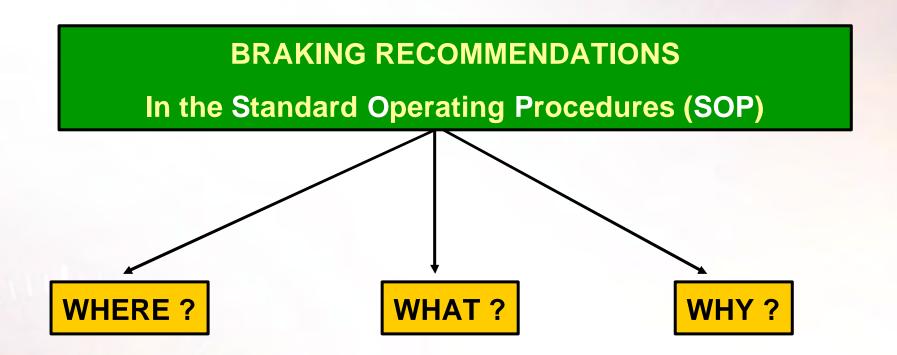




# INTRODUCTION





# CONTENTS



# FLIGHT PHASE

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSHBACK OR START

**TAXI** 

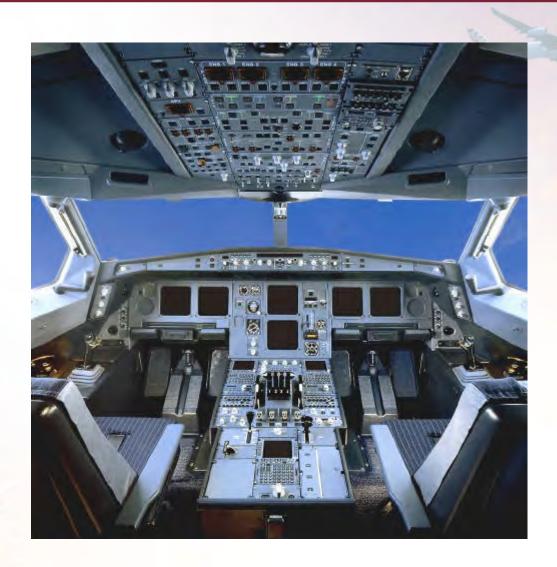
BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 





# Parking Brake Check

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

- -PARKING BRAKE .....ON
- -ACCU PRESS & BRAKE PRESS indicators.....CHECK
- ➤ The ACCU PRESS indication must be in the Green band.



If not, recharge the accumulator using the YELLOW electric pump (SA aircraft), or the BLUE electric pump (LR aircraft).

#### **WARNING:**

Obtain ground crew clearance BEFORE using the electric pump



# Alternate Braking System Check

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

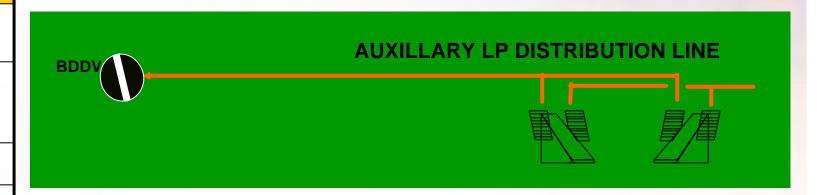
**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

Objective: Check for absence of "spongy pedals"



➤ Only performed before the first flight of the day



# Alternate Braking System Check ....



COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

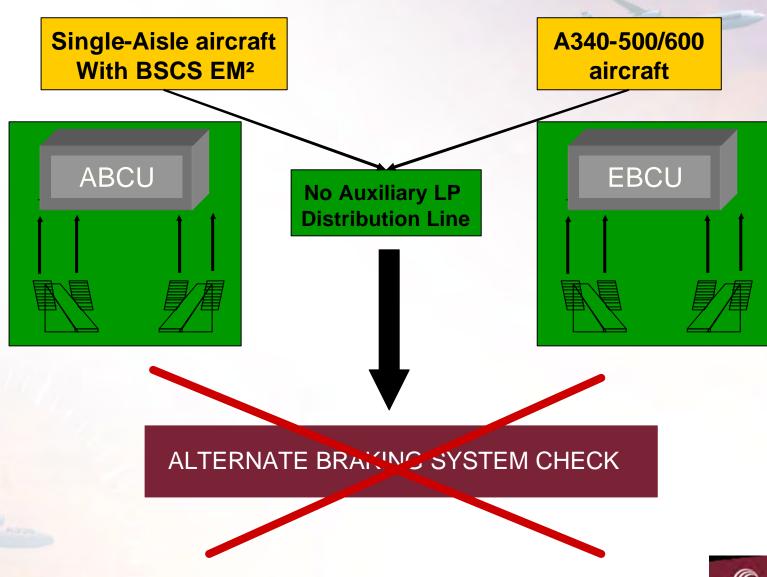
BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

