ACTIVITY BASED COSTING
4THSEMESTER
CMA 2
TEACHER: Prof. Sunita Saha(SS)

ACTIVITY BASED COSTING

CMA 2

4TH SEMESTER (hons)

MEANING AND DEFINATION OF ABC[cu bcom 2013, 2014, 2016, 2018]

Activity based costing is a methodology that identifies activities in an organisation and assigns the cost of each activity with resources to all products and services according to the actual consumption. It can also be said as a process of attributing indirect costs to cost units on the basis of benefits received from indirect activities (ordering, setting up, assuring quality). ABC is an effective management approach for distributing and controlling the overhead costs

For example: X ltd is manufacturing two products X and Y. Product X requires one inspection before dispatch but Product Y requires two inspections before dispatch. Under activity based costing inspection costs per unit of Y will be twice that of product X as it is consuming double the time of the inspection department.

Circumstances in which ABC would be needed: [2013, 2014]

1. More than one product is manufactured
2. Overhead forms a high proportion of total costs
3. Products are not similar. Different products are using different activities and consume different resources
4. Overhead are not depending upon the output but its complexities and diversity of operations

For example: PCB ltd. Is manufacturing circuit board for computer monitor, TV and aeroplane. Time for manufacturing each type of circuit board is the same. However the circuit board for the aeroplane is tested for a longer time by highly paid technicians because it must be 100% error free. No testing is necessary for the computer monitor or TV Circuit board. In this case, overhead is depending not on output but on complexity. Here ABC is only way out for product costing.

ADVANTAGES OF ABC [2014. 2016.2018]

1. ABC provides more accurate and informative product costs which is in turn helps the management to take decisions about pricing, products lines and market segments.
2. Management of overhead cost is achieved by coupling the costs to the activities that drive or cause them
3. ABC can help in distinguishing between profitable and unprofitable products and customers
4. ABC helps managers to identify and control the cost of unused capacity

5. ABC is able to acknowledge the complexity with multiple cost drivers some of which are not volume based.
6. In a service environment the allocation of costs to service delivery may not be easy. The use of different cost driver may help in allocation of costs in a better manner
7. ABC provides more reliable data relating to activity driving costs which helps managers to improve product and process value.

Different stages in ABC

1. Identification of major activities: eg: machine related activities, labour related activities, material ordering, material receiving, material handling, machine set up, production scheduling etc
2. Creation of cost pool or cost centre: cost pool is like a cost centre or activity centre around which costs are accumulated. For example the total of machine set up might constitute are cost pool for all set up related costs.
3. Allocation and apportionment of overhead costs to cost pool
4. Determination of cost driver:
   Cost driver is a factor which causes a change in the t of an activity. Examples of cost driver are number of machine set up, number of purchase order, number of customer order placed etc.
   Activity cost driver rate= total cost of activity/ activity cost driver
5. Calculation of activity cost driver absorption rate:
   If the total costs of purchasing materials were 1,00,000 and there were 1000 purchase orders the cost driver during the period

The rate per purchase order is 1,00,000/1000= Rs 100

If the particular product needs 2 purchase order the charge to the product will be

100 *2= 200

If 10 units of the product are produces CPU will be 200/10 units = Rs20

<u>Difference between traditional costing and activity based costing</u>

Traditional based costing	Activity based costing
Volume based	Activity based
Low overhead organisation	High overhead organisation
Various departments (cost centers)	Major activities (cost pools)
Firstly overhead are allocated to different departments and thereafter to various products	Firsttly overheads are assigned to major activities and thereafter to various products
Limited range of products	Diverse range of products
Labour intensive	Capital intensive
Machine hour rate, labour rate	Cost driver
Low cost efficiency	High cost efficiency

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Meaning of Cost Driver

A cost driver is any factor that has the effect of changing the level of total costs

ABC attempts to relate overhead costs to the activities that cause or drive them.

