

Case study – Dealing with overheads

This is the solution to the case study found at the end of:

- Chapter 7 Costing

(a) Overhead apportionment

	Basis	Total	Cutting and turning	Assembly and finishing
Factory rental	Floor area	75 000	52 500	22 500
Factory insurance	Floor area	7 600	5 320	2 280
Cleaning	Floor area	8 900	6 230	2 670
Canteen	No. of employees	11 100	3 552	7 548
Factory rates	Floor area	9 500	6 650	2 850
Electricity	Actual	22 500	15 200	7 300
Machinery maintenance	No. of call-outs	16 464	14 112	2 352
Machinery depreciation	Net book value	30 000	25 000	5 000
Canteen depreciation	No. of employees	3 500	1 120	2 380
Supervisors' wages	Actual	57 936	29 716	28 220
Other factory costs	Floor area	23 000	16 100	6 900
		265 500	175 500	90 000

The total production overhead apportioned to the cutting and turning cost centre is £175

500. The total production overhead apportioned to the assembly and finishing cost centre is £90 000.

(b) (i) Overhead absorption rate on the basis of machine hours

	Cutting and turning	Assembly and finishing
Production overhead	175 500	90 000
Machine hours	22 500	5 000
Overhead absorption rate	7.80	18.00

(b) (ii) Overhead absorption rate on the basis of labour hours

	Cutting and turning	Assembly and finishing
Production overhead	175 500	90 000
Labour hours	12 500	25 000
Overhead absorption rate	14.04	3.60

(c) (i) Machine hours

The details of the number of machine hours spent on each product are given in the case study (be careful not to get machine hours confused with labour hours).

Greenhouse			Garden chair		
Department			Department		
C&T	2 hours ×	15.60	C&T	2.50	19.50
	£7.80			hours ×	
				7.80	

A&F	0.5 hours	9.00
	× £18.00	
Total		24.60

A&F	0.50	9.00
	hours ×	
	£18.00	
Total		28.50

If 5000 greenhouses and 5000 garden chairs are produced and sold the total overhead absorbed will be:

	£	
Greenhouses: 5000 × £24.60	=	123 000
Garden chairs: 5000 × £28.50	=	142 500
		265 500

(c) (ii) Labour hours

The labour hours spent in each department on greenhouses and garden chairs are given in the prime cost details in the case study.

Greenhouse

Garden

chair

Department

Department

C&T	1 hour ×	14.04
	£14.04	
A&F	2 hours ×	7.20
	£3.60	
Total		£21.24

C&T	1.50 hours	21.06
	× £14.04	
A&F	3 hours ×	10.80
	£3.60	
Total		£31.86

If 5000 greenhouses and 5000 garden chairs are produced and sold the total overhead absorbed will be:

	£
Greenhouses: $5000 \times £21.24$	= 106 200
Garden chairs: $5000 \times £31.86$	= 159 300
	265 500

This example demonstrates that, whichever method of overhead absorption is selected, the total amount of overhead absorbed remains the same. The only difference is the way in which the total overhead is allocated to products.

(d) Gross profit

For this part of the case, we use the overhead absorption information calculated in part (c) together with the prime cost information given in the case study.

	Overhead absorption: machine hours £	Overhead absorption: labour hours £
Greenhouse (per unit)		
Selling price	85.00	85.00
Less: prime cost	(32.00)	(32.00)
Less: overhead absorbed	(24.60)	(21.24)
Gross profit	31.76	
Gross profit %	37.4%	

	Overhead	Overhead
	absorption:	absorption:
	machine hours	labour hours
Garden seat (per unit)		
Selling price	103.00	103.00
Less: prime cost	(45.00)	(45.00)
Less: overhead absorbed	(28.50)	(31.86)
Gross profit	29.50	26.14
Gross profit %	28.6%	25.4%

Discussion

It is very important to remember that there is no definitively correct way of absorbing production overheads. From the figures given above, the greenhouses certainly appear to be relatively more profitable than the garden seats. However, the gross profit and gross margin per unit depend to some extent on the basis of overhead absorption used.

Because of this variability, figures based upon the absorption method of accounting (i.e. including production overheads) are not likely to be reliable for decision making involving questions such as:

- How much more profitable is one product than another?
- Which product should we concentrate on producing?
- How much of product X should we produce?

Later in Chapter 7 we will look more closely at techniques that allow us to provide better answers to such questions. For the moment, students should be aware that absorption costing, while it is useful for information and for stock valuation, should be treated with some caution as a tool for decision making.

(e) Recommendation

The cutting and turning department relies more heavily on mechanised processes and, for this reason, it may be more appropriate to use an overhead absorption rate based on machine hours in respect of overheads allocated and apportioned to this cost centre.

The assembly and finishing department, by contrast, is much more heavily reliant upon manual processes, and so the use of an overhead absorption rate based on labour hours may make more sense in this cost centre.

The effect on product cost would be as follows. Overheads absorbed, per unit of product:

Greenhouse			Garden chair		
Department			Department		
CT	2 machine hours ×	15.60	CT	2.50 machine hours ×	19.50
	£7.80			£7.80	
A&F	2 labour hours ×	7.20	A&F	3 labour hours ×	10.80
	£3.60			£3.60	
Total		22.80	Total		30.30

Effect on total production cost per unit and on gross profit per unit:

Greenhouse		Garden seat	
£	£	£	£

Selling price	85.00	103.00
Prime cost	32.00	45.00
Production overhead absorbed	22.80	30.30
Production cost per unit	54.80	75.30
Gross profit	30.20	27.70
Gross profit %	35.5%	26.9%

If we compare these with the equivalent calculations in part (d) we can see that using different overhead absorption rates for the two departments produces a gross profit per unit that lies between those calculated earlier. Because this approach steers a middle course by using machine hours for one cost centre and labour hours for the other, it may be most appropriate in the circumstances.