3 Minard, D Prevention of Heat Casualties in Marine Corps Recruits Military Medicine *126(4)* 261–272, 1961

II Work load categories

The heat produced by the body and the environmental heat together determine the total heat load Therefore, if work is to be performed under hot environmental conditions, the workload category of each job shall be established and the heat exposure limit pertinent to the work load evaluated against the applicable standard in order to protect the worker from exposure beyond the permissible limit

A The work load category may be established by ranking each job into light, medium, and heavy categories on the basis of type of operation, where the work load is ranked into one of said three categories, i e

(1) light work e g , sitting or standing to control machines, performing light hand or arm work,

(2) moderate work e g , walking about with moderate lifting and pushing,

(3) heavy work e g , pick and shovel work,

the permissible heat exposure limit for that work load shall be determined from Table 1

B The ranking of the job may be performed either by measuring the worker's metabolic rate while performing his job or by estimating his metabolic rate by the use of the scheme shown in Table 2 Tables available in the literature listed below and in other publications as well may also be utilized

1 Per-Olaf Astrand and Kaare Rodahl "Textbook of Work Physiology" McGraw-Hill Book Company, New York, San Francisco, 1970

2 Ergonomics Guide to Assessment of Metabolic and Cardiac Costs of Physical Work Amer Ind Hyg Assoc. J 32 560, 1971

3 Energy Requirements for Physical Work Purdue Farm Cardiac Project Agricultural Experiment Station Research Progress Report No 30, 1961

4 J V G A Durnin and R Passmore "Energy, Work and Leisure" Heinemann Educational Books, Ltd , London, 1967.

TABLE 2

ASSESSMENT OF WORK LOAD

Average values of metabolic rate during different activities

A Body position and movement	Kcal /min
Sitting	0 3
Standing	0 6
Walking	2 0–3 0
Walking up hill	add 0 8 per meter (yard) rise

B Type of Work	Average Kcal /min	Range Kcal /min
Hand work		
light	0 4	0 2–1 2
heavy	0 9	
Work with one arm		
light	1 0	0 7–2 5
heavy	1 8	
Work with both arms		
light	1 5	1 0–3 5
heavy	2 5	
Work with body		
light	3 5	2 5–15 0
moderate	5 0	
heavy	7 0	
very heavy	9 0	

Light hand work writing, hand knitting

Heavy hand work typewriting

Heavy work with one arm hammering in nails (shoemaker, upholsterer)

Light work with two arms filing metal, planing wood, raking of a garden

Moderate work with the body cleaning a floor, beating a carpet

Heavy work with the body· railroad track laying, digging, barking trees

Sample Calculation Using a heavy hand tool on an assembly line

A	Walking along	2 0 Kcal /min
B	Intermediate value between heavy work with two arms and light work with the body	3 0 Kcal /min
		5 0 Kcal /min
C	Add for basal metabolism	1 0 Kcal /min
	Total	6 0 Kcal /min

Adapted from Lehmann, G E , A Muller and H Spitzer Der Kalorienbedarf bei gewerblicher Arbeit Arbeitsphysiol *14* 166, 1950