



Abnormal runway contact during takeoff

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ANAC
AGÊNCIA NACIONAL
DE AVIAÇÃO CIVIL

Event description, as per investigation authority report

- Abnormal runway contact during takeoff under heavy rain at Durango Airport, Mexico

EMB-190 31/Jul/2018

- The aircraft experienced an **abnormal** runway contact **during takeoff** under **heavy rain** at Durango Airport, Mexico.
- **103** POB, **NO** fatalities:
 - **14** severe
 - **25** light
 - **64** not injured



Conclusion, as per the final report:

- No evidences of any aircraft malfunction;
- Encountered **bad weather** condition;
- **The crew did not recognize the weather condition** and, therefore, did not follow any of the escape procedures published in the manufacturer's SOP.

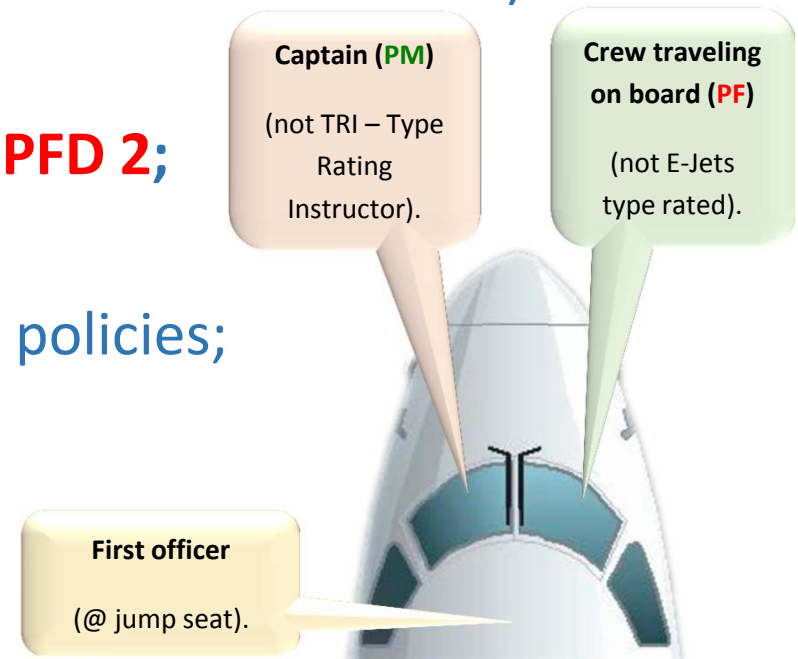


https://reports.aviation-safety.net/2018/20180731-0_E190_XA-GAL.pdf



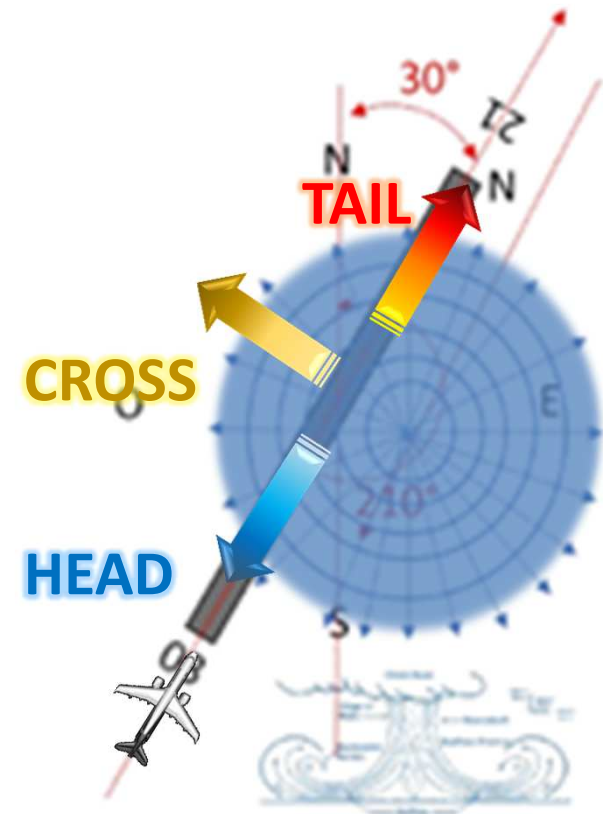
... the contributing factors...

