

# HANDLING AN EMERGENCY

*Original idea from Captain C.D. Ewell*

**M**ost of us will go through our entire careers without ever having to declare an emergency. For those who do pull the short straw however, there are some basic considerations that apply, regardless of the specific problem(s). The desired outcome for any emergency situation is a controlled rate of descent onto a prepared surface.

The basic steps in any emergency are:

1. Maintain aircraft control
2. Analyze the situation and take proper action
3. Land when conditions permit

Declaring an emergency is an exceptional tool for any captain. Do not hesitate to use it when considered appropriate. This is not a career-ending move!

## PREFLIGHT BRIEFING

In the preflight briefing, the captain assigns which pilot will fly, who talks to ATC, who runs the checklist(s), etc. A suddenly dark cockpit at night in IMC is not the time to figure out who is doing what. Having a plan for an immediate return and landing, considering minimum safe altitudes, nav aids available, and any special engine-out procedures that apply. One technique is to have an approach set up on the pilot-not-flying side (if that nav system isn't needed to fly the departure) in case of an immediate return.



## MAINTAIN AIRCRAFT CONTROL

Regardless of the phase of flight, when something goes wrong, your number one priority is to maintain aircraft control. If something goes bang, the pilot flying needs to fly the jet and resist the temptation to start analyzing the situation to the point that aircraft control suffers. In maintaining aircraft control, you must determine:

1. Is the aircraft flyable?
2. Can we maintain terrain separation?
3. Is this situation time critical?

## **IS THE AIRCRAFT FLYABLE? (Unusual Attitude vs. Out-of Control)**

The most immediate concern is whether or not you have control of the aircraft. Do not confuse an unusual attitude with being out-of-control; they're different. While you may be in an unusual attitude, if the aircraft is responding to control inputs, you're not out-of-control. If the aircraft does not respond to control inputs, or responds counter to a control input, *then* you're out-of-control. The out-of-control can be caused by mechanical problems, exceeding the aerodynamic envelope, or a combination of both.

Remember that in certain flight regimes, a control input response may not be immediate (e.g - slow speed, high angle-of-attack or a wake vortex encounter). Don't confuse a slow response with no response; make an input and give it enough time to take effect. Bottom line: your first priority is to maintain or regain aircraft control.



## **CAN WE MAINTAIN TERRAIN SEPARATION?**

Once you're sure the airplane will fly, ensure that the altitude you're maintaining or drifting down to, ensures terrain separation. Specific procedures are presented in the respective Operating Manuals. The flight plan calculates driftdown information based on the planned ramp weight over the flight planned route. Changes to either may invalidate the driftdown computation, so if weight or routing change, check with Dispatch or compute the driftdown information yourself from FMS, PMS, Performance Manual or the driftdown chart (if applicable).

## **IS THIS SITUATION TIME CRITICAL?**

Once this aircraft is under control and terrain is not a factor, start analyzing what went wrong. Determine how much time you have to troubleshoot and fix the problem or mitigate the impact it has on the flight. Even if time is critical, responses should be appropriate and controlled - rushing to throw switches might make the situation worse (e.g. engine fire and shutting down the wrong engine). Accomplish those things you can based on what you're wrestling with and the amount of time you have available. Losing an engine is bad; getting behind and making an engine-out go-around is worse.

## **USE ALL AVAILABLE HELP**

Remember, you are not alone. Time and conditions permitting, Dispatch can muster considerable help in dealing with an emergency. They can tie you in with Technical Services and/or a Technical Pilot from Flight Operations. They can coordinate with ATC, check weather and NOTAMS and even declare an emergency for you, if you give them a chance to help. ATC is also an excellent source of information, especially on location, weather, and facilities for nearby airfields (crash, fire and rescue equipment (CFR); medical assistance; etc.).

If unable to contact Dispatch, figure out what help you have on board. Many of deadheading and non-rev pilots take the time to introduce themselves to the flight crew and offer their assistance should it be required. Flight Attendants can let you know if they have noticed anything unusual in the cabin.

On one flight, the Flight Attendants on the aft jumpseat of a MD-80 heard "something different." it turned out to be a problem with one of the engine hydraulic pumps. Remember to brief the Flight Attendants, allowing them time to prepare the cabin and to complete an emergency evacuation in certain circumstances, even without an evacuation signal from the cockpit.

## **CHECKLIST PERSPECTIVE**

Don't get so wrapped up in checklist procedures that you fail to see what impact they might have. For example, a hydraulic problem might require an emergency gear extension. After the gear is down (to stay), it is the wrong time to see if you have sufficient fuel to get to a destination and/or alternate with the extra drag from the wheels hanging.

