IMPACT OF WEATHER ON AIRPORT OPERATIONS

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Introduction

Aviation is probably the mode of transportation that is greatly affected by weather, from thunderstorms, snowstorms, wind, fog, turbulence, extreme temperatures and pressures etc. Commercial aviation must deal with adverse types of weather regularly and it has its significant great effect on airline cost budgeting and its services is affected. Considering the above mentioned, airline companies are dependent on weather forecast to maintain the safety and efficiency of its aircraft and the service it provides. This all comes down to money. We are into a new era where weather is money. In the United States NASA has a say when an airport site is to be chosen. One of the main consideration is the historical weather phenomena and associated operational impacts in its configuration assessment of the chosen site. Severe weather conditions cause several millions of dollars of damage each year due to disruption and delays. Preparation is the key to minimizing the impact on aviation operations and weather is one major impact.

Impacts of Weather

There are many weather phenomenon that affects the aircrafts and in turn affects airport operations and the two main weather phenomenon that has great significant impact on aviation industry here in Fiji are thunderstorms and heavy showers of rain.

Thunderstorms occur from cumulonimbus clouds. These are clouds with vertical extent extending from 1000m (330ft) to 12000m (39000ft) to the top. Thunderstorms are also known as electrical storms which consist of lightning, thunder, strong winds and very heavy rain and sometimes even without rain (precipitation). Severe turbulence is also frequently experienced in these types of clouds. Airlines do not fly into these clouds but keep their distance if it is on their route to their destination.

When thunderstorms are about, light aircraft are not allowed to be airborne. From thunderstorms above stations fueling of aircrafts are prohibited because of the presence of lightning. Aircrafts use very flammable fuel and this is why fueling is not allowed. Aviation fuel is a specialized type of petroleum-based fuel used to power aircraft. It is generally of a higher quality than fuels used in less critical applications, such as heating or road transport, and often contains additives to reduce the risk of icing or explosion due to high temperatures, among other properties. Even without lightning, the presence of the cumulonimbus clouds can stop or prolong refueling.
Thunderstorms are usually accompanied by

- Strong winds
- Heavy rain
- Snow
- Severe turbulence

We have many incidents in Nadi where refueling is always delaying international flights and domestic flights because of lightning and the presence of cumulonimbus clouds.

Delaying of flights cost a lot of money to the airport operations and airline companies etc, but the main focus is always on the safety of the aircraft and the life of the passengers.

Due to the above mentioned, aircraft schedule movement is affected, companies that are part of airline operations are affected drastically especially economically and its reputation is tarnished.

An example of thunderstorms affecting the airport operations is here in Nadi where bad weather has delayed aircraft refueling, aircraft take off delays and ending up in flight cancellation. The Nadi-Rotuma route is a good example. Due to bad weather, flight to Rotuma is always cancelled and sometimes it takes two to three weeks for a flight to Rotuma to eventuate. We have passengers rushing up to the weather briefing office to try and confirm the bad weather situations to justify the flight cancellation.

Lightning

Lightning possesses very significant threats to airports, airfields, and general aviation operations throughout the world today. Many airports experience significant damages from direct lightning strikes and power surges. Damage and destruction to airport facilities, aircraft, and equipment can wreak havoc on flight operations and passenger/cargo movement. When this occurs, aircraft flight operations can be significantly affected for extended periods of time. This flight
operations degradation can cause a negative ripple effect at other airports and airfields due to time movements of other awaiting aircrafts and delays in airport operations.

In the United States it is estimated annually that lightning damages to airport operations exceeds twenty million dollars US.

Turbulence
Turbulence is air movement that normally cannot be seen. It may occur when the sky appears to be clear and can happen unexpectedly. It can be created by any number of different conditions, including atmospheric pressures, jet streams, mountain waves, cold or warm fronts, or thunderstorms. Many passengers do not understand the effects of turbulence, or that an encounter with turbulence may occur without warning.

Sigmets are weather reports that are compiled by flying aircrafts that encounter these significant weather phenomena and relay them to the airports operations on the ground. This is included in weather briefing office documents that is collected by the pilots giving them the heads up on the weather situation enroute to their destination.

A situation occurred during an Air Pacific flight enroute from Nadi to Sydney where no sigmet was issued and the aircraft experienced severe turbulence just before the Sydney airport. The aircraft maintained damage and passengers were affected and a air hostess on duty sustained injury. The airport’s ground operations from Nadi and the weather briefing was almost sued by the injured air hostess.

Heavy Snow
In other countries apart from Fiji, snow is a very hazardous form of weather phenomena that affects airport operations.

Movements is limited causing operation standstill and most of the time airports operations shutting down.
**Heavy Rain**

Heavy rain is hazardous to airport operations. One most important factor affected is visibility. Visibility affects all forms of traffic roads, sailing and especially aviation. Heavy rain (such as from a thunderstorm) causes low visibility. Operations at the airport here in Fiji is always affected by heavy rains where airport personnel safety is always a priority. Operations are always prolonged depending on the heavy period of rain. Visibility of landing aircrafts or aircrafts taking off is affected.

One incident happened here in Nadi where an Air Pacific flight inbound from Brisbane had to divert to Nausori airport due to the low visibility from heavy rain.

Continuos heavy rain causes flooding in low lying airport sites or sites near a river. Airport operations in Nausori have shut down causing the airport to be shut down also due to continuou heavy rain causing flooding.

**Tropical Cyclones**

The South Pacific is a frequent visitor of tropical cyclones during cyclone seasons. Tropical cyclones causes airport operation to shut down for a long period of time due to the damages caused to the equipments, buildings and may more.

**Conclusion**

There are many more weather phenomena that affects operations at the airport, but the ones highlighted above are some of the main significant weather phenomena that directly affects airport operations. Now that we have seen some of the impact of weather on airport operations, it clarifies that weather is an important part of our everyday life both physically, mentally and economically. Weather is not something you take lightly because it can mean life or death to you individually.

**Reference**

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