



Frankfurt School

Managerial Accounting

COURSE OVERVIEW

Session	Topic	Hilton / Platt
1	The Changing Role of Managerial Accounting	Chapter 1
	Basic Cost Management Concepts	Chapter 2
2	Product / Job Costing	Chapter 3
	Transfer Pricing	Chapter 13
3	Cost-Volume-Profit Analysis	Chapter 7
	Inventory Costing (Absorption vs. Variable Costing)	Chapter 8
4	Decision-Making: Relevant Costs and Benefits	Chapter 14
	Responsibility Center, Performance Measures & Controls	(Chapter 12/13)
5	Activity-Based Costing	Chapter 5
6	Activity Analysis, Cost Behavior, and Cost Estimation	Chapter 6
	Budgets – Financial Planning and Analysis	Chapter 9
7	Standard Costing and Direct Cost Variances	Chapter 10
8	Signaling Effects of Incentives	
	Sustainability and Controlling	

CHAPTER 5

ACTIVITY-BASED COSTING

ACTIVITY-BASED COSTING

OUTLINE

TRADITIONAL, VOLUME-BASED COSTING SYSTEMS

ACTIVITY-BASED COSTING (ABC)

THE TWO-STAGE PROCESS

EXAMPLE: TRADITIONAL COSTING & ABC

ACTIVITY-BASED COSTING: KEY ISSUES

(ACTIVITY-BASED MANAGEMENT)

CUSTOMER PROFITABILITY

ACTIVITY-BASED COSTING

CASE

- Patio Grill Company
- 3 grills: standard (STD), deluxe (DEL), ultimate (ULT)
- Uses job-order product-costing with POHR
- Pricing policy: 120% of costs
- Fierce competition forces Patio grill to sell
 - STD at a \$10 discount (cp. to target price)
 - DEL at a \$20 discount (cp. to target price)
- ULT can be sold at a price greater than expected (\$40 above target price)

ACTIVITY-BASED COSTING

CASE

- What could be reasons that two products are sold at a discount (i.e., costs are too high) while one is sold at a premium (relative to target price)?
- For instance:

Cost control

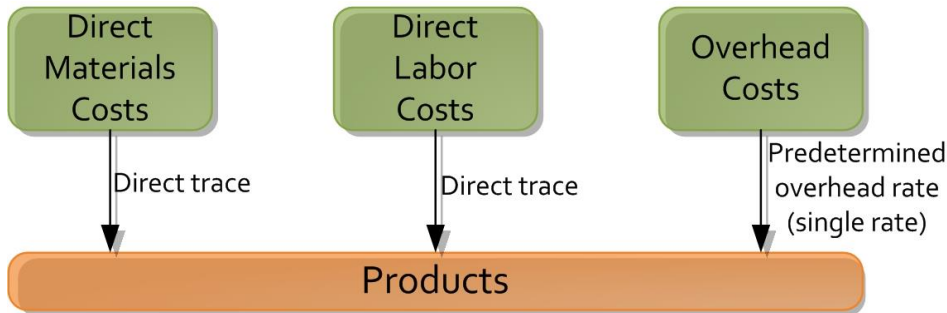
Accuracy of cost allocation

ACTIVITY-BASED COSTING

TRADITIONAL COSTING SYSTEMS

PROBLEMS WITH TRADITIONAL PRODUCT COSTING

- All manufacturing overhead is applied based on a single, volume-based cost driver (typically direct labor or machine hours)
- Some resources will not be consumed in proportion to the activity of the cost driver (e.g., cleaning, insurance, straight-line factory depreciation unrelated to labor/machine hours)



ACTIVITY-BASED COSTING

TRADITIONAL COSTING SYSTEMS

BAD DECISIONS RESULT FROM HAVING INCOMPLETE COST INFORMATION

- Price products poorly
- Make inefficient quantity decisions
- Reward (punish) employees for poor (good) performance
- Do (not) spend time refining production process of products manufactured efficiently (inefficiently)

ACTIVITY-BASED COSTING

COSTING SYSTEMS: TRADITIONAL VS. ABC

CHALLENGE: INCREASE ACCURACY IN THE ALLOCATION OF OVERHEAD!

- Increase number of indirect-cost pools (instead of lumping all overhead costs together)
- Use different allocation basis (cost driver) for each cost pool

ACTIVITY-BASED COSTING (ABC)



ACTIVITY-BASED COSTING

ABC: OVERVIEW

ACTIVITY-BASED COSTING ...