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# Alternate Braking System Check ....

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

- Y ELEC PUMP.....CHECK OFF
  - ➤ For SA aircraft only.
  - ➤ Ensures GREEN hydraulic system is not pressurized via the PTU.
    - Normal braking system is not available.
- CHOCKS......CHECK IN PLACE
- PARKING BRAKE.....OFF
- BRAKE PEDALS ......PRESS
- BRAKE PRESSURE....CHECK

If unsuccessful, maintenance action is due.





# Parking Brake for Exterior Inspection

# PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

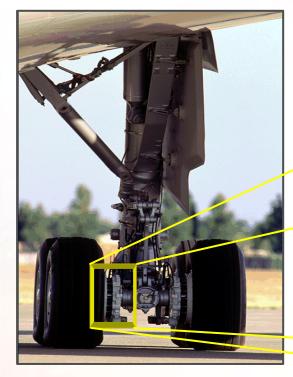
**APPROACH** 

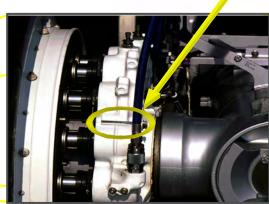
**LANDING** 

AFTER LANDING

**PARKING** 

- PARKING BRAKE..... ON
- To enable the flight crew to check brake wear indicators during the exterior inspection.







# FLIGHT PHASE ...

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

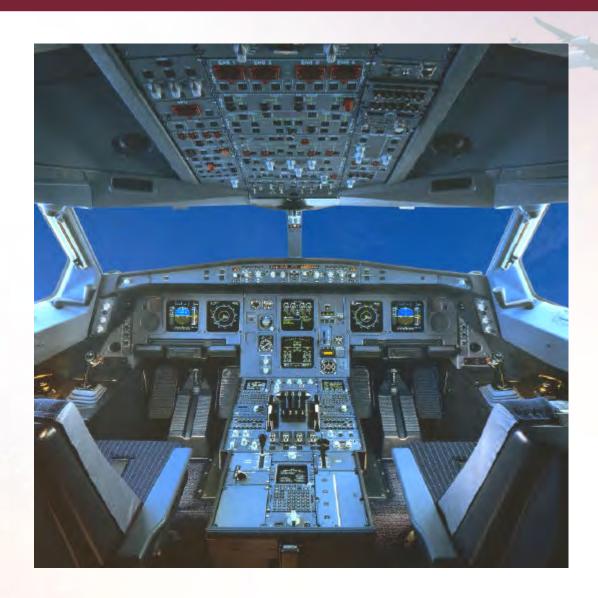
BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 





# Parking Brake Check

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

-PARKING BRAKE.....ON THEN OFF







# Parking Brake Check ....

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

-PARKING BRAKE.....ON THEN OFF

To check parking brake pressure







# Parking Brake Check ....

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

-PARKING BRAKE.....ON THEN OFF

To check parking brake pressure





If chocks are in place, release the parking brake to increase brake cooling during transit.



# FLIGHT PHASE ...

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 





# Parking Brake ACCU Pressure Check

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

LANDING

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

- PARKING BRAKE ACCU PRESS.....CHECK

The ACCU PRESS indication must be in the Green band.



To ensure parking brake availability, in case emergency braking is required during pushback due to a broken towbar.

