

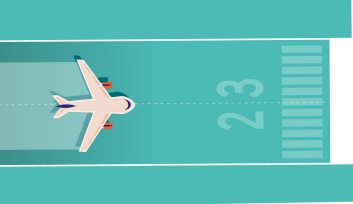


GRF AND AIRLINES

Arnaud BRUDERER

Pilote de ligne et responsable de base chez Malta Air Ltd





PRÉVENIR LES SORTIES DE PISTE

Jeudi 7 décembre 2023

SUMMARY

- SMS contributory factors
- Fleet equipment
- SMS – Flight Crew Awareness
- GRF implementation in Flight Crew Training
- Runway Condition Assessment and Reporting
- Air Report (AIREP) - PIREPS
- GRF Performance assessment guidance
- LDTA – Crew procedures
- KORA RE TEM



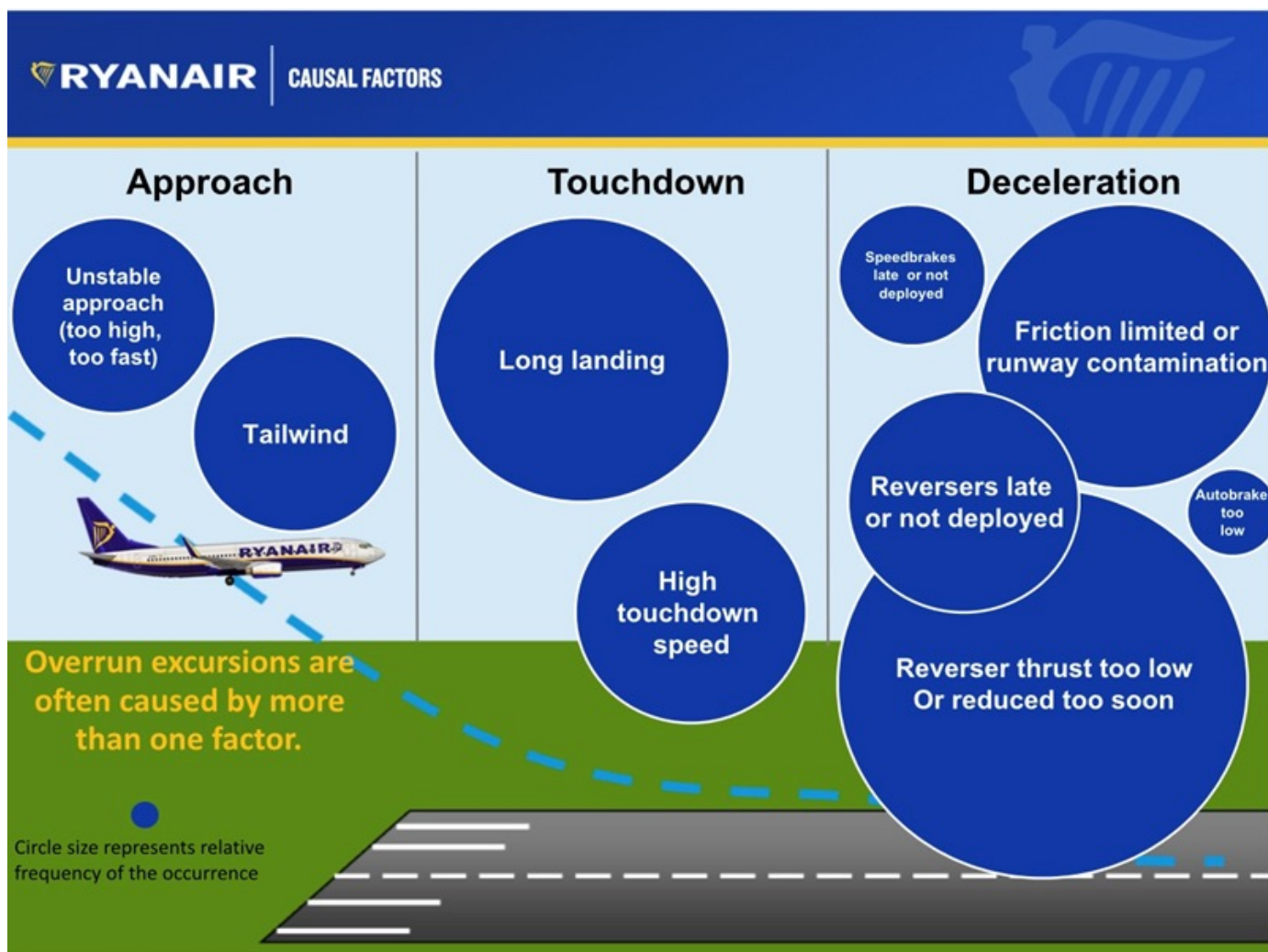


23

PRÉVENIR LES SORTIES DE PISTE

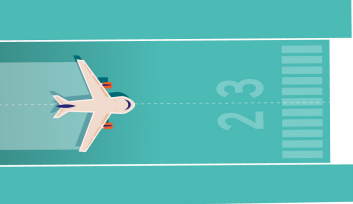
Jeudi 7 décembre 2023

SMS contributory factors



- Contaminated runways
- Incorrect performance calculation
- Reported runway conditions differing from actual conditions
- Wind components in excess of operational limitations
- Aircraft component or system failure
- Inappropriate handling technique
- Inappropriate decision to reject above V1
- Inappropriate decision to continue from an unstable approach





FLEET EQUIPMENT

Runway
Situation Awareness
Tools (RSAT)

RYANAIR RAAS DIFFERENCES		
