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The following circular is hereby promulgated for information, guidance and necessary action.

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Director General

**RULES OF THUMB TO ASSIST IN AVOIDING OR MINIMIZING
ENCOUNTERS WITH CLEAR AIR TURBULENCE**

The following rules of thumb have been developed for westerly jet streams by the International Civil Aviation Organization

1. Jet streams stronger than 110 knots (at the core) are apt to have areas of significant turbulence near them in the sloping tropo-pause above the core, and on the low pressure side of the core. In these areas there are frequent strong wind shears.
2. Wind shear and its accompanying clear air turbulence in jet stream is more intense above end to the lee of mountain ranges. For this reason, clear air turbulence should be anticipated whenever the flight path traverses a strong jet stream in the vicinity of mountainous terrain.
3. on charts for standards isobaric surface, such as 300 millibars, if 20-knots isotachs are spaced closer together than 60 nautical miles, there is sufficient horizontal shear for clear air turbulence (CAT). This area is normally on the pole ward (low –pressure) side of the jet stream axis, but in unusual cases, may occur on the equatorial side.
4. Turbulence is also related to vertical shear. From the wind – aloft charts or reports, compute the vertical shear in knots per thousands feet. If it is greater than five knots per thousand feet, turbulence is likely. Since vertical shear is related to horizontal temperature gradient, the spacing of isotherms on an upper air chart is significant. If the 5 deg. Isotherms are closer together than-two–degrees of latitude (120 nautical miles) , there is usually sufficient vertical for turbulence.
5. Curving jet stream are more apt to have turbulence edges than straight ones, especially jet stream curving around a deep pressure trough.

6. Wind-shift areas associated with pressure troughs are frequently turbulence. The sharpness of the wind-shift is the important factor. Also, pressure ridge lines sometimes have rough air.
7. In an area where significant clear turbulence has been reported or is forecast. It is suggested that the pilot adjust the speed to fly at the recommended rough air speed on encountering the first ripple, since the intensity of such turbulence may build up rapidly. In areas where moderate or severe CAT is expected, it is desirable to adjust the air speed prior to the turbulence encounter.
8. If jet stream turbulence is encountered with direct tailwind or headwinds, a change of flight level or course should be initiated since these turbulence areas are elongated with the wind and are shallow and narrow . a turn to the right in the Northern Hemisphere or to the left in the southern Hemisphere, Places the aircraft in more favorable winds. If a turn is not feasible due to airway restriction, climb or descent to the next flight level will usually find smoother air.

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