

## Paper 7

# COSTING AND OTHER MONEY MATTERS

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### Summary

Several related matters are dealt with; incentive payment, payment for worker-owned equipment, overheads with particular reference to labour oncost, machinery costs and costing an operation. High earnings sometimes cause raised eyebrows; this problem is put into its correct perspective, and the relative costs of day work and piecework compared. Future trends in costs of labour and machinery are propounded.

### Incentive Schemes

1. Before I launch into incentive payment, I must emphasise that the Work Study man's job stops when he has produced a sound standard time. If he is to remain impartial, he must not dabble in matters of paying the men. But he can of course be called upon for advice by men or management.

2. The object of incentive schemes is to reduce costs and increase earnings. It is therefore to the benefit of both workers and management that payment for work should be based on sound incentive schemes. A sound incentive scheme from which the worker benefits in proportion to his output has long been recognised as a valuable aid to increased productivity. It is particularly relevant in forestry where much hard manual work still remains in spite of modern tools and equipment.

3. Forestry Commission policy may be stated as follows:—

“As a result of increasing mechanisation and the rationalisation of forest operations through work study, forestry is becoming an increasingly skilled occupation. It is the Commission's objective to continue to maintain a well-trained permanent labour force, able to earn a good income through piece-work or other incentive schemes”.

(Quoted from the *Forty-fourth Annual Report of the Forestry Commissioners for the year ending 30 September 1963*. Para. 14 page 9(1). (HMSO 35p).

4. Two basic types of incentive scheme may be recognised:—

(i) *Piecework*, where the payment is directly proportional to output as a measured quantity (e.g. numbers of pieces, area, weight, volume, etc).

(ii) *Bonus*, where the relationship is not direct but either varies by some function of quantity,

or savings in time, or in the form of “Half a day's pay plus so much per unit”.

I am concentrating on piecework because at present it is considered more suitable for forestry which is still largely manual or controlled by the man rather than the machine. There are however a few bonus schemes in operation in the Forestry Commission. Other systems of piecework payment are described in Report No. 65 entitled *Payments by Results Systems*, of the National Board for Prices and Incomes (HMSO, 1968. 42½p).

5. The satisfactory working of an incentive scheme depends on certain basic requirements all of which have been well confirmed by Forestry Commission experience:—

- (a) The assessment of work content must be accurate and consistent.
- (b) The worker's earnings should be directly related to the effectiveness with which he performs his job.
- (c) Incentive is greatest when earnings depend on individual effort.
- (d) The scheme must be fair as between employer and employee, and between one worker and another.
- (e) Earnings should be related to the worker's basic rate, or approximately so.
- (f) Schemes must be simple and easily understood.
- (g) Co-operation with Unions and workers' representatives is essential, particularly in launching incentive schemes for a new operation. Degree of co-operation will depend on the past history of employer-worker relations, and in some cases it is necessary to overcome mutual distrust which has its origin in the nineteen-thirties.
- (h) External factors such as local wage levels for other industries must be considered.
- (i) There must be no limits on earnings, open or concealed.
- (j) It is important that incentive schemes should follow improvement wherever possible. It is much easier to introduce changes at an early stage than to adjust rates for better methods once a scheme is under way.

6. The procedure of Time Study and the Standard Times derived from it are considered the most suitable basis on which a sound piecework



scheme can be based in the present circumstances confronting the Forestry Commission.

7. We have seen how the standard times are calculated and how they are presented in a standard fashion (the Standard Time Table) to the local Supervisor to give him guidance on the time required to do the job in given circumstances. But how does one pay for the time?

In its simplest terms:

Time  $\times$  money = piecework rate.

8. If we take day pay  $\frac{£15.68}{5} = £3.136$  and divide it by the number of minutes in a day (480), we get the value of one minute of work:—

$$\frac{£3.136}{480} = £0.0065 \text{ or } 0.65\text{p.}$$

9. If we paid a worker 0.65p for each minute of work done (and he were an average skilled man), he would earn exactly £15.68 per week but he would not give us high output because there is no incentive for him to do so.

10. The Commission has negotiated with the Trade Unions an agreement which says:—

“The piecework rate for any job shall be such that a Skilled Forest Worker is able to earn on piecework in the ordinary weekly hours not less than 30% above his normal time rate for the period he is employed on piecework”.

*Agreement on Wages and Conditions of Service of Forest Workers in the Forestry Commission—Forestry Commission Industrial and Trade Council, 1970.*

11. Here then is a guide as to how to proceed; we can increase our daywork price per minute by 30% to meet our obligations to the Unions.

