll, 2009). Loss of objects to a disaster may be an exceptionally powerful experience, being so sudden and unexpected, requiring fast decisions over human lives and possessions. In such circumstances it is typical human behaviour to try and save as much as one can. The workings of how people can emotionally attach to possessions just as to fellow humans sometimes, explain why passengers, when feeling cornered, will take their baggage with them in an evacuation, against all no-nos, and how difficult it is trying to stop this instinctive human response to save the items regarded as part of the self."*

In the evacuation concerned, a significant percentage of passengers showed up at the doors with their carry-on they retrieved from under the seats and/or the overhead compartments. With a large number of these items confiscated, 28 percent of the passengers still managed to make it all the way out with their hand luggage. The primary goal of an evacuation is to get everyone out as quick as possible, so passengers blocking the escape route while collecting their belongings, rather than make a fast way out, will put a serious setback in evacuation efficiency. Apparently, these passengers fail to consider the immense threat their behaviour poses not only to themselves, but to other people's chances of survival as well. It stands to reason that instructions from the crew, meaningful pictograms and proper passenger briefings can, however moderately, increase passenger awareness concerning the importance of leaving their things behind to save lives in an emergency.

Passengers showing up at the door with their luggage in hand will immediately limit evacuation efficiency and give the cabin crew additional problems to deal with. Having to fight passengers confiscating their luggage will not only consume cabin crew's resources, but also break their focus in their effort to keep up passenger flow rate. Furthermore, bags piling up at the doors over time will eventually bottleneck the escape route and further aggravate the situation. The IC concurs that cabin attendants forced into this circumstance are often cornered into allowing passengers, for the greater good, to get out with their luggage, however much this puts both slide health and human life in danger. As a collateral, further passengers, witnessing the cabin crew's apparent tolerance to carry-on being taken out, will also feel invited and encouraged to follow suit and dig up their own luggage to bring it along. This spiral, once started, is ready to escalate out of hand very quickly, while it is just as hard to break – and the risk it poses to flight safety is exceedingly high.

This is exactly what happened in the investigated case. Cabin crew at the fore exits managed to confiscate a number of large pieces of carry-on with the greatest risk to slide integrity. Over time, realising that both the time spent on this and all the baggage piling up fast would negatively affect evacuation efficiency, cabin crew, in order to facilitate evacuation, gave up trying to take away carry-on items.

In their efforts to preserve slide integrity and maximise passenger flow, cabin crew were continuously instructing passengers to leave their luggage behind. A large share of passengers, however, either did not understand, or chose to ignore these instructions. In real fire emergencies bare seconds of delay can cost lives: industry standards in aircraft design mandate that all occupants must be evacuated in no more than 90 seconds in an emergency, which means, each passenger must get out of this particular aircraft model in no more than 4 seconds<sup>33</sup>. Retrieving an item from the overhead compartment takes about this long, but realistically speaking, it can take a whole lot longer. By this logic, each carry-on item brought out of the aircraft translates to a life or two lost to fire or smoke and toxic fume inhalation. The IC opines that dispersing information on the reasons of the restriction and

---

<sup>33</sup> (90/186\*8=3.87)

possible consequences of non-compliance during passenger briefings would prompt a higher cooperation rate.

#### 2.4.2 Cabin Crew Actions

Generally speaking, cabin crew actions during the evacuation were conform to CAM directives and disembarkation was relatively efficient in the given circumstances. Their decisions choosing usable exits were sound and reasonable. Their logic behind postponing overwing exit opening generally stands to reason, but leaves one focal question open. Namely, in the need of overwing exit opening due to a potential escalation of the situation, with the briefed ABP's by then gone for the fore exits, and cabin crew out of reach, doing their job at the fore and aft stations, with all the worked up passengers crammed up mid-aisle, who would have opened these exits?

The evacuation was performed in 3 minutes and 48 seconds. Although this timeframe exceeded the 90-second industry standard, in this particular event proved sufficient. For a proper context the following factors need consideration.

