



Airport means business:

Captain Rob van Eekeren

Vice chairman IFALPA / AGE committee

Air transport business



Basic Needs ?

■ Operator Business:

Carry pax / cargo (pay-load) from airport A to B

- Pay-load
- Aircraft
- Fuel
- Crew

■ Airport business:

Operate a provision for landing, take off and handling of aircraft.

- Ramp
- Runway

Why do (South) African pilots ask their co-pilot to do the walk-around?



Ramp Safety

Runway Safety



What is a runway?

A place for 80+ ton fuel at 300km+/hr.

Is that a problem?

No, if you are Michel Schumacher in a Ferrari on a circuit.

Agility of aircraft

- However, Aircraft on ground are per design limited:
- **Maneuverability**
 - Run over the edge of a runway: **Runway Excursion**
- **Decelerating**
 - Overrun the runway : **Runway Excursion**
 - Crash into other object (aircraft, vehicle, material, person, wild life, etc.): **Runway Incursion**

Runway safety

Runway Incursions



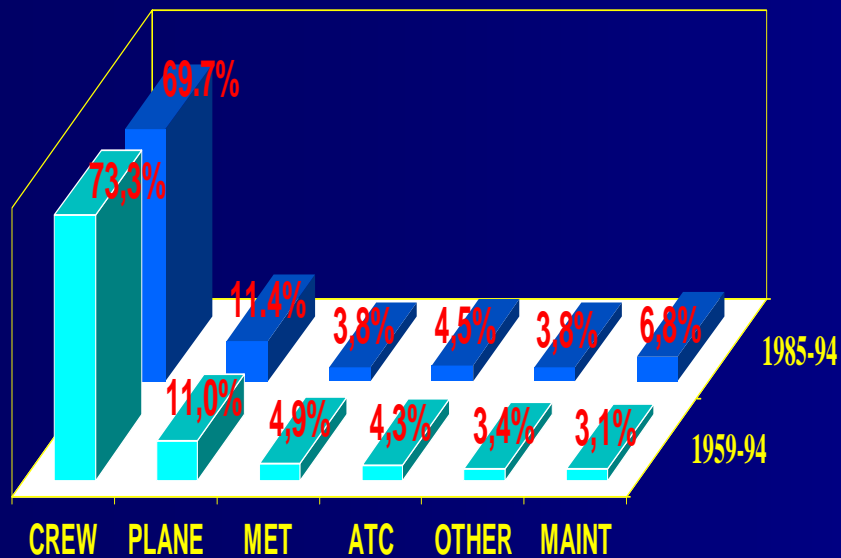
Runway Incursions:

Milan Linate oct 2001,
MD 87 / Cessna 525.