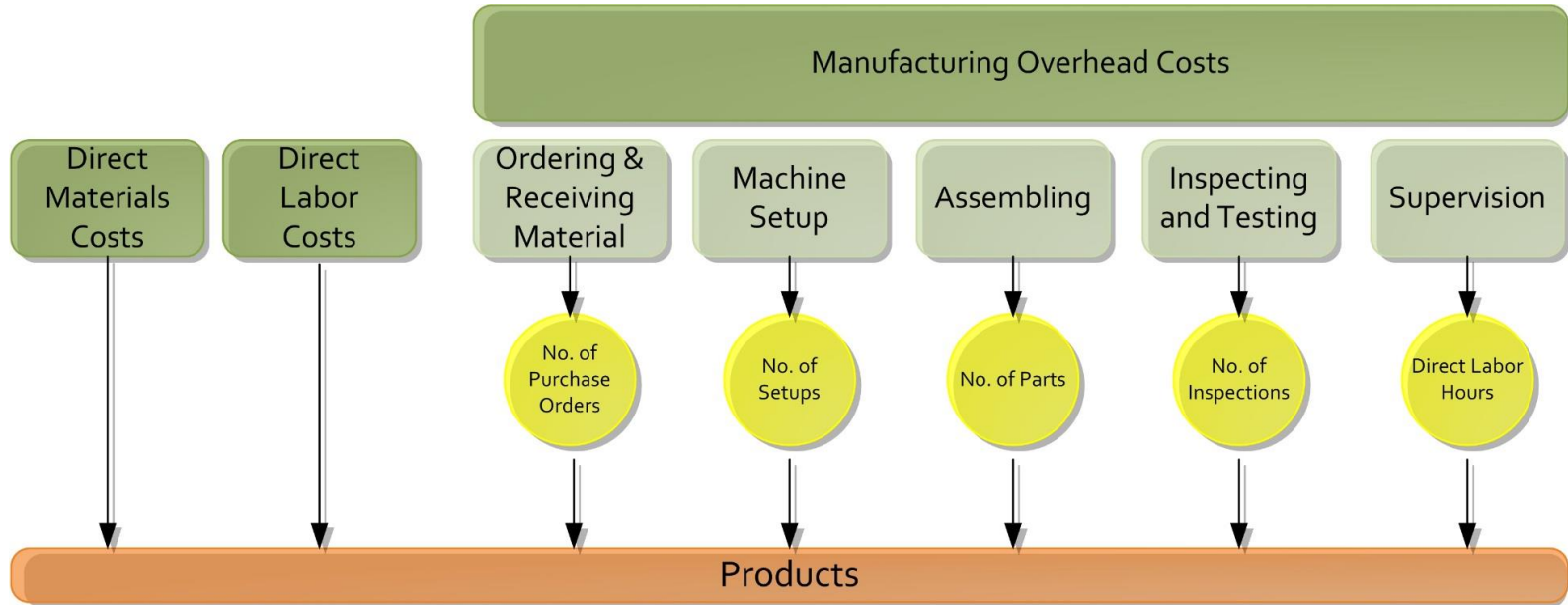
- ... is a method of assigning overhead costs based on the amount of overhead each product consumes or causes.

TWO-STAGE PROCEDURE IN ASSIGNING COSTS

1. Identify activity cost pools and assign OH: cost pools associated with significant activities that cause rather homogenous costs
2. Identify cost drivers: choose different cost-allocation base for each cost pool and allocate cost to products

ACTIVITY-BASED COSTING

ABC: TWO-STAGE PROCESS



ACTIVITY-BASED COSTING

STAGE 1: IDENTIFY ACTIVITY COST POOLS AND ASSIGN OVERHEAD

FOCUS ON SIGNIFICANT ACTIVITIES IN THE PRODUCTION

- Activity: event/task/unit of work with a specified purpose
- 4 broad categories for activity cost pools (see next slide)
 - Unit level
 - Batch level
 - Product-sustaining level
 - Facility level