- **Gravity of the situation.** No actual fire or smoke was present on board and outside, so there was no immediate threat to life.
- **Escalation of the urgency.** With no actual fire, there was no real emergency accompanied by panic or stampede. The situation did not escalate throughout the event and opening the overwing exits never became a necessity.
- **Level of passenger cooperation.** General disregard for instructions to leave carry-on items behind induced additional difficulties and slowed down disembarkation.
- **Number of exits.** Cabin crew's decision at the aft to exclude the use of rear doors is justified, taken there was a suspected fire outside and foam was visibly being sprayed all over the tail section. With the initial decision not to open the overwing exits until necessary on their minds, cabin crew eventually used but two of the eight emergency exits. Although this meant a significant reduction in passenger flow, back-up options had been available throughout to fall back on when needed.

**Ruling out overwing exits.** CA3 and CA4 in charge of these stations saw no fire, smelled no smoke, nor did they perceive any signs of fire throughout the event. When they saw that ABP's chose not to open the overwing exits, they agreed to this decision and went along with it, bearing in mind that opening these exits would still remain an option when the situation would call for it. Considering this, they did not instruct the ABP's to open the exits.

## 2.5 De-icing in LHDC

Document *E17*<sup>34</sup> contains the following conflicting information and directives not compliant with relevant rules and regulations (1.18.3).

- HOT starting time is not defined in document *E17*, yet in *EASA Easy Access Rules for Air Operations GM3 CAT.OP.MPA.250 "Ice and other contaminants — ground procedures"*<sup>35</sup> the following definition is provided: "with a two-step procedure, the HOT begins at the commencement of the second (anti-icing) step".
- Airport manual *E17* also says that "anti-icing must be carried out no later than 3 minutes from the commencement of the first step". This is in conflict with aviation standards (1.18.3), which mandates that "the second step will be taken before the first step fluid freezes (typically within 3 minutes but severe conditions may shorten this)".

The IC sees a hazard in the above inaccurate statements being misinterpreted, therefore proposes a safety recommendation to reduce potential associated flight safety risks.

<sup>34</sup> 'Aircraft De-icing and Anti-icing Directives', issued for Debrecen Airport Ground Services

<sup>35</sup> EASA Easy Access Rules for Air Operations, edition July 2021

## **2.6 Training of Aerodrome Fire Service Personnel**

The training of Debrecen Airport Fire Service personnel was done by a training organisation that had no supervisory body to oversee their activity. The reason for this, as they have stated, was that the service they provided was not mandated to be licensed and certified (1.18.10).

As this training organisation has continuously provided fire service personnel training at several aerodromes in the country, the above identified non-compliance poses a significant, nation-wide flight safety risk. Without going into details over the specific training curriculum used in these courses, the IC hereby expresses concerns over a training organisation offering aviation fire service training services without being supervised which, by all means, is another safety hazard.

## 3. Conclusions

### 3.1 Findings

#### 3.1.1 Aircraft

Certificate of Airworthiness was valid. (1.6.2)

As recorded in its documentation, the aircraft was equipped according to relevant rules and regulations and it had been maintained in line with the approved maintenance procedures. (1.6)

The investigation revealed no indication to any structural or systems related failure with effect to the occurrence outcome. (1.6.5)

All equipment required in the Type Certificate list had been installed. The IC did not find any concerns and none have been reported to them relating to aircraft equipment. (1.8; 1.9)

#### 3.1.2 Flight and Cabin Crew, Ramp Agent and Fire Captain

At the time of the incident, flight and cabin crew was properly licensed, qualified and current with adequate experience required for their flight duties. (1.5) and

The commander's decision to evacuate was sound and on the side of safety. (2.1.4)

Cabin crew executed the evacuation protocol in compliance with CAM's directives. Considering cabin crew's prerogative to prioritise, their ruling out the use of rear and overwing exits during evacuation was in no breach of prevailing directives and regulations. (2.4.2)

The Ramp Agent made a direct alert call to the Aerodrome Fire Service to summon them on the scene, which is not compliant with the directives set forth in the Airport Manual. (2.3)

