

STANDARD TIME TABLES AND THEIR USES

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Summary

Tables of standard times are statistically validated before being presented to management. A standard format is used for uniformity and each of the seven paragraph headings is examined in turn. Tables have uses other than as a basis for a piece-work payment system, they can be used to calculate output, assess performance and to calculate labour and machine requirements. Where a table is not statistically validated, an output guide can frequently be provided. Examples of a standard time table and an output guide are appended.

1. We have seen how standard times are produced; the purpose of this paper is to show how they are presented to management and workers and the uses to which they can be put.

2. All standard time tables have the same basic layout; the seven sections appear in a constant order:

- (1) Conditions.
- (2) Job Specification.
- (3) Tools and Equipment.
- (4) Allowances.
- (5) Method of selecting the standard time.
- (6) Tables of standard times.
- (7) Modification and variations to the standard times.

Each of these is now considered in turn:

Conditions (Para. 1)

3. The physical conditions under which a particular job is carried out will affect the time taken. In industry, working conditions are usually controlled and to some extent can be modified. Certain conditions in forestry cannot be altered, e.g. the slope of the ground; others can be affected by Management's earlier decisions, e.g. the amount of brashing and the timeliness of a thinning. Hence in every case a broad classification of conditions to which the standard times are applicable is given, drawing attention to likely variations. The conditions are not necessarily constant for a given operation e.g. thinning times for spruce presume drains at fairly close spacing and mound planting, but those for pine do not.

4. If all the conditions described are not present then either:

- (a) some modification to the times may be necessary as given in para. 7 of the booklet.
- or:
- (b) the times may not apply to the job proposed. In this instance, the supervisor would refer to the local work study officer for advice.

Job Specification (Para. 2)

5. Quality standards must be laid down and adhered to. It is just as important to see that excessively high, and thus expensive, standards are not set, as to see that lower standards do not creep in unnoticed. The inspection of work is a prime function of junior supervisors and they should receive guidance as to the correct standard.

6. The job specification frequently becomes a condition for the next operation, e.g. "poles must be extracted and piled with their butts mainly together" to ensure efficient crosscutting. The balancing of these tasks to give the lowest overall cost is an important part of the original method study.

7. A supervisor may well decide that a worker who has failed to meet the required job specification may not be due the full rate for the job until the required standard has been met.

Tools and Equipment (Para. 3)

8. It is essential that the correct equipment be available, including both gear which is required occasionally and those items of maintenance equipment needed daily. It is also essential that a high standard of tool maintenance be achieved and maintained.

Allowances (Para. 4)

9. In the standard times, allowances are made for ancillary tasks such as tool maintenance, walking from one site to another and counting or checking work etc. These, together with a small allowance for contingencies, are usually expressed as a percentage of the basic time for the particular job. This other work allowance is stated in para. 4(a). Rest allowed is shown in 4(b). Para. 4(c) is a reminder to management that an incentive allowance must be included in the price per standard minute. With jobs involving the use of a chainsaw, para. 4(d) gives the percentage of the day that the

saw will be in use. This is to assist management in agreeing a rate for a worker-owned saw.

Selecting the Standard Time (Para. 5)

10. The purpose of this paragraph is to tell users how to gain entry to the tables in para. 6 and what measurements they will need to take beforehand.

Tables of Standard Times (Para. 6)

11. These form the central feature of each scheme but are only valid within the conditions, job specification, working methods, and method of evaluation set out in para. 1-4.

Modifications and Variations to the Standard Times (Para. 7)

12. Having found the main variables and produced a table of standard times for the whole range, it is generally possible to predict what will happen if certain other subsidiary factors change, e.g. if there is coppice in a stand to be thinned, or if the plants to be weeded are very small. Such differences can be allowed for as fixed or percentage alterations to standard times. Naturally the accuracy of these derived times is less than that for the defined jobs but in making a whole series of time studies one or two examples of each change will have been observed. These variations are applied at the supervisor's discretion using his judgement of the appropriateness of the conditions.

13. As an example, Standard Time Table XVIII/14—Thinning CP/SP. is appended (Appendix 1).

Uses of Standard Time Tables

14. Standard Time tables can be used for the following purposes:—

- (i) As a direct basis for a piecework scheme.
- (ii) As a basis for producing an output guide.
- (iii) To calculate output and assess performance.
- (iv) To calculate labour requirements.
- (v) To calculate machine requirements.

Standard Time Booklets

15. We shall be looking more closely at the method of converting time into money in Paper 7 hence I'll not deal further here with the use of Standard Times as a direct basis for piecework payment.