- Non-qualified crew member assigned to act as a co-pilot;
- The informal instruction provided by the captain to the person seating on the right seat (↓ crew's situational awareness).
- **Non recognition of speed variation and differences between PFD 1 and PFD 2;**
- Lack of adherence to operational procedures, sterile cockpit, company policies;
- **Lack of warnings by the ATC about the significant weather changes.**



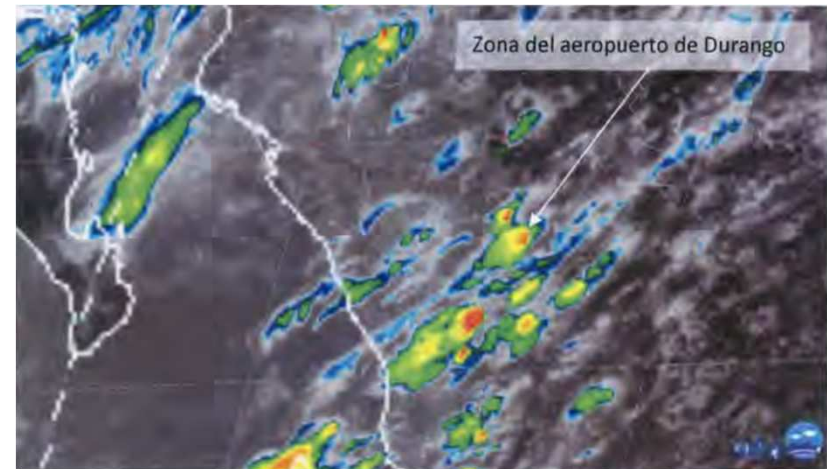
... and the probable cause:

- LOSS OF CONTROL AT THE FINAL PHASE OF THE TAKEOFF RUN (...) DUE TO A **DECREASE OF SPEED AND LIFT.**
- The investigation authority issued recommendations to the operator, local aviation regulator, ATC and airport administrator.



Weather information:

- 20°C (dew point 13°C)
- Relative hum. 64.1%



	Dispatch 14:41	METAR 15:18	SPECI 15:22
Wind	010° @ 5kt	070° @ 3kt	110° @ 23kt
Horizontal Visibility	10 miles	7 miles	0 miles and VV000
Weather	Broken sky @ 2,500ft AGL Cumulonimbus	Thunderstorms Rain Broken sky @ 2,000ft AGL Cumulonimbus	Thunderstorms Rain

TWR: gives authorization to takeoff with wind 090° @ 20kt (15:22).

Surveillance cameras:

Heavy rain time was **15 min.**



Aircraft pushback

Rain starts

Heavy rain

Rain ends

PAX start arriving back

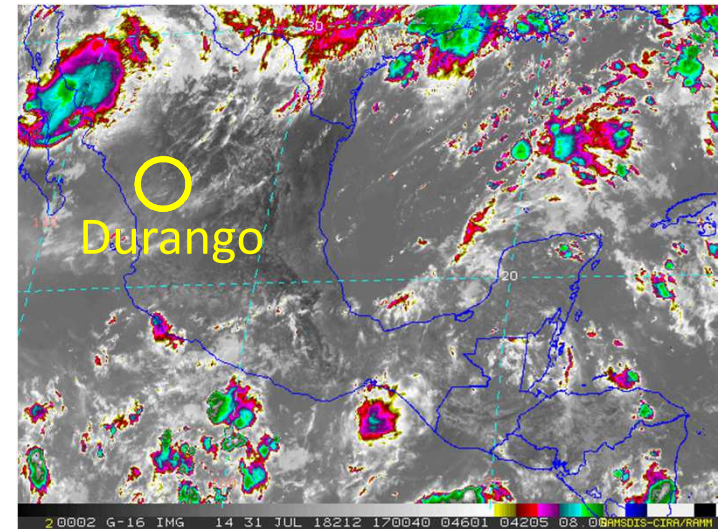
8 min

2 min

15 min

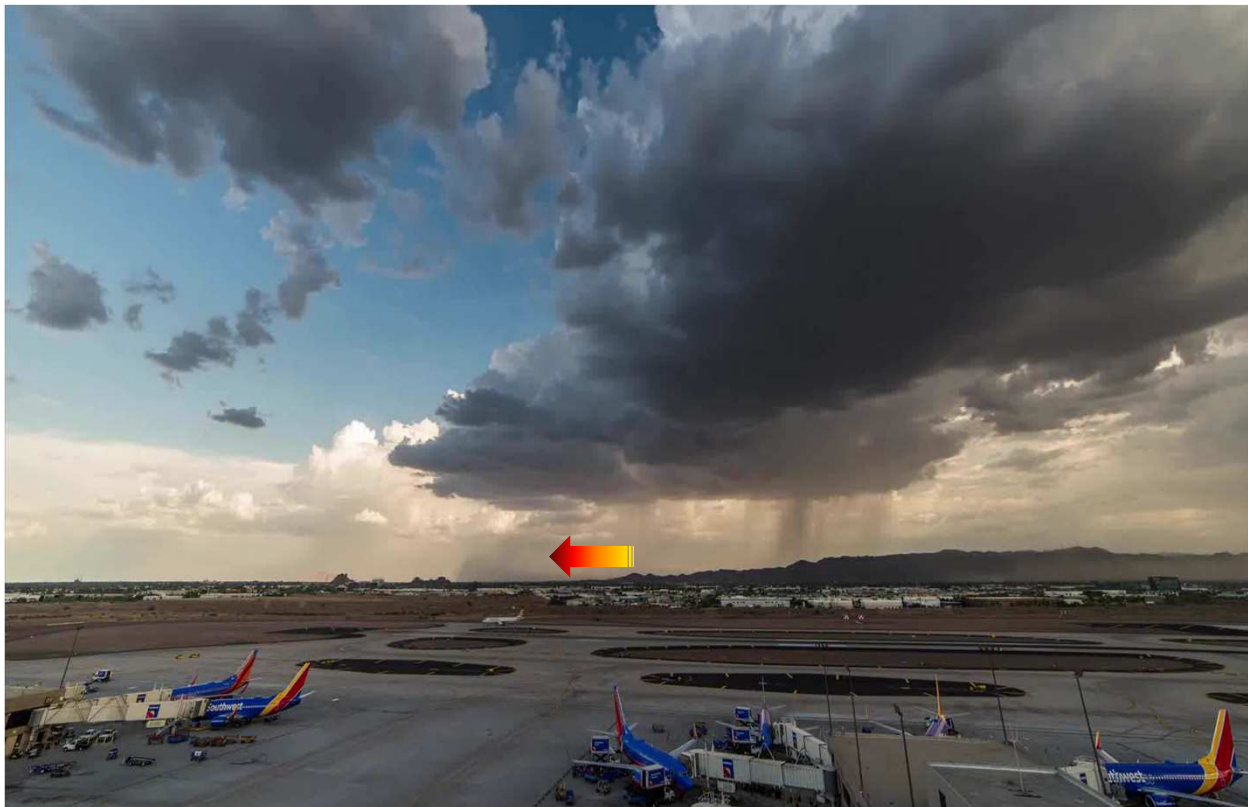
33 min

Weather @ Durango (microburst?):



What is a MICROBURST ?

Phoenix, AZ – July 2016



Microburst noun

mi-cro-burst | \ 'mī-krō-, bərst

- a violent short-lived [5 ~ 15 min] localized downdraft that creates extreme wind shears at low altitudes and is usually associated with thunderstorms.

Let's take a closer look...

