Product Cost using the Activity-Based Cost Method

Activity-Based Cost Analysis…

We've seen how the Job-Cost method of allocating MOH allows us to get a good picture of product costs.

We get a more accurate estimate of product cost by breaking production into individual "activities".

Then allocating overhead based on how products flow through each activity.

While this is more challenging to do, it leads to a more accurate value for product cost.

Activity-Base Cost ("ABC") analysis greatly refines our approach to product cost.

Activity-Based Cost Analysis - “ABC"

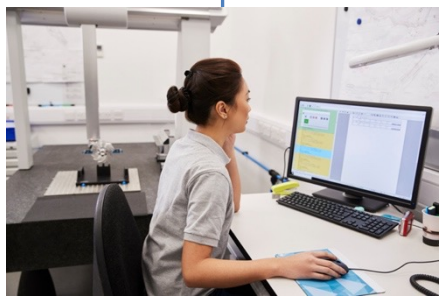
Just what is an “Activity”?

Manufacturing Activities
(a few of them at least)

Warehouse Department

Material Handling

Assembly Supervision



Inspection & Testing Technicians

Packaging Department

ABC defines the overhead costs of all these activities.

And these costs are then allocated to each Job.

Define the Activities

Step 1: Management first defines all the activities it wants to consider. Then they estimate the total MOH (indirect) costs associated with *each* activity – called an Activity Cost Pool.

Activity	**MOH Costs Related to Activity**	**Total Activity Cost Pool**
Warehouse Department	Indirect Labor used to collect parts from shelves	$150,000
Materials Handling	Forklifts, fuel, Operator's Wages	$100,000
Assembly Supervision	Production Engineers Labor	$450,000
Inspection & Testing	Testing and inspection equipment, Labor	$200,000
Packaging Department	Packaging Equipment, Boxes & Staff	$100,000
	Total Plantwide MOH	**$1,000,000**

Determine Each Activity's Basis

Step 2: Management selects the basis for each activity, based on the primary "cost driver" for that activity. Then they estimate the total amount that will be used during the year.

Activity	Activity Allocation Base (The Cost Driver)	Total for the Year
Warehouse Department	# of Material Requisition Orders	15,000 orders
Materials Handling	# of Parts Moved	200,000 parts
Assembly Supervision	Direct Labor Hours	62,500 DL Hours
Inspection & Testing	# of Inspections & Tests Completed	25,000 I & T
Packaging Department	Cubic Feet of Product Packaging	500,000 ft^3

Determine the MOH Rate for the Activity

Step 3: Management calculates its Activity-Based Cost allocation from Steps 1 & 2.

$$ABC\ Allocation\ Rate = \frac{Total\ Estimated\ Activity\ Cost\ Pool\ per\ Year}{Total\ Estimated\ Activity\ Allocation\ Base\ Per\ Year}$$

Activity	Total Activity Cost Pool	Total for the Year	ABC Allocation Rate
Warehouse Department	$150,000	15,000 orders	$10 per order
Materials Handling	$100,000	200,000 parts	$0.50 per part
Assembly Supervision	$450,000	62,500 DL Hours	$7.20 per DL hour
Inspection & Testing	$200,000	25,000 I & T	$8 per inspection & test
Packaging Department	$100,000	500,000 ft^3	$0.20 per ft^3

Apply the Activity MOH Rate to the Job

Step 4: The MOH Rate for each activity is then applied to the jobs using that activity.

$$MOH\ Allocation\ to\ Job\ = (ABC\ Allocation\ Rate)\ x\ (Actual\ Amount\ of\ Activity\ used\ by\ Job)$$

Job 101: XT5 Commuter e-Bike; Quantity = 1			
Activity	**ABC Allocation Rate**	**Activity Use by Job**	**MOH Allocation**
Warehouse Department	$10 per order	3 orders	$30
Materials Handling	$0.50 per part	20 parts	$10
Assembly Supervision	$7.20 per DL hour	10 DL Hours	$72
Inspection & Testing	$8 per inspection & test	3 I&T's	$24
Packaging Department	$0.20 per ft^3	50 ft^3	$10
		Total	**$146**

