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## HAZARD OF WIND SHIFT *in Landing*

Explained by Safety Specialist

*The following is a safety bulletin recently issued by the Civil Aeronautics Board. It was written by B. C. Haynes, Safety Bureau Specialist in Meteorology.*

One of the most disconcerting and often dangerous phenomenon that pilots have to deal with is the windshift line that crosses the landing area just as a landing is being effected.

A wind shift is said to occur when the wind suddenly changes direction. As an example the wind may be south and suddenly change to west or it may be west and suddenly change to north. Usually the wind change occurs along a line which can be followed on a weather map as a front or "wind-shift line" as it is often called.

The cross wind and added tail-wind effects are the most dangerous and may produce disastrous results if the pilot is caught unawares. The effect of changing of the wind to a tail-wind component during landing is to experience a sudden loss of lift, which may force the plane down outside of the airport or decrease the altitude so that there is a danger of striking obstructions near the edge of the field. If the plane is over the airport, the drop may damage the landing gear.

The cross-wind effect is always dangerous, since the drift to the side will produce undesirable stresses in the landing gear on contact with the ground.

There are three principal types of wind-shift lines that may be observed. The wind-shift at a warm front is the least important, since it usually shifts slowly. The wind-shifts that occur with the line squall and the strong cold front are the most important and dangerous types.

It is possible for the Weather Bureau to forecast the movement of cold front wind-shift lines and the speed of the front or expected displacement is usually given in the airway forecast. Each operator should have a supply

of blank maps at his disposal to plot the position of the cold fronts and also the expected displacement, so that he may obtain an approximate time of passage at his airport.

Many times, it is also possible to give a picture of the line squall wind shift; but if the thunderstorms are isolated, they may not pass a weather station and will arrive at an airport unannounced. These storms, however, usually give a warning of 15 minutes to one-half hour, and planes may be grounded and put in the hangars or staked down. As the storm approaches, lightning will be visible. When thunder is heard clearly, the storm is not far distant, usually 10 to 15 minutes in time. When the storm is 2 to 5 minutes away, a low black cloud will be observed; and the wind-shift will occur as this cloud passes over the airport. The wind behind this cloud is very gusty and will be accompanied by moderate or even heavy rain. Gust peaks have been estimated to be over 75 M.P.H. in a well-developed line squall connected with a severe thunderstorm.

The general movement of these localized thunderstorm squall lines is in the direction, and with the speed, of the winds in the air mass in which they are forming.

The direction of a cold front wind-shift is always from your right if you are landing into the wind before it has shifted. Cold front wind shift lines are usually accompanied by a lowering of the clouds, precipitation, or in dry types by dusts. Along sea-coasts the sea breeze may give a local wind shift during the late morning or early afternoon. The wind will blow on-shore during the day and off shore at night.

All operators should be familiar with the effect of wind-shift lines crossing their airports, since local effects may cause some variation from the general rules. All pilots should be instructed as to the dangers of landing at an airport through a wind-shift. Schedules should be ar-

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