

Activity Based Costing (ABC)

1. During the last twenty years, KL's manufacturing operation has become increasingly automated, with computer-controlled robots replacing operatives. KL currently manufactures over 100 products of varying levels of design complexity. A single, plant-wide overhead absorption rate (OAR), based on direct labour hours, is used to absorb overhead costs.

In the quarter ended March 2004, KL's manufacturing overhead costs were :

	₹000
Equipment operation expenses	125
Equipment maintenance expenses	25
Wages paid to technicians	85
Wages paid to store men	35
Wages paid to dispatch staff	40
	<u>310</u>

During the quarter, Rapier Management Consultants were engaged to conduct a review of KL's cost accounting systems. Rapier's report includes the following statement :

'In KL's circumstances, absorbing overhead cost in individual products on a labour-hour absorption basis is meaningless. Overhead costs should be attributed to products using an activity-based costs (ABC) system. We have identified the following most significant activities :

1. receiving component consignment from suppliers ;
2. setting up equipment for production runs ;
3. quality inspections;
4. Dispatching goods orders to customers.

Our research has indicated that, in the short term, KL's overhead are 40 per cent fixed and 60 per cent variable. Approximately half the variable overheads vary in relation to direct labour hours worked and half vary in relation to the number of quality inspections. This model applies only to relatively small changes in the level output during a period of two years or less'.

Equipment operation and maintenance expenses are apportionable as follows : components stores (15 per cent), manufacturing (70 per cent) and goods dispatch (15 per cent.)

Technician wages are apportionable as follows : equipment maintenance (30 per cent,) setting up equipment for production runs (40 per cent) and quality inspections (30 per cent).

During the quarter :

- a total of 2,000 direct labour hours were worked (paid at ₹12 per hours) ;
- 980 component consignment were received from suppliers;
- 1,020 production runs were set up;
- 640 quality inspection were carried out; and
- 420 goods orders dispatched to customers.

KL's production during the quarter included components r, s, and t. The following information is available.

	Component r	Component s	Component t
Direct labour hours worked	25	480	50
Direct materials costs	₹1,200	₹2,900	₹1,800
Component consignment received	42	24	28
Production runs	16	18	12
Quality inspections	10	8	18

Goods orders dispatched	22	85	46
Quantity produced	560	12,800	2,400

In April 2004 a potential customer asked KL to quote for the supply a new component (z) to a given specification. 1,000 units of z are to be supplied each quarter for a two-year period. They will be paid for in equal installments on the last day of each quarter. The job will involve an initial design cost of `40,000 and production will involve 80 direct labour hours, `2,000 materials, 20 component consignments, 15 production runs, 30 quality inspections and 4 goods dispatches per quarter.

KL's sales director comments:

'Now we have a modern ABC system, we can quote selling prices with confidence. The quarterly charges we quote should be the forecast ABC production cost of the units plus the design cost of the z depreciated on a straight-line basis over the two years of the job- to which we should add a 25 per cent mark-up for profit. We can base our forecast on costs experience in the quarter ended March 2004.'

Requirements

- Calculate the unit cost of components r, s and t, using KL's existing cost accounting system (single-factory, labour-hour).
- Explain how an ABC system would be developed using the information given. Calculate the unit cost of components r, s and t, using this ABC system.
- Calculate the charge per quarter that should be quoted for supply of component z in a manner consistent with the sales director's comments. Advise KL's management on the merits of this selling price, having regard to factors you consider relevant.

Note : KL's cost of capital is 3 per cent per quarter. 7.0197 (May 2011 New)

3. ABCD plc manufactures four products, A, B, C, and D using the same plant and process. The following information relates to a production period :

Product	Volume Units	Material Cost per unit	Direct labour per unit	Machine time per unit	Labour cost per unit
A	500	5	0.50	0.25	3
B	5,000	3	0.50	0.25	3
C	600	16	2.00	1.00	12
D	7,000	17	1.50	1.50	9

Total production overhead recorded by the cost accounting system is analysed under the following heading

- Factory overhead applicable to machine-oriented activity is `37,424
- Set-up are `4,355.
- The cost of ordering materials is `1,920.
- Handling materials : `7,580.
- Administration for spare parts : `8,600

These overhead costs are absorbed by products on a machine hours rate of `4.80 per hour, giving an overhead cost per product of :

A	`1.20
B	`1.20
	8.2

C ₹4.80
D ₹7.20

However, investigation into the production overhead activities for the period reveals the following totals:

Product	Number of Set-ups	Number of material orders	Number of times materials was handled	Number of spare parts
A	1	1	2	2
B	6	4	10	5
C	2	1	3	1
D	8	4	12	4

Requirements

Compute an overhead cost per product using activity-based costing, tracing overheads to production units by means of cost drivers.

