



**UNITED REPUBLIC OF TANZANIA
TANZANIA CIVIL AVIATION AUTHORITY
Aeronautical Information Services**

AERONAUTICAL INFORMATION CIRCULAR

P.O. Box 2819 DAR ES SALAAM.
FAX: (255 22) 2118905
PHONE: (255 22) 2115079/80, **2111951**.
COMM: DIRAIR
AFTN: HTDQYOYO
Email: tcaa@tcaa.go.tz
Web-site: tcaa.go.tz

AIC 14/2000 (Pink 8) 7 September 2000
--

TCAA./P.60/19

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

M. Munyagi
Director General

AQUAPLANING.

Water on runways can seriously affect aircraft ground control ability and braking efficiency on both hard surface and grass runways.

The effect that water has on an aircraft varies in part with the depth of covering. When there is only a surface wetness, the friction is reduced solely by the lubricating effect of the water on the two surfaces concerned i.e., runway and tyre. As aircraft speeds and water depth increase, the water layer builds up an increasing resistance to displacement resulting in the formation of a wedge of water beneath the tyre. This resistance progressively lifts the tyre thereby decreasing the area in contact with the runway until, under certain aircraft configurations and depths of water, the tyre is completely clear of the surface and aircraft is fully aquaplaning. In the full aquaplaning condition, the tyre is no longer capable of providing directional control of effective braking.

The most significant factors affecting the onset of aquaplaning are as follows;

- a) **Water depth:** Research so far indicates that with typical aircraft tyres and runway surface textures aquaplaning may take place with a minimum depth as low as 0.1" but is not normally initiated until over 0.2" in depth. However, once aquaplaning has commenced, it may be sustained over areas of runway where water depth is lower than that required to initiate aquaplaning.
- b) **Aquaplaning speed:** Minimum speeds at which aquaplaning may commence are directly related to the tyre pressures. The higher the tyre pressure the higher the speed at which an aircraft may commence aquaplaning e.g. a B707 with a tyre pressure of 170 lb. per square inch could commence at 112 kts. Whereas a DC 3 with tyre pressure of 50 lb per square inch would not commence until around 60 kts. Once commenced, aquaplaning may continue even when the aircraft has decelerated to speed well below the speed at which it commenced.
- c) **The Tyre Tread Design and Condition:** A multi-rib tread with grooves of adequate dimensions to give good drainage increases the contact pressure between the runway and delays the onset of aquaplaning.

- d) **Undercarriage Arrangement:** In tandem wheel arrangements, the clearing action of the front wheels tends to reduce the fluid depth encountered by rear tandem wheels and with this arrangement, greater depths of water can be encountered before aquaplaning takes place.

Extreme caution should be observed in landing when pools of water are discernable on a runway or on a grass aerodrome following or during periods of precipitation. Once aquaplaning has commenced, there is very little action the pilot can take to regain control until the aircraft has ceased to aquaplane of its own accord.

Air Traffic Control Officers will include in the landing instructions a warning, when necessary, that pools of water are present on hard surface runways and an estimation of the braking action on grass aerodromes following or during periods of precipitation.

Cancel AIC 9/1979