Tucson, AZ – August 2015



MICROBURST

They can cause winds
with speeds as high as

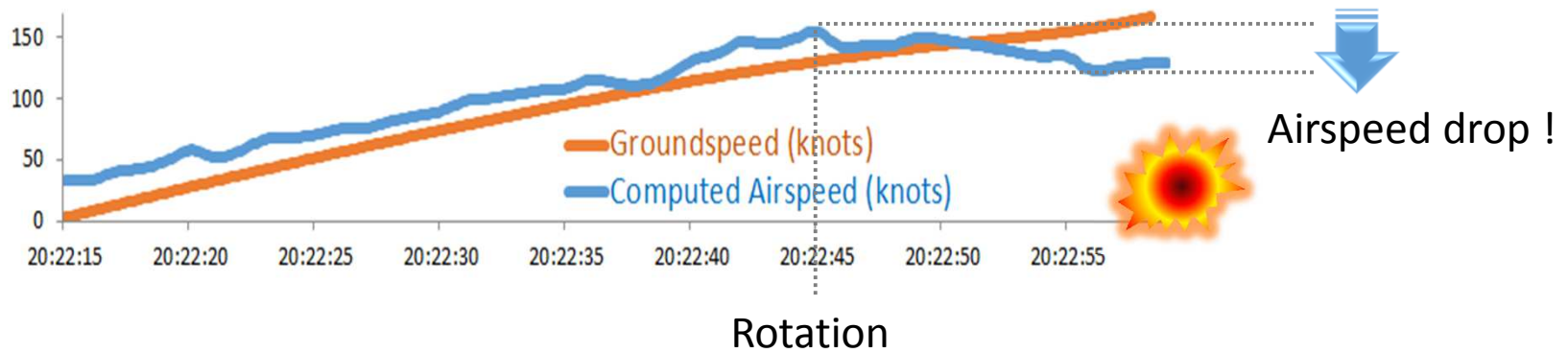
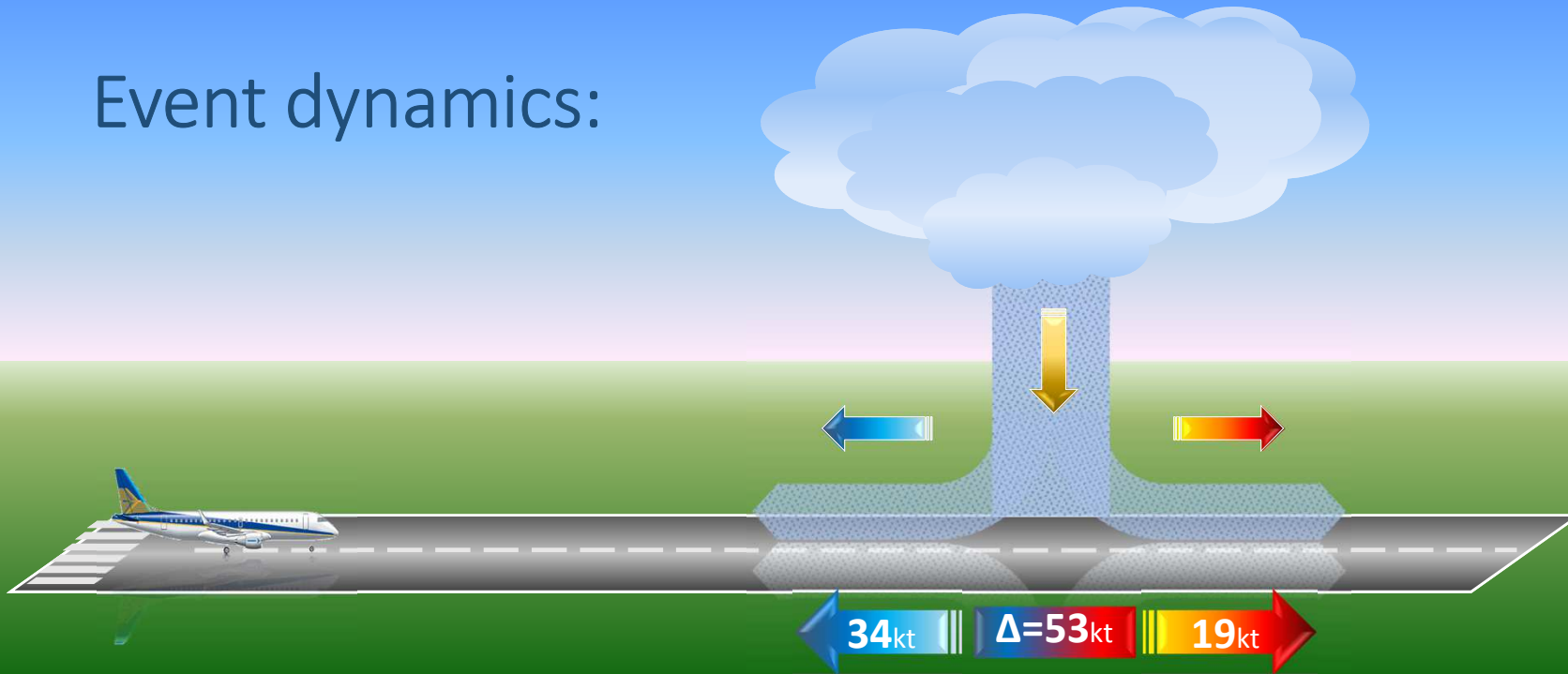
270km/h