Neither the Ramp Agent, nor the Fire Captain had adequate aircraft knowledge necessary to make an accurate situation assessment in the given circumstances. (2.1.3)

#### 3.1.3 Aircraft Operation

Both flight and cabin crew performed their duties according to rules and regulations. (2.1.4)

Aircraft weight and balance was within limits. Fuel on board was ample and of the required grade and quality. (1.6.4)

#### 3.1.4 Operator

Pre-flight briefing for emergency exit row passengers did not meet relevant regulations. (1.18.5)

Crew commands used during emergency evacuation are neither explicit and to-the-point, nor are explained to ABP's in advance, and are therefore prone to ambiguity. (2.2.3)

Pictograms in the safety briefing cards also fail to convey a clear message as intended, even in colour layout. (2.2.1)

#### 3.1.5 ATS, Airport, Aerodrome Fire Service

The aerodrome operator had valid licences required by law. (1.17)

The Aerodrome Fire Service was not alerted in compliance with prevailing aerodrome directives. (2.3)

The airport ground handling service provider's training material contains insufficient information for trainees to be able to conduct adequate safety-critical radio communication. (2.3)

The IC did not find any concerns and none have been reported to them relating to ground-based navigation equipment. (1.8)

The IC did not find any concerns and none have been reported to them relating to ground-based radio communication equipment aircraft equipment. (1.9)

The concerned aerodrome's operating licence was valid. (1.10)

Several entries in the aerodrome's de-icing and anti-icing procedures are not in harmony with relevant EASA requirements. (2.5)

The aerodrome's de-icing and anti-icing procedures contain multiple inaccuracies which, being prone to misinterpretation, call for revision. (2.5)

The firefighters' intervention time significantly exceeded the reaction time prescribed in the LHDC Fire Services Manual, but was compliant with relevant EU regulations.. (2.1.3)

### **3.1.6 Data Recorders**

Data and image recording devices located at the aerodrome, ATS equipment and other required data recording systems were operational. Recorded data were retrieved and used in the investigation. (1.11)

### **3.1.7 Medical and Pathological Information**

No evidence suggested any physiological or other factors adversely affecting crew capacity in the incident. (1.13)

### **3.1.8 Survival Aspects**

Nobody was injured in the occurrence. (1.2)

### **3.1.9 Supervisory System**

In contrast to international practices, Flight Operations Officer licence applicants in Hungary are not required to undergo radio communication training. (1.18.1; 2.3)

Relevant EU legislation does not provide clear guidelines for operators in safety briefing card content and design. (2.2.1)

## **3.2 Causes**

The IC determined that the direct cause of the incident was the Fire Captain's perception error leading to an erroneous decision. (2.1.3)

Furthermore, the IC identified the following as contributing factors.

- The Ramp Agent's and the Fire Captain's insufficient aircraft knowledge coming from inadequate training (2.1.1).
- Both the Ramp Agent and the Fire Captain ignored the information provided for them, which could help them to avoid false fire identification (1.9.2).

The IC, in addition, means to point out the following safety risks which, although not in direct causal relation to the occurrence, have been found during the investigation.

- Pictograms in the safety briefing cards are not clear and unambiguous enough to convey the intended message. (2.2.1)

- The ABP briefing delivered to emergency exit row passengers does not suitably prepare them to perform efficiently in emergencies. (2.2)
- The commands cabin crew use to effectuate evacuation are not clear enough. (2.2)
- Passengers will go to great lengths to retrieve and take off their carry-on items during emergency evacuation. (2.4)



## 4. Safety Recommendations

### 4.1 Actions taken by the Operator during the investigation

During the span of the safety investigation the Operator revised their Cabin Attendant Manual (CAM) and implemented risk mitigation measures as a result of their internal safety investigation (1.17.1).

### 4.2 Interim Safety Recommendation

During the safety investigation, on 11 February 2020, Hungarian TSB issued the following safety recommendation (the complete safety recommendation is attached in Appendix 2).