Do NOT use brakes during pushback, unless required due to an emergency



# Parking Brake

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

- •If during engine start, the aircraft starts moving with parking brake ON:
  - PARKING BRAKE……OFF
  - BRAKE PEDALS.....PRESS
- For only A320 Family without new pressure switch (Mod 30062 SB A320-32-1201), braking via pedals is not possible while the parking brake is ON.
- >However, there is one single procedure in the SOP for all aircraft types, to cover Mixed Fleet cases.



# FLIGHT PHASE ...

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 





# Parking Brake Check

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

TAXI

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

- PARKING BRAKE.....OFF







# Parking Brake Check ...

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

TAXI

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

- PARKING BRAKE.....OFF

Check that brake pressure is zero





#### **For the A340-500/600 aircraft:**

If the brake pedals are pressed, before releasing the parking brake, alternate braking remains active.

- Alternate pressure is displayed until pedals are released.
- Corrected via the BSCU S3B Standard (MOD 52465)



#### Brakes Check...

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

#### **TAXI**

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

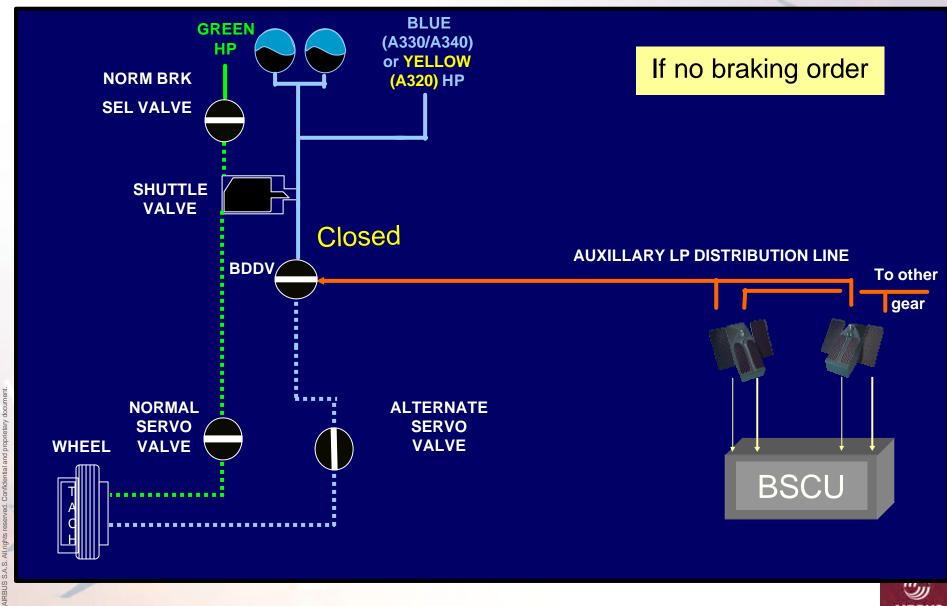
**PARKING** 

- BRAKES......CHECK
  - ➤Once the aircraft starts moving:
    - Check normal braking efficiency
    - Check that GREEN pressure has taken over the YELLOW (SA aircraft) pressure, or the BLUE (LR aircraft) pressure.

