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The Gliding Federation of Australia
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Safety Management System

Safety Bulletin

No. 01/24 **8th February 2024**

Windsocks and Safety

Purpose. This Bulletin provides guidance for Committees, Safety Officers, CFIs and Panels regarding safety aspects of windsock siting, suitability and visibility, training on reading windsocks and calculating crosswinds, and applicable standards and guidance.

Safety Imperatives. Why do we need windsocks? Bottom line, safety. We normally should be launching and landing into wind, to reduce groundspeed and landing distance, improve controllability. Launching and landing crosswind or downwind can introduce controllability and ground loop risks, particularly if runway grass is long, slope or obstructions including above ground runway lights and runway markers are present. Vegetation and grass growth challenges are an issue in many clubs.

Every year we see SOAR reports for occurrences involving out-of-wind operations. Ground loops and runway excursions are very bad for gliders, pilots and wallets. Towing gliders on the ground also requires awareness of wind direction and potential for glider damage.

So reliable visual indications of wind direction and strength are essential to situational awareness and improved safety outcomes. Operational outcomes are affected by the condition of visual aids.

Glider pilots should land and take off into wind to the extent practicable, noting limitations for the glider in the AFM/POH allowing the glider to land or take off downwind or crosswind, and the pilot in command is satisfied that traffic conditions enable such a landing or take-off to be carried out safely.

Regulatory Aspects at Certified Aerodromes. Another reason is regulatory compliance, a priority at certified aerodromes where Civil Aviation Safety Regulations (CASR) *Part 139 Manual of Standards Aerodromes Chapter 8* applies. An extract from this Manual as at 6 Feb 2024 regarding windsocks is attached at Appendix 1, for those averse to reading legal websites.

Non-Certified Aerodromes. Operations Advice Notice 02/23 *Aerodrome Operational Standards and Procedures* provides comprehensive advice on gliding aerodrome requirements and applicable references. CASA Advisory Circular AC 91-02 V1.2 *Guidelines for aeroplanes with MTOW not exceeding 5 700 kg - suitable places to take off and land* also refers, extract attached at Appendix 2. These issues are also discussed in Gliding Australia Safety Bulletin SB 03/23 *Safety Considerations in Aerodrome Environments*.

Windsock Problems. Why on earth are we talking about windsocks? Next time at your aerodrome or airfield, check out their condition and utility, and whether or not they are easily discernible at a distance. Check them out from above circuit joining height. Can they be easily seen against the background? Are they broken, shredded, limp, or tangled in guy wires? Are the pivot bearings seized or damaged?

Some clubs operate from council-owned facilities, or multi-user aerodromes where they are dependent upon maintenance contractors for windsock upkeep. Some clubs own their airfields and facilities and need to budget for windsock replacements, get volunteers to replace them. Depending on windsock design, working up a ladder, handling guy wires or lowering and raising a heavy hinged structure can present their own safety hazards and workload. At sites with very high wind speeds, wear and tear can be high and replacement hazards significant.

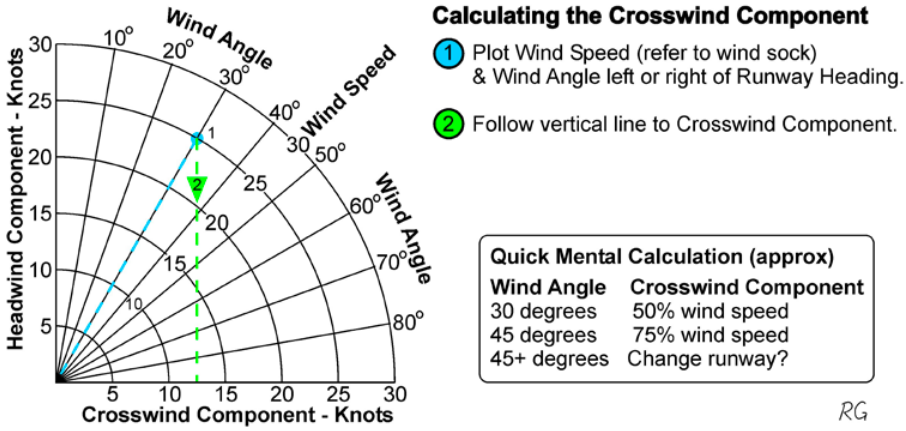
Travelling around to various airfields and clubs, sometimes we see pristine windsock examples, other times shredded rags that are barely functional. Many clubs purchase manufactured windsocks, built to specifications, and some are obviously self-made. Some are white, or yellow, orange-red, or hessian. Some are monochrome, others striped. MOS Part 139 and AC 91-02 discuss colour and contrast.