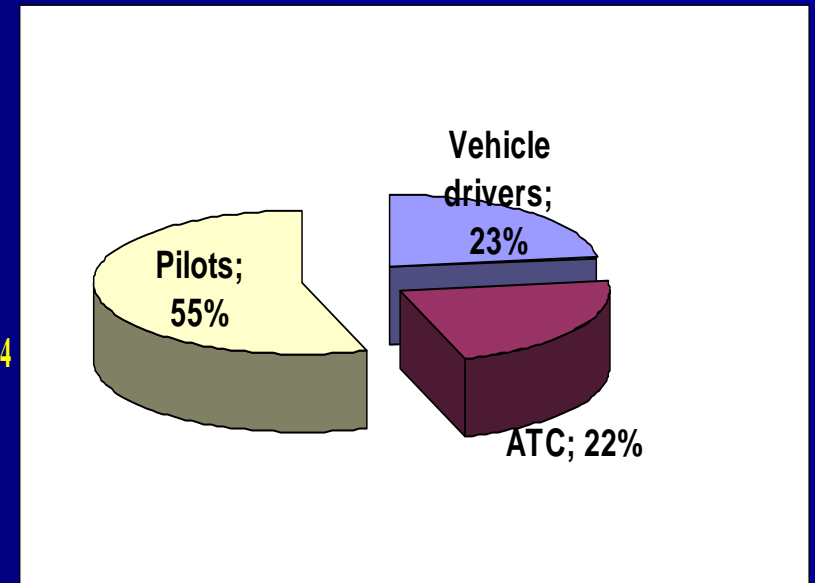


Causes accidents

PRIMARY CAUSES OF AIRPLANES LOSSES

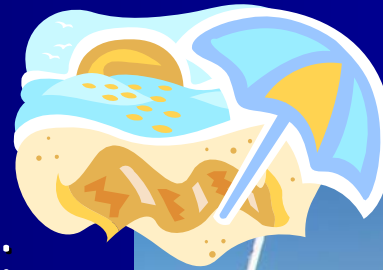


Causes runway Incursions

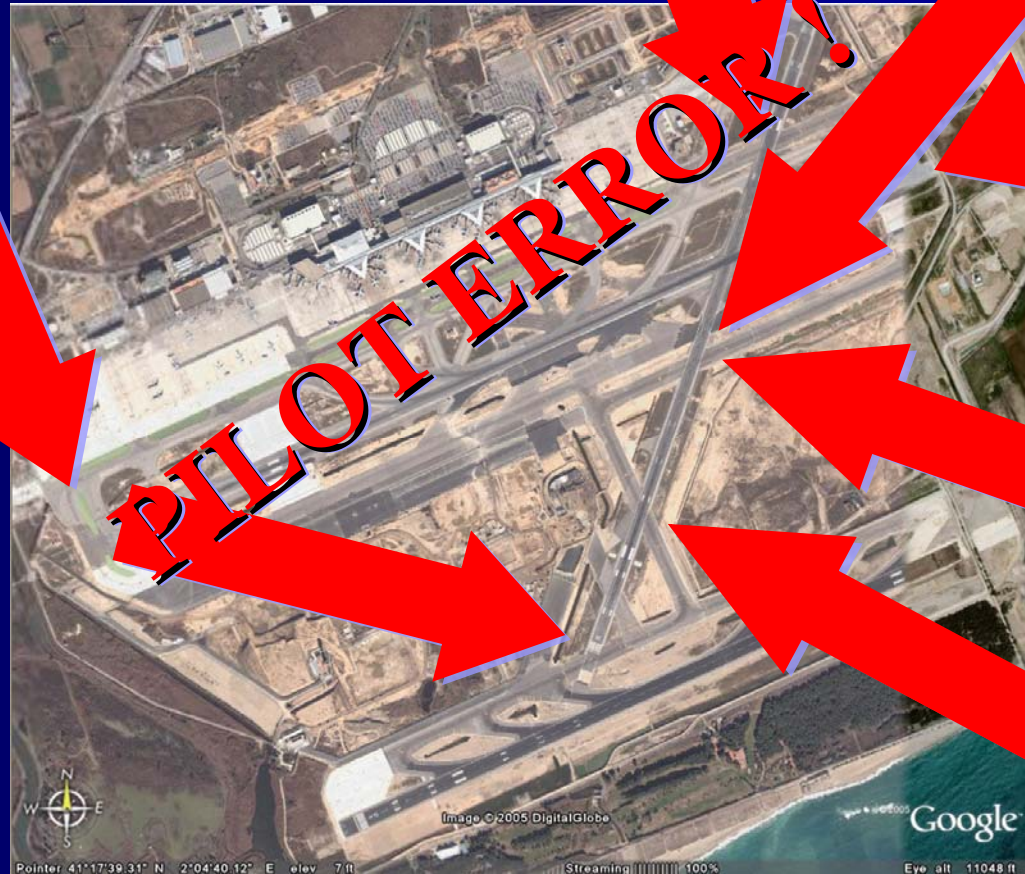


Airport Managers, Legislators, Authorities.

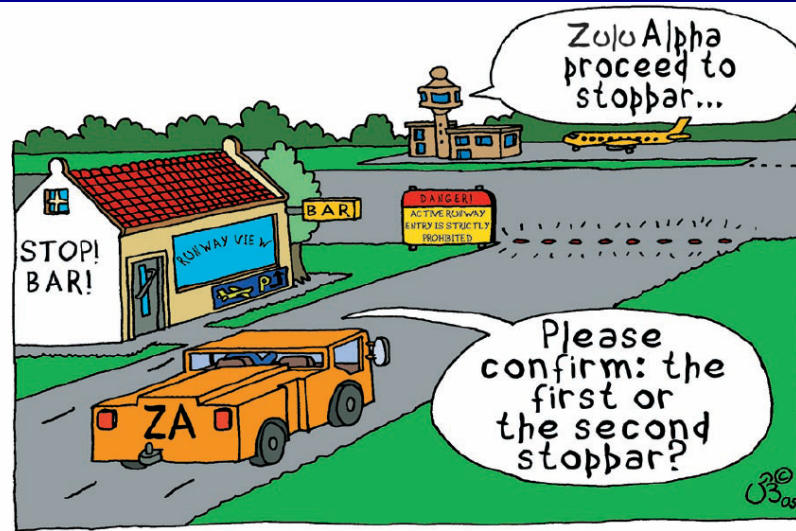
- In view of the statistics:
- Sit Back and **RELAX**



Airside design: runway crossing requirements



STOPBARS ? The least!



Crossing a red stopbar is prohibited.



What Else?



A-SMGCS & Runway Safety Annual Workshop



Simultaneous positional information
Simultaneous proximity warning for Pilots, Controllers
and Drivers

