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Fuel Transfer

Do it, when QRH Checklists asks to maintain fuel balance. There is no other trigger than the Imbalance ED Message. (Transfer 200 kg to the “good” side = sufficient for APP/LDG.)

Before moving the Switch, display Fuel page on PNF MFD to check correct operation of pumps & valves (to identify transfer failure, monitor transfer, have a noticeable reminder of transfer in progress. Having MFD Fuel page open is an AFM requirement.)

When you have a confirmed fuel leak on one side and fuel is a factor, transfer fuel from leaking side to “good” side. Fuel imbalance is not a big deal, even if there is a big imbalance.

When you have a big imbalance, hold control column firmly and press TCS to find out the control loads before approach and landing.

IDENTIFICATION

To identify an engine/propeller malfunction, first look, if there is Fuel Flow, thereafter, look at the prop rpm. If the malfunction can not be identified, also take TRQ and N_L , N_H , ITT indications into account.

Malfunction	Propeller rpm (N_P)	Fuel Flow
Engine Failure, no fx	> 200	No
Engine Failure, fx	< 200	No
Compressor stall	Fluctuating	Fluctuating
Unscheduled fx	Low, but > 0	Yes
Propeller Overspeed	High	Yes
Reduction Gearbox (RGB) failure	Zero	Yes

Additional indications

Malfunction	
Engine Failure, no fx	Strong yaw moment, slow climb, Engine spool down
Engine Failure, fx	Engine spool down
Compressor stall	Alternating yaw moment, all indications fluctuate
Unscheduled fx	POWERPLANT ED Message, PEC Light, TRQ indication can be higher than normal, reduced climb rate
Propeller Overspeed	POWERPLANT ED Message, PEC Light, TRQ indication slightly lower, normal climb
Reduction Gearbox (RGB) failure	Very strong & sudden yaw moment, $N_P=0$, but propeller might not be feathered, slow climb.

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Propeller Overspeed and UPTRIM / MCP

Did you ever notice? When confronted with an Propeller Overspeed, you will never get UPTRIM when you shut the engine down and you have to set MCP manually by moving the Power Lever above the detent.

Why?

Usually, when the propeller runs into Overspeed, the engine is running with Power Levers above Flight Idle. The engine itself has not failed. It is running quite normally (= no need for an UPTRIM).

Memory items

Power Lever ... FLT IDLE (Engine spools down as commanded & normally)

Condition Lever ... Start & FX

etc.

So, the engine itself is shut down by pilots inputs. It did not fail. Therefore, there is no UPTRIM on the "good" engine. UPTRIM is required to get MCP (!!) with BLEEDS ON/NORM.

How to get MCP

Select BLEEDS ON/NORM. Then move the Power Lever of the "bad" engine forward. This signals that the pilots demand power from the engine. Because it is shut down, TRQ will not reach the commanded value, so the aircraft will now notice that the engine must have failed (although, it was shut down manually, does not matter. Power Levers well above FLT IDLE with low TRQ is not normal and the aircraft assumes, the engine has failed). It will send an UPTRIM signal to the "good" engine. In combination with BLEEDS ON/NORM or ON/MAX, it will announce and set MCP. Move the Power Lever back to FLT IDLE. This will not remove the UPTRIM signal. Later on, when working through the QRH checklists, it will be moved back forward (Power Levers ... operate together).

If that does not work, select BLEEDS ON/NORM and move Power Lever approx. 1 cm above detent to set MCP manually.

The undefined ...

What do you do, when you notice problems with an engine or propeller but you can not identify it definitely as an engine failure / unscheduled fx / propeller Overspeed / RGB failure / Compressor stall / ... ?

First, see what condition YOU as a pilot are in. You are flying around without knowing, what the real status of your aircraft is. Bombardier states, that this is beyond "certified flight". Pilots must always know, what is going on and what is very likely to happen.

The only possibility, to return to certified flight is to convert the aircraft to a condition that is predictable for you, a state that is known and that you are trained for. So, to return to certified flight, this engine must be shut down. (If propeller can be feathered.) You are trained for single engine flight, the aircraft is certified for single engine flight and there will be no further uncertainty, what will happen next with the "strange" engine / propeller.