ALLOCATE OH TO ACTIVITY COST POOLS

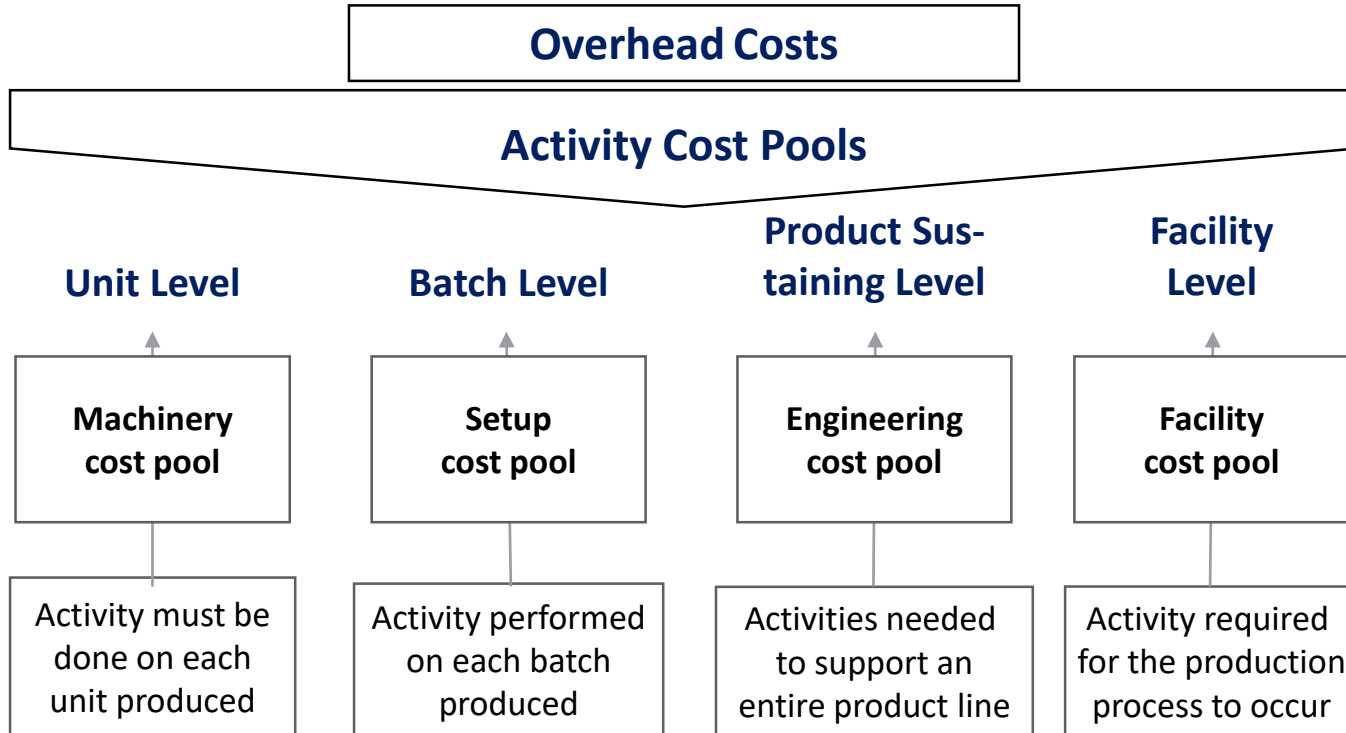
ACTIVITY-BASED COSTING

STAGE 1: IDENTIFY ACTIVITY COST POOLS AND ASSIGN OVERHEAD

- Activity cost pools fall into 4 broad categories (cost hierarchies)
 - Unit level: done for each unit of production (e.g., operating machinery)
 - Batch level: performed for each batch (e.g., machine setup, purchasing, quality assurance)
 - Product-sustaining level: support entire product line (e.g., engineering design)
 - Facility level: required for entire process (e.g., insurance, electricity, cleaning, taxes)