Runway safety

Runway Excursions



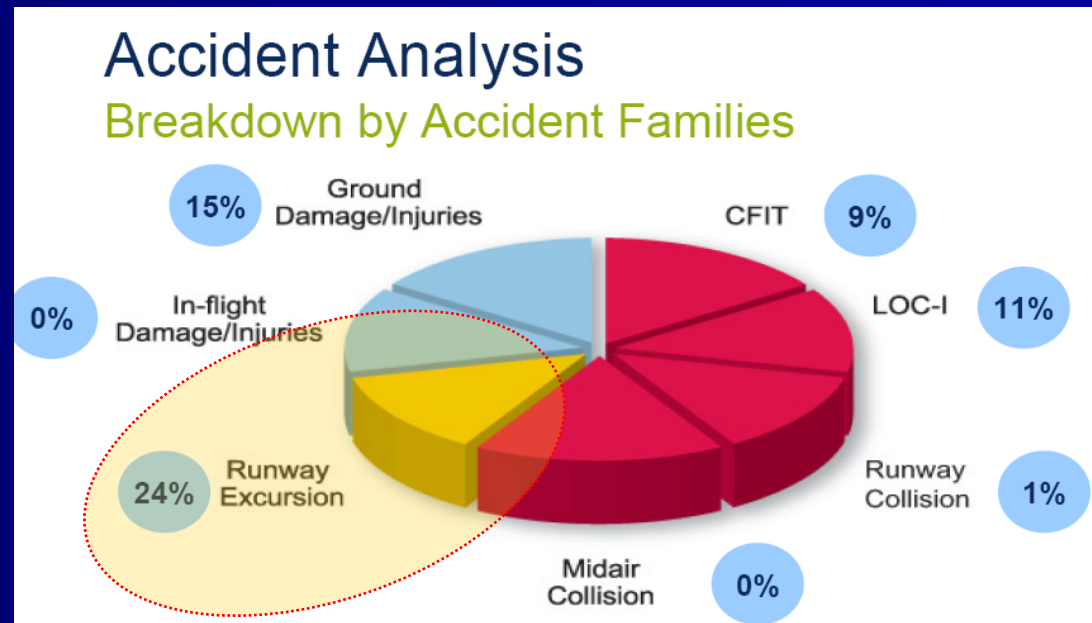
A runway excursion is a veer off or overrun off the runway surface.



Mashhad, Iran, 1-sept-2006
TU-154.

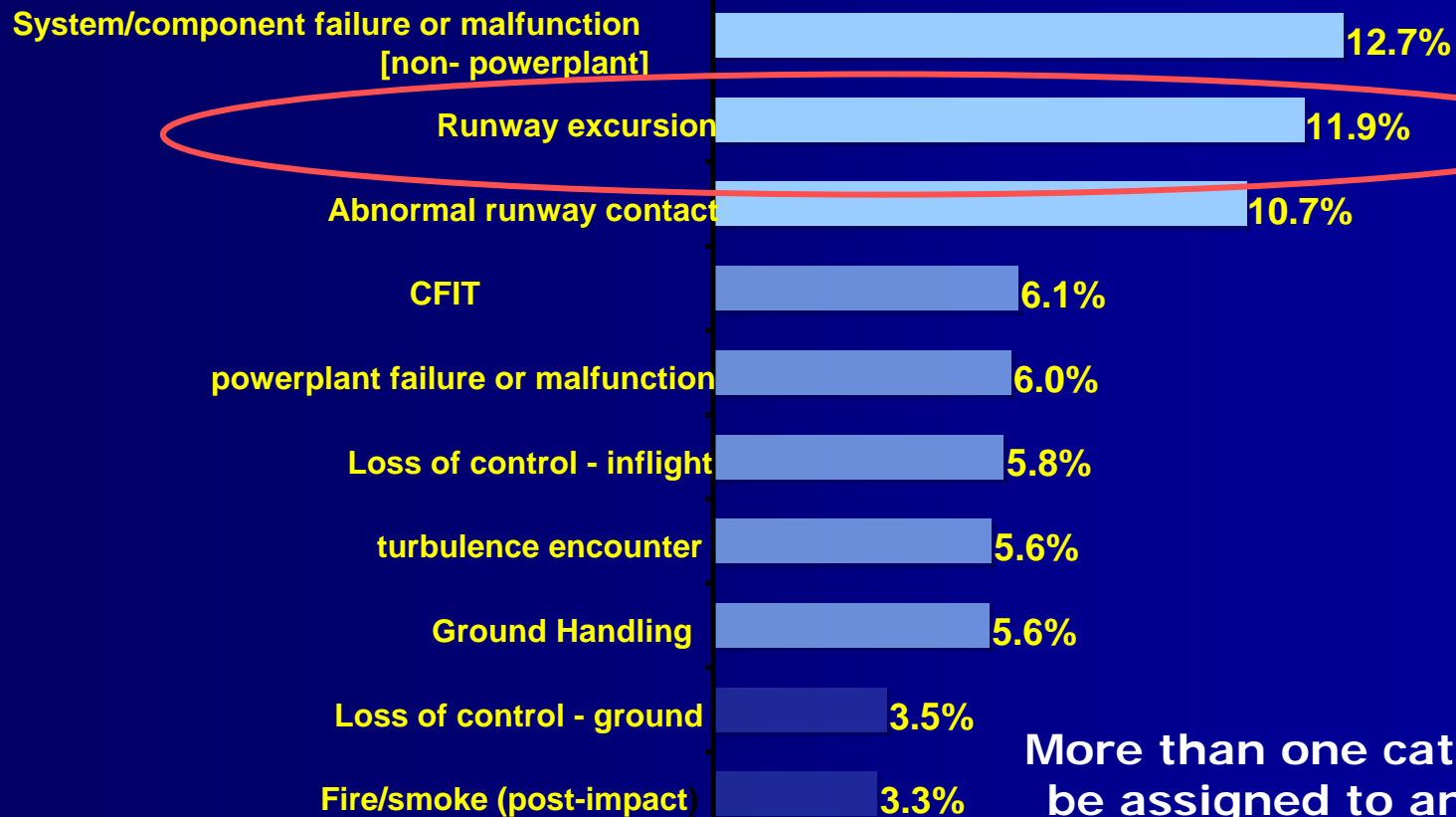
Runway Excursions

- Runway Excursions
 - Excursions > Incursions
 - Airport capacity
 - Airport safety