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Q400 Landing Gear

Which QRH Checklist will you read, if after takeoff, the right main landing gear leg does not retract?

You will not find a matching checklist. The most dangerous will be to simply read the “ALL landing gear fails to retract” checklist, because it sounds cool and 50%-matching.

Why?

Most problems with the landing gear come from faulty sequence valves. Cycling of the landing gear lever can result in landing gear legs travelling through closed gear doors, that might jam and lead to a partial gear up landing which is quite “unpleasant”.

So, if you have landing gear problems and there is no 100%-matching checklist or you can not identify the problem, perform an alternate landing gear extension.

There is no situation, where an alternate landing gear extension is wrong. (!!!)

Yes, you will be able to taxi with differential power / brakes. (Of course, except single engine / strong winds.)

No, you do not have to block the runway, because the gear pins only have to be inserted after parking, when the engines are shut down.

Alternate landing gear extension “specials”

There are only two options:

1. You have successfully lowered the landing gear with the alternate extension.
2. You hold the broken handle/wire in your hand.

It will NOT break. You can not pull hard enough.

If you and your colleague are “light”, consider a “heavy” CCM or even a passenger as ABP to have a pull. (Emergency situation)

There have been Q400 gear up landings, where the aircraft was jacked afterwards in the hangar and the alternate extension cables were pulled really hard, resulting in gear extension. (!)

If the gear does not lower, you will be burning down fuel for crash landing and your CCMs will be preparing the cabin for that. So, you have time to consult the Bombardier Service Letter that was issued a while ago. It gives further advise, if a landing gear cycling might be helpful. (You can not make the situation worse at that stage.)

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UPTRIM / MTOP & Co ...

UPTRIM is only 10%.

If you are on a 83% RTOP and an engine fails, UPTRIM will be:

$83\% + 10\% = 93\%$ MTOP

If you have negative UPTRIM, move the Power Lever above the detent and set manually 93%.

If you are on a 90% NTOP and an engine fails, UPTRIM will be:

$90\% + 10\% = 100\%$ MTOP

If you have negative UPTRIM, move the Power Lever above the detent and set manually 100%.

If you are on a 100% MTOP and an engine fails, UPTRIM will be:

Disabled. You can not get more than 100%.

Pushing the "MTOP" button on the engine control panel is wrong and can be fatal. It will result in 100% TRQ in any case. If you are light and slow, you might be below minimum control speed to counter the asymmetric high power. Therefore, remember that the MTOP button is only for setting MTOP on the ground, with the After Start Checklist and after takeoff, when setting climb power.

By the way ... How to set Climb Power during an MTOP takeoff:

MTOP is a push in / out button. If you push MTOP, the button will stay there, you will perform MTOP takeoffs all day long. So, MTOP must be deselected after take off.

PNF "Acceleration Altitude"

PF "Flaps zero, Climb Power"

PNF "Flaps zero" → retract the Flaps to zero,

"Climb Power" → press MTOP, select BLEEDS ON/NORM and set Condition Levers
to 900

If you do not press MTOP before selecting Bleeds, you will notice both engines running in MCP.

Flight Director / FMA

When you press a button on the Flight guidance control panel, check the flight mode annunciator (the funny thing on top of the PFD), if desired Mode is armed / active as required.

Not doing it, very often results in severe and unnecessary (SIM) fu*#-ups. Consider position of the NAV SOURCE Selector and HSI Selector!

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Go around power

... is not set by the PF! PF only moves Power Levers to mid-console position. PNF moves them into detent. There were occurrences at night, where the PF moved them into the detent and commanded "Go around, set power, Flaps 10" and the PNF pushed the Power Levers into the "next" detent = firewall, because he could not see / know that they were already set contrary to SOP. (TRQ approx. 135% ...)

If you note as PF that you accidentally moved the Power Levers into the detent by yourself, tell your PNF that you did immediately! So he/she will just verify that the go around Power is set.