Purchase costs	No of purchase
Inspection costs	No of inspection
Dispatch cost	No of deliveries
Set up costs	No of set ups
Production scheduling costs	No of production run
Personnel department costs	No of workers/ employees
Machine activity	Machine hour
Material handling costs	No of production runs
Stores administration	No of different components
Security costs	Square footage
Quality testing	Hour of test time
Quality control	Inspection plans
Inspection	Inspection per item
Customer order processing	Order value

Meaning of cost pool

A company producing T shirt has cost of materials such as buttons, threads, labour cost for stitching the T shirt and other costs are accumulated into meaning ful groups. These groups are called cost pool.

PROBLEM SUMS WITH SOLUTIONS

A manufacturing company produces two products ie X and Y. The particulars relating to two products are given below [CUBCOM (H) 2012]

	Product X	PRODUCT Y
Direct material costper unit	10	12
Direct wages per unit	10	8
Units produced	200	200
Direct labour per unit	12	12
Material moves per product line	10	14

Budget material handling cost Rs 24,000
Determine cost per unit of the products using volume based allocation method (Direct labour hour rate)
Determine cost per unit of the products using ABC method
Solutions:

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1. Under traditional costing method, the amount of factory overhead ie material handling cost of Rs 24,000 is to be absorbed on the basis of direct labour hour method.
   Here, Total direct labour hours for product X and Y=
   No of Units produced* Direct labour hour per unit
   =(200*12+200*12) [x and y both units are 200]
   = 4800 labour hours
   So Total factory overhead/total labour hours
   = 24,000/4800= Rs 5

Calculation of total cost per unit under traditional costing method for the products X and Y for the period ended on---

Particulars	**X**	**Y**
Direct material cost per unit	10	12
Direct wages per unit	10	8
Prime costs	20	20
Factory overhead : Material handling cost: Product X: 12 hrs * Rs 5	60	
Product Y: 12 labour hours * Rs 5		60
Total cost	**80**	**80**

ii) **under ABC , the factory overhead is to be absorbed on the basis of number of material moves in product lines.**
Here total no of material moves
= 10+14=24
So factory over head per material move
= total factory overhead/total no of material moves
= 24,000/24
Rs 1000
Thus total factory overhead absorbed for product X
(1000*10)= Rs 10,000
Product Y = (1,000*14)= 14,000

Statement showing computation of total cost per unit under ABC for the product X and Y for the period ended on

Particulars	**X**	**Y**
DM COST	10	12
DIRECT WAGES	10	8
PRIME COSTS	20	20
Factory overhead: Material Handling costs Product X: (10,000/200)	50	
Product Y: (14,000/200)		70
TOTAL COST	**70**	**90**

Q 2. A company manufacturing two products

Product	**Annual output**	**Total machine hours**	**Total number of purchase**	**Total number of set ups**

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			order	
A	**5000**	**20,000**	**160**	**20**
B	**60,000**	**120000**	**384**	**44**
	65,000	**1,40,000**	**544**	**64**

The annual overhead are as under:
Volume related activity costs 5,50,000
Set up related costs 8,20,000
Purchase related costs 6,18,000
You are required to calculate the overhead cost per unit of each product A and B based on:
Traditional method
ABC

A) Calculation of over head cost per unit under Traditional Based Costing

Total O/H: 5,50,000+8,20,000+6,18,000=19,88,000

Machine hour rate is used for charging overhead A and B

MHR= 19,88,000/1,40,000= **Rs 14.20 per mac hr**

Statement showing o/h costs

	A	**B**
Machine hr	20,000	120000
Mhrate	14.20	14.20
Total O/H	2,84,000	17,04,000
OUTPUT	5000	60,000
OVERHEAD PER UNIT	56.80	28.40

B. **Calculation of overhead cost per unit under ABC Method**

Under ABC method separate O/H rate is calculated:

1. MHR: VOLUME RELATED O/H/MACHINE HOUR= 5,50,000/1,40,000= Rs3.93
2. Cost per set up: set up related costs/No of set ups= 8,20,000/64= 12,812.50
3. Cost per purchase order: Purchase related cost/ no of order= 618,000/544= 1,136.03

Statement showing overhead cost per unit

	A	B
Output	**5000**	**60,000**
Volume related activities	78,600	471600
Set up related cost	256250	563750
Purchase related costs	181765	436236
TOTAL COST	**516615**	**1471586**
Overhead per unit	**Rs 103.32**	**24.53**

1. Volume related activity= 20,000*3.93=78,600 + 12000*3.93= 4,71,60
2. Set up related costs:= 20*12812.50=2,56,250+44*12,812.50=5,63,750
3. Purchase related cost= 160*1136.03= Rs1,81,765 , B= 384*1136.03=4,36,236

Q 3. **S co. Has furnished the following particulars in respect of two products A & B. A is a newly introduced product with some technical problems requiring substantial engineering changes. On the other hand, Product B is a mature and established productand thus not require much attention regarding engineering changes**

	A	B
Output units	2,000	2,000
Engineering changes notices per product line	30	18
Unit cost per engineering change notice	1250	1250
Machine hours required per unit	4	8

You are required to:

1. **Ascertain overhead cost per unit of each product by using traditional machine hour rate method**
2. **Ascertain overhead cost per unit of each products using ABC**
3. **Comment on the results**

Solution:

Statement showing computation of cost per unit under traditional machine hour rate method

PARTICULARS	A	B
Total machine required	(2,000*4) 8,000	(2,000*8) 16,000
Machine hour rate	2.50	2.50
Total overhead cost	20,000 (8,000*2.50)	40,000(16,000*2.50)
Unit produced	2,000	2,000
Cost per unit	10	20

Machine hr rate: Budgeted engineering change costs/ budgeted machine hour

= (30+18)* 1250/8,000+16,000

= 60,000/24,000= Rs2.50

Under this conventional system, it is noticed that product A has much lower cost per unit even though it consumes more than one and half times as much engineering cost than Product B. Thus this system fails to stress the high level of engineering changes for the product B. Product B wrongly absorbs more engineering costs because it consumes more machine hours. This situation can be expressed as a cross subsidy in which one product wrongly absorbs the cost that are belonging to the another product. Product A seems to be cheaper because under the conventional costing overhead costs are averaged. But here the appropriate cost driver should be engineering changes notices and not the machine hours.

b). Under ABC the engineering changes notice costs are allocated to the products on the basis of engineering changes notices rather than machine hour

Statement showing computation of costs per unit ABC system

Particulars	A	B
Engineering changes notices per product line	30	18

(a)		
Cost per engineering changes notice(b)	**1250**	**1250**
(c)Engineering changes notice costs applied per product line (a*b)	**37,500**	**22,500**
(d)Unit produced	**2000**	**2000**
Engineering changes notice costs per unit c/d	**18.75**	**11.25**

The fact that product A consumes more than one and half times of engineering activity and it has been reflected through per unit engineering change notice cost by using ABC

Q4. ABC Co. Produces three products A,B,C their per unit cost data are given below:

Particulars	A	B	C	Total
Unit produced	10,000	20,000	30,000	
Direct material cost per unit	50	40	30	
Direct labour cost per unit	30	40	50	
Labour hours per unit	3	4	5	
Machine hours per unit	4	4	7	
No of purchase requisition	1200	1800	2000	5000
No of machine set ups	240	260	300	800