**BA2020-0008-4-1A:** In the course of their safety investigation, the IC of Hungarian Transport Safety Bureau has found that the pictograms in the on-board safety briefing cards instructing passengers to remove shoes and leave carry-on items behind in an evacuation are not adequately conspicuous. Additionally, several other pictograms in the safety briefing cards are unintelligible, difficult to understand, or misleading.

**For this reason, the Transport Safety Bureau of Hungary recommends that Wizz Air Hungary Ltd. revise their on-board safety briefing card in a way that prohibitions concerning shoes and carry-on items in an evacuation shall be both duly conspicuous and readily intelligible, and every pictogram in the safety briefing card shall convey the intended message without the possibility of misinterpretation.**

The IC expects that the adoption and implementation of the amendments outlined in the above recommendation will ensure greater efficiency in passenger emergency briefing, and thus contribute towards increasing passengers' chances for survival in case of an emergency.

Upon receipt of the safety recommendation, the Operator informed the IC in writing that they would comment on the proposals within 90 days. Later, the Operator indicated that they had planned to introduce the modified passenger information cards in October 2022 and again in January 2023.

### 4.3 Concluding Safety Recommendations

The Investigating Committee of TSB proposes the following safety recommendations.

**BA2020-0008-4-1:** The IC has found out that Decree No. 53/2016 (XII. 16.) of the Ministry of National Development, in contradiction with prevailing ICAO standards, does not require Flight Operations Officer applicants to undergo radio communications training in the course of their licencing procedures.

**To address this concern, the Transport Safety Bureau of Hungary recommends that the Deputy State Secretary responsible for Transport of the Ministry of Construction and Transport provide that national legislation regulating Flight Operations Officer licencing is revised and amended so as its provisions are in adherence with international recommendation.**

With the adoption and implementation of the above legislative revisions, risks associated with ground handling personnel's inexpert radio communication is expected to minimise.

---

**BA2020-0008-4-2:** The IC has found that the supervision of the training organizations of airport firefighters is not supervised by any authority in Hungary.

**The Transport Safety Bureau of Hungary recommends that that the Deputy State Secretary responsible for Transport of the Ministry of Construction and Transport amend the current regulations so that airport fire services are placed under the supervision of a designated public body.**

With the adoption and implementation of the above legislative revisions, the IC expects that the harmonisation and supervision of the training and educational activities carried out by the training organisations of airport firefighters in Hungary will be ensured.

---

**BA2020-0008-4-3:** In the course of the safety investigation the IC has found out that EU legislation does not provide sufficient guidelines for operators in the design and content of safety briefing cards.

**The Transport Safety Bureau of Hungary recommends that European Aviation Safety Agency (EASA) provide to offer comprehensive guidelines for air operators concerning safety briefing card content and design.**

By adopting the above proposal, safety briefing cards are expected to become more informative and therefore more useful in fulfilling their primary purpose.

---

**BA2020-0008-4-4:** The IC has found that the training material used to train the Ground Handling Service personnel at Debrecen International Airport did not cover light phenomena potentially capable of causing optical illusions induced by aircraft lights, including upright beams, interacting with the environment.

**Therefore, the Transport Safety Bureau of Hungary recommends that the Air Navigation and Air Navigation Services and Aerodromes Supervisory Department of the Ministry of Construction and Transport seek to revise the training material used by Aerodrome Ground Service Providers to train their personnel, by including the discussion and explanation of light phenomena potentially capable of causing optical illusions when aircraft lights, including upright beams, interact with the environment. Furthermore, TSB recommends that the a.m. authority reject any further ground handling service provider training curricula submitted for approval, unless revised according to the above.**

By adopting and implementing the above measures a decrease is expected in the probability of Ground Handling Service personnel mistakenly identifying upright light beams illuminating vapours as fire, and will contribute to avoiding similar mistakes resulting from similar optical illusions.

---

**BA2020-0008-4-5:** The IC has established that cabin crew emergency evacuation commands used aboard flights operated by Wizz Air Hungary Ltd. are not consistent with flight deck commands and also not expressive enough.