Source: IATA 24 april 2006, Halifax

Top 10 accident categories (1997-2005)

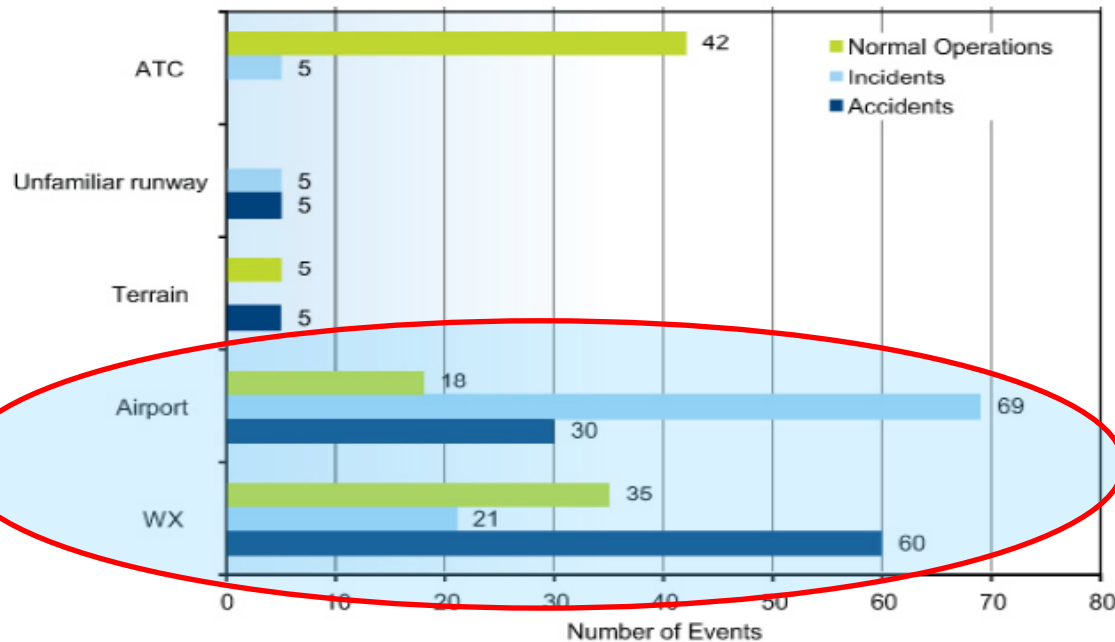


More than one category can be assigned to an accident

IATA RWY EXCURSIONS



Environmental Threats Runway Excursions

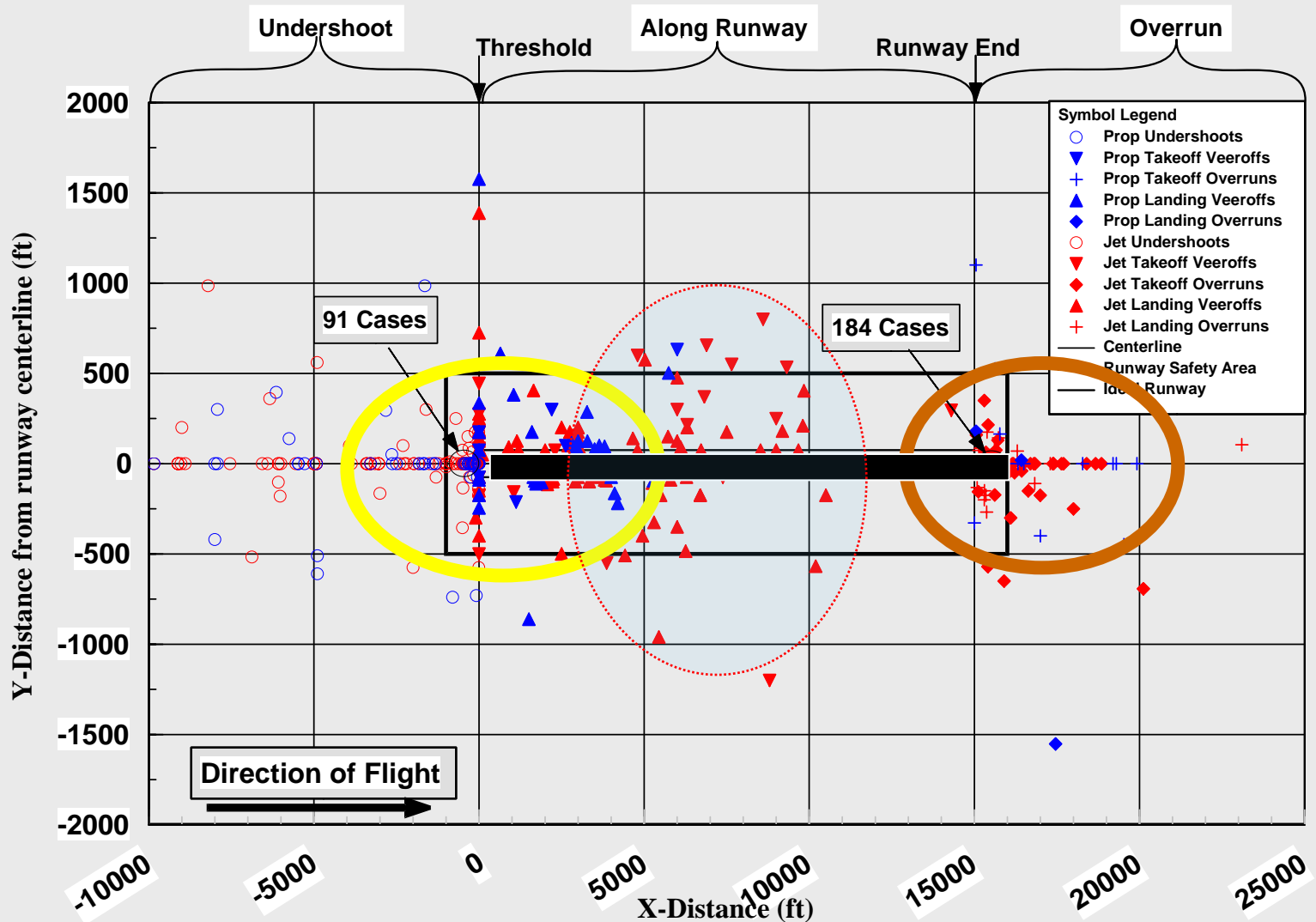


Source: IATA 24 april 2006, Halifax

Where Accidents Happen



Location of Landing and Takeoff Accidents



last updated, 3/5/97

Runway excursions accidents



Multiple engine commercial aircraft 1997-2005.

■ Total distribution:

- 75 % landing
