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AN ILLUMINATED GUIDE-BAR AS AN AID FOR UNDERWATER ESCAPE FROM HELICOPTERS

J.R.Allan

Environmental Sciences Div., Royal Air Force Institute of Aviation Medicine, Farnborough, Hampshire, United Kingdom
Address for reprints:
Royal Air Force Institute of Aviation Medicine
Environmental Sciences Division
Farnborough, Hampshire GU14 6SZ
United Kingdom

Escape hatch lighting is now widely used as an aid to underwater escape from ditched helicopters. Present systems, usually based on Light Emitting Diodes (LEDs), exhibit serious limitations in respect of visibility in turbid water and line of sight can be obstructed by seat structure. The present study assessed the effectiveness of an illuminated guide-bar, placed centrally down the cabin and strobed towards the exits. This device reduces the distance over which escape hatch lights must be seen and leads the survivor to a position opposite the exits from where the lights are viewed at right-angles and without obscuration by seating. The bar also provides manual assistance.

Following a period of training, 12 male subjects completed timed emergency underwater escapes from a specially constructed research dunker. Each subject completed 3 escapes in clear water and 3 in turbid water (attenuation coefficient 3.5 m^{-1}). One escape in each condition was done without the guide-bar, one with the bar not illuminated and one with the bar illuminated. The order in which these three levels of assistance were tested was varied in a balanced design. The escape route was 3.0 m long and the escape hatch used was illuminated on all runs with EXIS 1 (Mk 2) lights, (RFD Ltd, Godalming) placed at the top and two sides of the hatch. At the start of each escape the subject was strapped into a seat in the dunker and provided with a demand breathing system. The subject was then immersed and inverted. As the dunker came to rest a signal light was illuminated immediately in front of the subject who then released his seat belt, travelled to the hatch and escaped through it. The escape time was measured from the illumination of the start signal to the time the subject's head broke the surface of the pool. After each group of three escapes the subject was asked to rate their difficulty on a scale from 10 (easy) to 1 (impossible).

Escape times were significantly shorter with the illuminated guide-bar' than with the unlit bar or without the bar ($p<.05$). Escape times were signifcantly longer ($p<.05$) in turbid conditions without the guide-bar than in clear conditions but there was no difference between turbid and clear conditions when the guide-bar was present. Subjective assessments of escape difficulty revealed significant advantages attributable to the guide-bar. An illuminated guide-bar can provide valuable assistance to underwater escape reducing disorientation and overcoming some important limitations of hatch lighting in turbid conditions.