Plantwide Allocation System…

Job 101: XT5 Commuter e-Bike

Total Plantwide MOH
$1 Million

$16 per DL Hour

Job 102: MT20 Mountain e-Bike

Job 101: XT5 Commuter e-Bike; Qty = 1
10 DL Hours
MOH = $160

Job 102: MT20 Mountain e-Bike; Qty = 1
10 DL Hours
MOH = $160

Activity-Based Cost Allocation System…

Job 101: XT5 Commuter e-Bike

Job 102: MT20 Mountain e-Bike

Total Plantwide MOH
$1 Million

Warehouse Department $150,000	Materials Handling $200,000	Assembly Supervision $450,000	Inspection & Testing $200,000	Packaging Department $100,000
$10 per order	$0.50 per part	$7.20 per DL hour	$8 per I&T	$20 per ft^3

Job 101: XT5 Commuter e-Bike; Qty = 1

$30 + $10 + $72 + $24 + $10

MOH = $146

Job 102: MT20 Mountain e-Bike; Qty = 1

$40 + $13 +$72 +$30 + $15

MOH = $170

The More Accurate Job Cost Record

ABC allows for a more accurate allocation of MOH…

The Job Cost Record is updated with allocation of the Manufacturing Overhead.

$7300 is the ABC value for MOH… ($146/unit x 50 units)

…which results in a more accurate estimate of product cost!

Job Cost Record

Job Number: 403

Customer: For Stock

Job Description: 50 units of Model XT5 Commuter e-Bike

Date Started: March 2 **Date Completed:** _____

Manufacturing Cost Information	Cost Summary
Direct Materials Req. #528: $63,250 Req. #529: $ 4,000 Req. #530: $ 1,500	$68,750
Direct Labor Employee 177: 21 DL Hours ($630) Employee 192: 13 DL Hours ($325) Employee 233: 12 DL Hours ($360) … (a total of 500 hours)	$15,750
Manufacturing Overhead	$7,300
Total Job Cost	$91,800
Number of Units	50
Cost per Unit	$1836

Product Cost Analysis – Main Takeaways

- A product's cost for a manufacturing company is made up of three components:
  - Cost of Direct Materials
  - Cost of Direct Labor
  - Allocated Manufacturing Overhead (MOH) Cost

- Direct Materials and Direct Labor are relatively straightforward to determine.