**For this reason, Transport Safety Bureau of Hungary recommends that Wizz Air Hungary Ltd. revise the commands to be used to order emergency evacuation, and standardise them throughout company operation procedures.**

With the adoption and implementation of the proposed changes, safety risks associated with the use of inconsistent and vague commands to order emergency evacuation will be reduced.

---

**BA2020-0008-4-6:** The IC has established that cabin crew emergency evacuation commands used aboard flights operated by Wizz Air Hungary Ltd. are not consistent with flight deck commands and also not expressive enough.

**For this reason, Transport Safety Bureau of Hungary recommends that Wizz Air Hungary Ltd. revise the commands to be used to order emergency evacuation, and standardise them throughout company operation procedures.**


With the adoption and implementation of the proposed changes, safety risks associated with the use of inconsistent and vague commands to order emergency evacuation will be reduced.

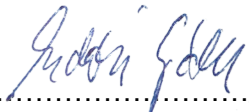
**BA2020-0008-4-7:** The IC of the TSB has revealed that several entries in the directives published by Debrecen International Airport Kft., regulating de-icing and anti-icing procedures at Debrecen Airport are inconsistent with relevant industry standards and recommendations, therefore leave room for misinterpretation.

**The Transport Safety Bureau of Hungary recommends that Debrecen International Airport Kft. revise the directives issued to regulate de-icing and anti-icing procedures at Debrecen Airport so that the corrected version shall reflect conformity with relevant industry standards and recommendations.**

It is expected that effecting the proposed corrections in the next revision, flight safety risks posed by inaccuracies in the current version will be eliminated.

Dated in Budapest, on 12 January 2023

  
.....  
Mr. Zsigmond Nagy  
Investigator-in-Charge

  
.....  
Mr. Gábor Erdősi  
Investigator

# APPENDICES

## Appendix 1: Safety Briefing Card of A320

# FOR YOUR SAFETY

# A320-200





### LAND



### WATER



### EVACUATION

**EXIT A**





**EXIT B**





### LIFE VEST

#### TYPE 1



#### TYPE 2







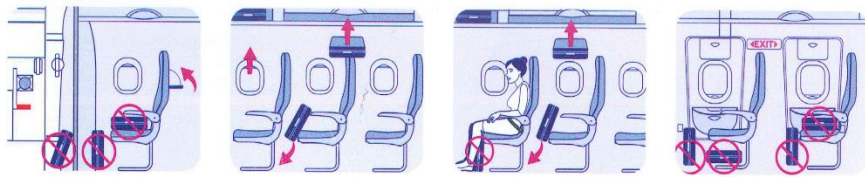
PLEASE DO NOT REMOVE THIS SAFETY INSTRUCTION CARD FROM THE AIRCRAFT.  
THIS SAFETY INSTRUCTION CARD HAS BEEN APPROVED BY WIZZ AIR ACCOUNTABLE MANAGER. (-) REV 07 SIC-320-MAR-2019



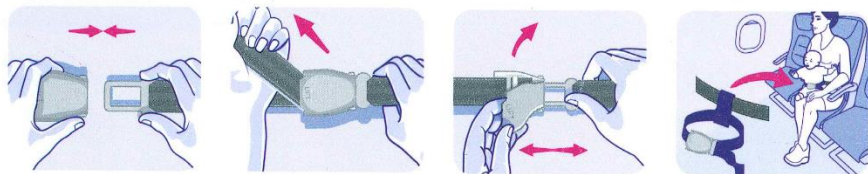
# FOR YOUR SAFETY A320-200



## TAXI, TAKE-OFF, LANDING



## SEAT BELT - LOW AND TIGHT



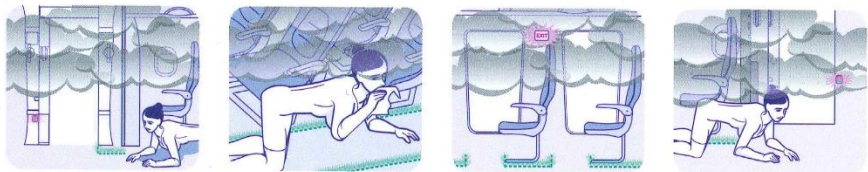
## OXYGEN



## BRACE POSITION



## ESCAPE ROUTES



PLEASE DO NOT REMOVE THIS SAFETY INSTRUCTION CARD FROM THE AIRCRAFT.  
THIS SAFETY INSTRUCTION CARD HAS BEEN APPROVED BY WIZZ AIR ACCOUNTABLE MANAGER. (-)