Expressed as a formula, we get:—

$$\frac{\text{Day pay in pence}}{480} \times \frac{130}{100} = \text{piece rate price per standard minute}$$

$$\frac{313.6\text{p}}{480} \times \frac{130}{100} = 0.85\text{p/SM}$$

12. Different grades of workers have different rates of pay and hence different prices per standard minute.

Examples are (July 1971):—

| Grade                 | Weekly rate of Pay | Price per SM 30% incentive |
|-----------------------|--------------------|----------------------------|
| Skilled Forest Worker | £15.68             | 0.85p                      |

|                        |        |       |
|------------------------|--------|-------|
| Wheeled Tractor Driver | £15.95 | 0.86p |
| Lorry Driver:          |        |       |
| 6–10 tons + crane      | £16.24 | 0.88p |
| Over 10 tons + crane   | £16.44 | 0.89p |

#### Payment for Worker-owned Equipment

13. In the Forestry Commission it is usual to agree with the men (via their Trade Unions) a price per hour *in use* for equipment which they supply and use at work. For example, an agreed hourly rate for a chainsaw might be 25p. It is possible to convert this rate to so much per standard minute and add it to the price for the worker concerned.

$$\text{e.g. } \frac{25\text{p}}{60 \text{ mins.}} = 0.42\text{p per minute}$$

14. If the worker is employed on felling and chainsaw snedding where the usage (by time study) has been determined as 60% (of the working day), the formula becomes:—

$$\frac{25\text{p}}{60 \text{ mins.}} \times \frac{60}{100} = 0.25\text{p per minute}$$

15. Hence the worker using a Commission-owned saw on felling and chainsaw snedding might be paid 0.85p/SM while his mate using his own saw on the same job would be paid 0.85p + 0.25p = 1.10p/SM. This method of compensating a worker allows for the greater usage of a saw in the hands of a man who rates, for example, 120 because it is linked directly to the number of units of work produced.

16. The same method of payment can be adopted for other equipment owned by the worker such as horses or tractors.

#### Labour Oncost

17. Labour oncost is the collective term used in the Forestry Commission for expenditure incurred as a direct result of employing a worker and includes such items as National Insurance, holidays, sick leave, wet time, transport and training of workers and provision for pensions. The total sum in the Commission for its 7,487 workers is £2,745,860 per annum (1969–70). Assuming a 200 day working year (to allow for holidays, sickness and wet time, etc), this figure may be expressed as £1.80 per man day.



18. It may also be expressed as so much per minute, e.g.

$$\frac{180\text{p}}{480 \text{ mins.}} = 0.38\text{p per minute.}$$

This method of calculation is useful when costing an operation (see paras. 23-25).

### Costing of Machinery

19. All Conservancies in the Commission have what are known as PDC (Predetermined charge) rates for different classes of machine which are charged per hour, or per mile, or per month, while that machine is in use. But these are historical charges; they are a means of distributing this year's costs over this year's work on the basis of what happened last year. They are reasonably accurate for accounting purposes but may not be sufficiently accurate for costing. They vary considerably from one Conservancy to another because of the varying degrees of usage. PDC rates also have the major disadvantage in that they are of no value whatever when a machine of a type never before used is purchased. For example, they would be of no use in costing a feller/buncher because the Commission has never owned one before and therefore has no historical costs to call upon.

20. To overcome these disadvantages, we use the following formula which is sufficiently accurate for most costing purposes:

$$\text{Rate per hour} = \frac{\text{Capital Cost of Machine} \times 3}{\text{Estimated life in hours}}$$

Experience has shown that a reasonable life expectation is 8,000 hours but this figure can be varied according to circumstances.

21. Therefore if we take our feller/buncher at £15,000 capital cost, its hourly charge rate would be of the order of:—

$$\frac{£15,000 \times 3}{8,000 \text{ hrs}} = £5.625 \text{ per hour}$$

22. In practice, therefore, one can say, that with a factor of 3 and a life of 8,000 hours, each £1,000 of capital value = 37.5p per hour, and this too can be converted to a price per minute, e.g. each £1,000 of capital value = 0.625p per minute. This formula gives a working approximation only; more refined costing methods are available.

### Costing an Operation

23. When producing costs of an operation, it is wise to state the items which have been included. These are usually:—

Labour  
Labour Oncost  
Machine cost  
Materials and other (e.g. chemicals, fencing materials, plants, etc).

24. If we compare hand weeding with using a portable brushcutter and take labour costs only, we obtain the following costs (assuming D3 weeds, i.e. heavy woody weeds, 2.1 m spacing).

*Hand:* Standard Time Table XV/1 3,350 SM's  
× 0.85p = £28.47 per ha.

*Machine:* Standard Time Table XV/1A 2,030 SM's × 0.85p = £17.25 per ha.

There is therefore an apparent saving of £11.22 per ha by weeding with a portable brushcutter.

