

## CHAPTER 11 - PHYSIOLOGICAL FACTORS

### GENERAL

Gliding combines mental and physical activity which can take its toll on its participants. There are several aspects to consider.

### THE WEATHER

Gliding is dependent upon good weather for successful soaring. This often means hot days, usually with blue skies and intense sunlight. Gliding launch-points usually have little shade and people are exposed to these harsh conditions for many hours in a day. Not surprisingly, this has a detrimental effect on human performance.

Precautions need to be taken against the effects of heat and exposure to sunlight. These precautions are simple and it is foolish to ignore them.

### DEHYDRATION AND HEAT STRESS

It is impossible to drink too much water during a day's gliding. Most pilots drink far too little. Heavy sweating places very high demands on the body's fluid reserves. Sweat is over 99% water, most of the water being derived from blood plasma, which itself is 91% water. Therefore sweating reduces blood volume and causes dehydration. If fluid is not replaced, the body's core temperature may rise to a dangerously high level.

Insulated water containers are very cheap and a useful size for a day's gliding activities is 4 litres. Clubs can contribute to their pilots' well-being by providing a large (20 litre, say) water container at the launch point. It is a very good service to provide.

Plain water is best. If cordials or electrolytes (such as certain "sports" additives) are used, the solution should be weak, as heavier concentrations can inhibit the absorption of fluid into the body. Fizzy drinks are no use at all.

Take a small container of water into the air if you are going on a long flight. There are plenty of cheap plastic water bottles with built-in straws available nowadays and these are ideal for use in a cockpit.

If you are learning to fly or in the early stages of solo flying, and the Duty Instructor detects signs that you are suffering from dehydration, don't be surprised if it is suggested that you don't fly until you have taken in some fluid and allowed some time for it to take effect. Later on, when you have become more experienced, you will be expected to monitor this aspect of your activities yourself.

As a guide, the American College of Sports Medicine regards the Heat Stress Index (HSI) as a reliable measure of the environmental heat stress. The HSI is based on the wet-bulb temperature and a value of 28 degrees is considered the upper limit for strenuous exercise. There are plenty of days when the ambient temperature exceeds this figure on the average gliding field, and some of these fields are in humid parts of Australia. While it is not suggested that we put the gliders away on days over 30 degrees, it is prudent to pace yourself on the hotter days, so as to keep heat stress to a minimum.

An additional factor is acclimatisation. Repeated exposure to hot conditions results in the body progressively adapting to the new environment. However, this can take up to 10 days to be really effective. When acclimatised, the body sweats more readily and more copiously, leading to cooler skin and lower core body temperature when exercising.

People who work in an air-conditioned office five days a week, then go to the gliding club on a Saturday and work outside on a 30+ degree day will have no chance of acclimatising. Keep this in mind when rigging gliders and pushing them around the field.

### **PROTECTION AGAINST THE SUN**

Sun-tanned skin is damaged skin. It is well-known that exposure to sunlight can cause a wide range of problems, the mildest of which is a painful sunburn, the worst being skin cancer which can be fatal.

It is particularly important to protect the head and neck from the sun. To this end, a broad-brimmed hat is essential. Terry-towelling "floppy" hats are commonly worn and their only limitation is that the brim is usually not quite wide enough for protection of the neck. They should be worn in conjunction with a turned-up shirt collar.

Peaked caps with "foreign legion" flaps at the back, as commonly worn by Australian schoolchildren, offer good protection, but the peak tends to get in the way of turning the head in the cockpit. Thus they can save your skin on the ground, but create a real hazard in the air by inhibiting lookout.

"Akubra" type hats offer good sun protection, but most people find they are too hot to wear for long periods and they suffer from the same limitation as peaked caps when worn in a cockpit.

T-shirts lack neck protection and should not be worn for long periods in the sun unless accompanied by a suitable hat. The penalty is a seriously burnt neck. A conventional shirt, on which the collar can if necessary be turned up, is preferable.

Increasingly, pilots are turning to long-sleeved shirts for sun protection and long pants in preference to shorts for the same reason. Some pilots departing on long cross-country flights will be found wearing light cotton gloves of the kind which is obtainable from chemist's shops. These protect the vulnerable backs of the hands, which tend to roast under the canopy.

Sun-block cream or lotion is essential for a long day on the airfield. It is generally accepted nowadays that anything less than a 15+ sun protection factor is a waste of time.