	Honeywell RAAS (NG)	Boeing RAAS (8200)
Approaching Rwy (Landing)	✓	✓
Approaching Rwy (Ground)	✓	✓
Approaching Short Rwy (Landing)	✓	✓
Take off Short Rwy (Ground)	✓	✓
On Rwy (Ground)	✓	✓
Extended Holding on Rwy (Ground)	✓	✓
Distance Remaining (RTO)	✓	✓
Distance Remaining (Landing)	✓	✓
Runway End	✓	✓
Taxiway Take Off	✓	✓
Flaps (Landing)	✓	✗
Flaps (Takeoff)	✓	✗
Too Fast	✓	✗
Too High	✓	✗
Unstable	✓	✗
Taxiway Landing	✓	✗
Long Landing	✓	✗

- The RSAT concept emphasizes a three-pronged approach that includes flight crew procedure updates, a training aid for flight crew, and airplane systems changes to assist flight crew situational awareness.
- RSAT is a set of tools designed to prevent runway overrun and incursions. RSAT is an umbrella term for RAAS, Overrun Warnings (ORW) and Speedbrake warnings.
- Runway Awareness Alerting System (RAAS) was installed across 550 aircrafts fleet. This technology provides flight crew with aural warnings and alerts relating to take off and landing runway operations.





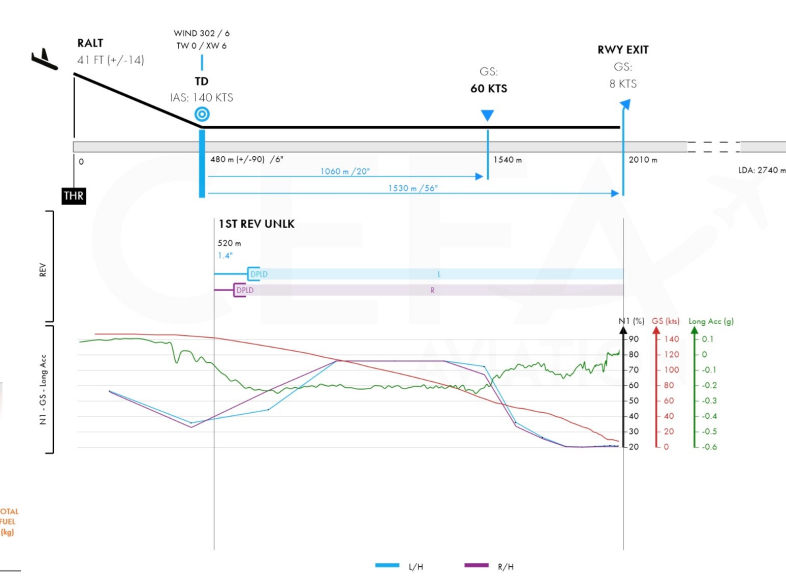
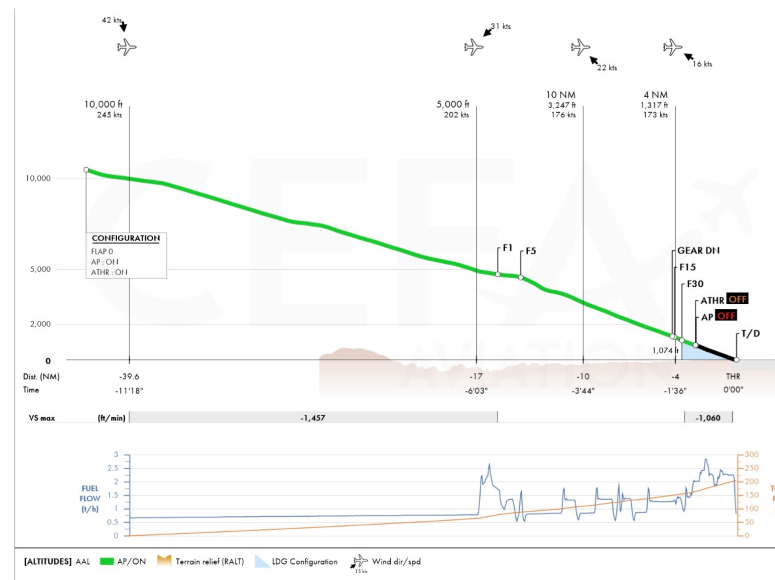
23