Production overhead Rs26,00,000 split into two departments:
Department 1: 11,00,000, Department 2: 15,00,000
Department 1 is labour intensive and Department 2 is machine intensive
Total labour hours in Department 1 = 1,83,333
Total machine hours in department 2 = 5,00,000
Production overheads split into two Rs26,00,000
Receiving and inspection: 14,00,000
Production scheduling and machine set up: 12,00,000
You are required to prepare product cost statement under:

a. **Traditional method and Activity method**
b. **Compare the two results**

Solution:

a. Traditional method

Statement of cost

Particulars	**A**	**B**	**C**
Direct material cost per unit	**50**	**40**	**30**
Direct labour cost per unit	**30**	**40**	**50**
Prime cost	**80**	**80**	**80**
Overhead department 1 (labour hr * rate)	**18**	**24**	**30**
Department 2 (machine hr * rate)	**12**	**12**	**21**
Total cost per unit	**110**	**116**	**131**

Overhead absorption rate:
Department 1: 11,00,000/ 1,83,333= Rs 6 /labour hr
Department 2: 15,00,000/ 5,00,000= Rs 3 machine hour

b. Activity based costing

Using ABC method, the overhead costs are absorbed according to the cost drivers rate:
Receiving and inspection= 14,00,000/ 5,000= Rs 280 per requisition
Scheduling and set up= 12,00,000/ 800= Rs 1500 per set up

Particulars	**A**	**B**	**C**

Direct material cost per unit	**50**	**40**	**30**
Direct labour cost per unit	**30**	**40**	**50**
Prime cost	**80**	**80**	**80**
Overhead Receiving and inspection: A: 280*1200/10,000 B: 280*1800/20,000 C:280*2000/10,000	**32.60**	**25.20**	**18.67**
Production scheduling A: 1500*240/10,000 B: 1500*260/10000 C: 1500*300/30,000	**36.00**	**19.50**	**15.00**
Total cost	**149.60**	**124.70**	**113.67**

Comment

The two methods TBC & ABC give different results. Under TBC product show higher cost as compared to ABC. On the other hand if we adopt ABC method the product A shows higher cost as compared to traditional method. If ABC method is considered as most appropriate for overhead absorption then it appears that product C is overpriced in TBC . If force the sales of such product decline as the competitors can sole the product at a cheaper rate. Similarly the sales of product A would be high because it would be under price in traditional method resulting loss per unit on such product.

Q5. A company manufactures conference tables and follows ABC to absorbs overhead. The comoany has chosen the following cost pools and cost drivers for the production overhead:

Cost pool	Production overhead	Cost driver	Cost driver quantity
Machine set up	**4,00,000**	**No of set ups**	**5,000set up**
Production orders	**1,00,000**	**No of orders**	**200 orders**
Machine maintainence	**1,60,000**	**Machine hours**	**4,000hours**
Parts repairs	**2,40,000**	**Number of parts**	**8,000 parts**

You are required to :

1. **Compute the overhead rate for each cost driver**
2. **The company receives a special order of 20 conference tables that requires the following number of support activities:**
3. **Number of machine set ups: 60, number of production order: 25, number of machine hours:400, number of parts to be repaired-50**
4. **Howmuch production overhead would be charged to this order?**
5. **Compute the factory cost for this order from the following table:**

Direct material Cost per unit-4000, direct wages per unit: 2500, Direct expense per unit-Rs1,000

Solutions

1. **Cost driver rate**

Main activity Cost pool	**Production overhead**	**Cost driver quantity**	**Cost driver rate**
Machine set up	4,00,000	5000 set up	Rs 80 per set up
Production orders	1,00,000	200 orders	Rs500 per order
Machine maintenance	1,60,000	4,000 hours	Rs 40 per hour
Parts repair	2,40,000	8,000 parts	Rs 30 per part

2. **Production overhead to be charged to special order**

Machine set up(60*80)	4800
Production orders(25*500)	12,500
Machine maintenance (400*40)	16,000

Parts repair(50*30)	1500
Production overhead to be charged	**34800**

3. Factory cost for the order (20 conference tables)

Direct material(20*4000)	80,000
Direct wages (20*2500)	50,000
Direct expenses (20*1000)	20,000
Prime cost	**1,50,000**
Add production overhead	34800
Factory cost	**1,84,800**