- 53 % veer-offs
- 25 % rejected take-off
- 47 % overruns

■ OF landing incidents

- 51 % landing accidents occurred on a wet or contaminated runway.

BUT

- Only 10% movements are on wet or contaminated runways

=> P_{accident wet/contem} is 10x higher than P_{acc dry}.

Do Runway excursions effect Airports?

1. Runway open is business; a closed runway is not.
2. Airports good father ship
3. Publicity; (WWW)
 - CFIT → Airline (SWISS-AIR)
 - Runway → Airport (TORONTO)

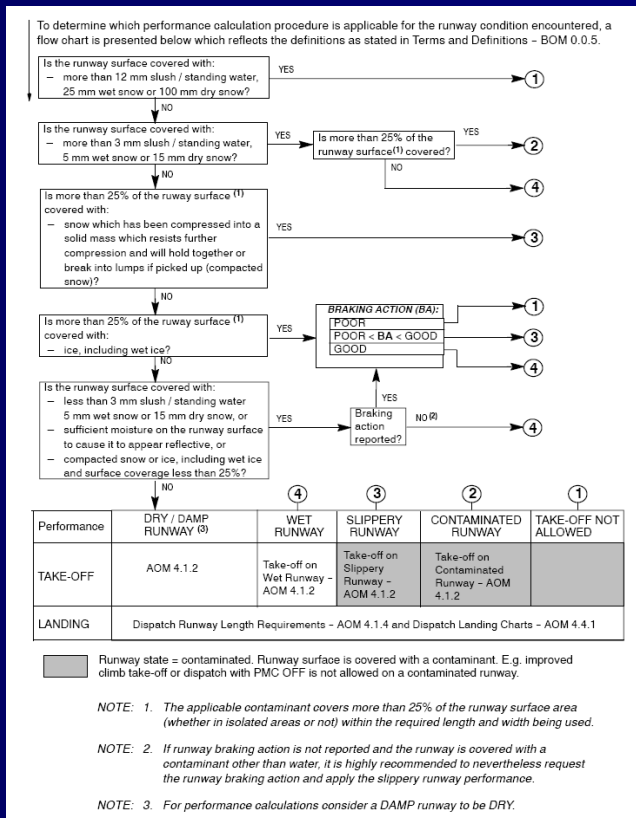


Operator business:

→ Pay -load

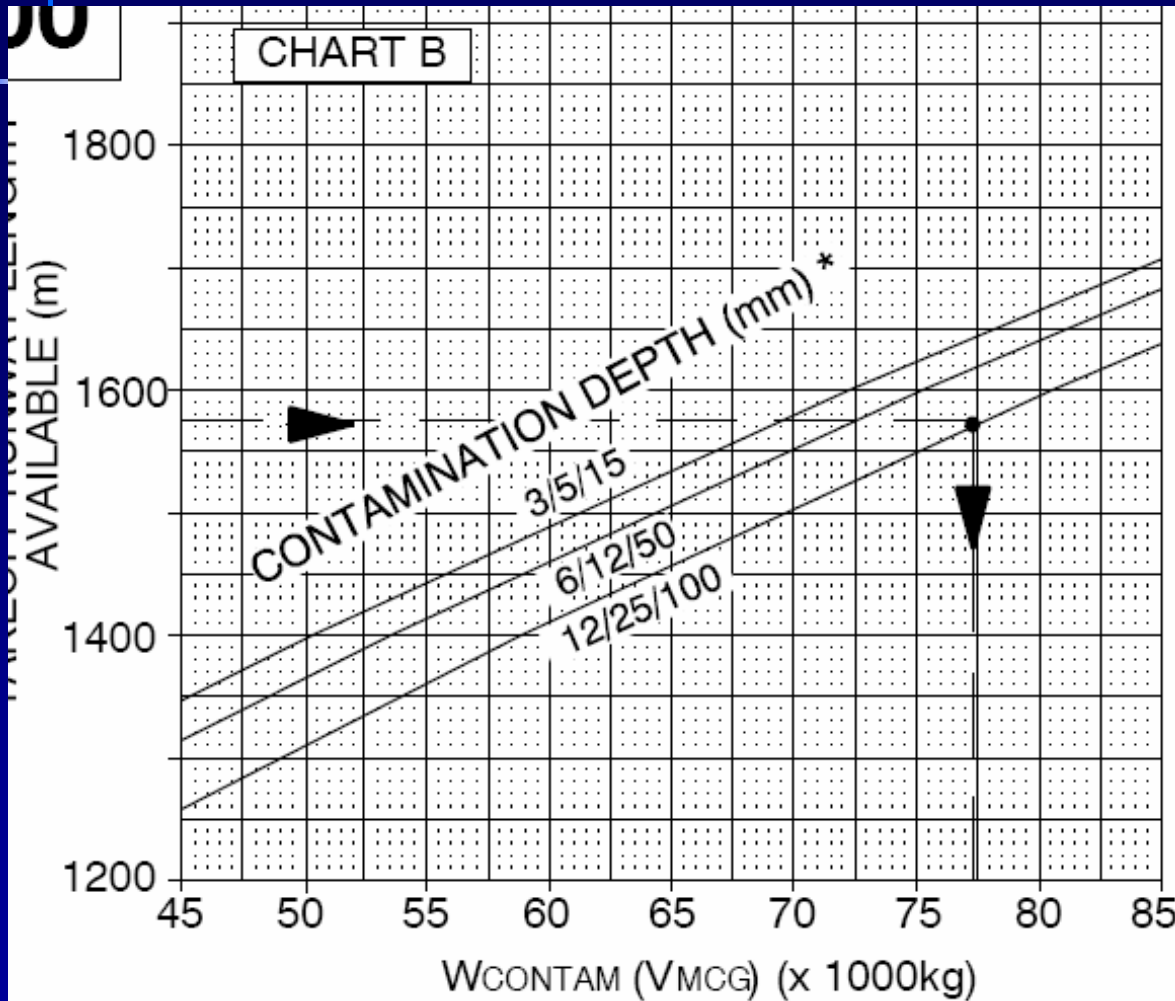
- Pay load weight determines profit, thus operator strives for Max pay load.
- Pay load is restricted by:
 - Max structural /Max Take off /Max Landing Weight
- MaxTOW limited by
 - Engine out obstacle clearance
 - Engine out climb gradient
 - Runway length (usable)

Take off Weight Calculation

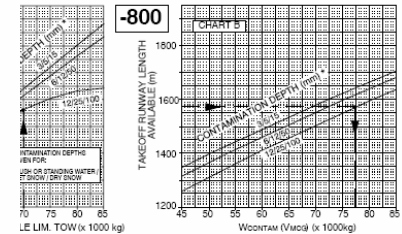


- **Meteo**
 - Wind /QNH /Temp
- **Aircraft Deficiencies**
 - (Auto) brakes / Packs / Deration
- **Runway condition**
 - Depth of slush / standing H2O /wet / dry snow
 - % of runway surface covered
 - Compressed or compacted snow
 - (Wet) ice
 - Braking action (poor/good)
 - Moisture reflective
 - Runway shortening (end/beginning)
- **Etc.**

Take off performance



length/obstacle limited TOW and V_1 :
 ermine the Runway length/obstacle limited TOW at zero wind (use zero
 ions).
 Anti-ice ON and/or engine bleed OFF, if applicable.
 irected Runway length/obstacle limited TOW and contamination depth
 termine WCONTAM (RWL/OBST). Reduce WCONTAM by 500 kg / 1000 ft
 level.
 way length available and contamination depth (interpolation is allowed) to
 . First reduce the runway length available by 50 m / 1000 ft pressure



stacle limited TOW is the lesser of the weights determined in step 3 and 4.
 ps 3 and 4 is:

itted TOW is the lower of WCONTAM (RWL/OBST) and the Climb limited
 NH, Anti-ice ON and/or engine bleed OFF, if applicable.
 rom ACM 4.2.2 for the actual TOW and adjust it by the applicable
 sent from the table below (interpolation allowed) to find V_1 CONTAM.
 operational V_1 , with VMCG as a minimum.