PRÉVENIR LES SORTIES DE PISTE

Jeudi 7 décembre 2023

SMS – FLIGHT CREW AWARENESS

- We Developed and rolled out a new Operational Flight Data Monitoring (OFDM) concept, MyOFDM which provides captains and first officers with individual approach, landing and taxi reports creating greater awareness of operational performance and exceedances.
- Based ON OFDM data, we updated our Airfield Briefs to include KORA precursors and to highlight potential challenges associated with specific airports.
- CEFA Aviation video replay: This system allows pilots to watch a video replay of their flights thus providing an ongoing opportunity for positive training.





23

PRÉVENIR LES SORTIES DE PISTE

Jeudi 7 décembre 2023



LES SYMPOSIUMS

GRF implementation in Flight Crew Training

- GRF was implemented via e-learning, recurrent training and checking including classroom, Q&A and live dedicated events for GFR / winter operations, internal publications.

RYANAIR

WOPS LIVE EVENT 2022 Q&A



REVISION I
PUBLISHED 31/01/2023



RST 4

The General Guide to
Recurrent Training and
Checking

Notes

RYANAIR

GRF Q&A



REVISION I
PUBLISHED 30/09/2021

KORA September 2020
RUNWAY EXCURSION

Over 30 REs in 2019 !
Do you know the NEW RAAS SOPs ?

Runway excursions are almost always associated with contaminated Runways and or High Energy Approaches. ARE YOU USING THE CORRECT RUNWAY STATE ?

TEM
Anticipate, Recognise, Recover, Safe Flight

THREAT (ANTICIPATE)

- TSMs, Gust Fronts, Rain
- Wind Tailwinds, Gusts, Variations
- If no RWY Condition Report for MDD Rain on Unimproved or HEAVY Rain on grooved RWY:
 - 4mm slush/water for T/O
 - Medium / Poor SA for LANDING

ERROR (RECOGNISE)

- Changing Environmental Conditions?
- High Energy Approach?
- Gate Bust?
- Long Landing?

MANAGE (MITIGATE, RECOVER):

- Recompute OPT Landing Performance (LDR - LDA?)
- PM "GO GO AROUND"
- Touchdown in "The Zone" (OPT Assumed Air Distance?)
- RAAS on Ground Callouts & SOPs!

RAAS : "600 Metres"
CAPTAIN : "I Have Control"

If RAAS 300m & 100m Calls activated:
• F/O should call out Groundspeed.
• Ensure stopping effort is SUFFICIENT.

CRM :
Situational Awareness

KORA Key Operational Risk Area
September 2021
Runway Excursion

RUNWAY EXCURSIONS REMAIN A SIGNIFICANT THREAT

ANTICIPATE

- Pre-Flight Planning -- Apply OMA 8.1.5 ICAO Annex III guidance
- Confirm if Airport GRF Compliant
- Incorporate AFB TEM guidance -- Grooved RWY?
- Review NOTAMS: WIP? Revised LDA?
- Thoroughly analyse TAF & ATIS versus ETA
 - Moderate or Heavy Rainfall?
 - Tailwinds?
- Utilise Performance Assessment Guidance Table
- Establish OPT limiting conditions for calculation
- Advocate performance limited runways (LDR within 300m LDA)
- Analyse impact of transient weather conditions
- Proactively monitor takeoff/landing manoeuvres

THREATS

- WIP
- Tailwinds
- LVPs
- Runway Contamination
- OPT Calculation Errors
- Unstable At / Below the Gate
- Extended Flare
- Braking Action
- Delayed, incorrect application of deceleration devices

MANAGE THE THREATS

RECOGNISE

- HEA?
- Landing Gate Stability?
- Change of conditions impacting performance?
- EGPWS Hard Warning below the Gate?
- RAAS / ORW Callouts and CAUTIONS
- Extended Flare beyond calculated air distance?
- Flaring beyond touchdown zone?
- Exceeding Latest Touchdown Point?