They need to be fit for purpose. Fitness for purpose includes visual discernibility against background vegetation, making high contrast windsocks an important safety consideration. Some windsocks, built to approved standards but wrong colour may not be fit for purpose. Some sites use multiple colours.

Training, Education and Awareness. This leads us to a training and education issue. How well are pilots trained to read windsocks, to estimate wind strength and direction from the windsock angles? It is surprising how many pilots make large errors in those estimates. Different windsock designs have distinct cues, which pilots should learn, in addition to listening to AWIS radio broadcasts.

The windsock training process should start with GPC Unit 02 Ground Handling and Signals and associated theory lesson. GPC Unit 15 Breakoff and Circuit Planning starts to emphasise wind awareness and drift, landing into wind, choice of landing direction. GPC Unit 16 Circuit Joining and Execution requires corrections for drift, cross winds and strong winds, which culminate in a Stabilised Approach and Landing in Unit 17. GPC Units 13 and 14 address upper air launch and takeoff training.

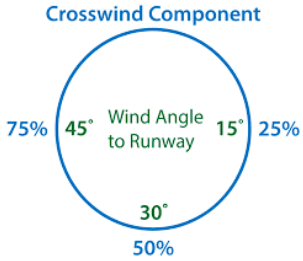
Explicit wind judgements and corrections come later at GPC Unit 19 Crosswind Takeoffs and Landings. There are important references to calculating crosswind components, using the GFA Crosswind Chart.



GFA Crosswind Chart

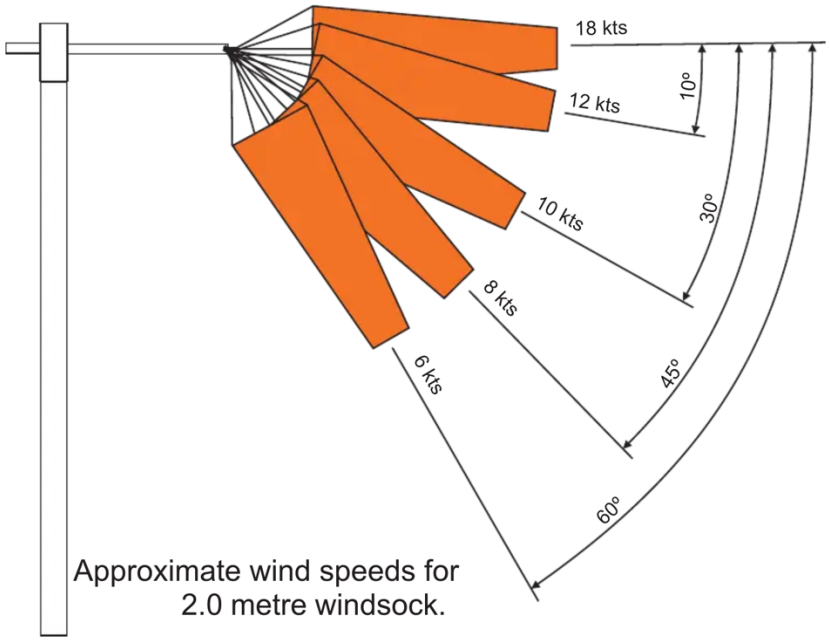
Point 1 on the chart plots a 25 knot wind at an angle of 30 degrees to the runway.

Following the vertical line shows a crosswind component of 12.5 knots, which is quite significant.



This presupposes that the pilot is capable of reading the windsock angle and making accurate assessments of wind strength. *These angles will vary with windsock type and standards.*

The CASA AC 91-02 guidance above is based upon a CASA MOS 139 Standard Size: 3650mm x 900mm x 225mm, heavy material.



Alternative windsocks (eg available from Windsocks Australia, FlyRite, Concept Aviation, Skyshop etc) may have different indication angles versus wind speed. Worn, shredded, tangled windsocks will not give reliable indications, so wind estimates from drift and other visual cues have great importance. Outlandings, usually no windsock is available! GPC Unit 34 refers.

Wishing you all fun and safe gliding adventures.

A.R. (Drew) McKinnie
Safety Manager
8 February 2024

APPENDIX 1 to SB 01/24

MOS PART 139 CHAPTER 8 (Applicable to Certified Aerodromes)

Division 7 Wind direction indicators

8.101 Requirements

(1) An aerodrome operator:

(a) must install and maintain at least 1 wind direction indicator at the aerodrome, unless this MOS requires the installation of more than 1 wind direction indicator; and

(b) may install and maintain wind direction indicators additional to those required under paragraph (a) in accordance with the requirements of this subsection.