REV 07 SIC-320-MAR-2019

**Appendix 2: Interim Safety Recommendation (BA2020-0008-4-1A)**

INNOVÁCIÓS ÉS TECHNOLÓGIAI  
MINISZTERIUM  
KÖZLEKEDÉSBIZTONSÁGI SZERVEZET

Iktatószám: KBSZ/939-8/2020-ITM

Ügyintéző: Nagy Zsigmond  
Telefonszám: +36 1 432-6240

[REDACTED]  
részére

**Wizz Air Hungary Kft.**

Budapest  
Kőér u. 2./A, B épület  
H-1103

**Tárgy:** azonnali biztonsági ajánlás

Tisztelt [REDACTED]!

A 2020. január 4-én Debrecen repülőtéren, a HA-LYD lajstromjelű Airbus A320 repülőgéppel bekövetkezett repülésemény (vészkiürítés) kapcsán a Közlekedésbiztonsági Szervezet szakmai vizsgálatot folytat, melynek eddigi megállapításai alapján a BA2020-0008-4-1A számon, a 2005. évi CLXXXIV. törvény 9. § (4) bekezdése alapján az alábbi biztonsági ajánlást adja ki:

*A Közlekedésbiztonsági Szervezet Vizsgálóbizottsága a szakmai vizsgálat során azt tapasztalta, hogy a légi jármű fedélzetén rendszeresített utastájékoztató kártyán, egy esetleges evakuáció során a cipő viselésre és a kézipoggyászra vonatkozó tiltások nem kellően figyelemfelhívóak, valamint a tájékoztatásra szolgáló ábrák sok esetben értelmezhetetlenek, illetve nehezen értelmezhetőek és félrevezetőek. Ezért*

**a Közlekedésbiztonsági Szervezet javasolja a Wizz Air Hungary Kft.-nek, hogy a fedélzetén rendszeresített utastájékoztató kártyán tegye kellően figyelemfelhívóvá, egyértelműen értelmezhetővé az evakuáció során a cipőre és a kézipoggyászra alkalmazott tiltásokat, illetve gondoskodjon a kártyán alkalmazott egyéb ábrák egyértelművé tételéről.**

*Az ajánlás elfogadása és végrehajtása esetén a Vizsgálóbizottság véleménye szerint a vészhelyzetekre vonatkozó utastájékoztatók hatékonyabban valósítható meg, ezzel növelve az utasok túlélésének lehetőségét.*

Közlekedésbiztonsági Szervezet, 1441 Budapest, Pf. 88.  
e-mail: kbszrepules@itm.gov.hu  
tel.: (+36 1) 432-6240; fax: (+36 1) 432-6241

1 - 4

A Vizsgálóbizottság a szakmai vizsgálat során az alábbi ténymegállapításokat teszi az Airbus A320-200 típusú légi jármű utastájékoztató kártyával kapcsolatosan (*számok megegyeznek az 1.számú mellékleten találhatóakkal*):

- **1**: a jelölt utasítások a többi ábrához képest kisebbek, nehezen észrevehetőek és értelmezhetőek.
- **2**: az ajtó nyitására vonatkozó utasítás az Airbus A320 típuscsalád esetében csak a törzs bal oldali (entry) ajtókra igaz. A törzs jobb oldali (service) ajtókat balra kell nyitni.
- **3**: az ábra jelentése nem értelmezhető.
- **4**: a mentőmellény övének meghúzása összetéveszthető a mellény felfújásának (működésének) utasításával.
- **5**: Mind a Type 1 és Type 2 csecsemő mentőmellény használatának ábrarészéből hiányzik az az utasítás, hogy azokat mikor kell felfújni (működtetni).
- **6**: az ábrarészlet megtévesztő.

