

## **How can weather affect flight safety?**

Weather is very important in safe flight operations as it affects all phases of flight. Of course, modern aircraft are equipped to fly in different meteo conditions but pilots from time to time experience and have to deal with potential danger caused by bad weather. Ground operations may be stopped due to thunderstorms in the area. Pilots will experience difficulties during taxiing, taking off and landing because of slush, snow, standing water or other contamination on the RW. Even more it can lead to RW excursions. Low cloud, fog, rain showers may reduce visibility at and around the aerodrome. So both pilots and controllers always need to be careful and attentive working in such conditions.

- **What are effects of bad weather conditions on controller's work?**

Adverse/marginal/bad weather conditions may bring big problems to controllers' job. Such conditions significantly increase their workload. This is because situation changes very quickly, controllers constantly provide navigational assistance. They recommend re-routing to avoid the weather or nearest alternate, they use different procedures like going around, holding, vectoring, level change, low visibility procedures on the ground and so on. All that requires extra/additional communication and coordination with pilots and neighboring sectors. Besides sometimes situation may be difficult when controllers will need to use plain English for describing or clarification problems. They may experience miscommunication.

- **What weather phenomena may affect operation in your zone of responsibility?**

Our operations may be affected by severe thunderstorm activities, low cloud, dense and thick fog, wind shear, strong gusty winds and heavy shower precipitations. Thunderstorms can lead to long delays as aircraft have to enter holding patterns and wait vectoring for landing. Low cloud, rain showers, snow fog may reduce visibility at or around the aerodrome. Braking action may become poor or unreliable due to RW contamination and so on.

- **What factors can influence the choice of appropriate strategies?**

For correct and successful actions in challenging situations the crew/controllers should know type, location, size, height, direction, movement speed of the phenomenon. Also they should try to predict how soon the situation may change and which way: for better or worse. They should realize/understand if the phenomenon is (phenomena are) a threat for flight safety or not and then make a correct decision.

- **What are operating practices for dealing with thunderstorm activity?**

When a thunderstorm is present in the vicinity of an aerodrome, pilots will delay or cancel their flights. While in flight the crew will avoid the dangerous area by overflying or flying around. Also they may reroute and divert to the nearest alternate.

- **What are operating practices for dealing with turbulence?**

Today's pilots are trained and can handle most turbulence. To prevent structural damage, loss of control of the aircraft and in-flight injuries the crew will not enter the dangerous area but will avoid it. When dealing with moderate to extreme turbulence, pilots slow the aircraft to regain control. They may change FL, heading, proceed parallel offset or divert to area with more comfortable conditions. Of course, it can lead to delays, schedule breakdown, increase fuel use/consumption but in any event it will provide safety.

As for the controller he should provide necessary separation between aircraft in the area and coordinate any deviations with adjacent units.

- **What are operating practices in periods of excess demands due weather?**

Due to severe thunderstorm activity in the vicinity of an aerodrome, flights are not allowed to depart. Refueling of aircraft is also prohibited because of the presence of lightning. During periods of adverse weather, such as fog or heavy/shower rain or snow (low visibility conditions) controllers at airports must use low visibility procedures. During winter weather the ground staff must keep the runways, taxiways and apron clear and safe for flights.

- **How to get prepared for dealing with adverse weather?**

Before every flight, pilots will study the maps and the forecast and understand weather conditions for each flight and choose the best/the most suitable route and also alternates. So they will be able to change their course to avoid areas with extreme weather. Crews will take additional fuel due to possible holding or diversion.

- **What damage can an aircraft get in case of lightning strike?**

A lightning strike normally doesn't damage the airplane structure but it can damage communication and avionic navigation equipment. In worst cases it can cause explosion of fuel tanks.

- **What damage can an aircraft get in case of hail?**

Hail can significantly damage an aircraft structure, destroy wings, the leading edge. It may hit engines and break fan blades, windscreen. Level of damage depends on the sizes of hailstones.

- **What damage can an aircraft get in case of thunderstorm?**

Thunderstorms are quite dangerous phenomena in aviation as they have negative effects on aircraft operations. Thunderstorms can produce severe turbulence, hail and lightning. They may damage an airframe, windshield/windscreen, communication, navigation and avionic systems. In such conditions passengers and crew may be injured.

- **What damage can an aircraft get in case of severe turbulence?**

In case of severe turbulence objects flying in the cabin: flight attendants' or passengers' belongings may damage aircraft structure. Also pilots may temporarily lose control of the aircraft.

- **How can controllers assist an aircraft in adverse weather conditions?**

Controllers will always issue important information on weather updates and assist pilots in avoiding dangerous areas when requested. ATCOs must be ready to provide a new route to avoid affected areas or clear level change.

- **What measures can be taken to make controller's job easier under adverse weather conditions?**

Controllers should organize a good team work, coordinate all the actions in the shift and with aerodrome services in good time/in advance/beforehand and find the best ways to solve this or that problem. They should share the workload and replace each other when needed. The supervisor should provide enough breaktime for controllers.

- **Have you ever had/heard of a situation connected with adverse weather conditions?**

I can remember one accident. It happened at Domodedovo airport about 10 years ago. Tupolev 204 made landing in foggy (poor visibility) and slippery conditions. After landing the aircraft ran out of the RW and hit snow banks. As a result the aircraft structure was badly damaged, but fortunately nobody was injured or killed.