(2) A wind direction indicator must be visible from aircraft:

(a) in flight; or

(b) on the manoeuvring area.

(3) A wind direction indicator must be such that it is not affected by the effects of any air disturbance caused by buildings or other structures.

(4) A wind direction indicator must be provided at the threshold of an instrument runway.

(5) Despite subsections (2) and (4), for a runway that is not more than 1 200 m in length, the wind direction indicator may be centrally located provided it is visible from:

(a) both approaches; and

(b) the aircraft parking area.

(6) The location required by subsection (4) does not apply to an instrument runway if surface wind information is communicated to pilots of aircraft approaching the runway by:

(a) ATC; or

(b) an aerodrome weather observing system that:

(i) is a Bureau of Meteorology-approved weather observing system; and

(ii) provides surface wind information through an aerodrome weather information broadcast; or

(c) an approved observer with a communication link to pilots through which timely information about surface wind may be passed; or

(d) any other means approved in writing by CASA.

Note Despite subsection (6), locating a wind direction indicator at the threshold is recommended as such a visual aid provides immediate indication of wind direction and speed to pilots at the critical phase of the landing.

(7) A wind direction indicator provided at the threshold of an instrument runway must be located as follows:

(a) on the left-hand side of the threshold as seen from a landing aircraft;

(b) outside the runway strip;

(c) clear of the transitional obstacle limitation surface;

(d) 100 m upwind of the threshold.

(8) Despite paragraphs (7) (a) and (d), a wind direction indicator may be located on the right-hand side of the threshold, and up to 200 m upwind, if the left-hand side location 100 m upwind of the threshold is obstructed by:

(a) a taxiway, a navigational aid or a similar obstruction; or

(b) a structure or obstacle which is assessed, by CASA or a person approved in writing by CASA, as interfering with natural wind effects.

(9) Despite subsections (7) and (8), a wind direction indicator provided at the threshold of an instrument runway may be located as approved in writing by CASA.

8.102 Standards for wind direction indicators

(1) A wind direction indicator must consist of a tapering fabric sleeve with the widest end attached to a pole at an attachment point which ensures that the centroid of the sleeve is as close as possible to being 6.5 m above the ground.

(2) The sleeve must be 3.65 m long and taper uniformly from 900 mm in diameter to 250 mm in diameter, as illustrated in Figure 8.102 (2).

(3) The widest end of the sleeve must be mounted on a rigid frame that:

(a) keeps the end of the sleeve open; and

(b) keeps the sleeve attached to the pole; and

(c) allows the sleeve to move freely through 360 degrees around the pole.

(4) The fabric of the sleeve must be of a conspicuous colour, preferably white, except that white fabric must not be used if its visibility is affected by snow or other contaminant on the movement area.

Note Natural or synthetic fibres within the weight range of 270 to 275 g/m^2 have been used effectively as wind direction indicator sleeve material.

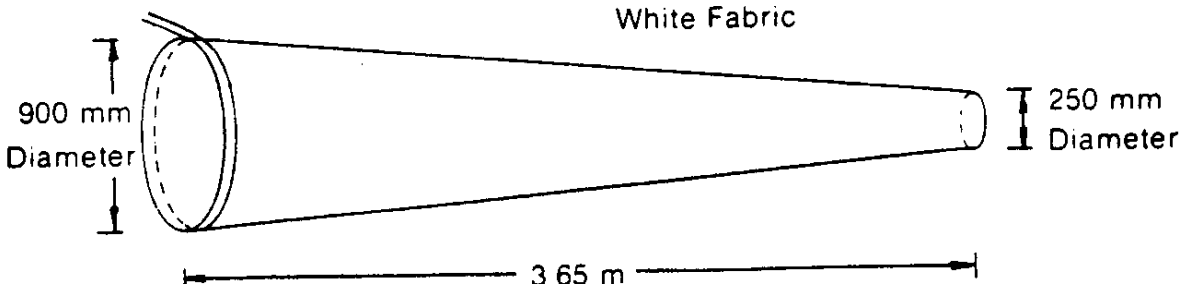


Figure 8.102 (2) Wind direction indicator (illustrates matters)

(5) At a non-controlled aerodrome, or an aerodrome without a 24 hour ATC service, the pole of at least 1 wind direction indicator must be located in the centre of a circle (the ***background circle***) on the ground which provides a background contrast for the colour of the sleeve.

