SEPTEMBER 2000

Best way to disorient aircrew (Defense and Civil Institute of Environmental Medicine, Toronto, ON, and Survival Systems, Dartmouth, NS, Canada): "Spatial orientation is based on the integration of concordant and redundant information from the visual, vestibular, and somatosensory systems. When a person is submerged underwater, somatosensory cues are reduced, and vestibular cues are ambiguous with respect to upright or inverted position. Visual cues may be lost as a result of reduced ambient light. Underwater disorientation has been cited as one of the major factors that could inhibit emergency egress after a helicopter ditching into water. One countermeasure to familiarize aircrew with underwater disorientation is emergency egress training. This study examined the relative degree of underwater disorientation induced by the Modular Egress Training Simulator (METS™) and the Shallow Water Egress Trainer (SWET). … There were 36 healthy subjects (28 males and 8 females) who participated in the study. Underwater disorientation was quantified by measuring the deviation of subjective vertical-pointing from the gravitational vertical, time to egress, and subjective reports of disorientation and ease of egress. A repeated measure design was used with seat position (SWET chair, METS™ window, and METS™ aisle) as the sole factor. … Subjective response data indicated that the degree of disorientation is rated significantly higher, and the ease of egress is rated worse from the two METS™ seat positions than from the SWET. This is supported by the findings that subjective vertical-pointing accuracy is worse in the METS™ seat positions than in the SWET ($P < 0.01$). The time to egress is longer from the two METS™ seat positions than from SWET ($P < 0.01$). … Our results indicate that the METS™ device is effective for inducing underwater disorientation as provoked by simulated helicopter ditching."[1]

SEPTEMBER 1975

To mask or not to mask (Naval Submarine Medical Research Laboratory, Groton, CT): "Distance and size estimates and stereoacuity judgments were made in water by divers, both with and without facemasks. Without the mask, only stereoacuity was markedly degraded. Distance estimates were slightly more accurate, despite a great decrease in the range of visibility. Size estimates were slightly too small. Divers with refractive errors did not appear to be more handicapped than those with normal vision."[2]

Pick your aircraft carpet carefully (Department of Surgery, Harvard Medical School, Cambridge, MA, and Medical Department, Trans World Airlines, New York, NY): "The smoke toxicity of three carpets commonly available for use in commercial aircraft was determined by ignition in a specially designed smoke apparatus. Rats were exposed for 15 min to three different fuel loads, on a weight-to-volume basis. Evaluation was by mortality, time of useful function (TUF), and unconsciousness. No deaths were noted with carpets A or C at $64\ mg \cdot L^{-1}$ or $128\ mg \cdot L^{-1}$ fuel load concentration; at $256\ mg \cdot L^{-1}$, 42% mortality resulted from carpet A and 4.5% with carpet C. Exposure to carpet B resulted in a mortality of 4.3%, 72.5%, and 100% at the three concentrations. The TUF data and time of unconsciousness correlated closely with the results of the mortality, but were much more sensitive. These studies indicate that a potential severe hazard exists with some types of carpet, and further research is needed to identify and eliminate these materials from aircraft interiors."[3]

SEPTEMBER 1950

Effects of hypoxia at altitude (Département d'Acclimatation, Faculté de Médecine, Université Laval, Québec City, QC, Canada). "Human subjects submitted repeatedly to a simulated altitude of 10,000 feet, during many weeks, improve their scores in a very significant way in many psychological tests, when receiving extra oxygen (by demand valve) at that altitude; control subjects receiving compressed air (by the same system) showed no significant progress in the same tests. The same results were found during two consecutive years on two different groups of 20 human subjects each time, for three of the principal psychological tests used, namely (1) The MacQuarrie Test for Mechanical Ability; (2) the Survey of Space Relations Ability and (3) the Survey of Object Visualization. Other tests, tried only during the last experiment, gave the same results. Some of the tests showed no progress or equal progress for both groups, but there was no instance where the group submitted to mild anoxia (not receiving added oxygen at 10,000) could display a better performance than the group receiving oxygen. On the contrary, the latter one improved in a significant way, from trial to trial, in the majority of cases.

All those results seem to indicate that the relative deficit of oxygen corresponding to an altitude of 10,000 feet inhibits partly the normal functioning of the higher centers, especially the learning process."[4]

SEPTEMBER 1925

It happened so long ago. In September 1925, the U.S. Army established the Air Corps Physiologic Research Laboratory at Wright Field in Dayton, Ohio, initially to investigate the effects of hypobaric states, hypoxia, and centrifugal force on pilots. Also this month, U.S. Army Major Louis H. Bauer, the head of the U.S. Army's School of Aviation Medicine, departed his post to report to the Army War College in Washington (Dalitsch WW. Personal notes on aviation medicine historical research; 2025).

REFERENCES

1. Cheung B, Hofer K, Brooks CJ, Gibbs P. Underwater disorientation as induced by two helicopter ditching devices. Aviat Space Environ Med. 2000; 71(9):879–88.
2. Luria SM, Kinney JAS. Vision in the water without a facemask. Aviat Space Environ Med. 1975; 46(9):1128–31.
3. Dressler DP, Skornik WA, Bloom SB, Dougherty JD. Smoke toxicity of common aircraft carpets. Aviat Space Environ Med. 1975; 46(9): 1141–3.
4. Dugal LP, Fiset PE. Sensibility of man to light anoxia. J Aviat Med. 1950; 21(5):362–74,404.

This column is prepared each month by Walter Dalitsch III, M.D., M.P.H. Most of the articles mentioned here were printed over the years in the official journal of the Aerospace Medical Association. These and other articles are available for download through the link found on https://www.asma.org/journal/read-the-journal.

DOI: https://doi.org/10.3357/AMHP.6750.2025