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SECTION 109 – HAND LABOUR

General

2414. Although the greatest possible use should be made of plant, most Projects require some hand labour. On small jobs machines may prove uneconomical and on large jobs trimming by hand is often necessary after machines have carried out the bulk of the work. Sometimes for tactical reasons, eg surprise, earthmoving can be carried out only by hand labour.

2415. A considerable labour force is required on road work:-

- a. To operate, service and repair plant and vehicles.
- b. To maintain output at loading and transfer points
- c. For trimming, clearing and small jobs for which machines are uneconomical.
- d. For repair and maintenance work.

2416. The output of available equipment can often be increased by supplementary construction teams working with hand tools.

2417. Even large work can, if necessary be completed in due course by hand labors.

2418. It usually pays to establish teams trained for a particular task rather than to allot men piecemeal.

Classes of labour

2419. Military labour- Organize by units and sub units to simplify command and administration.

The OIC work is responsible for technical instructions, for the provision of stores tools and for correct execution of work. The OC unit is responsible for discipline and industry and that allotted tasks are properly completed.

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2420. Civilian labour. Recruiting, general organization, and administration are normally the responsibility of the Directorate of labour. The principles of organization are:

- a. Organize groups under civilian supervisors, foremen and gangers, though who alone orders should be given and control be exercised.
- b. Use existing labour organization, eg, contractors, whenever possible.
- c. provide the type of tools to which the labour is accustomed.
- d. Respect local customs as far as possible, especially if religious practices are involved.
- e. screen individuals to eliminate undesirables, and to select men who are skilled or suitable for training.
- f. Establish a civilian administrative section.
- g. Arrange for adequate supervision.

2421. PW labour. Prisoners of war are best organized in complete labour units, working under their own NCOs and with their own administrative personnel. PW labour is relatively inflexible, as close supervision and adequate guards are essential. A special PW camp is required.

Work output

2422. Working hours. An 8- hour working day is desirable over long periods. A 10-hours day can be worked when necessary, but hourly output then tends to fall. On urgent tasks, adopt shift working if sufficient labour is available and if possible install artificial lighting so as to work round the clock.

2423. Labour constants. Output varies considerably with the class of labour and local conditions, some constants are given in Tables 86 to 8, but these should be regarded only as guide.

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TABLE 24.7-CONSTANTS-HAND EXCAVATION
EUROPEAN LABOUR

Serial No	Class of soil	Output (cu yds per man-hour)	
		Side-hill cutting	Trenches up to 5 ft deep
(a)	(b)	(c)	(d)
1.	Sand, loose earth, or loam	1.1	0.58
2.	Compacted earth with stones, or loamy clay.	0.73	0.45
3.	Gravel of stiff clay	0.67	0.38
4.	Soft chalk	0.37	0.20
5.	Hard chalk, or soft rock	0.25	0.12

TABLE 24.8-CONSTANTS-HAND EXCAVATION AND
HAND LOADING OF WHEELBARROWS AND VEHICLES

Ser No	Task	Labour required (man has per cu yd)				
		Sand, loam, light earth	Compact earth with stones	Compact gravel , stiff clay	Soft chalk	Hard chalk, very soft fissured fock
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1.	Shallow excavation over areas and loading wheelbarrows	1.1	1.3	1.8	3.1	4.0
2.	Bulk excavation and loading wheelbarrows	0.9	1.1	1.5	2.5	3.3
3.	Excavation of shallow trenches and loading wheelbarrows	1.8	2.2	3.0	4.5	6.0
4.	Excavation in side hill cutting	1.3	1.7	1.9	3.1	4.4

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	and loading wheelbarrows.					
5.	Add extra for loading vehicles (horsed wagons, trucks, or dumpers) in lieu of wheelbarrows	0.2	0.2	0.2	0.2	0.2
6.	Loading materials already dug	0.7	0.7	0.8	0.7	1.0

**TABLE 24.9- CONSTANTS – LOADING LOOSE
METERLALS BY HAND**

Serial No	Material	Time taken in landing into wagon trucks or dumpers (man hrs)	
		Per ton	Per cu yd
(a)	(b)	(c)	(d)
1.	Ashes	0.70	0.46
2.	Asphalt	1.00	1.57
3.	Bricks loose	0.60	0.61
4.	Bricks staked	1.20	1.60
5.	Chalk	0.65	0.65
6.	Clay loamy	0.75	0.72
7.	Clay, stiff	0.80	0.78
8.	Clinker	0.70	0.38
9.	Concrete, broken	0.80	0.75
10.	Concrete, mixed	0.70	1.12
11.	Concrete, precast units	0.80	0.75
12.	Gravel	0.70	1-12
13.	Hardcore, building rubble	1-10	-
14.	Pipes, cast iron	0.65	0.76
15.	Pipes, concrete or stoneware	0.81	0.79
16.	Rails	1.20	-
17.	Road metal	1.00	-
18.	Rolled steel joists	1.10	-
19.	Sand	1.00	-
20.	Shingle	0.60	0.58

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21.	Stone, broken, 1½-in down	1.00	0.68
22.	Stone, broken, ½ to 2½-in	0.65	0.75
23.	Stone, broken, 2½ to 4-in	0.70	0.85
24.	Tarmacadam	0.10	0.90

**TABLE 24.10-MISCELLANEOUS HAND LABOUR OPERATIONS IN
SOILS**

Serial	Task	Labour required (man-hrs per cu yd)				
		Sandy loam light, earth	Compact , earth with stones	Compact gravel, stiff clay	Soft chalk	Hard chalk, Very soft fissured rock
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	Loosening by	0.2	0.3	0.8	1.6	0.2
2	pick	0.5	0.6	0.7	0.8	0.8
3	Wheelbarrow 25yds,tip and return	0.4	0.5	0.5	0.4	0.4
4	Spread and level in 12-in layers	0.2	0.2	0.3	0.2	0.2
5	Hard ramming, 6 to 12 – in layers Fill and ram in layers, to from bank	0.6	0.6	0.7	0.6	0.6

(b) Other materials :

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Serial	Task	Labour required (man-hrs per cuyd)
(a)	(b)	(c)
6	Break out concrete , not	14.25
7	exceeding 12 ins thick	4.0
8	Break out hardcore	5.0
9	Break out water bound	
10	macadam and hardcore	5.5
11	under	0.7
12	Break out tarmacadam	0.9
13	and hard core under	0.9
	Lay clinker	1.2
	Lay hardcore	
	Lay water bound	
	macadam	
	Lay tarmacadam	