## **COMMUNICATE YOUR INTENTIONS**

Once you have aircraft control, determine what's wrong and how you're going to handle it. Communicate your plan to ATC *Don't hesitate to declare an emergency to get traffic priority.*

As soon as you let ATC know you have a problem, they will want to know fuel on board, souls on board, etc. If you don't have the time to discuss it, tell them to standby until you're ready. This information is important to ATC. They need to let your destination know what to expect and how to respond. Major airports normally have sufficient CFR capability around-the-clock; however a smaller airfield may not. If a single-seat fighter pilot ejects on short final, most airports can go get him with a pickup truck.

To deal with a DC-10 carrying 236 people, an airport might have to alert or request resources that are 100 or even 200 miles from the field. So, the number of souls and fuel remaining is important to let the airport know how much time they have and how they need to prepare for your arrival.

## **CONTROLLABILITY CHECK**

Some situations adversely affect aircraft control; this is definitely a factor on approach and landing. Don't wait until the flare to find this out. If you have structural damage, an abnormal flight control configuration, or the aircraft is a real handful to fly, consider doing a controllability check. Techniques for a controllability check vary, but generally involve:

- Getting the jet to a safe altitude. (Technique: use 10,000 feet AGL; at a minimum, try to be VMC.)
- Configuring your landing based on what's wrong with the aircraft. (Remember the fuel scenario discussed above.)
- Decreasing slowly to approach speed or the minimum speed at which the aircraft is still flyable. (Technique: Slowdown in 10 knot increments which will help determine the minimum control speed without going below it.)
- Flying final at the final approach or minimum control speed to the longest, widest piece of operationally suitable concrete available at destination.

## APPROACH AND LANDING

Don't get rushed. Get the checklist done so that your attention on final approach is directed primarily on flying the aircraft. This isn't the time to practice that double figure-8 NDB approach. If approach radar is available, let them help get you set up on a straight-in final.

Technique: request a 10 mile final at 3,000 feet AGL which puts the aircraft on a 3° glide path angle to the runway. Use whatever nav aids are available to maintain situational awareness in the radar pattern as well as on final.

If single engine, or with a controllability problem, keep the power up until you are sure the aircraft will arrest the sink rate in the flare without bleeding airspeed below minimum control speed.



## SUMMARY

In an emergency

1. Maintain aircraft control.
2. Figure out what's wrong and how you're going to handle it. Use all of the resources available to you.
3. Let ATC know what your plan is, and ensure they assist you in implementing it.

### Why is There Little Need for Safety in Operations?

"When anyone asks me how I can best describe my experience in nearly forty years at sea, I merely say, uneventful. Of course there have been winter gales, storms, fog and the like. But in all my experience, I have never been in any accident ... of any sort, worth speaking about. I have seen one vessel in distress in all my years at sea. I never saw a wreck and never have been wrecked, nor was I even in any predicament that threatened to end in disaster of any sort.

**Edward J. Smith Captain, R.M.S. Titanic 5th April 1912**

# **TO DEAL WITH AN EMERGENCY IN FLIGHT**

By Captain Ludovic ANDRE

Acronym : **FACABDI**

## **FLY THE AIRCRAFT**

- FLIGHT PATH & SPEED Control maintained by PF (or PNF if necessary)

## **ACTIONS**

- Pilot who first detects the fault makes the call, ex. *"ENGINE FIRE !"*
- Other pilot checks and confirms the fault
- PF asks for RECALL ITEMS (if appropriated) under captain's supervision
- If required MAYDAY or PANPAN (x3)

## **CHECK-LIST**

- PF chooses the appropriate Check-List under captain's supervision.

## **ANALYSIS**

- Evaluation & cause of the problem ? (How & Why did it happen ?)

## **BALANCE (remember: MOC)**

### **Mechanical**

- BREAKERS, APU availability ?
- RECALL -> Check EICAS messages -> Check all Main systems (electrical, fuel, pneumatics, engines, hydraulics)
- If necessary check Boeing Operations Manual (supplementary procedures, etc.)

### **Operational**

- CONSEQUENCES on the remaining flight (en-route / approach / landing / go-around performances), Fuel consumption, ETOPS capability, etc.
- METEOROLOGY (En-route, destination, diversion airports suitability).
- REPAIR AVAILABILITY (Best location to fix the fault)
- MEL (check MEL for following leg)
- CREW (duty time)

### **Commercial**

- Check CCP REPORT (Cabin / Pax status).
- PAX specificity (connecting flights, hotel accommodation, political / religious aspects, etc.).
- CARGO (Live animals / Specific Cargo / NOTOC)

## **DECISION (CAPTAIN)**

- Reasonable DECISION (in respect – if possible – of Company FOM)

## **INFORMATION**

- ATC / CCP / PAX / Company