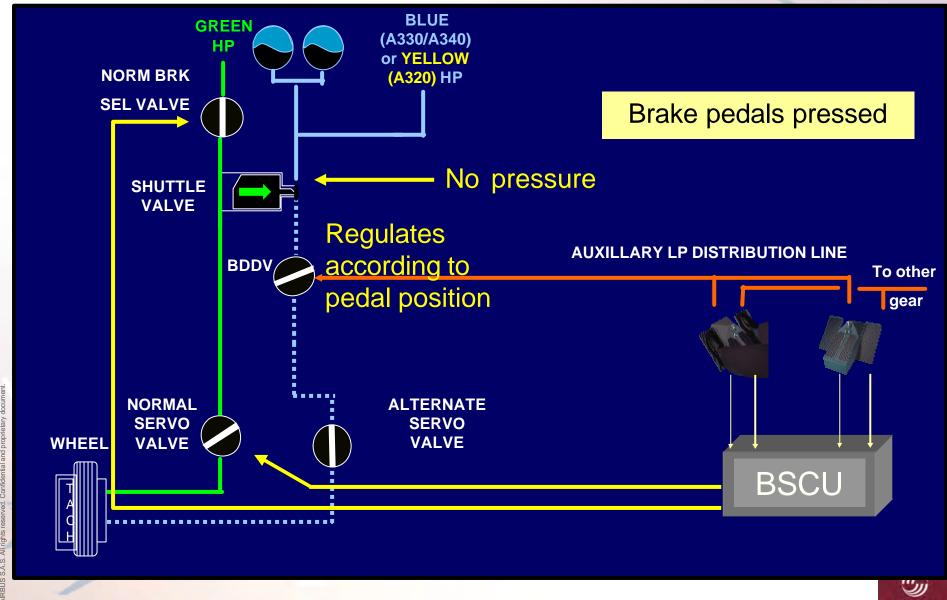




## Brakes Check...



## Brakes Check...



### Brakes Check ...

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

#### TAXI

BEFORE TAKEOFF

**APPROACH** 

LANDING

AFTER LANDING

**PARKING** 

- BRAKES......CHECK
  - >Once the aircraft starts moving:
    - Check normal braking efficiency
    - Check that GREEN pressure has taken over the YELLOW pressure.
  - ➤ "Spongy" pedals indicate degraded performance of the alternate braking system.



#### Brakes Check ...

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

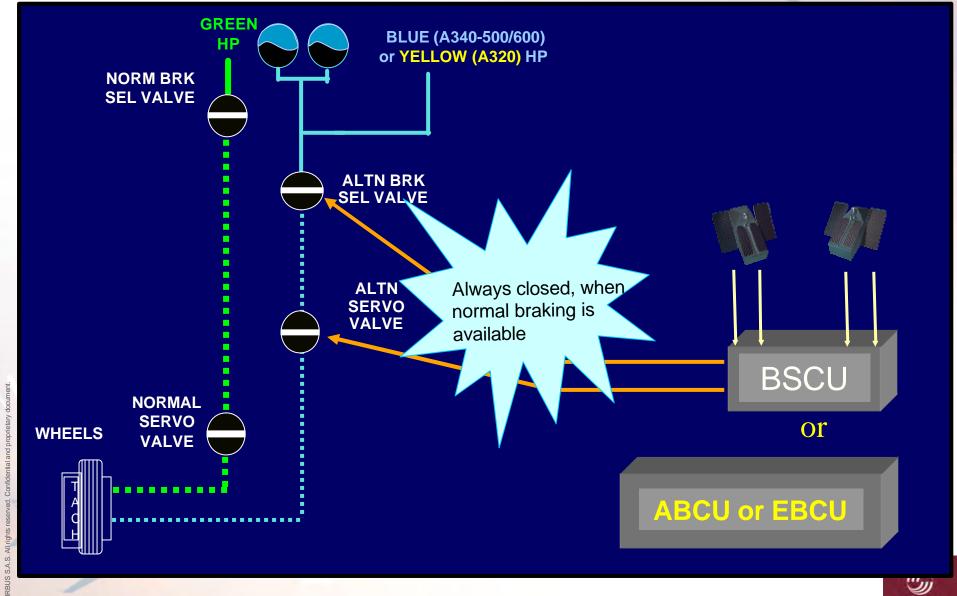
- BRAKES......CHECK
  - >Once the aircraft starts moving:
    - Check normal braking efficiency
    - -Check that GREEN pressure has taken over the YELLOW pressure.

"Spongy" pedals indicate a degraded performance of the alternate braking system.

NOT APPLICABLE to A340-500/600 or single-aisle aircraft with the BSCS EM<sup>2</sup> Standard



## A340-500/600 and SA aircraft with BSCS EM<sup>2</sup>



#### Brakes Check ...

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

#### TAXI

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

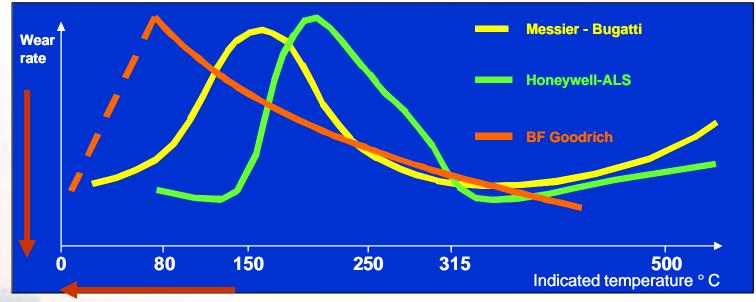
**PARKING** 

SECURING
THE AIRCRAFT

- BRAKES......CHECK
  - >Do not "ride" the brakes, to reduce brake wear.
  - ➤If an arc is displayed on the ECAM wheel page, above the brake temperature, set the brake FANS ON:



→ To reduce brake wear.





