

problems which are likely to be encountered in a VDT installation are outlined and principles to be followed for lighting these areas are described. The ways that new installations can be designed and old installations improved are shown. Sections also describe the ways that uplighting, downlighting and desk-mounted lighting systems can be used to provide a good quality lit environment for the use of VDTs.

22.3.41 (119908)

Lindner, H., Hubner, K., Schlote, H.W., and Rohl, F.

Subjective lighting needs of the old and the pathological eye. *Lighting Res and Technol*, 1989, 21.1, 1-10, 28 refs.

This paper is a report on the subjective lighting needs of 225 subjects comprising younger and older normals as well as patients with cataract and glaucoma. Six single tests were performed to determine the lighting demand for various vision tasks and to choose the most pleasant light colour. From the findings, recommendations are derived as to the illuminance level for people with poor vision, the level of interior lighting when watching television in homes, and for relaxation. The colour of light preferred by all groups of subjects was 'warm white'.

22.3.42 (119919)

Wilkins, A.J., Nimmo-Smith, I., Slater, A.I., and Bedocs, L.

Fluorescent lighting, headaches and eyestrain. *Lighting Res and Technol*, 1989, 21.1, 11-18, 18 refs.

The weekly incidence of headaches among office workers was compared when the offices were lit by fluorescent lighting where the fluorescent tubes were operated by (a) a conventional switch-start circuit with choke ballast providing illumination that pulsed with a modulation depth of 43-49% and a principal frequency component at 100 Hz; (b) an electronic start circuit with choke ballast giving illumination with similar characteristics; (c) an electronic ballast driving the lamps at about 32 kHz and reducing the 100 Hz modulation to less than 7%. In a double-blind cross-over design, the average incidence of headaches and eyestrain was more than halved under high-frequency lighting. The incidence was unaffected by the speed with which the tubes ignited. Headaches tended to decrease with the height of the office above the ground and thus with increasing natural light. Office occupants chose to switch on the high-frequency lighting for 30% longer on average.

22.3.43 (119922)

Jones, D.M., Miles, C., and Page, J.

Disruption of proof-reading by irrelevant speech: Effects of attention, arousal or

memory? *Applied Cognitive Psychol*, 1990, 4.2, 89-108, 32 refs.

A series of five experiments examined the effects of irrelevant speech on proof-reading and memory. Four of the experiments used a proof-reading task and showed that the deleterious effects of irrelevant speech: (1) depend on the speech being meaningful, (2) are only present when the burden on short-term memory is low, and (3) are manifested in a lower detection rate for non-contextual as opposed to contextual errors. Neither the spatial location of the speech (either in terms of spatial dispersion of sources or spatial movement of a single source) nor the intensity of the speech (in a range bounded by 50 dB(A) and 70 dB(A)) had any effect on proof-reading. Late selection models of attention are favoured by the results in preference to models having arousal, short-term memory or early selection in attention as their basis. A final experiment showed serial recall for visual lists to be impaired by the presence of any speech-like sound (including reversed speech and speech in an unfamiliar language) which suggests a set of phenomena qualitatively different from those associated with proof-reading. Throughout the article the practical consequences of the findings are emphasised.

22.3.44 (119936)

Malchaire, J.

State of the art in heat stress evaluation and its future in the context of the European Directives. *Annals of Occupational Hygiene*, 1990, 34.2, 125-136, 26 refs.

This address is divided into two parts. The first reviews the problems of heat stress evaluation: it describes the comprehensive approach adopted by ISO standards and in particular the rationale of the Required Sweat Rate index, and presents the work done during the ECSC inter-laboratory study, which extends the application of this index to intermittent or fluctuating conditions of exposure. The second part presents a rapid overview of the European economic and social Directives proposed in anticipation of 1993. It suggests that occupational hygienists, occupational physicians, safety specialists, toxicologists and ergonomists should adopt a common view about the practical implications of these new Directives and contribute to their incorporation into national regulations.

System characteristics

22.3.45 (119958)

Copas, C.V.

An investigation of the cognitive ergonomics of a modern air traffic control radar display system. In:

Ergonomics, technology and productivity. Proc 25th Ann Conf of the Ergonomics Soc of Australia, 26-29 Nov 1989. Ergonomics Soc of Australia, Fortitude Valley, Queensland, 1989, pp 67-80, 3 refs.

Australia recently commissioned an air traffic control system which employs increased computer technology. Controllers have experienced several difficulties in adjusting to the new system, with the majority of difficulties arising from human-machine information transfer problems. This paper summarises the author's field investigations of the system. Topics addressed include the design of the human-machine interface, the impact of the system upon operational procedures, the effects of increased levels of automation, the conversion training for the system, and software engineering practices.

22.3.46 (119965)

Swaanenburg, H.A.C., Zwaga, H.J., and Duijnhouwer, F.

The evaluation of VDU-based man-machine interfaces in process industry. In: J. Ranta (Ed), Analysis, design and evaluation of man-machine systems 1988, Pergamon Press, Oxford, 1989, pp 71-76, 9 refs.

The human operator aspects of the modern, VDU-based man-machine interface were evaluated in a number of different field studies. A description is given of the procedure applied; the major results are presented and are set against the design principles of the instrument manufacturers. It follows that the actual use of these systems is not in line with the conceptual ideas of the instrument designers.

22.3.47 (119974)

Vainio-Larsson, A.

Hypermedia and human-computer interaction. In: J. Ranta (Ed), Analysis, design and evaluation of man-machine systems 1988, Pergamon Press, Oxford, 1989, pp 329-333, 20 refs.

This paper discusses the concept of hypertext in relation to the more general concepts of hypermedia. The need for unified data- and interaction-models for highly interactive systems is addressed. The representation of these models by the use of metaphors is claimed to be an important schema for reducing user interface complexity. The paper outlines a setting for the assessment of different hypertext packages in order to identify central issues to be considered crucial for the human-computer interaction part of these systems.