A Közlekedésbiztonsági Szervezet a fenti biztonsági ajánlást levél formájában küldi meg az eseményben érintett légi jármű üzemeltetőjének valamint megjelenteti a honlapján is.

A Közlekedésbiztonsági Szervezet kéri a tisztelt címzettet, hogy a 996/2010/EU rendelet 18. cikk (1) bekezdése alapján a levél kézhezvételétől számított 90 napon belül tájékoztassa Szervezetünket a meghozott vagy tervezett intézkedésekről, és adott esetben az azok végrehajtásához szükséges időről, továbbá amennyiben nem történt intézkedés, annak indoklásáról.

Budapest, 2020. február 11.

Tisztelettel:



**Melléklet:**

1.sz. melléklet: utastájékoztató kártya (1 db, 2 oldal)

**Kapják:**

- Wizz Air Hungary Kft.
- Innovációs és Technológiai Minisztérium, Közlekedési Hatóság, Ügyekért Felelős Helyettes Államtitkárság, Légügyi Kockázatértékelési Hatósági Főosztály

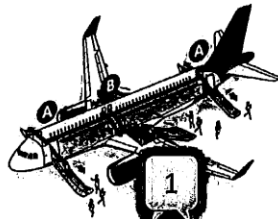
1.számú melléklet

**FOR YOUR SAFETY A320-200**



LAND

WATER



EVACUATION

EXIT A

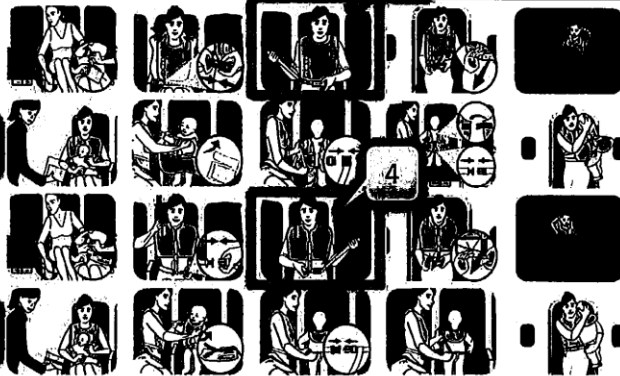
EXIT B



LIFE VEST

TYPE 1

TYPE 2



PLEASE DO NOT REMOVE THIS SAFETY INSTRUCTION CARD FROM THE AIRCRAFT.  
THIS SAFETY INSTRUCTION CARD HAS BEEN APPROVED BY WIZZ AIR ACCOUNTABLE MANAGER. (-) REV 07 51C-320-MAR-2019

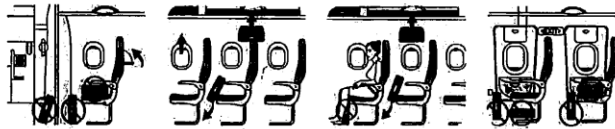


**FOR YOUR SAFETY**

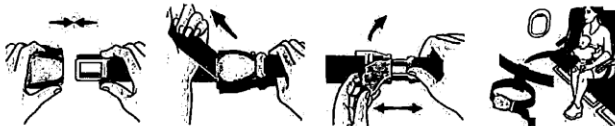
**A320-200**



**TAXI, TAKE-OFF, LANDING**



**SEAT BELT - LOW AND TIGHT**



**OXYGEN**



**BRACE POSITION**



**ESCAPE ROUTES**



PLEASE DO NOT REMOVE THIS SAFETY INSTRUCTION CARD FROM THE AIRCRAFT.  
THIS SAFETY INSTRUCTION CARD HAS BEEN APPROVED BY WIZZ AIR ACCOUNTABLE MANAGER. (-)

REV 07 SIC-320-MAR-2019

### Appendix 3: firefighting activity timeline

