

SOURCE: Barber & Freeman

Using productivity and unit cost in planning

When it comes to planning a new wool harvesting system or modifying an existing one, there are usually several possible solutions which could be applied. Designing a system does not normally lead to a single unique solution, and one must choose which alternative to adopt.

As described in the Introduction, the need to contain costs and the fact that labour is the most significant cost factor means that a system is required which provides a comparatively low unit cost and high productivity. Making the necessary calculations of productivity and unit cost provides a rational basis for comparing systems and enables a choice to be made on objective information rather than subjective impressions such as appearance or feelings. An objective measure is very important. A new shearing shed with a high standard of finish fitted out with new equipment and providing various amenities for employees may appear impressive when compared to a renovated old shed which still looks much the same as it did 50 years ago. However, the working methods adopted in the renovated shed, and the physical layout and interrelationship of the necessary equipment, may be such that the efficiency is far ahead of that of the new shed. The question is: What are the facts on performance?

Resist the temptation to be sidetracked by the most recent equipment or by impressive appearances. Feelings and subjective impressions are not necessarily reliable guides to effectiveness. Of course, the most desirable result would probably be a new shed with new equipment which does in fact perform efficiently. However, new buildings and new equipment do not necessarily guarantee high performance, while on the other hand; high performance is not necessarily dependant on new buildings or equipment.

Productivity

Productivity of shearers and handlers is relatively simple and easy to calculate. Daily throughput of sheep or fleeces divided by the appropriate number of people involved gives the productivity.

Experience with newer systems provides a guide as to what to expect with various types of shed layout. Shearer productivity does not vary as widely as handler productivity. There is little the woolgrower can do to make substantial changes in shearer productivity, whereas he has considerable opportunity to improve handler productivity.

Ways of achieving better productivity include the following:

- More shearers – this gives more fleece per handler but involves outlay of funds to provide extra pens and shearing gear;
- Faster shearers – this avoids installing more equipment but means that shearers have to be specially selected and this is often difficult;
- Fewer handlers – this can be achieved provided the shearing shed layout, work methods and equipment are such that unproductive tasks are eliminated and human effort minimized, but this may require capital outlay and a key item here is an automatic hydraulic wool press;
- Some combination of these three factors.

Unit cost

It is not as easy to give guideline figures for unit cost as for productivity. This is due to the very wide variation in conditions giving rise to the unit cost value, A more detailed investigation is necessary.

Unit cost is made up of two parts – operating cost and ownership cost. Operating cost is a measure of the cost of operating the shearing system. High cost implies poor performance while low cost is desirable. The fact that labour costs make up 70 to 80 per cent of the operating cost means that labour productivity and operating costs are closely related. High productivity will lead to low unit cost. Similarly excessive labour, or labour used ineffectively, will result in high operating cost.

The other component of unit cost is the ownership cost. This can be a significant proportion of the unit cost and is often overlooked. While the ownership cost for many old sheds is negligible, it is of considerable importance when new systems are planned which require capital expenditure.

Variations in productivity and unit cost – an example

An example is used to demonstrate some of the courses of action which can be taken when planning a wool harvesting system. While this is a hypothetical case, the options suggested and the assumptions made are realistic.

The example is based on an existing system, which has been operating for many years and needs to be improved. Costs and productivities are first determined for the existing system, and numerous options are then investigated. Results are summarized in Table 1.3 on Page 17.

Costs are calculated using the procedures described earlier in this chapter, but details are omitted for clarity.

The existing system is exactly the same as that used earlier to illustrate the calculations of operating cost. The relevant data for that system is reiterated here:

Existing System

Sheep shorn annually	3500
Number of shearers	3
Number of shearing stands	3
Shearer productivity	120 sheep per day
Handlers engaged	1 woolclasser (multiple duties) 2 shedhands
Number of bales	105
Weight of bales	160kg
Shearing rate	\$90.50 per 100
Wage rates : classer	\$371.60 per week
: shedhand	\$273.40 per week
Workers compensations	10% of gross wages
Freight	\$4.00 per bale
Warehousing and testing	\$11.00 per bale

Wool packs	\$5.00 each
Sundries	\$100.00

Daily throughput is 360 sheep and so the duration of shearing is 10 working days, while the average fleece weight is 4.8kg.