Pressure altitude level	Depth of slush or standing water / wet snow / dry snow					
	5 mm / 15 mm		6 mm / 12 mm / 50 mm		12 mm / 25 mm / 100 mm	
	Pressure altitude	Sea level	Pressure altitude	2000 ft	Pressure altitude	2000 ft
	V1 adjustment					
4	-13	-9	-7	+1	-1	-1
5	-14	-9	-8	+1	-1	-1
7	-16	-11	-10	+1	-1	-1
8	-17	-12	-11	0	-1	-1
9	-18	-14	-13	-3	-2	-2
0	-19	-16	-15	-7	-6	-6
2	-21	-19	-18	-11	-10	-10
2	-21	-20	-19	-14	-13	-13
3	-22	-21	-20	-17	-16	-16

itted TOW is the lower of WCONTAM (VMCG) and the Climb limited TOW
 Anti-ice ON and/or engine bleed OFF, if applicable.
 onal V_1 .

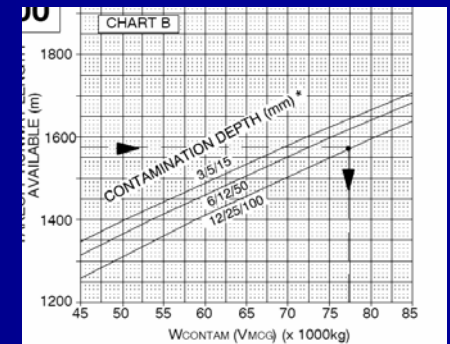
Take off performance slush

1 mm difference (eg 6 iso 5 mm) in slush measurement:

B777: 1mm = 0800kg

B737: 1mm = 1000kg

B747: 1mm = 5000kg



Either less pay load (economical factor)

–or–

Wrong TOW (safety factor)

Landing performance

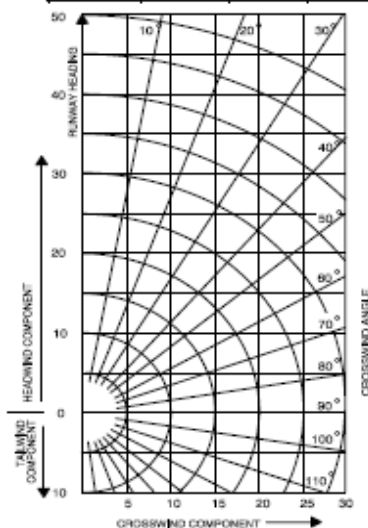
MAXIMUM WIND COMPONENTS (kt), INCL. GUSTS

-300

Braking Action	TAKE-OFF AND LANDING			
	POOR	MED	GOOD and WET	GOOD and DRY
Friction Coeff.	≤ 0.05	0.05-0.35	≥ 0.40	
MOTNE code	1	3	5	
			T/O	Landing
CROSS *	5	15	25	30
TAIL *	0	5	10	10

* Use of intermediate wind limits is permitted.

AUTOLAND	Headwind	Crosswind	Tailwind
CAT I, II, III	25	15	10



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NORMAL CHECKLIST 737-300-400

16 APR 2004



Aircraft Operations Manual **737**

2.2 CHECKLISTS
2.2.3 Normal Checklist

CALCULATED LANDING DISTANCES - AUTO BRAKES

The Reference Calculated Landing Distances on this page are based on the following Reference Conditions:

- Auto-brakes.
- Flaps 30.
- Landing Weight: 45,000 kg.
- Standard flight techniques as per AOM 2.8.
- Touchdown point at 400 m.
- FAS: V_{app} - 5 kt.
- Standard temperature.
- Sea level.
- Zero slope.

AUTO-BRAKES

Landing NOT allowed

REFERENCE CALCULATED LANDING DISTANCES (m)

Braking Action	GOOD				MEDIUM				POOR
	MAX	3	2	1	MAX	3	2	1	MAX
Tailwind 10 kt	1120	1540	1800	2020	1300	1570	1800	2020	2000
Component 5 kt	1060	1480	1800	1930	1250	1520	1800	1930	1920
Zero wind	1040	1420	1720	1840	1200	1440	1720	1840	1830
Headwind 10 kt	970	1310	1580	1690	1110	1330	1580	1690	1680
20 kt	900	1200	1440	1550	1020	1220	1440	1550	1530
Component 30 kt	830	1090	1300	1360	930	1110	1300	1360	1360

Corrections (m) for deviating conditions:

WEIGHT	Per 1000 kg ABOVE	+15	+25	+35	+40	+20	+35	+40	+35
	45,000 kg BELOW	-15	-20	-30	-35	-15	-20	-30	-35
FAS	Per 1 kt ABOVE	+15	+20	+25	+25	+15	+20	+25	+25
TEMPERATURE	Per 1°C ABOVE Std	+5	+5	+5	+5	+5	+5	+5	+5
	BELOW	-5	-5	-5	-5	-5	-5	-5	-5
FIELD ELEVATION	Per 1000 ft ABOVE Sea Level	+35	+45	+55	+60	+40	+45	+55	+60
SLOPE	Per 0.1% ABOVE slope	+10	+10	+15	+15	+10	+10	+15	+15
	BELOW	-5	-5	-10	-10	-5	-5	-10	-10
REVERSE THRUST	No reverse or Idle reverse	+15	+5	+55	+340	+175	+35	+60	+340
FLAPS	Flaps 40	-55	-85	-115	-125	-60	-90	-115	-125

Maintain a margin of 200 m over the Calculated Landing Distance.