PA calls to CCMs

Attention Crew on Station (ditching)

2 minutes prior emergency landing / unprepared emergency landing (ditching)

Safety Position (ditching)

30 sec prior emergency landing/ unprepared emergency landing (ditching)

Senior to the Cockpit

Only for end of emergency descent and Prepared emergency landing or ditching, NOT to give infos during diversions / re-landings / etc.

(Call via Interphone and ask SCCM to come to the cockpit to get information.)

Cabin Crew Member to the Cockpit

Incapacitation.

After emergency landing, set parking brake, CM2 calls 2x "Attention Crew on Station" to signal, that cockpit crew is still capable for further decisions.

After RTO, CM2 always calls 2x "Attention Crew on Station". There is not a single situation, where the call is wrong, but a lot of situations where it would be wrong not to perform the call. You never know, how the situation after an RTO will develop, even if it seems to be relaxed at the first look.

Flap / Landing Gear Protection

Keep in mind that the max. speed after takeoff and go around is 185 kIAS until the After Takeoff Checklist is completed. Also with one engine out ... !

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TCAS Phraseology bei "Clear of Conflict"

In der Regel hat der Lotse bei TCAS Events zwei oder mehr Targets an einem Fleck. Das heißt, er kann die Situation bei "Clear of conflict" nicht 100%-ig einschätzen. Daher hilft in die konsequente Nutzung der Standard-Phrasologie:

"AB ... clear of conflict, returning to FL ..." → man ist noch nicht zurück im Level.
"AB ... clear of conflict, FL... resumed" → man ist wieder im Level angekommen.

Wenn man sagt "AB ... clear of conflict, resuming FL ..." könnte der Lotse verwirrt sein, wenn er nur das Wort "resume" aufschnappt. (Im Hintergrund wird der Wachleiter wie ein Rohrspatz schimpfen und für Blutdruck sorgen, so dass der Lotse nicht alles mitbekommt. ;))

"Clear of conflict" (= keine unmittelbare Gefahr einer Kollision) bedeutet bei uns "durchatmen", der Lotse ist aber erst entspannt und wird weitere Freigaben erteilen, wenn er seine minimum Radar Separation hat. (5 NM oder 1000 ft, was dann "Clear of traffic" bedeutet.)

Mayday declaration

Nur, wenn nötig. **F/O declared niemals einen Emergency, ohne darüber vorher mit dem CDR zu sprechen.** Ausnahme: Emergency Descent als PNF und CDR incapacitation, aber dann ist der FO ja CDR.

Maydays können auch wieder zurückgenommen werden, wenn alles OK ist.

Bei Mayday und PAN steht die Feuerwehr IMMER an der Bahn, auch wenn man dies ablehnt oder nicht anfordern sollte.

Wenn man Mayday declared hat, die Kabine jedoch nicht für eine NL vorbereiten lässt, sollte man sich überlegen, ob der Mayday tatsächlich nötig ist... ;) Und umgekehrt natürlich auch

FMS Crossfill

You can not crossfill holding definitions.

When in the hold, a crossfill will not destroy your holding. The aircraft will stay in the hold.

Three ways to exit holding:

- PROCEED (Holding pattern will be continued until the next fix passage and then the FMS will sequence to the next point after the Holding fix.)
- DIR TO (Holding pattern will be terminated immediately and the aircraft will turn towards the selected DIR TO fix.)
- ACT APP (LNAV will revert to LNAV HDGSEL and the aircraft will continue on present heading, the holding will disappear, extd centerline / scale change ... will show up. (Do not use for standard approaches, as the Intermediate Approach will disappear.)

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Visual Approach

Gibt es beim VIS APP eine MDA/DA? → Nein! Die Entscheidung, dass das Wetter für eine Landung OK ist, fällt man in dem Moment, wo man ATC um die Freigabe zum VIS APP bittet. (Field in sight, 25 NM, etc...) In 1000 ft / 500 ft wird entschieden, ob der APP "stable" oder "unstable" ist, also gab es bei den alten SOPs keinen "LAND"-Callout. (Bitte beachten, dass durchstartender Verkehr bei einem VIS APP in die Platzrunde einfliegt, also NICHT einem ILS G/A Verfahren folgt...!)

