

ENGINE FAILURE OVER THE ATLANTIC

A true story – written by captain Werner MOENS

Flight : from ZRH (Zurich – Switzerland – Europe)
to EWR (Newark – USA – America)

Date : March 2006

Aircraft : Boeing 737-800

Crew : 2/4

Passengers : 54

After about 50 oceanic crossings on the 737, I stopped counting.

Bored? No!

Routine? Up to a given point, yes!

It started as any other flight, nothing unusual, we prepared the flight and checked our ETOPS enroute alternates. My first officer was Stefan, a first officer with a lot of experience on the 737 including the NG. This flight was his line training concluding his OCC (Operator Conversion Course), he told me he wanted to see something different and joining our airline company would be just that.

The flight preparation, takeoff and climb were normal. There were no indications whatsoever of a problem with one of the engines. During climb I even checked the secondary engine display for engine vibrations since we had some resonance in a given engine regime (15.000 ft, 70% N1), all parameters were normal.

During cruise, about one hour before the event, we looked at the secondary engine display. Since it was a training flight, we were discussing engine oil levels and a number of other subjects. Again, all engine parameters indicated normal.

After some 4 hours of flight we decided to take a break and stop discussing training topics. I had just started my laptop in order to continue working on the fall 2006 recurrent and training program when we smelled something...

The source and type of smoke was difficult to determine. I remember me saying "This is not normal" after which I immediately switched off my laptop and stowed it. In the mean time, Stefan had opened the gasper outlet stating "I think it is coming from the air conditioning system". **Looking at each other, we were both thinking the same: 'Here we are, just passed 30 West with smoke and possible fire'. The adrenaline level started rising.**

While still investigating, the engine 1 'LOW OIL PRESSURE' warning popped up. The warning was confirmed by the secondary engine display indicating the oil quantity at zero and the oil pressure dropping rapidly. My first words were "This can't be true", you can refer to it as the 'pinch me' effect, convincing yourself that it IS true.

At this time we got a call from cabin asking to enter the flight deck with a cup of thee I requested earlier, I replied that it was not a good time. Without saying anything to the cabin crew yet, she new something was not normal.

I can guarantee that the adrenaline level went up further. Although you are very alert to external stimuli, other senses become numbed, such as the notion of time.

On the other hand, having the engine problem was kind of a relief. First the situation was unclear but now we find ourselves in a well defined state. And it was most probably not a fire or smoke.

As soon as we analyzed and realized what the problem was, I pulled the thrust lever in idle. My first reflex was to try saving the engine; or at least prevent severe damage knowing the engine could run longer in idle even without lubrication.

At this point you see that good training proves not to be luxury. We now distributed tasks and while Stefan was performing the 'Low Oil Pressure' non normal checklist, I had already entered the offset track in the FMC and connected the APU generator on the electrical bus (the APU was running because we were conducting an ETOPS flight). In the mean time Stefan had arrived at the 'Engine Failure and Shutdown' non normal checklist.

While performing this non normal checklist, the N2 rotor seized. Vibrations were felt throughout the aircraft until the N2 rotor stopped. Ouch!

It now immediately struck me that we were in the middle of the Atlantic on 1 engine! The feeling is quite different from what we experience in the simulator every 6 months, this is for REAL!

Thrust on the remaining engine was set to maximum cruise, we chose not to push it up to maximum continues thrust since our airspeed didn't drop very fast. We were able to maintain our level until on the offset track.

While Stefan continued the non normal checklist, I performed the initial call on 121.500 to warn aircraft in the vicinity about our position and problem.

We elected to use the famous word 'MAYDAY'. This would for sure attract the attention of nearby aircraft.

Further, given the fact that we would not be able to maintain our altitude for a long time and that one normally has to make that call only once in a lifetime, we didn't hesitate. Once again, using that word in REAL life does give it a more dramatic touch...

We chose not to call Gander radio on HF just yet, it would only increase the workload and there was no real hurry. Instead I asked the Keflavik BIKF weather on 121.50. A very attentive KLM crew had already prepared this and we received it instantly (very good show, thanks KLM !). It was the same flight crew that inquired if we had the situation under control, again very nice!

Since it was the closest airport (except for Narsarsuaq, however less appropriate for this case) and the weather was suitable, I had already mentally prepared to divert to Keflavik although the decision still had to be taken.

When Stefan had completed the non normal checklist we had spare capacity to evaluate the situation (we certainly didn't want to fly the opposite way too long), so we decided together to divert to BIKF.

We then tried to advise ATC on HF. I don't have to draw you a picture but it was really what one can expect from long range HF communications: difficult to read, say again, change frequency,.... At a given moment we were both sitting there with our hands covering the headset, volume at maximum, trying to understand them! Not really a sight. Anyway, to my opinion, we were losing time.

The aircraft was well under control and we were descending at a normal descent rate (we kept engine 2 slightly above idle) on the offset track so we agreed that Stefan would continue on HF while I called the purser, Catherine, to the flight deck. I used the interphone cabin call, a call over the Public Address would not have been appropriate and there was no hurry.

When the purser entered the flight deck she had already prepared a piece of paper with the word NITSA (Nature of problem, Intentions, Timing, Specials, Announcement) written vertically on it. **I really appreciated that and it gave me the feeling that she was on top of the situation.** The crew had already noticed that there was a problem, especially since I urged to come back later with my drink...

So I asked first how the crew and passengers were doing. Apparently everything seemed to be under control. We then went through the NITSA details and she calmly wrote down what she was being briefed and repeated it back to me.

It is important to remain calm towards your cabin crew and passengers. Your attitude will have a significant impact on the behavior of the entire crew.

