

WORK STRESS IN SELF-PACED STRENUOUS WORK IN THE ANTARCTIC, THE SUDAN, AND AUSTRALIA - IMPLICATIONS FOR OCCUPATIONAL WORK AND HEAT STRESS STANDARDS

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There is an increasing tendency for occupational health and safety recommendations to contain quantitative statements of acceptable upper limits of hazards and stresses. Whilst 'numbers' may be helpful to both management and employee agencies, there is the risk that inappropriate values could lead to either hazardous or, on the contrary, to over-conservative work practices. Furthermore, they may be a potent source of industrial unrest because workers may become anxious if they think that they are being overstressed relative to the standard, or, if they consider that they are being exploited will demand restrictive work practices or higher remuneration.

It is essential that recommendations for allowable work rates should be based on direct observations of people engaged in occupational tasks as well as on laboratory investigations of physiological stresses and strains.

This paper reports observations of energy expenditure made on Antarctic expeditioners, Sudanese cane cutters and Australian bushfire fighters. These men, engaged in tasks that allowed strenuous physical exertion, spontaneously adopted energy expenditures between 500 and 770 W which were equivalent to 60 to 65% of individual $\dot{V}O_2$ max. Work heart rates were > 130 bts/min, deep body temperatures $> 38^\circ\text{C}$ and sweat rates > 14 g/kg/hr. The bushfire fighters reported their exertion as 'somewhat hard'. Similar findings have been reported on other occupational groups, as well as on hikers and high altitude mountaineers. It appears that in some activities men choose to work close to their lactate threshold which, for men accustomed to the work, may be in the order of 60-70% $\dot{V}O_2$ max. Individual productivity is thus determined by work capacity.

These observations of normal physical behaviour should be recognised in recommendations for allowable occupational work rates and physiological strains. They also have implications for personnel selection for special occupational tasks, for work practices in hot environments, and even for recommendations for 'healthy exercise'.