Alcohol and Flight Safety

Wg. Cdr. D. E. Satur VM*

THE reason why alcohol constitutes a major hazard to flight safety is because it continues to affect the optimum human performance even though it is present in the human body in small quantities especially under the aviation environmental stresses. Alcohol has been accepted by society and has become a part of normal life. It is the purpose of this paper to re-emphasise some facts regarding alcohol and flying with the hope of assisting pilots to retain the high level of competence which they have developed.

A brief review of air accident statistics readily indicates the importance of alcohol as a possible cause factor. Such information has been gathered from toxicological analysis of remains from victims of fatal air accidents. Studies on the cause of fatal accidents carried out in countries like the USA, UK and Canada indicate positive presence of alcohol in 18–43% of the fatal accidents. These refer to accident victims in whom the positive presence of alcohol was actually found in the pilot on post-mortem examination. In other words, this is related to a relatively recent pre-flight drinking period with the accident occurring before the alcohol has had time to be eliminated from the body.

Let us consider the example of a healthy pilot, who decided to spend a portion of the evening consuming beer containing 4% alcohol. On consuming his 4th bottle he has sufficient beer to bring his blood alcohol level in excess of .08%. In some countries like Canada, the Criminal Court has defined this level as the upper permissible limit for automobile driving.

A recent study conducted in the USA on the effect of alcohol on the ability of experienced pilots to perform the task of flying a single engine aircraft under simulated instrument landing approach conditions indicated that a 'danger limit' was reached at a blood alcohol level of .02% in some of the subjects and that none were predictably able to safely perform their task with blood alcohol levels between .04% to .05%. Futher, there is reason to believe that the skills necessary for piloting an aircraft are measurably degraded by one quarter the amount of alcohol required to produce a measurable decrement in performance with a road motor vehicle. In reality, there is no acceptable positive blood alcohol compatible with flight.

Unfortunately, it is not as simple as merely equating pilots performance to measurable blood alcohol levels. This is particularly true in the pilots of high performance aircraft. While a 'hangover' due to alcohol may be looked upon as an annoyance on the ground, in the air under the stresses of aviation environment, it becomes a potentially hazardous condition. The most positive effects of the 'hangover' due to alcohol are found in the abnormal responses evoked by the vestibular organs effecting the senses of balance and orientation in space.

This sensory organ may well be affected for several hours after, even when no "measurable" alcohol is detected in the blood. Its effect may appear as blurring of vision or in the absence of poor visual references as encountered in poor visi-

* Deputy Director of Flight Safety, Air Headquarters.

bility conditions, cause the sensation of abnormal motion. Investigations into this phenomenon have shown that its intensity and duration have direct relationship to the quantity of alcohol consumed. In fact, some suggest that it may be provoked for periods as long as 20 to 36 hours after drinking by abnormal rotational or positive gravitational forces as encountered during flight.

There are cases on record which agree with this suggestion. A young fighter pilot after consuming alcohol till late in the night was detailed to fly as No. 2 in a 4 aircraft low level mission the following evening. The pilot could not cope up with the exercise which consisted of a series of turns at high gravitational forces and ultimately failed to return to base. Another young pilot who habitually consumed a fair amount of alcohol in the evening was detailed to fly two consecutive 'tail chase' sorties as No. 2 about midday. After the fourth reversal in the second sortie, this pilot got into a situation from which he failed to recover and crashed with his aircraft.

Alcohol is also known to effect sleep patterns by reducing the proportion of sleep spent in the 'rem' state. Lack of 'rem' sleep is known to induce feelings of tiredness and anxiety as well as impairment of concentration. It is well known that a feeling of tiredness follows the day after drinking, despite the feeling of having had a normal sleep.

In summary, it is pointed out that the necessity of a knowledgeable restraint in the drinking habits of those who fly aircraft exists. The true magnitude of the problem only comes into focus when the 'hangover' period as well is considered. It is necessary that every pilot understands the pitfalls of over-indulgence in alcohol consumption as it may affect the performance of his duty. Current regulations and medical checks may assist in achieving this aim but cannot provide adequate solution without the sound judgement of the pilot himself.