<i>Operating cost</i>	<i>Amount in dollars and cents</i>
Shearers' wages	3167.50
Handlers' wages (2 weeks)	
: 1 classer	743.20
: 2 shedhand	<u>1093.60</u>
Total wages	5004.30
Workers compensation	500.45
Wool packs 105 @ \$5	525.00
Freight 105 bales @ \$4	420.00
Warehousing and testing	
105 bales @ \$11	1155.00
Sundries	<u>100.00</u>
Total	7704.73

Converting to cents per head
 Operating costs = 220 cents per head

Ownership cost
 Since the shed is old the ownership cost is negligible.

Unit cost
 Unit cost = 220 + 0 = 220 cents per head

Shearer productivity = 120 sheep per shearer per day
 Handler productivity = 360 / 3 = 120 fleeces per handler day
 Or = 120 x 4.8 = 576kg handler day

Option 1

Build a new 3-stand shed and purchase new shearing gear, press and two round wool tables.

The cost of the new shed and equipment is estimated at \$25,000. The planned life is selected as 20 years and an interest rate of 13% is adopted.

Bale weight rises from 160kg to 195kg due to the new press, and so the number of bales reduces to 86 instead of 105.

The improved layout and equipment allows two handlers to be used instead of three.

Daily throughput is still 360 sheep per day and so shearing lasts for two weeks.

Other data are the same as for the existing system.

<i>Operating cost</i>	<i>Amounts in dollars and cents</i>
Shearers' wages	3,167.50
Handlers' wages (2 weeks)	
1 classer	743.20
1 shedhand	<u>546.80</u>
Total wage:	4457.50
Workers compensation	445.75
Wool packs 86 @ \$5	430.00
Freight 86 bales @ \$4	344.00
Warehousing and testing 86 bales @\$11	946.00
Sundries	<u>100.00</u>
TOTAL	6723.25

Converting to cents per head.
 Operating cost = 192 cents per head

Ownership cost

For an interest rate of 13% and planned life of 20 years the ownership cost factor is 14.2 (from figure 1.5).

$$\text{Ownership cost} = \frac{14.2 \times 25,000}{3500}$$

$$= 101 \text{ cents per head}$$

Unit cost

$$\text{Unit cost} = 192 + 101 = 293 \text{ cents per head}$$

Shearer productivity = 120 sheep per shearer day

Handler productivity = $360 / 2 = 180$ fleeces per handler day

Or = $180 \times 4.8 = 864\text{kg}$ per handler day

Option 2

Build a new 2-stand shed and purchase new shearing gear, press and round wool table.

The cost of the new shed and equipment is estimated at \$18,000. Planned life is 20 years and interest rate 13%.

Bale weight rises to 195kg giving 86 bales instead of the original 105.

The only handler engaged is a wool classer (multiple duties) but the owner works half-time in the shed (unpaid) so there are 1.5 effective handlers.

Daily throughput by two shearers each average 120 sheep per day is 240 sheep. The duration of shearing now extends to 15 days (3 weeks).

Other data are the same as for the existing system.

<i>Operating cost</i>	<i>Amount in dollars and cents</i>
Shearers' wages	3167.50
Handlers' wages: (3 weeks)	
: 1 classer	<u>1114.80</u>
Total wages	4282.30
Workers compensation	428.23
Wool packs 86 @ \$5	430.00
Freight 86 bales @\$4	344.00
Warehouse and testing	
86 bales @\$11	946.00
Sundries	100.00
Total	6530.53

Converting to cents per head

Operating cost = 187 cents per head

Ownership cost

For an interest rate of 13% and planned life of 20 years, the ownership cost factor is again 14.2.

$$\text{Ownership cost} = \frac{14.2 \times 18,000}{3500}$$

$$= 73 \text{ cents per head}$$

Unit cost

$$\text{Unit cost} = 187 + 73 = 260 \text{ cents per head}$$

Shearer productivity = 120 sheep per shearer day

Handler productivity = $240 / 1.5 = 160$ fleeces per handler day

Or = $160 \times 4.8 = 768$ kg per handler day