

- **the most common reasons for an engine failure**

An aircraft engine may fail for many reasons: fuel problem, engine vibration, foreign object ingestion, electrical failure, loss of oil pressure or a serious mechanical failure. Many engine failures happen due human error. It may be: poor maintenance, inadequate pre-flight checking, fuel exhaustion, fuel contamination and so on. A turbine engine failure can also be caused by bird strikes or weather conditions like precipitation, volcanic ash, icing or severe turbulence.

- **related malfunctions in case of an engine failure**

Pilots may report about an intense vibration, reduced / idle thrust, an engine stall indication, engine flame-out, engine shutdown / cutting off, oil reduction issue.

- **dangers posed by an engine failure**

It depends on the stage of flight, the type of aircraft (single- or multi-engine aircraft) and the extent of failures. The most critical is the uncontained engine failure because fuselage and adjacent systems could be damaged. Engine failure on a single engine aircraft can be deadly.

- **possible consequences of an engine failure**

Engine failure may have serious consequences for an aircraft. Engine failure on an aircraft will reduce its power and ability to fly normally. The engine failure can lead to loss of electrical power, navigational system, communication system, loss of cabin pressure and manual gear extension.

- **pilots' requests and actions in case of an engine failure**

In case of engine failures, we can anticipate different scenarios, depending on the stage of the flight and the type of aircraft. So one engine failure on a multi-engine aircraft usually does not affect flight safety. The crew will probably shut down the affected engine and make a precautionary landing at the nearest airfield, but sometimes pilots can carry on to the destination on the remaining engines. It depends on the aircraft position and fuel situation.

Engine failure on a single-engine aircraft is certainly an emergency situation, because the aircraft can lose power, altitude and speed very quickly. In this case the pilot will choose a suitable landing area and glide the aircraft to the ground in order to carry out a forced landing.

- **controller's actions in case of an engine failure**

Pilots may need assistance from controllers: changes in flight path, level, destination, type of approach; technical support on the ground and emergency services.

The controller should be prepared (be ready) to

- clear the air space below the affected aircraft
- provide safe separation with other traffic in the sector
- inform the crew about next suitable aerodrome and provide alternate aerodrome details and weather information as soon as possible
- inform landing aerodrome of the inbound traffic with engine failure
- arrange towing equipment, technical and emergency services to be on stand-by
- in case of forced landing, request POB and if any dangerous goods on board

- **the best principles of ATC assistance to the pilot in case of an engine failure**

To help the pilot in emergency, we should follow the ASSIST principles:

- Acknowledge the nature of emergency;
- Separate the emergency aircraft from other traffic. Clear the airspace beneath the plane.
- Silence – impose silence if needed.
- Inform all concerned.
- Support the pilots in any way possible. Arrange whatever is necessary for the pilot.
- Time – give pilots sufficient time to solve the problem (to troubleshoot); do not press pilots with non-urgent messages.

- **arrangements needed on the ground for successful landing in case of an engine failure**

- Clear RWY according to local instructions
- Keep safety strip clear
- Towing equipment, medical service and fire brigade on standby

- **special vehicles required upon arrival in case of an engine failure**

There are ambulance, fire truck, shuttle bus, passenger steps.

- **situation connected with an engine problem you have had / heard about**

A couple of months ago, on the night shift, I personally encountered an engine failure. The crew of the Boeing 767 reported problem with engine #2 and requested descend from FL 350 to FL 250 and made decision to continue flight to the destination. However, after 20 minutes in airspace of Kazakhstan, the crew requested landing at the nearest suitable airport.

I remember one story. It's called "miracle in the cornfield". Ural Airlines Flight was taking off from Moscow to Simferopol, when it suffered a double bird strike, causing one engine to burst into flames and the other to stop working. Aircraft was forced to ditch into a cornfield. Captain Yusupov brought the plane down with no power in either engine and with the landing gear retracted.