How dangerous is a situation on board in case of an engine failure?

Though modern aircraft use reliable jet engines these engines unfortunately can fail. Level of danger from the engine failure depends on number of engines and the stage of a flight. If it is a multi engine aircraft the pilot may shut down the affected engine and continue the flight safely to the nearest suitable aerodrome or even to the destination. But during landing due to long and high speed approach the aircraft may run out or skid of the RW. It may result in crash and fire. Also total or single engine failure may result in depressurization, loss of electrical, navigation, and communication systems. It is really dangerous and can lead to catastrophe/disaster. Besides the flight situation may be dangerous in case of "uncontained" engine failure as/because broken parts of the engine may destroy the aircraft structure or injure the occupants.

- ***What are the most common reasons for an engine failure?***

Engine failure can happen due to technical reasons: fuel system problems (such as fuel contamination, fuel leak, fuel exhaustion), high or low oil pressure, metal fatigue; also due to weather conditions, for example icing, hail storm, volcanic ash; human factor: poor service on the ground; other factors are bird strikes, penetration of foreign objects and debris on the RW.

- ***What are related malfunctions in case of an engine failure?***

1 вариант:Engine failure can lead to malfunctions of electrical, navigational, communication, hydraulic aircraft systems.

2 вариант: There might be different engine problems: high vibration, overheating, engine fire, engine flame out, engine /stall/ cutoff.

- ***What are possible consequences of an engine failure?***

Due to engine failure the aircraft will fly at lower altitudes and use more fuel. So the pilot may need to proceed to alternate or to the nearest suitable aerodrome for refueling (technical stop) and will not be able to reach the destination in time. After landing the aircraft may block the RW. In very serious situations the captain may make decision to perform forced/crash landing or ditching.

- ***What are expected actions of the crew in case of an engine failure?***

If it happens during rolling a pilot may abort takeoff. Sometimes the crew may continue takeoff and then return for landing. The flight crew may need to dump fuel. Also we may expect high speed approach and deviation from SID or STAR.

- ***How can a controller assist a flight with an engine failure?***

The ATCO has to assess the situation, clear the airspace for the suffering aircraft, inform the supervisor and landing aerodrome, provide aerodrome details (RW in use, length, landing aids) and weather information. For landing at his aerodrome the controller should clear the RW , arrange/organize towing equipment standing by for the arrival of an emergency aircraft.

- ***What are the best principles of ATC assistance to the pilots in case of an engine failure report?*** The best Euro-control principles to assist are:

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

-Acknowledge an engine failure and ask for intentions; - Separate the aircraft, clear the airspace; -Impose radio silence if necessary.- Inform the supervisor and all concerned.- Support pilots with necessary airport data. - Give pilots time for solving the problem.

- ***What arrangements are needed on the ground for successful landing?***

For successful landing of an emergency aircraft the controller should (keep) clear the RW from departing, arriving aircraft and also from any vehicles, stop all the operations in the maneuvering area. The supervisor alerts appropriate emergency services and the ground staff. As for the ground staff they should prepare/ arrange necessary towing devices/equipment and an isolated parking stand/position.

- ***What kind of special vehicles may be required upon arrival?***

After landing the pilot may need towing trucks, tractors or a tow bar for his type of aircraft, a follow-me-car, fire vehicles, an ambulance and additional/special passenger steps.

- ***Have you ever had/heard of a situation connected with an engine problem***

I'd like to tell a true story, it happened many years ago but I still remember it.. The crew reported engine failure and their decision to change the original destination and use our airport as alternate. The situation was very serious because broken parts of the engine destroyed the fuselage causing explosive decompression. All persons on board lost consciousness, the total crew became incapacitated and the aircraft started to fall down. Fortunately after reaching the safe altitude one of the pilots regained consciousness (became conscious again) and could (managed to) land the aircraft safely without fatality. But to a great pity, aviation authorities stopped the pilot's license due to health problems after this incident.