167mph

146kt

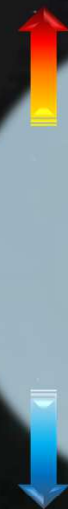
They are difficult to
detect and predict with
standard weather
instruments, and are
especially hazardous to
airplanes during landing
or taking off.

Event dynamics:





CHALLENGE.
CREATE.
OUTPERFORM.



Airspeed #1 #2 Groundspeed

Google Earth

What can be done?

Taking off:



- Use the longest suitable runway;
- Use the maximum rated takeoff power;
- Consider using higher airspeed for liftoff...

Landing:



- Fly a stabilized approach within 1,000ft of the ground;
- Avoid large power reductions;
- Use longest suitable runway;
- Consider using higher approach speed...



STANDARD OPERATING PROCEDURES

NORMAL PROCEDURES (SUPPLEMENTARY)

WINDSHEAR

CHALLENGE	ACTION	PERFORMED BY
Windshear escape maneuver without EGPWS announcement:		
Autopilot	DISENGAGE	PF
Thrust Levers	MAX	PF
When moving the Thrust Levers, press TO/GA Button.		
Pitch	20° OR PLI, WHICHEVER IS LOWER	PF
After stabilizing, pitch may be increased above 20°, limited to PLI.		
Maintain the current configuration (landing gear and flaps) until 1500 ft AGL and with terrain clearance assured.		

Other valid options:

- **Wait for some minutes;**
- **Reject takeoff;**
- **Go-around...**

Some recommendations in the report:

- OPERATOR*:
 - Prohibit that people strange to the operation take the controls or cause reduction of situational awareness;
 - Give training about bad weather detection, instruments indications, aircraft configuration and related procedures;
 - Keep sterile cockpit procedures;
 - Callout changes (phraseology);
 - Stick to ICAO Doc 4444;

(*) This is not the whole list



- DIRECCIÓN GENERAL DE AERONÁUTICA CIVIL*:
 - Implement a risk level criteria for bad weather;
 - Airports to install storm detection / classification systems;
 - Eliminate risks to the power supply.
- AIR TRAFFIC CONTROL*:
 - Assure updated information is provided to crew;
 - Evaluate the necessary people count at control station;
 - Eliminate risks to the power supply.
 - Stick to ICAO Doc 4444 phraseology.


(*) This is not the whole list



Risk trends, and a final thought

“More turbulence from climate change”

Allianz “AVIATION RISK 2020” report



“When everything seems to be going against you, remember that the airplane takes off against the wind, not with it.”

Henry Ford

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