Output Guides

16. Output guides are similar to Standard Time Booklets but para. 6 takes a different

form. It does not give the standard time (validated statistically) for a job but gives either "time" (implying "not statistically validated") or output in terms of quantity of work achievable. An output guide is therefore a guide to managers but leaves them with the full responsibility for negotiating the piecework rate.

17. They are produced:

- (i) Where insufficient data has been collected to produce a full Standard Time Booklet.
- (ii) Where guidance is required by management quickly, i.e. before the full studies are complete.
- (iii) Where data collected in one area (and perhaps published as a Standard Time Booklet) is modified for use in another area.
- (iv) Where the expense of producing a full Standard Time Booklet is not justified because of the local nature of the work concerned.

18. Output guides are nevertheless as useful to management as are Standard Time Booklets, the only proviso being that they are likely to be less accurate. As an example the output guide for step and notch planting is reproduced at Appendix II.

Output and Performance

19. If the standard time for a job—say felling and snedding a tree—is 10 standard minutes (usually expressed as 10 SMs) then the output for an 8 hour day at standard performance is:

$$\frac{\text{Minutes at work daily}}{\text{Standard Minutes for job}} = \frac{8 \text{ hrs.} \times 60 \text{ mins}}{10 \text{ SMs}} = 48 \text{ trees/day}$$

20. It should be noted that a man will not in fact take 10 minutes to fell and sned a tree at standard performance but perhaps 7 or 8; the balance being other work and rest that occurs at other times of the day.

21. The output as calculated above is for one man; if as part of the specified conditions of the job, two or more men are obliged to work together as on some machines, e.g. sawbench or peeler, then the output for that machine is:

$$\frac{\text{Minutes at work daily}}{\text{Standard Minutes for job}} \times \text{No. of operators}$$

22. Obviously the actual output of a less skilled or day worker and a highly skilled piece worker will vary considerably and might range from say

36 to 60 units/day. Standard performance, (i.e. that achieved by a skilled worker under incentive conditions) is expressed as 100. The output given above can be expressed relative to this and the performance calculated:

Output	Output at 100	Performance
36	48	$\frac{36}{48} \times 100 = 75$
60	48	$\frac{60}{48} \times 100 = 125$

23. Combining the two calculations in 19 and 22 above into general terms, *Performance* can be defined:

$$\frac{\text{Output expressed in standard time}}{\text{Time on job}} \times 100$$

e.g. with an output of 60 units of 10 SMs in an 8 hour day is:

$$\frac{60 \text{ units} \times 10 \text{ SMs} \times 100}{8 \text{ hours} \times 60 \text{ mins}} = \text{a performance of } 125$$

24. In forestry, more than in manufacturing industries, performance over short periods may appear to vary widely when in fact it is local variation in conditions that is responsible. However, performances over periods of more than a few days which consistently fall outside the limits of 70–130 need investigation, because the job or conditions may have changed or the standard data been incorrectly applied. It should be noted that a performance of 75 represents, approximately, day work output whilst a performance of 130 is not seen very often during studies and is regarded as exceptional. Management, is of course, free to investigate lesser variations.

Calculation of Labour Requirements

25. *Example.* To fell and sned a stand of 4,000 Douglas fir average volume 0.55 m³ a week (5 days), how many men are needed? Using Standard Time Table XVIII/19, the time for 1 tree is 12.66 standard minutes.

Therefore the time for the stand is 12.66 × 4,000 = 50,640 minutes.

As there are 2,400 minutes per man per week available, the number of men required is:

$$\frac{50,640}{2,400} = 21 \text{ men}$$

For reasons of safety, it might be as well to use six men and take a month to do the job!

Machine Requirements

26. The calculation is similar to that for labour: *Example.* To peel 11,500 m³ of poles averaging 0.09 m³ each and 8 metres long per annum using a Cambio 35 peeler. Can the machine cope with this throughput in a year of 200 days or must overtime or shift working be resorted to?

Using Standard Time Table XX/7, the standard time of 18.57 minutes per 100 metres peeled is selected, but this is the time for 2 men. It must be divided by 2 to find the time the machine will take:

$$\text{Machine time per } 100 \text{ m} = \frac{18.57}{2} = 9.29 \text{ min.}$$

Total length of poles to be peeled =

$$\frac{11,500}{0.09} \times 8 \text{ metres} = 1,022,222 \text{ metres}$$

therefore no. of days required =

$$\frac{1,022,222 \times 9.29}{100 \times 480} = 198 \text{ days}$$

or 1 working year almost exactly!