5. F plc supplies pharmaceutical drugs to drug stores. Although the company makes a satisfactory return, the directors are concerned that some orders are profitable and others are not. The management has decided to investigate a new budgeting system using activity based costing principles to ensure that all orders the accept are making a profit.

Each customer order is charged as follows. Customers are charged the list price of the drugs ordered plus a charge for selling and distribution costs (overheads). A profit margin is also added, but that does not form part of this analysis.

Currently F plc uses a simple absorption rate to absorb these overheads. The rate is calculated based on the budgeted annual selling and distribution costs and the budgeted annual total list price of the drugs ordered.

An analysis of customers has revealed that many customers place frequent small orders with each order requesting a variety of drugs. The management of F plc has examined more carefully the nature of its selling and distribution costs, and the following data have been prepared for the budget for next year.

Total list price of drugs supplied	₹ 8 m	
Number of customer orders	8,000	
Selling and distribution costs	₹ '000	cost driver
Invoice processing	280	see note 2
Packing	220	size of package – see note 3
Delivery	180	Number of deliveries – see Note 4
Other overheads	200	Number of orders
Total overheads	880	

Notes:

- Each order will be shipped in one package and will result in one delivery to the customer and one invoice (an order never results in more than one delivery).
- each invoice has a different line for each drug ordered. There are 28,000 invoice lines each year. It is estimated that 25% of invoice processing costs are related to the number of invoices, and 75% are related to the number of invoice lines.
- packing costs are ₹ 32 for a large package, and ₹ 25 for a small package.

4. The delivery vehicles are always filled to capacity for each journey. The delivery vehicles can carry either 6 large packages or 12 small packages (or appropriate combinations of large and small packages). It is estimated that there will be 1,000 delivery journeys each year, and the total delivery mileage that is specific to particular customers is estimated at 350,000 miles each year. ` 40,000 of delivery costs are related to loading the delivery vehicles, and the remainder of these costs are related to specific delivery distance to customers.

The management has asked for two typical orders to be coated using next year's budget data, using the current method, and the proposed activity – based costing approach. Details of two typical orders are shown below:

	Order A	Order B
Lines on invoice	2	8
Package size	Small	Large
Specific delivery distance	8 miles	40 miles
List price of drugs supplied	`1,200	`900 .

Required

(a) Calculate the charge for selling and distribution overheads for order A and order B using:

- (i) The current system; and
- (ii) The activity – based costing approach.

7. The following are Product Nova Shaft's data for next year budget:

Activity	Cost Driver	Cost Driver volume/year	Cost Pool
Purchasing	Purchase orders	1,500	`75,000
Setting	Batches produced	2,800	`1,12,000
Materials handling	Materials movements	8,000	`96,000
Inspection	Batches produced	2,800	`70,000
Machining costs	Machine hours	"50,000'	`1,50,000

Purchase orders	25
Output	15,000 units
Production batch size	100 units
Materials movements per batch	6
Machine hours per unit	0.1

Required:

- (i) Calculate the budgeted overhead costs using activity based costing principles.
- (ii) Calculate the budgeted overhead costs using absorption costing (absorb overhead using machine hours).

How can the company reduce the ABC for Product Nova Shaft? (June 2009 Old)

8. X Ltd. is engaged in the production of four products : A, B , C and D. The price charged for the four products are ` 180, ` 175, ` 130 and ` 180 respectively. Market research has indicated that if X Ltd. can reduce the selling prices of its products by ` 5, it will be successful in getting bulk orders and gain a significant share of market of those products. The company's profit markup is 25% on cost of the product. The relevant information of products are as under:

Products	A	B	C	D
----------	---	---	---	---

Outputs in units	600	500	400	600
Cost per units:				
Direct material (in `)	40	50	30	60
Direct labour (in `)	28	21	14	21
Machine hours (per unit)	4	3	2	3

The four products are usually produced in production runs of 20 units and sold in batches of 10 units. The production overhead is currently absorbed by using a machine hours rate, and the total of the production overheads for the period has been analysed as follows:

	(`)
Machine department costs	52,130
Setup costs	26,250
Stores receiving	18,000
Inspection/Quality control	10,500
Material handling and dispatch	23,100

The cost drivers to be used for the overhead costs are as follows:

Cost	Cost Drivers
Setup costs	Number of production runs
Stores receiving	Requisitions raised
Inspection/Quality control	Number of production runs
Material handling and dispatch	Order executed

The number of requisitions raised in the stores was 100 for each product and the number of order executed was 210, each order being for a batch of 10 units of a product.

You are required

- To compute the target cost for each product.
- To compute the total cost of each product using activity based costing.
- Compare target cost and activity based cost of each product and comment whether the price reduction is profitable or not.