RECOVER

- Respect the Gate
- Advocate
- Take Appropriate Action
- No Blame Policy for Go-Arounds

ALWAYS

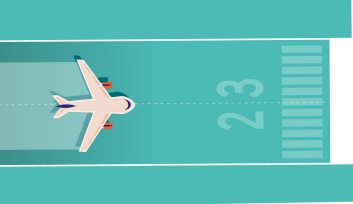
- Communicate & Advocate
- Ensure active monitoring by PM
- Don't rush -- Rely on Checklist Discipline
- READ-LOOK-LISTEN

TAKE-OFF

- ATC "Ready Immediate?" Avoid rushing
 - Default -- "Standby"
- Verify Correct Intersections
- Verify OPT Data if conditions change
- Achieve OPT line up distances
- RTO -- maximum use of deceleration devices until stopping assured

LANDING

- Set-Up, Brief as per DALTA
- Complete Double-Briefing as per SOP
- Fly the Plan (as per the DALTA Brief)
- Not Stable? GO AROUND -- No Blame!
- RAAS CAUTION? Action as per FCOM NP
- "300m Remaining" -- CPT Takes Control!



Runway Condition Assessment and Reporting

- 3 Kelvin-Spread Rule : air temperature of at or colder than + 3 degrees Celsius with a dew point spread of 3 degrees Celsius or less.
- Importance of updated weather information and RCR.
- In the absence of an updated RCR, assume a RWYCC of 2 (minimum standing water depth of 4 mm) when rainfall intensity is:
- MODERATE or HEAVY on an UNGROOVED runway
- HEAVY on a GROOVED runway

Runway Condition Assessment Matrix (RCAM)

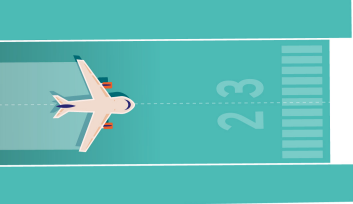
Assessment Criteria for Airport Operator Use Only		Control/Braking Assessment Criteria for Pilot Reports of Braking Action	
Runway Condition Description	RWYCC	Deceleration or Directional Control Observation	AIREP or PIREP
• DRY	6	---	---
• FROST • WET (includes damp and 3mm depth or less of water) 3mm depth or less of: • SLUSH • DRY SNOW • WET SNOW	5	Braking deceleration is <u>normal</u> for the wheel braking effort applied AND directional control is normal.	GOOD
OAT -15°C and Colder: • COMPACTED SNOW	4	Braking deceleration OR directional control is between Good and Medium.	GOOD to MEDIUM
• SLIPPERY WHEN WET (wet runway) • DRY SNOW or WET SNOW (any depth) over COMPACTED SNOW Greater than 3mm depth of: • DRY SNOW • WET SNOW OAT -14°C and Warmer: • COMPACTED SNOW Greater than 3mm depth of: • WATER • SLUSH	3	Braking deceleration is <u>noticeably reduced</u> for the wheel braking effort applied OR Directional control is noticeably reduced.	MEDIUM
• ICE	2	Braking deceleration OR directional control is between Medium and Poor.	MEDIUM to POOR
• WET ICE • SLUSH OVER ICE • WATER ON TOP on top of COMPACTED SNOW • DRY SNOW or WET SNOW on top of ICE	1	Braking deceleration is <u>significantly reduced</u> for the wheel braking effort applied OR directional control is significantly reduced.	POOR
	0	Braking deceleration is <u>minimal to non-existent</u> for the wheel braking effort applied OR directional control is uncertain.	LESS THAN POOR



Air Report (AIREP) - PIREPS

- Whenever requested by ATC, or if the runway braking action encountered during the landing roll is not as good as reported in the Runway Condition Report (RCR), the Commander must notify Air Traffic Services (ATS) by AIREP as soon as practicable using the terms, GOOD, GOOD TO MEDIUM, MEDIUM, MEDIUM TO POOR, POOR and LESS THAN POOR
- The friction readings from ground friction measuring vehicles do supply an additional piece of information for the pilot to evaluate when considering runway conditions for landing. Crews should evaluate these readings in conjunction with the PIREPS (pilot reports and the physical description of the runway (snow, slush, ice, standing water etc.) when planning the landing. Special care should be taken in evaluating all the information available when braking action is reported as POOR or if slush/standing water is present on the runway