Landing performance: Runway Condition

B737: 55T LDW, no wind, max auto braking, max reverse

Reported braking action

Landing distance:

Good

1190 mtr

Medium

1400 mtr (+ 17,6%)

Poor

2180 mtr (+ 83,2%)

Braking action must be reliable and representative

Actual examples: Information to pilots

LSGG:

ATIS: BRAKING ACTION UNRELIABLE.

EDDM:

A2200/05 NOTAMN

Q)EDMM/QMRXX/IV/BO/A/000/999/4821N01147E00
5 A) EDDM B) 0509231013 C) 0609302359 EST
E) RWYS MIGHT BE SLIPPERY WHEN WET.

SBGR:

J1321/05 NOTAMR J0649/05

Q) SBBS/QMRX///A /000/999/ A) SBGR B)
0510202311 C) 0512210000 E) RWY 09L/27R
OPR CTN WHEN WET DUE TO LOW FCT:

	FIRST	SECOND	THIRD
RWY 09L	0,39	0,48	0,47
RWY 27R	0,47	0,48	0,39

- **LSGG,**
 - Not reliable:
 - Absolutely useless
- **EDMM,**
 - Not representative
 - useless
- **LSGR,**
 - Reliable?
 - Representative?

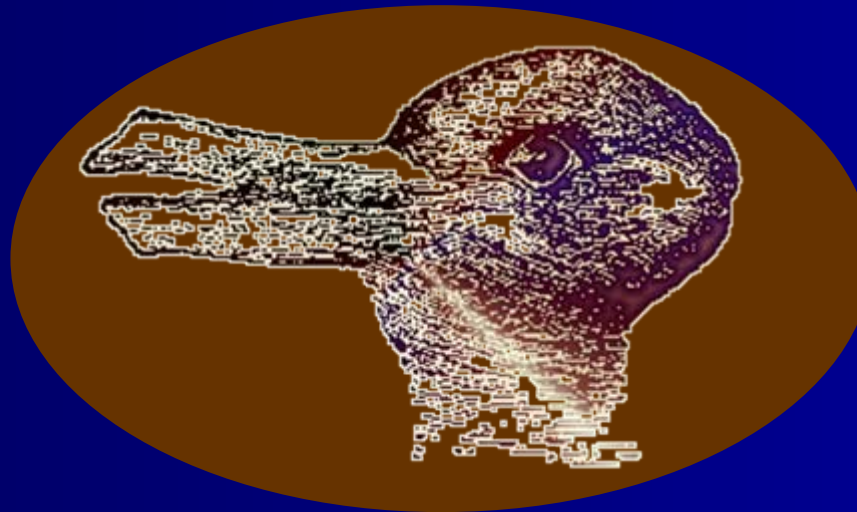
Are Runway Excursions an Airport concern?

- Prevention:
 - Quality of runway surface
 - Reporting timely, correct and reliable
- Limiting damage, safe life
 - Runway environment (RESA, strip, shoulders, clearway, etc.)
 - Frangibility
 - RFF
- **YES !**

Pilots & others in the industry may see different problems and therefore arrive at different solutions.



**Duck
Duck
Duck**



**Rabbit
Rabbit
Rabbit**

Communication between different groups is an essential key to foster safety.

Work together !

- Airport manager / planner is specialist
- Air traffic controller is ops specialist
- Pilot is ops specialist

Respect the different position and use the collective expertise.

- IFALPA ALR (**Airport Liaison Representative**)

Airport Liaison Representative



ALR Objective:

To enhance SAFETY and EFFICIENCY at airports served by IFALPA pilots.

We are there to help improving runway safety

Conclusion Runway safety:

Runway Incursions

- Effect airport safety, threat to passengers, crew and vehicle drivers.
- More incidents, few Accidents.
- Number of incidents have limited effect on airport capacity
- Accident often high casualty rate
- Can be avoided given proper incentives, ICAO rwy Incursion manual.

Runway Excursions

- Effect airport safety, threat to passengers, crew and vehicle drivers.
- Few incidents, More accidents
- Number of accidents reduce airport capacity considerably
- Higher survivability
- Should be reduced, requires effective and proper future incentives

Conclusion



- Runway safety = Incursions & Excursions
- Start Global initiative to effectively reduce runway excursion threat (ACI, FAA, IATA, IFALPA, IFATCA, Eurocontrol, FSF, Boeing, Airbus, etc.)
- On Local level; Work together in runway safety team (airport ops; ATCo; pilot)



Conclusion: Goal



- Safe life's
- Enhance runway safety
- Reduce runway incursions risk
- Reduce runway excursions risk
- Reduce runway excursion effects
- Thus Enhance Airport Business