Hence the machine can cope.

In practice however, half a day per week (4 hours) must be allowed for machine maintenance, hence 4 hours overtime working per week must be introduced to that the machine can peel the required quantity in the time allowed.

Section XVIII. No. 14. Date 1968/69.

STANDARD TIMES FOR THINNING CORSICAN AND
SCOTS PINE USING A CHAINSAW
(Chainsaw Snedding)

1. Conditions

The Standard Times apply to stands thinned under the following conditions:

- The volume of the average tree is determined by the Tariff system.
- The brashing percentage is at least 90%.
- Forest floor conditions are average i.e. generally flat or with a slope of not more than 10% and with some decayed brash and undergrowth. For worse conditions see para. 7.
- Racks are 40 m apart.
- Supplies of chainsaw fuel and oil, stump treatment solution are readily available at convenient places.

2. Job Specification

The Standard Times are for the following work:

- Trees to be felled in the direction as instructed by the supervisor.
- Trees to be cut low, stumps not more than 0.025 m above ground level.
- Branches and prominent knots to be cut off flush with the wood so that no snags remain. Snedding to be by chainsaw.
- Felling and other cuts to be made squarely across the tree. Butts must be trimmed square if necessary.
- Lop and top to be cleared from racks and rides unless otherwise directed by the supervisor.
- Cut stumps to be treated immediately after felling. (This work attracts extra standard time—see para. 7b).

3. Tools and Equipment

- Lightweight self oiling chainsaw of a type suitable for snedding, with spares and maintenance tools.
- A 0.13 m plastic felling wedge.
- A pulp hook.
- A cant hook.
- Protective clothing and equipment.
- A Spencer (or similar) logger's tape and logger's belt with hooks and pockets for small tools.

4. Allowances

Included in the Standard Times

- For contingencies and work other than that performed on individual trees, e.g. refuelling and day to day maintenance of the saw,

clearing brash from rides etc. 20% of the time spent on actual thinning.

- For personal needs and rest: 20% of the total working time.

To be included in the price per Standard Minute

- The appropriate incentive allowance.
- Chainsaw usage when thinning and chainsaw snedding is 60%.

5. Method of Selecting Standard Time

- The trees shall be tarified according to the method specified in the F.C. Forest Record No. 31. At the same time the number of whorls of branches to be cut off between butt and the 0.07 m top diameter over bark point on the felled sample trees shall be recorded. Where the felled sample tree has been pruned, only the whorls remaining to be cut off shall be counted.
- To select the standard time from Table 6A (Scots pine) or 6B (Corsican pine) select the appropriate average volume for the stand (rounding up or down to the nearest) and read off the standard time from col. (ii). This time is for the average number of whorls shown in col. (iii). If the number of whorls is greater or less than this figure, add/subtract the standard minutes per whorl as shown at the foot of the table. If the average number of whorls is outside the range shown in col. (iv), consult the Work Study Officer.

6A. Standard Times for Thinning in Scots Pine
(Chainsaw Snedding)

Average Tree (Cubic Metres) (i)	Standard Mins. per Tree (ii)	Average No. of whorls (iii)	Range of whorls (iv)
0.036	2.95	10	7-14
0.045	3.23	11	7-15
0.065	3.55	12	8-16
0.080	3.71	12	8-16
0.100	4.04	13	9-17
0.115	4.29	14	10-18
0.145	4.62	14	10-18
0.170	4.98	15	11-19
0.190	5.27	15	11-19
0.225	5.75	16	12-20
0.250	6.07	17	13-21
0.280	6.52	18	14-21
0.315	7.08	19	15-22
0.350	7.56	20	16-23
0.395	8.24	22	18-25
0.440	8.86	23	19-26
0.470	9.33	24	20-28

Add/Subtract: 0.13 SMs per whorl if different from average value given in col. (iii) but do not go beyond range given in col. (iv).

6B. Standard Times for Thinning in Corsican Pine (Chainsaw Snedding)

Average Tree (Cubic Metres) (i)	Standard Mins. per Tree (ii)	Average No. of whorls (iii)	Range of whorls (iv)
0-110	5-77	16	11-21
130	6-00	16	11-22
160	6-26	17	12-22
180	6-45	17	12-22
220	6-79	18	13-23
250	7-12	18	13-23
305	7-47	18	13-23
350	7-85	19	14-24
395	8-26	19	14-24
460	8-96	20	15-25
540	9-68	21	15-25
575	9-91	21	16-26
620	10-34	22	17-27
665	10-82	22	17-27
720	11-24	22	17-27

Add/Subtract: 0-25 SMs per whorl if different from the average value given in col. (iii) but do not go beyond the range given in col. (iv).