PRÉVENIR LES SORTIES DE PISTE

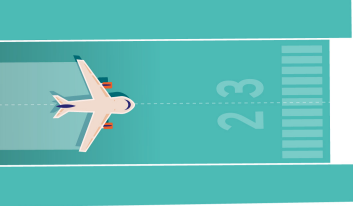
Jeudi 7 décembre 2023

GRF
Performance
assessment
guidance

Runway Surface Condition – Performance Assessment Guidance Table

Start with RWYCC			LANDING					Start with RWYCC		TAKEOFF	
RWYCC	OPT COND	CROSSWIND LIMIT	RUNWAY CONDITION DESCRIPTION			RWYCC	OPT COND	CROSSWIND LIMIT			
6	6 DRY	33	DRY			6	6 DRY	33			
5	5 GOOD	33	FROST, WET (includes damp) 3mm depth or less of: WATER, SLUSH, DRY SNOW or WET SNOW DOWNGRADED RWY with RWYCC 5			5	5 GOOD	25 (33)*	*Refer to OMB 2.4.1.1		
4	4 GOOD TO MEDIUM	33	COMPACTED SNOW (OAT -15°C and colder) SPECIALLY PREPARED WINTER RUNWAY (refer to AFB for SPWR approval) DOWNGRADED RWY with RWYCC 4			4	4 GOOD TO MEDIUM	22			
3	3 MEDIUM Max depth: Dry Snow 100mm Wet snow 13mm	25	SLIPPERY WET (wet runway) COMPACTED SNOW (OAT -14°C and warmer) UPGRADED or DOWNGRADED RWY with RWYCC 3			3	3 MEDIUM	20			
			DRY SNOW (any depth) OVER COMPACTED SNOW Greater than 3mm depth of DRY SNOW				3 DRY SNOW Max depth: 100mm				
			WET SNOW (any depth) OVER COMPACTED SNOW Greater than 3mm depth of WET SNOW				3 WET SNOW Max depth: 13mm				
2	2 MEDIUM TO POOR Max depth: Slush/Water 13mm	17	UPGRADED or DOWNGRADED RWY with RWYCC 2			2	2 MEDIUM TO POOR	15			
			Greater than 3mm depth of WATER				2 STANDING WATER Max depth: 13mm				
			Greater than 3mm depth of SLUSH				2 SLUSH Max depth: 13mm				
1	LANDING PROHIBITED		POOR ICE			1	TAKE-OFF PROHIBITED				
0			LESS THAN POOR WET ICE / SLUSH OVER ICE / WATER on top of COMPACTED SNOW / DRY SNOW or WET SNOW on top of ICE			0					





PRÉVENIR LES SORTIES DE PISTE

Jeudi 7 décembre 2023

LDTA – Crew procedures

PERFORMANCE - LANDING - DISPATCH

PROFILE OPT TRAINING

ARPT Info NOTAM MEL CDL Send Output

ARPT **EIDW / DUB** 30 FLAP

RWY **28L** AUTO A/C

MACG **2.50% MIN. GRADIENT** OFF A/I

COND **6 DRY**

WIND **0 KT**
0 HW/0 XW KT

OAT **12 C** AUTO SBRK
54 F

QNH **1012.0 HPa** NO CREDIT REV
29.88 IN HG

737-800/CFM56-7B26 Calculate

Dispatch Landing Data for: **RWY 28L**

Normal: Limit Wt **65317 KG** Vref30 **148 KT**

PERFORMANCE - LANDING - ENROUTE

PROFILE OPT TRAINING

ARPT Info NOTAM MEL CDL Send Output

ARPT **EIDW / DUB** 30 FLAP

RWY **28L** AUTO A/C

MACG **2.50% MIN. GRADIENT** OFF A/I

COND **6 DRY** ALL BRKS

WIND **0 KT** NONE NNC
0 HW/0 XW KT

OAT **12 C** AUTO SBRK
54 F

QNH **1012.0 HPa** NO CREDIT REV
29.88 IN HG

LANDING WT: **62000 KG** VREF ADD: **5**

737-800/CFM56-7B26 Rwy Graphic

Enroute Landing Data for **62000 KG**:
Vref30+5: **149 KT** Recommended Brake Cooling Time:

Operational Landing Distance:		Ground:
MAX MANUAL	1316 M	51 minutes
AUTO BRK 1	3299 M	0 minutes
AUTO BRK 2	2790 M	15 minutes
AUTO BRK 3	2183 M	31 minutes
MAX AUTO	1586 M	43 minutes

Landing Distance Available: **2637 M**

PERFORMANCE - LANDING - ENROUTE

PROFILE OPT TRAINING

ARPT Info NOTAM MEL CDL Send Output

ARPT **EIDW / DUB** 30 FLAP

RWY **28L** AUTO A/C

MACG **2.50% MIN. GRADIENT** OFF A/I

COND **6 DRY** ALL BRKS

WIND **0 KT** NONE NNC
0 HW/0 XW KT

OAT **12 C** AUTO SBRK
54 F

QNH **1012.0 HPa** NO CREDIT REV
29.88 IN HG

LANDING WT: **62000 KG** VREF ADD: **5**

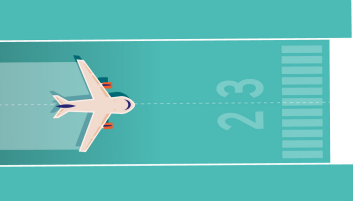
737-800/CFM56-7B26 Rwy Graphic

Enroute Landing Data for **28L**:
Vref30+5 **149 KT** Landing Distance Available: **2637 M**
AD-Assumed Air Distance: **455 M**

MM	Max Manual	MA	Max Auto	3 Auto Brake 3	2 Auto Brake 2	1 Auto Brake 1
	1316 M	1586 M	2183 M	2790 M	3299 M	

AD MM MA 3 2 1





PRÉVENIR LES SORTIES DE PISTE

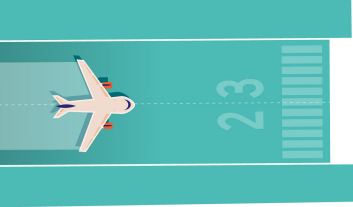
Jeudi 7 décembre 2023

KORA RE TEM



ANTICIPATE THE THREATS – ALWAYS PREPARE AHEAD





PRÉVENIR LES SORTIES DE PISTE

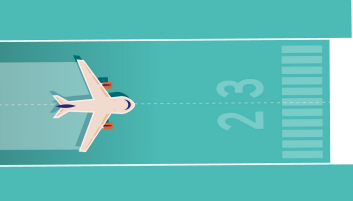
Jeudi 7 décembre 2023

KORA RE TEM

Plan

- Review AFB & NOTAM – Runway Excursion threats & WIP affecting LDA
- Review RWY characteristics – Down slope, Non-standard aiming point, PAPI vs G/S TCH
- Review TAF/METAR - Convective Activity with SHRA, VRB wind, Freezing precipitation
- Obtain and assess the Runway Condition Report
- Consider deteriorating conditions, determine minimum acceptable condition and use the associated higher Flap setting and AUTOBRAKE/REV THRUST as required
- Apply MEL/CDL limitations
- ALWAYS COMPUTE LANDING DISTANCE REQUIRED





PRÉVENIR LES SORTIES DE PISTE

Jeudi 7 décembre 2023

KORA RE TEM

Act

- RAAS "Long Landing"
- ORW "Overrun, go-around"
- Touchdown beyond TDZ
- Excess tailwind
- Excess speed

**Don't Press On,
Press TOGA!**

Do

- Limit IAS to 250kts <10,000ft
- 3000ft @ 200kts with Flap 1 (3-2-1 rule) and 10 mile rule (latest Flap 1)
- Fly a stabilised approach - Respect the Landing Gate
- Observe RAAS and ORW alerts – apply FCOM NP actions
- Correct excess speed and avoid an extended flare
- Apply deceleration devices immediately at touchdown

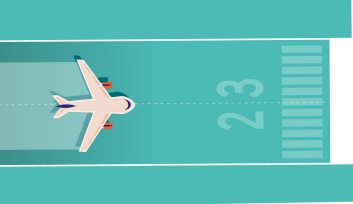
Check

- Tailwind?
- Heavy Rain?
- Changed runway condition?
- Stabilised criteria met at the landing gate?
- Aligned on the Centre Line?
- Glide Path or Speed deviation?
- Speed Brake Armed and Autobrake Set?
- Actual conditions, configuration and path = OPT conditions, configuration and path?

**Don't Press On,
Press TOGA!**

Ryanair 2023





PRÉVENIR LES SORTIES DE PISTE

Jeudi 7 décembre 2023

THANK YOU FOR YOUR ATTENTION !