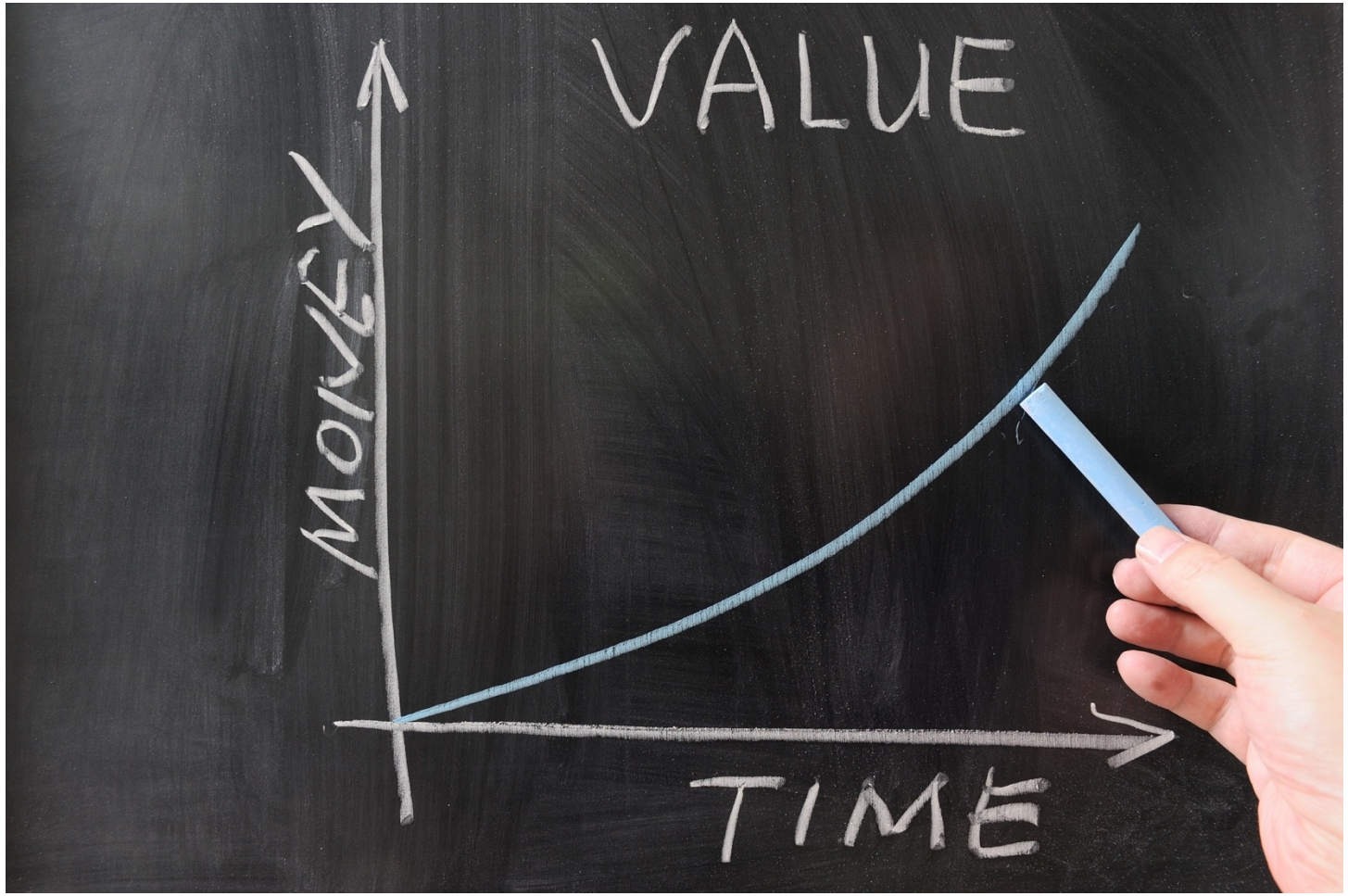
- Manufacturing Overhead requires more work, but is often based on:
  - simple plantwide allocation
  - activity-based allocation

- Activity-Based Cost Allocation is the most accurate way of calculating MOH for each job, but also requires the most knowledge of the production process.

An accurate estimate for product cost enables management to make sound decisions about cost reduction opportunities, pricing and overall profitability – all critical elements of a successful business.

Next Time…Something Different!

Time Value of Money - TVM



Credits & References

Slide 1: Activity based costing illustration with a man writing on paperwork with money, calculator and folder document on top of table by teguhjatipras, Adobe Stock (140854016.jpeg).

Slide 2: High angle portrait of factory personnel wearing hardhat walking across production workshop by Seventyfour, by Adobe Stock (218713397.jpeg).

Slide 3: Young male worker in uniform is in the warehouse with notepad and pallet truck by standret, Adobe Stock (302850814.jpeg). Storehouse employee in uniform working on forklift in modern automatic warehouse by Алина Бузунова, Adobe Stock (397707156.jpeg). Supervisor and workers talking in steel factory by KOTO, Adobe Stock (455979547.jpeg). Engineer Uses CMM Coordinate Measuring Machine In Factory by Monkey Business, Adobe Stock (200537230.jpeg). Preparation of goods for dispatch by WavebreakmediaMicro, Adobe Stock (78824524.jpeg).

Slide 8, 9: Black electric bike isolated with clipping path by eshma, Adobe Stock (222853589.jpeg). Fantasy ebike pedelec with battery powered motor by stockphoto-graf, Adobe Stock (290150747.jpeg).

Slide 12: Time value of money by raywoo, Adobe Stock (42064610.jpeg).