7. Modifications and Variations to the Standard Times for Thinning in Pine.

N.B. These modifications should be applied at the Forester's discretion using his judgement as to the appropriateness of the conditions.

a. Presence of Bramble

Where conditions are more difficult because of the presence of bramble, an addition may be necessary. The average height of the bramble throughout the area for which the rate is being calculated should be assessed and the additions shown below added to *all* trees. (Parts of the area may have no bramble and must be allowed for.)

Mean Bramble Height	Add per tree
metres	Standard Minutes
0-3	0-41
0-6	0-49
0-9	0-58
1-2	0-66
1-5	0-74
1-8	0-82
2-1	0-90
2-4	0-99
2-7	1-07

b. Stump Treatment

The Standard Times include:

Preparation (making up the suspension in the case of *Peniophora*); filling the container, applying the liquid to cover completely all the exposed wood of the stumps that result from felling the tree immediately after felling, and an allowance for working with the dye. The following standard times may be added to Tables 6A or 6B or paid separately as a price per stump.

Stump Diameter	Standard Minutes per Stump
metres	
Up to 0-15	0-10
Over 0-15 and up to 0-28	0-20
Over 0-28 and up to 0-40	0-32
Over 0-40 and up to 0-53	0-42
Over 0-53 and up to 0-66	0-52
Over 0-66 and up to 0-79	0-62
Over 0-79 and up to 0-91	0-72

c. Tops

When trees are snedded beyond the 0-07 m top diameter (over-bark) point, additions to the standard times are necessary as shown in the table below. The extra time for the *average* cut-off diameter should be added to *all* trees.

Top Diameter over bark	Add Per Tree
metres	Standard Minutes
0-06	0-55
0-05	0-67
0-04	0-82
0-03	0-96
0-02	1-10

Section XIV. No. G1. Date April 1971.

OUTPUT GUIDE. STEP AND NOTCH PLANTING

1. Conditions

- a. The outputs apply to planting by the step and notch method on single or double mouldboard ploughing in upland areas. They apply equally to tine or turf (Cuthbertson) ploughing; shallow and deep peat; regular and broken ground. See para. 5.
- b. Planting of Pines and Spruces.
- c. Slopes up to 21°, but see para. 7b.
- d. Sheughs laid out less than 150 m average walking distance from the planting area, but see para. 7a.

2. Job Specification

The guide applies to the following work:

- a. Collecting bundles of plants from sheughs, opening bundles and culling as necessary.
- b. Walking to and from sheugh to planting site and within the planting site between furrows, *but not major moves between sites.*
- c. Cutting a step in the turf so as to provide shelter and to enable the roots to reach the sandwich layer—as directed by the forester.
- d. Planting the tree using a single notch, firming the tree and meeting the silvicultural requirements laid down.

3. Tools and Equipment

- a. Small planting spade—Spear and Jackson No. 1153 28 in. PY.
- b. Planting bag.
- c. File for sharpening spade—essential in peat areas.

4. Allowances

- a. Work other than actually cutting step and planting is 19% of stepping and planting.
- b. Rest varies from 12%–19% between Other Work and Cyclic Work.

5. Selecting the Output

- a. Decide into which classification the site falls as follows:
 - A. Shallow peat, peat and mineral mixture, usually associated with tine ploughing. Somewhat broken ground conditions. Slopes variable up to 21°. Turf thickness less than 250 mm. Minority of plants planted in a step.
 - B. Deep peat usually associated with Cuthbertson ploughing. Reasonably uniform conditions. Slight slope up to 5°. Turf thickness over 250 mm. Majority of plants planted in a step.
- b. On site A measure the average slope.
- c. Look up the outputs in para. 6 below.

6. Outputs

Site	Slope (degrees)	Output Trees/Hour
A	0–5	235
	6–10	220
	11–16	206
	17–21	194
B		167

7. Modifications and Variations to Outputs

- a. If sheughs are spaced at a distance of more than 150 m from the planting area; they generally contain over 2,500–3,000 plants and under these conditions,
REDUCE OUTPUT BY 10%
- b. There is very little evidence of outputs on slopes over 21° but what little there is suggests that for every 5° increase in slope,
REDUCE OUTPUT BY 6%