#### Brakes Check ....

# PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

#### TAXI

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

- BRAKES......CHECK
  - > Do not "ride" the brakes, to reduce brake wear.
  - ➤If an arc is displayed on the ECAM wheel page, above the brake temperature, set the brake FANS ON:



- → To reduce brake wear.
- → To ensure maximum energy will be sustained, in case of a rejected takeoff.



#### Autobrake

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

TAXI

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 



- Enhances safety, in case of a rejected takeoff.
- Perform the flight control check before arming the autobrake:
  - >To check that ground spoilers are not extended
    - → To prevent autobrake activation when armed.



# FLIGHT PHASE ...

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

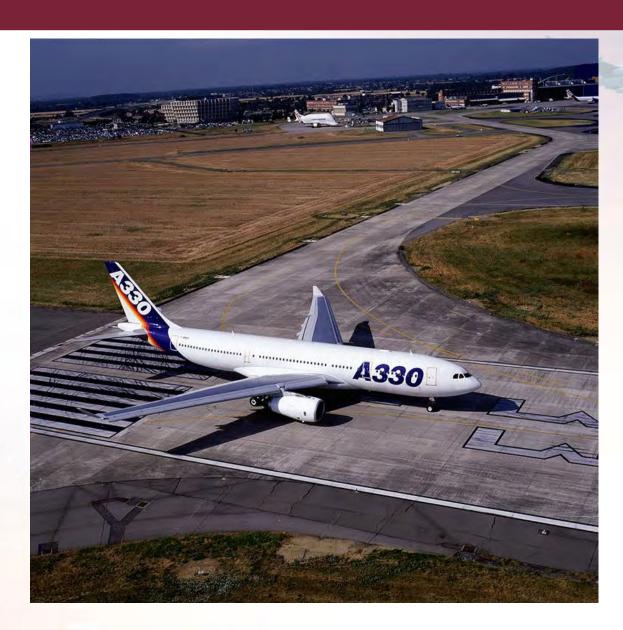
BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

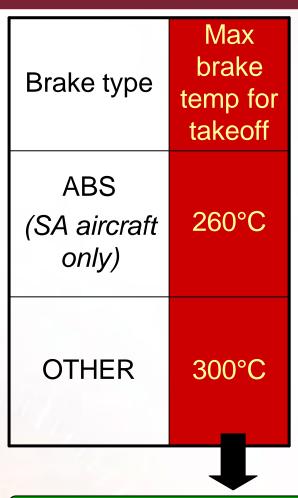
**PARKING** 





# Brake Temperature

PRELIMINARY COCKPIT PREPARATION
COCKPIT PREPARATION
BEFORE PUSH BACK OR START
TAXI
BEFORE TAKEOFF
APPROACH
LANDING
AFTER LANDING
PARKING
SECURING THE AIRCRAFT



Prevents hydraulic fluid ignition in the main landing gear bay, in the event of a fluid leak.



# Brake Temperature ...

PRELIMINARY COCKPIT PREPARATION COCKPIT	Brake type	Max brake temp for takeoff	Brake Fans	Displayed brake temp
PREPARATION BEFORE PUSH BACK OR START	ABS (SA aircraft only)		Not installed Or OFF	260 °C
TAXI			ON	
BEFORE TAKEOFF			Not installed	$\widehat{}$
APPROACH	OTHER	300°C	Or OFF	300 °c 3 =
LANDING		300 0	ON	$\widehat{}$
AFTER LANDING			ON	150 °c
PARKING SECURING THE AIRCRAFT			fluid ignition the event o	

Monitoring **ECAM** " BRAKES HOT " **ECAM** " BRAKES HOT " Flight Crew

ain landing



# Brake Temperature ....

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

- → Do not takeoff, in case of:
  - → "BRAKES HOT" ECAM Caution, or
  - →Brake temp> 150°C with the brake fans ON, and no ABS brakes
- → Do not takeoff with the brake fans ON, to avoid brake fan damage caused by debris.



