Title	Research Report 254: Validation and Development of a Method for Assessing the Risks Arising from Mental Fatigue
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Executive Summary	This report has been prepared for the health and safety executive (hse) under contract number 3597/r67.020. It describes a programme of work to evaluate and to develop further a procedure for assessing the risks associated with fatigue in a range of industries, particularly in those safety-critical industries which the hse is responsible for regulating. The method, involving the calculation of a fatigue index, incorporates both expert opinion from shift work research and the experience of present working practices within British industry. There is increasing recognition that fatigue contributes to human error as a key element in many accidents. In round-the-clock operations, that involves working irregular hours, fatigue is a common sequel and leads to reduced vigilance, increased errors, impaired decision-making and a general deterioration in mood and motivation. This has obvious implications for those industries where safety is a major concern. The appropriate design and assessment of work-rest schedules are areas where the risks associated with fatigue can be carefully managed. Although an increase in fatigue is inevitable when operating a shift system involving unusual hours of work, employers should endeavor to ensure that working patterns are selected so that the risks are limited. Indeed, under the management regulations (1992) a suitable risk assessment should be carried out before any changes are made to the existing hours or patterns of work. The HSE, in collaboration with WS Atkins ltd., developed a prototype method, involving the calculation of a fatigue index (FI), to provide guidance on risk assessment for safety-critical work in the rail sector [1]. It was intended that the index could be used to establish whether a change to a working time pattern was likely to increase fatigue, and whether any particular aspect of an existing or proposed working time pattern was likely to cause fatigue. Any such increase would then provide justification for a more detailed assessment of risk. The method incorporated six factors known to be related to the build up of fatigue, namely the length of the work period, the interval between shifts, the number of rest days, quality of the rest breaks, the variability of shifts and the time of day. The six factors were scored and the scores were then combined to provide an overall index of fatigue. In this way, a proposed shift system could be compared with an existing system to help determine whether the risks associated with fatigue would be likely to change. 'red zones' were also indicated, for example for a shift over 12 hours in duration, to help employers focus on aspects of a working pattern which may cause particular problems in terms of increased levels of fatigue. The present report outlines a 2 year programme of research, carried out by DERA centre for human sciences (CHS), to validate and to develop further this method of assessing the risks arising from fatigue. A flow chart of the study is provided in figure 1. The study included an initial assessment of the index in which the strengths and weaknesses of the procedure were identified. This was followed by the collection of data to assist in the development of the index, and finally, after consultation with representatives from industry, a redefined version was produced.
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