Let us now look at this costing bringing in the other relevant factors, labour oncost and machinery:

*Hand:*  
Labour 3,350 SM's × 0.85p = £28.47  
Labour oncost 3,350 SM's ×  
0.38p = 12.73

Total cost of hand weeding = £41.20 per ha

*Machine:*  
Labour 2,030 SM's × 0.85p = £17.25  
Labour oncost 2,030 SM's  
× 0.38p = 7.71  
Machine cost 2,030 SM's  
× 0.50p = 10.15

Total cost of machine weeding = £35.11 per ha

The true saving by using a portable brushcutter is therefore only £6.09 per ha.

25. If the costs of hand and machine weeding were almost the same, say £1 per hectare, one would not attempt to refine the calculation but make the choice on non-financial grounds, e.g. machine chosen if suitable labour for hand weeding is likely to be scarce, or hand methods chosen if it is desirable to avoid redundancy or employ extra workers to relieve unemployment.

26. One can also use this type of costing to estimate the price one could reasonably expect a contractor to put forward if the work is to be done by non-Commission labour. In addition to the items shown in para. 23, we need to add another, "profit margin", and make an intelligent guess as to what the contractor requires.

### Earnings Levels

27. Fear is sometimes expressed over the high earnings of certain workers while employed on



piece-work as it is a prerequisite of piecework schemes based on standard times that there shall be no upper limit to earnings. Let us have a look at different situations to see how they affect a man's earnings:

|                                                                       | <i>Earnings<br/>per week</i> | <i>% of<br/>Day Pay</i> |
|-----------------------------------------------------------------------|------------------------------|-------------------------|
| (i) Day Pay                                                           | £15.68                       | 100                     |
| (ii) Piecework pay (30% incentive)                                    | £20.38                       | 130                     |
| (iii) As (ii) but 125 rater                                           | £25.48                       | 162                     |
| (iv) As (iii) but man takes 10% less rest (his earnings go up by 12%) | £28.54                       | 182                     |

28. Earnings above the levels shown might cause one to consider:—

- (i) That the job specification (para. 2 of the ST booklet is not being met).
- (ii) That the method or tools may have changed.
- (iii) That modifications in para. 7 of the ST booklet may have been applied too liberally.
- (iv) That "drift" may be occurring. See Paper 12

29. It is just as important of course to investigate low earnings. A man unable to make his money on piecework may require further training or management may be at fault in not having met job conditions (para. 1 of the ST booklet).

### Overheads

30. It may be generally assumed that the level of expenditure by supervisory and administrative staff is unaffected by the techniques used in field operations. It is possible that some effects on these overheads will occur as a result of large scale changes in operational techniques, but it will always be difficult to identify such changes.

31. The forester can control some of the labour oncost charges, hence these are shown in costing calculations (paras. 23–25).

### Day Work versus Piecework

32. The main advantage of piecework over day work is that while the overheads remain the same, more units of work are performed and the unit costs therefore come down.

33. Let us compare the operation of weeding by hand carried out on day work with the same operation on piecework:—

#### (i) Day Work

Output, say, 0.2 hectares per day or 1 hectare per week.

|                                |          |
|--------------------------------|----------|
| Day pay                        | = £15.68 |
| Labour oncost at £1.80 per day | = 9.00   |
| Total cost per week            | = £24.68 |

Therefore cost per hectare = £24.68.

#### (ii) Piecework

|                                |          |
|--------------------------------|----------|
| Day pay                        | = £15.68 |
| 30% incentive                  | = 4.70   |
| Labour oncost at £1.80 per day | = 9.00   |
| Total cost per week            | = £29.38 |

Output 30% above day work = 1.3 hectares per week.

Therefore cost per hectare = £22.60

(iii) If the pieceworker rates 125, the situation becomes:—

|                                  |          |
|----------------------------------|----------|
| Day pay                          | = £15.68 |
| 30% incentive                    | = 4.70   |
|                                  | £20.38   |
| + 25% for 125 rater              | = 5.10   |
|                                  | £25.48   |
| + Labour oncost at £1.80 per day | = 9.00   |
| Total cost per week              | = £34.48 |

But now the output is of the order of 1.63 hectares.

Therefore cost per hectare = £21.15

### Trends in Costs of Labour and Machines

34. Between 1939 and 1956, the Swedes found that the cost of labour had risen much more rapidly than that of machines, viz:

|                                                                | 1939 | 1956 |
|----------------------------------------------------------------|------|------|
| Labour                                                         | 100  | 476  |
| Farm Tractors                                                  | 100  | 172  |
| (Farm tractors were rising at only 36% of the rate of labour). |      |      |

We have recently carried out the same exercise over the period 1949 to 1971 in the UK, viz:

|                                                                | 1949 | 1971 |
|----------------------------------------------------------------|------|------|
| Labour                                                         | 100  | 388  |
| Farm Tractors                                                  | 100  | 261  |
| (Farm tractors have been rising at 67% of the rate of labour). |      |      |

35. This gives a pointer therefore to greater mechanisation as time passes.