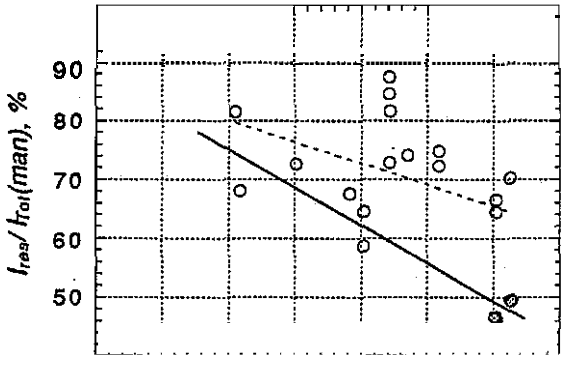
(I_{Cl})



factors as intensity of work, amount of sweating, type of clothing etc. Greatest reduction in I_{Tot} was observed in experiments with significant sweating (filled circles). The detrimental effect of moisture absorption on clothing insulation and body heat heat loss has been reported by many investigators [1, 7, 13].

Olesen et al. [11] found reductions in I_{cl} during walking by up to 46%. Havenith et al. [5] derived a set of formulas describing the reduction caused by wind, body movements, and insulation thickness. One of their regression equations is drawn in the figure (solid line). In comparison with our results their formula seem to overestimate the reduction, particularly at high insulation levels. Apparently, there is an effect of insulation thickness. Sweating and moisture absorption by clothing resulted in greater reductions in I_{Tot} and can explain some of the large variation among dam. In fact, the absorption process contributes to the heat transfer, but the magnitude is difficult to measure.

It is evident, that significant errors arise in predictions of thermal responses, when insulation values used in calculations, are assumed equal to resultant values. The higher the activity level, the greater will be the error. Accordingly, in the heat prediction models are likely to overestimate heat stress at moderate temperatures and underestimate at high temperatures. In the cold actual heat losses will be significantly greater, than predicted on the basis of tabulated values for typical cold weather clothing. The obvious lack of sufficient knowledge about the dynamic behaviour of clothing in terms of heat exchange, certainly justifies more research in this field

CONCLUSIONS

Standard values for clothing thermal properties are in most applications not representative for the actual performance of clothing during given conditions.

In a first approximation standard values should be reduced by 20–40% to compare with resultant values predicted for dynamic, active work.

Predictions of thermal stress based on standard values may severely over– or underestimate dry heat losses.

More research is required to develop a better understanding of clothing thermal function during realistic conditions.

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