Circling Approach

Wann darf man unter die Circling-MDA sinken?

→ Wenn man an der MDA genug sieht, und den Platz während des gesamten Manövers im Blick halten kann. Es macht Sinn, für den visual part auf Platzrundenhöhe weiter zu sinken. Wenn man den Platz sieht, muss man also nicht auf der Circling-MDA ausleveln.

Break off mit Flaps 5, Speed 170-180, abeam threshold Stop watch, Speed 160, Gear down, Flaps 15 (, im Final Flaps 35) – Landing Checklist.

Q400 Single Engine flying

- Anticipate Rudder Inputs! Applying Power requires rudder deflection into the running engine. Do not wait for the Slip/Skid Indicator to deflect, this will destabilize the track.
- During takeoff rotation, look outside onto the runway centerline. *) If an engine fails, you will instinctively kick the correct rudder to bring the nose back onto the centerline! At the same time, apply a significant amount of aileron into the same direction as you applied the rudder to counter the lift loss on the failed side. If you don't, the aircraft will bank to the failed side and you will turn away from the center line. If you are in full control, apply 5 sec. rudder trim (2nd graduation - fast trim) and release the pressure off your foot, apply 2 sec. aileron trim, adjust pitch trim and the aircraft will fly straight out on its own.
- When adjusting rudder trim during single engine flying, never use the slow rudder trim. This is only good for dual engine flying.
- Keep the Slip/Skid indicator centered. If you fly off center, you will leave the track / route / approach center line, even if you keep the roll F/D in the middle. (F/D System does not "know" yaw.)

*) *Background:*

American Airlines found out that there are two "types" of pilots. Those, who inadvertently turn away from the runway course and those, who stay bang on centerline. AA tasked the NASA to support a study and they equipped pilots in the SIM with goggles that show, where the pilots looked at during engine failures during takeoff.

- Pilots that turned off course looked onto the instruments, searching for Slip/Skid indication and engine instruments, desperate to find out, which engine failed so that they could kick the correct rudder.
- Pilots that stayed on course looked outside onto the runway centerline. They found the correct rudder immediately, because they only had to kick the nose back, like countering a crosswind gust during takeoff run.

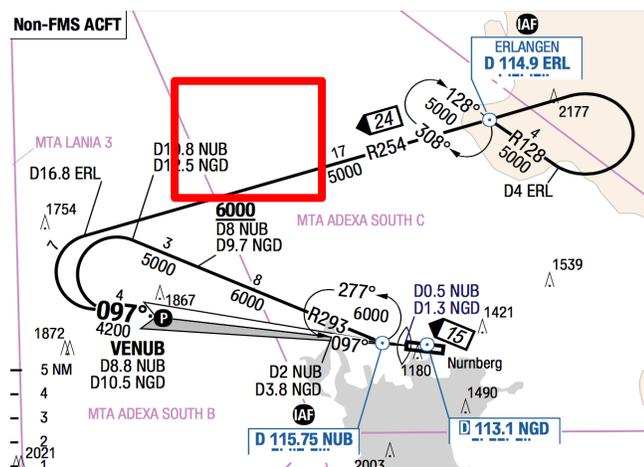
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Standard Approaches

Do not just brief the Final Approach, also consider the Intermediate Approach with its profile and track(s). Make up your mind, how you will fly the Intermediate Approach. (Which Modes, Courses, Headings, Nav Sources, Frequencies required to be tuned or changed, etc.)

Keep in mind, that the Intermediate Approach might not be (completely) available in the FMS. The list of available Intermediate Approaches in the FMS Arrival Page might be long; make sure that you select the correct one!

Example: NUE ILS RWY 10. Alignment turn after ERL is not in the FMS and must be flown conventionally! How will you do it?



Sim Preparation

Prepare for the SIM. Ask your instructor, which airports are used so do not get caught in the SIM when you see an approach plate for the very first time for obvious reasons!!!

Read and understand ALL relevant OM/C pages! If there are 2000 AOI pages, read 2000 AOI pages!!

Dress code

Short trousers & open shoes in the SIM is not good and not desired. (Danger of injury on sharp edges center stand, etc.)