

GACA Safety Bulletin

GACA SB-2023-02

Issuance Date: 22 June 2023

Potential Hazard Presented by Dust Devils on Aircraft Operation

Applicability:

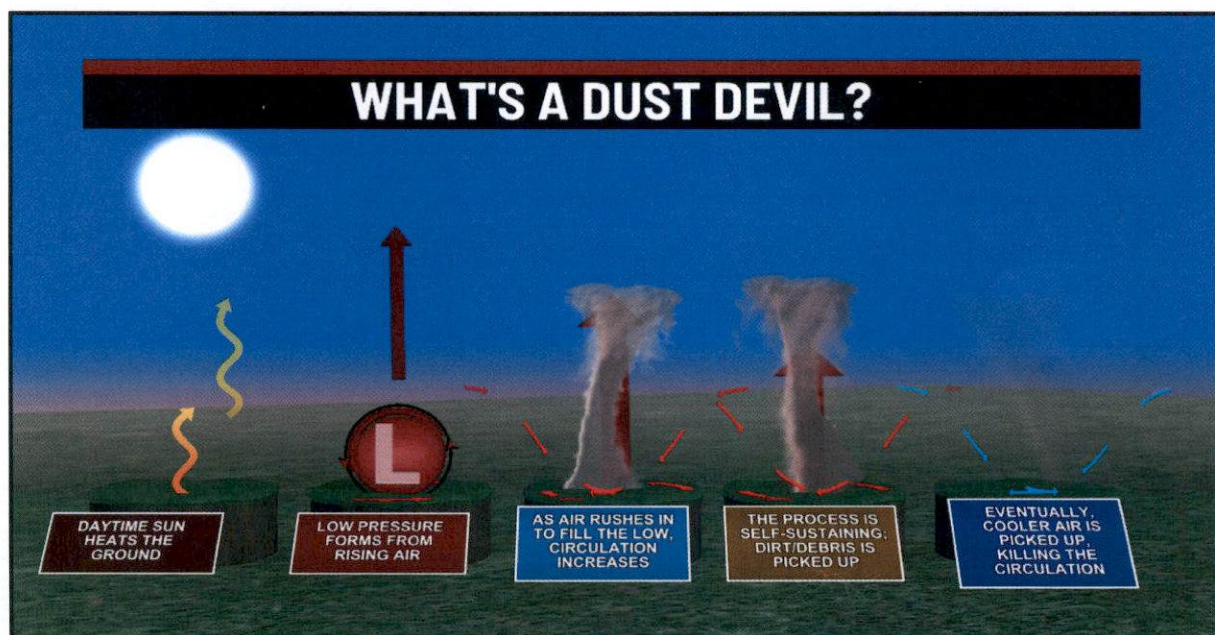
Aerodromes:	All Certificated/Authorized Aerodromes under GACAR Parts 139 and 138.
Air Traffic:	The provider of Air Traffic Services in KSA (SANS).
Flight Operations:	All GACA Certificated / Authorized Air Operators.

This document is available at: <https://gaca.gov.sa/web/en-gb/content/miscellaneous>

General:

GACA Safety Bulletins (SB) are issued under the authority of the GACA Executive Vice President of Aviation Safety & Environmental Sustainability. GACA Safety Bulletins contain important safety information and may include recommended actions. Besides the specific action recommended in a GACA-SB, an alternative action may be as effective in addressing the safety issue named in the GACA-SB. The contents of a GACA-SB document do not have the force and effect of law and are not meant to bind the public in any way. GACA Safety Bulletins are intended only to provide clarity to the public regarding existing requirements under GACA regulations.

What is a Dust Devil?



A Dust Devil is a common wind phenomenon that occurs throughout much of the world. These dust-filled vortices, created by strong surface heating, are generally smaller and less intense than a tornado. Typical diameters of dust devils range from 10 to 300 feet, with an average height of approximately 500 to 1000 feet. In most locations, dust devils typically last only a few minutes before dissipating. Although, in desert areas, dust devils can reach heights of several thousand feet and last on the order of an hour or more. Wind speeds in larger dust devils can reach 70 km/h or greater. Even though they are generally smaller than tornadoes, dust devils can still be destructive as they lift dust and other debris into the air. Small structures can be damaged, and even destroyed, if in the path of a strong dust devil.

Background:

If a dust devil is encountered during takeoff or landing, it can cause sudden and unpredictable changes in wind direction and speed. This can result in turbulence, buffeting, and loss of control of the aircraft. Dust devils can also cause damage to aircraft, particularly to the engines, by ingesting dust and debris. Flight through a dust devil at high speed may produce accelerations in excess of the airplane design

load factors. Since the high accelerations experienced during such flight can continue for only a fraction of a second, it is generally insufficient for the work of deformation exerted on the aircraft structure to rupture the primary structural parts of the airplane. Consequently, physical damage may not be noted even though the design loads of the aircraft were instantaneously exceeded. Dust devils are certainly not to be treated lightly by pilots, especially pilots of light aircraft flying at low altitudes and low speeds.

Hence, GACA is releasing this Safety Bulletin to emphasize the potential dangers of this weather phenomenon, especially during the summer season when there is an increase in the likelihood of dust devil formation.

Recommendations

Air Operators:

- GACA urges all air operators to educate their pilots of the potential danger posed by dust devils. When operating in areas where they are known to occur, it is important to maintain a safe altitude and speed and to be prepared for sudden changes in wind conditions.
- Operators should instruct pilots to avoid flying through dust devils when encountered and instead maneuver around them, if possible. It is recommended that they do not fly through them below 500 feet above the ground and further point out that it is safer to avoid them entirely.
- Instruct pilots intending to land on a superheated runway, especially in desert areas, should carefully scan the airport and an area 2-3 miles upwind for dust swirls to preclude the possibility of penetrating a dust devil at low altitude and near stall speeds. They should also be alert to the possibility of the formation of a dust devil during the landing or takeoff maneuver and take the required precautions if one forms along or crosses the intended flight path.

Control Towers:

When a dust devil is observed around the vicinity of an airport, the control tower should take the following precautions:

- Alert all aircraft in the area of the dust devil, advising them of its location and potential danger.
- Inform the airport maintenance crew and ground staff of potential dust devil activities in the airport area.
- Consider dust devil activities in the aircraft departure and arrival sequence.
- Continuously monitor dust devils when spotted, and keep all aircraft updated with any changes in their size, location, and direction of movement.
- Continue to provide updates and notifications to all parties until the dust devil dissipates or moves away from the vicinity of the airport.

It is important to take dust devils seriously as they can affect the safe and efficient operation of aircraft. By following these recommendations, Air Operators and Control Towers can help ensure the safety of all involved.

Additional Related Information:

- [AIB-030623-911 Limited Scope Investigation Report Dust Devil Encounter on Takeoff.](#)
- [Australian Transport Safety Bureau \(ATSB\) – The Dangers of Dust Devils.](#)
<https://www.atsb.gov.au/media/news-items/2012/dangers-of-dust>

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