# FLIGHT PHASE ...

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 



### Autobrake

<b>PRELIMINARY</b>
COCKPIT
<b>PREPARATION</b>

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

- AUTOBRAKE..... AS REQUIRED
- Use of the autobrake is recommended to:
  - >Optimize the deceleration rate
  - >Ensure single brake application
    - → Reduce carbon brake wear



# Autobrake ...

PRELIMINARY COCKPIT PREPARATION
COCKPIT PREPARATION
BEFORE PUSH BACK OR START
TAXI
BEFORE TAKEOFF
APPROACH
LANDING
AFTER LANDING
PARKING
SECURING THE AIRCRAFT

AUTOBRAKE MODE		
A340- 500/600	AUTO/BRK LO MED MAX DECEL DECEL ON ON	CONDITION
LO, 2 or 3	LO	Long and dry runways
4	MED	Short or contaminated runways
	MAX	Not recommended for landing
HI		In some emergency or short runway situations



### Autobrake ...

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

#### **AUTOBRAKE MODE**

A340-500/600



#### **TEMPORARY REVISION:**

On wet or contaminated runways, use

manual braking and maximum reverse.

→ Cancelled by BSCU S3B Standard

LO, 2 or 3

HI

MED

LO

Long and dry runways

Short or contaminated runways

MAX

Not recommended for landing

In some emergency or short runway situations

# Residual Braking Check

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

- WHEN LANDING GEAR IS DOWN:
  - ECAM WHEEL PAGE ......CHECK
    - ➤ Check residual braking on the triple indicator



#### RESIDUAL BRAKING PROC

#### ■ IN FLIGHT :

- BRAKE PEDALS . . . . . . . . . . . . . . . . . . APPLY SEVERAL TIMES
   Press the brakes pedals several times. This could zero a residual pressure on the
   alternate system.
- IF RESIDUAL PRESSURE REMAINS :
  - A/SKID & N/W STRG selector . . . . . . . . . KEEP ON
  - IF AUTOBRAKE IS AVAILABLE :

  - IF AUTOBRAKE IS NOT AVAILABLE :
  - JUST AFTER TOUCHDOWN . . . . . . APPLY BRAKING Pressing the brake pedals gives immediate priority to normal braking, which cancels residual alternate pressure.
  - Beware of possible braking asymmetry after touchdown, which can be controlled by using the pedals.

NOTE: In case of taxi with deflated or damaged tires, refer to the TAXI WITH DEFLATED TIRES procedure (FCOM 3.01.32, page 2).



# Residual Braking Check ....

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

WHEN LANDING GEAR IS DOWN:

- ECAM WHEEL PAGE ......CHECK

With A330 FWC K7, and

A340-500/600 FWC W3:

"RESIDUAL BRAKING"

**ECAM** alert

not inhibited in flight

#### RESIDUAL BRAKING PROC

#### IN FLIGHT :

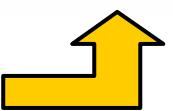
- BRAKE PEDALS . . . . . . . . . . . . . . . . . . APPLY SEVERAL TIMES
   Press the brakes pedals several times. This could zero a residual pressure on the
   alternate system.
- IF RESIDUAL PRESSURE REMAINS :
  - A/SKID & N/W STRG selector . . . . . . . . . KEEP ON
  - IF AUTOBRAKE IS AVAILABLE :

  - IF AUTOBRAKE IS NOT AVAILABLE :
    - JUST AFTER TOUCHDOWN .......... APPLY BRAKING Pressing the brake pedals gives immediate priority to normal braking, which cancels residual alternate pressure.
  - Beware of possible braking asymmetry after touchdown, which can be controlled by using the pedals.

NOTE: In case of taxi with deflated or damaged tires, refer to the TAXI WITH DEFLATED TIRES procedure (FCOM 3.01.32, page 2).