(6) The background circle must be:

(a) 15 m in diameter; and

(b) coloured black; and

(c) bordered by:

(i) a white perimeter 1.2 m wide; or

(ii) a ring of at least 8 equally-spaced white markers, each with a base not less than 0.75 m in diameter.

Note For the illumination of wind direction indicators, see section 9.38.

(7) At aerodromes with more than one wind direction indicator, any additional wind direction indicators mentioned in paragraph 8.101 (1) (b) must comply with subsections (1), (2), (3) and (4) (of this section) except that the sleeve colour may be:

(a) if not illuminated at night — a conspicuous colour other than white, preferably yellow or orange; and

(b) if illuminated at night — white (subject to subsection (4)), or another contrasting colour which is clearly visible when illuminated.

APPENDIX 2 to SB 01/24
AC 91-02 V1.02 SECTION 8 EXTRACT (Guidance for All Aerodromes)

8.3.1 Wind speed and direction

Note: Regulation 91.380 requires the pilot to land and take off into wind to the extent practicable unless the AFM/POH allows the aircraft to land or take off downwind or crosswind, and the pilot is satisfied that traffic conditions at the aerodrome enable such a landing or take-off to be carried out safely.

8.3.1.1 Pilots should be aware that wind affects the length of runway required for take-off or landing. However, it is particularly dramatic when taking off or landing downwind. Although the tables in section 7 above provide guidance relating to the tailwind effect on a take-off and landing, where landing or taking off into the wind is an option then this is preferable. Aircraft conducting operations at non-controlled aerodromes into wind have priority over aircraft conducting downwind operations.

8.3.1.2 For non-controlled aerodromes without an Aerodrome Weather Information Service (AWIS), pilots will need other visual cues to determine the take-off and landing direction. The windsock has been used for many years to provide pilots with wind direction and strength at the aerodrome surface.

8.3.1.3 While other systems that provide wind information are now routinely available to pilots, considerable useful information can be obtained by observing the windsock(s) before taking off or landing.
Note: It is recommended that, where possible, pilots observe and interpret the behaviour of a relevant windsock prior to taking off or landing.

8.3.1.4 Windsock interpretation:
a. A windsock at a 45º angle to the horizontal indicates a windspeed of approximately 15 kts.

b. A windsock that is horizontal indicates a windspeed of 25–30 kts.

a. A windsock at a 30º angle to the direction of the runway indicates that half of the total windspeed will be crosswind.

c. A windsock at a 45º angle to the runway indicates at least a 15 kt crosswind.

d. Gusting conditions will be indicated by the windsock varying rapidly in direction or angle. These conditions should be treated with caution.
Note: Pilots are recommended to consider both the possibility and effects of wind shear, and whether the conditions remain within the maximum crosswind limit of the aircraft.

8.3.1.5 Where two windsocks are available, a difference in direction or speed between them can show a transient change or the influence of mechanical interference, such as trees or buildings. It is not unusual during the passage of frontal weather to have windsocks at either end of the runway showing completely opposite wind directions. Localised weather, such as gusts, or a ‘willy willy’, can produce significant fluctuations of the windsock.

8.3.1.6 At uncertified aerodromes it is recommended that, prior to flight, pilots establish whether there are any windsocks and if they are functional. Windsocks at uncertified aerodromes do not need to meet the standards in Part 139, and may therefore not be able to be interpreted in accordance with the guidance in these paragraphs.
Note: When operating into unfamiliar uncertified aerodromes it is recommended that, in addition to windsocks, pilots are able to use additional methods to judge the windspeed and direction, such as observing aeroplane drift, tree movements, glassy water on dams, directions of farm windmills, blowing dust etc.

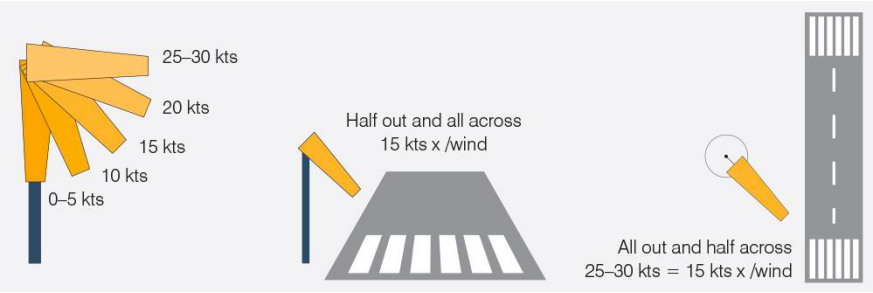


Figure 1: Windsock interpretation