By now Stefan had been in 'contact' with Gander radio and he was at least able to get the message through that we wanted to divert to BIKF at FL200. Later it showed that it was about the only thing that got through. They didn't really seem to know why...

In the mean time we had convinced ourselves that diverting to Keflavik was still the best option. When we descended below FL285 and setting course to Keflavik we received the clearance from Gander to do so.

I handed-over the flight controls to Stefan in order to speak to the passengers. Before doing so I rehearsed the speech a few times in my head making sure I would make a consistent and confident impression. **Jumping on the mike would not have been wise because one would use too many pauses and maybe use the wrong words.** I made the speech in English only.

On course to KEF VOR we descended further to FL200, well, to be honest we flew at FL198. We just wanted to make sure not to encounter any military or other stray traffic in the region, you never know.

We also chose to fly lower than the 1 engine inoperative LRC altitude in order to use a thrust setting lower than MCT. I know, but once again we wanted to have a bit more margin.

By now things had settled down and we reviewed our decision again, it was still the best option. **We asked if any of the cabin crew wanted to come in the flight deck to have a chat, one accepted and it helped putting her at ease.**

Based on the last weather we received (140/24 +10K -RA F017 B038 B050 8/5 1018), we prepared for approach on runway 20 (variation 18°W).

When approximately half way (we flew on one engine for 1h45) I performed a second speech for the passengers, reassuring them everything was still under control and that they would be taken care of on arrival. This was a calculated guess but we didn't feel like calling our airline company on HF. It was of minor importance to us and we had been receiving calls on HF by Gander, Shanwick and Iceland radio who all wanted to know something different on different frequencies. Very time consuming and disturbing. The only valuable information we got was the latest weather report of Keflavik which had worsened (T140/21-32 9K -RA F012 B020 B028 7/4 1016).

When in ACARS VHF range we sent a message to our handling agent in Switzerland stating the problem and intentions. We never received a reply...

About 150 nm from BIKF we were in VHF radio contact and shortly later under radar contact. We now received a new weather report (M150/25-32 9K -RA F014 B025 O038 7/4 1016). Given the slightly changed wind direction we reviewed the landing runway and decided to change to runway 11. The crosswind would be slightly less and the in-flight controllability on a single engine would be increased.

Before we initiated descent towards Keflavik I performed a third speech for the passengers giving them the latest details and the exact landing time. We received a cabin secured in due time.

Since we were planned to land with engine anti-ice our Vref was increased to Vref ICE. Due to the wind and gusts, speed was further increased by a maximum permissible of 10 knots. We also decided to go for the no engine bleed landing.

When receiving vectors from radar we noticed they would bring us to a 7 NM final which that day seemed a bit tight so we asked a vector to 10 NM final. At about 8 NM final we were advised by ATC of possible windshear at 500 feet ground. We agreed that it was a bit late to pass that kind of information in our situation. To be on the safe side we added another 10 knots until passing 500 feet.

The wind during approach was from M150° at 50 knots combined with gusts and turbulence.

At around 1000 feet we had the approach lights in sight, it had started raining harder and we required use of wipers. We still experienced quite some gusts and turbulence while the wind intensity decreased. The autopilot managed very well and I disconnected it shortly below 1000 feet to get familiar with the aircraft controllability.

The landing was normal using minor reverse thrust and autobrakes position 3. When vacating the runway we were escorted by the fire brigade to our gate and after assuring ourselves that everything was normal we cancelled the distress.

Arriving at the gate we were obviously expected and we shutdown the remaining engine a bit reluctant but happy. I asked Stefan to complete the shutdown checklist while I went to the cabin to say goodbye to the passengers. **This appeared to be a gesture well appreciated by the passengers**, about half of them shook my hand and almost all of them thanked me. This was a bit unfortunate for the cabin crew because they did a very good job as well. I guess this is a normal reaction in these situations and I hereby want to thank the cabin crew for a job well done !

By now Stefan had turned on the company phone and it was almost immediately red hot. I was asked to answer the phone **but I delegated this to Stefan, I first wanted to make sure that the passengers were being taken care off.** The local handling agent was very helpful and assured me that transport and hotels for the passengers and crew were already arranged. I then had to make an official statement to the Iceland Police. The statement was brief, only mentioning a few facts.

In the mean time some maintenance engineers had entered the aircraft but since they were not qualified on the B737 NG they could only confirm what we already knew. Then I filled out the required paperwork.

Finally I was ready to speak to our airline operations and the technical department. I explained the incident and it was obvious the engine had to be changed. The aircraft now had to be repositioned to a remote stand and since the maintenance engineers were not type rated we had stay on the aircraft for the towing. Needless to say that all of this took some time.

We passed through immigration and customs and a taxi took us to the hotel. In the meantime I had news that most of the passengers would be picked up the next morning by our B757 to continue their journey to Newark. Since a number of passengers were already at this hotel I personally notified them and again this was appreciated by the passengers.

The reception now informed us that we were dropped off at the wrong hotel so we had to wait for another taxi and we then drove 45 minutes to Reykjavik...

During the trip I advised the crew already that they shouldn't make any statement to anyone, certainly not the press. We all know how things can be taken out of context. **Arriving at the hotel I invited the entire crew for a mandatory debriefing. We all joined in my room and talked for a few hours about what we thought and felt.** I don't know if we continued to sunset or sunrise, it's kind of difficult up north in the springtime...

This story is a mix of facts and feelings. I hope it gives you a better idea of what and how things can happen and how we react to them, hoping it will never happen again, knowing it will happen again.



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