#### **BRAKES RESIDUAL BRAKING**

- RESIDUAL BRKG PROC......APPLY





# Residual Braking Check ....

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

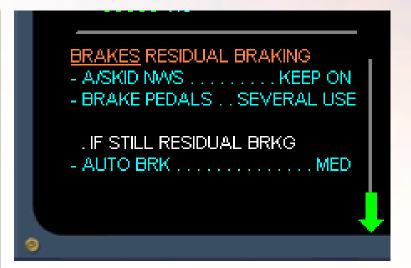
SECURING
THE AIRCRAFT

WHEN LANDING GEAR IS DOWN:

- ECAM WHEEL PAGE ......CHECK

•With A340 FWC L10, "RESIDUAL BRAKING" procedure displayed on ECAM

- •Will be introduced in:
- -A330 FWC K8
- -A340-500/600 FWC W4





PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 





# Braking

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

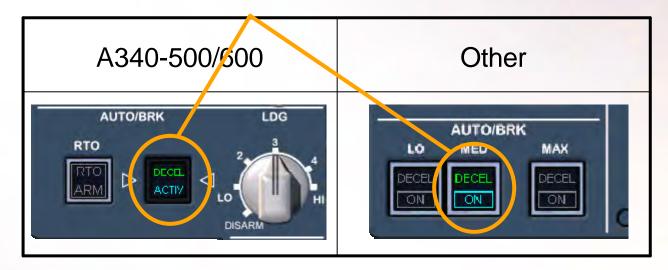
**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

- BRAKES......AS REQUIRED
  - ➤ Monitor the autobrake



- ➤ When required, brake with pedals.
- Before 20 knots:
  - AUTO BRK......DISENGAGE
  - ➤To prevent brake jerks at low speed.



PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 





## Brake Temperature

<b>PRELIMINARY</b>
COCKPIT
<b>PREPARATION</b>

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

- -BRAKE TEMPERATURE.....CHECK
- Check for discrepancies and high temperature
- Select brake fans:
  - □ At least 5 minutes after the temperature check to:
    - → Allow thermal equalization and stabilization
    - → Avoid oxidation of brake surface hot spots
  - ☐ Just before stopping at the gate, to:
    - → Prevent carbon dust from being blown over ground personnel

However, when turnaround time is short, or brake temperatures are likely to exceed 500°C (ABS: 350°C): Use brake fans



# Brake Temperature ...

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

-BRAKE TEMPERATURE.....CHECK

Refer to the FCOM 3.04.32 for brake temperature limitations requiring maintenance action



PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 





# Parking Brake

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

TAXI

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

- PARKING BRAKE ACCU PRESS......CHECK

The ACCU PRESS indication must be in the Green band. —



- ➤ If not, chocks are required before:
  - ➤ ENG 1 shutdown (A320 FAM)
  - >ENG 1 and 2 shutdown (A330)
  - ➤ ENG 1 and 4 shutdown (A340)
- → To ensure Green Hydraulic pressure/ normal braking availability



# Parking Brake ...

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

PARKING BRAKE.....ON

▶ If the brake temperature is above 500°C (350°C with the Brake Fans ON, and for non ABS brakes), and unless operationally necessary:

- Avoid applying the parking brake
  - → To prevent brake damage



# Parking Brake ...

<b>PRELIMINARY</b>
COCKPIT
<b>PREPARATION</b>

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

- After shutting down the engines, and checking that the chocks are in place:
  - PARKING BRAKE.....AS RQRD
- ➢If the brake temperature is above 300°C (150°C with the Brake Fans ON, and for non ABS brakes), and unless operationally necessary:
  - Avoid applying the parking brake
    - → To prevent brake damage, due to brake application for an extended period of time, and at high temperatures.



PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 





# Parking Brake

PRELIMINARY COCKPIT PREPARATION

COCKPIT PREPARATION

BEFORE PUSH BACK OR START

**TAXI** 

BEFORE TAKEOFF

**APPROACH** 

**LANDING** 

AFTER LANDING

**PARKING** 

SECURING
THE AIRCRAFT

- PARKING BRAKE......CHECK ON

>To reduce the hydraulic leak rate in the brake accumulator



### CONCLUSION

- This presentation is designed to provide our recommendations for the standard operation of braking systems.
- These recommendations take the following aspects into account:
  - 1. SAFETY
  - 2. COST-EFFECTIVENESS

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