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THE DESIGN OF REST BREAKS FOR VIDEO DISPLAY TERMINAL WORK: A REVIEW OF THE RELEVANT LITERATURE

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Recent studies have demonstrated a daily accumulation of eye and musculoskeletal strain in video display terminal (VDT) workers which is not eliminated by the use of high quality workstations or conventional rest break schedules (e.g., Zwahlen et al., 1984; Schleifer and Amick, 1988). These types of observations have prompted calls for limitations on the period of continuous VDT work. For example, the Swedish National Board of Occupational Safety and Health has suggested an upper limit of 1-2 hours of continuous VDT work. While the logic for such recommendations is substantial, there has been little empirical study of the effects of increased rest breaks, or shortened work periods, in VDT work. There is, however, an extensive literature on the design of rest break schedules in light, repetitive (industrial) work. This literature has been largely ignored in discussions regarding rest break design in VDT work, but is highly relevant since the tasks studied share common stress factors with VDT work (e.g., constrained static postures and the need for continuous attention).

Presented below is a synopsis of the literature on rest breaks in light, repetitive work and of the less developed literature specifically examining rest break effects in VDT/office work. This synopsis is organized in relation to the two main considerations in the design of rest breaks in VDT/office work: i.e., break frequency/duration and content.

BREAK FREQUENCY AND DURATION

Research by the (British) Industrial Fatigue Research Board (IFRB) was the first to demonstrate the benefits of increased rest breaks. Studies conducted by this group showed that productivity increased in assembly tasks when mid-morning and mid-afternoon rest breaks were introduced into the workday (Vernon and Bedford, 1924; Wyatt, 1927; Wyatt and Fraser, 1925). More recently, a study of clerical workers by Bhatia and Murrell (1969) found that 10-minute hourly breaks were favored by the workers, and produced

greater productivity gains in comparison to more infrequent 15-minute breaks. Similar effects were shown in a VDT task by Horie et al. (1987). These findings are consistent with conventional wisdom that short, frequent breaks are preferable to longer, more infrequent breaks (Rohmert, 1973).

Additional support for hourly breaks is provided by studies of VDT work which indicate that single, mid-morning and mid-afternoon breaks may have negligible effects (Delvolve and Quennec, 1983; Schleifer and Amick, 1988; Zwahlen et al., 1984). Furthermore, a study by Floru et al. (1986) points to the efficacy of short, hourly breaks in routine VDT work. In this study, 5-minute breaks inserted after a 40-minute period of work were effective in eliminating performance decrements which normally occurred after that period.

Muscle fatigue studies suggest the need for even more frequent breaks in VDT work. VDT work is often characterized by constrained postures and static loads. Two studies (Waersted et al., 1986; Kogi, 1982) reported, respectively, sustained forces reaching 6 and 20 percent of maximum voluntary contraction (MVC) in keyboard tasks. However, data suggest that forces greater than 10 percent MVC cannot be sustained for more than 10-15 minutes without perceptions of fatigue (Bjorksten and Jonsson, 1977).

The need for short, frequent breaks in repetitive VDT work is also suggested by extrapolation from trends in VDT users' discomfort ratings over the workday. An algorithm (yet to be empirically tested) developed by Zwahlen and Adams (1987) predicts that six, 12-minute breaks will prevent musculoskeletal discomfort from exceeding the "quite-a-bit" threshold for 99 percent of the VDT population (for the repetitive task upon which the model was developed). Regarding the frequency of breaks, however, a cautionary note is in order. Too frequent breaks can interfere with work rhythms (Rohmert, 1973), and may increase costs due to disruptions in production.

It is sometimes advocated that workers be given self-discretion in the control of both break duration and frequency. However, the limited number of empirical studies in this area argue against this proposition. When breaks are self-regulated, there is a tendency to work beyond the appearance of performance decrements, or to terminate breaks before recovery is complete (Murrell, 1971; Henning, 1987).

BREAK CONTENT

Productivity gains have been shown when activity or task changes are substituted for rest breaks (Bennett et al., 1974; Miles and Skilbeck, 1944). More recently, attention has turned to the potential benefits of exercise during VDT work. While research in this area is limited, a number of studies suggest that exercises are valuable in reducing acute discomforts (Laporte, 1966; Lee and Humphreys, 1985; Winkel and Jorgensen, 1986) and possibly even chronic disorders (Ferguson and Duncan, 1976) associated with VDT work, or

other keyboard work.

CONCLUSIONS

Although more research specific to VDT work and associated health outcomes is needed, the existing literature strongly suggests that frequent rest breaks would benefit both productivity and comfort in VDT work.

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