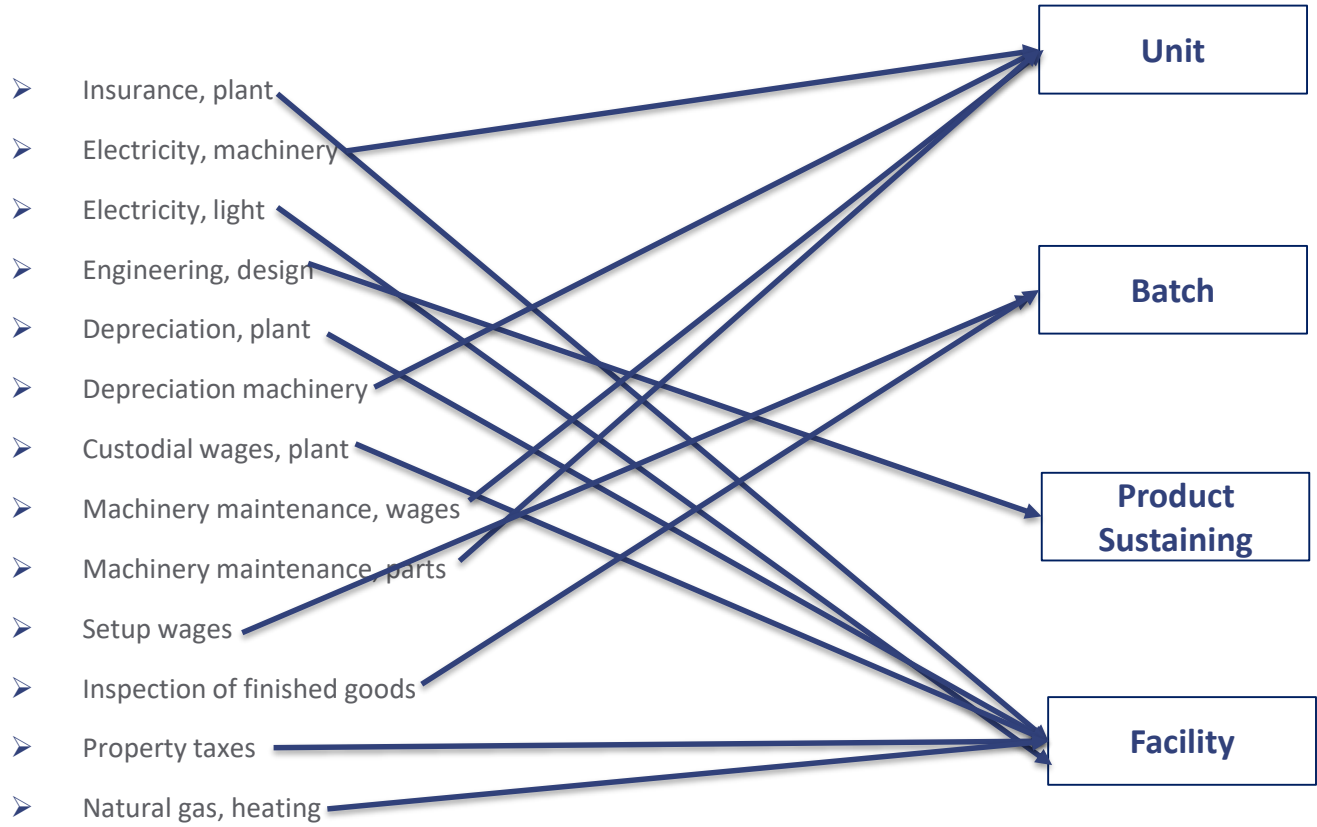
ACTIVITY-BASED COSTING

STAGE 1: IDENTIFY ACTIVITY COST POOLS AND ASSIGN OVERHEAD



ACTIVITY-BASED COSTING

E5-27



ACTIVITY-BASED COSTING

E5-27

Unit	Batch	Product Sustaining	Facility
Electricity, machinery	Setup wages	Engineering design	Electricity, light
Depreciation, machinery	Inspection of finished goods		Natural gas, heating
Machinery maintenance, parts			Property taxes
Machinery maintenance, wages			Depreciation, plant
			Insurance, plant
			Custodial wages, plant

ACTIVITY-BASED COSTING

STAGE 2: IDENTIFY COST DRIVERS AND ALLOCATE COSTS

IDENTIFY COST DRIVERS FOR EACH COST POOL

- Objective: High level of correlation to how the cost is incurred, e.g., purchase orders in procurement, number of set-up in machine set-ups, etc.

ALLOCATE OVERHEAD FROM COST POOLS TO PRODUCTS BASED ON THEIR CONSUMPTION OF THE ACTIVITY

- e.g., machine hours, pieces inspected, number of orders/shipments per product line, sqm used in warehouse, etc.

ACTIVITY-BASED COSTING

E5-28

Unit	Batch	Product Sustaining	Facility
Electricity, machinery Depreciation, machinery Machinery maintenance, parts Machinery maintenance, wages Cost driver: <ul style="list-style-type: none">➤ Machine hours➤ Nr. of units produced	Setup wages Inspection of finished goods Cost driver: <ul style="list-style-type: none">➤ Production runs	Engineering design Cost driver: <ul style="list-style-type: none">➤ Engineering hours➤ Nr. of parts in a product Cost driver: <ul style="list-style-type: none">➤ direct labor hours/costs	Electricity, light Natural gas, heating Property taxes Depreciation, plant Insurance, plant Cost driver: <ul style="list-style-type: none">➤ square footage Custodial wages, plant

ACTIVITY-BASED COSTING

EXAMPLE: TRADITIONAL COSTING & ABC

- Patio Grill Company manufactures three product lines, all high-end, gas barbecue grills: Standard (STD), Deluxe (DEL), and Ultimate (ULT).
- Traditional costing system: Overhead is applied on the basis of direct-labor hours.
- The company's budgeted manufacturing overhead costs are lumped together in one single cost pool.

ACTIVITY-BASED COSTING

EXAMPLE: TRADITIONAL COSTING & ABC

- Production and cost data

	STD	DEL	ULT
Planned monthly production			
- Volume in Units	10,000	8,000	2,000
- Production runs	80 runs of 125 units	80 runs of 100 units	40 runs of 50 units
Direct material per product	\$ 100	\$ 120	\$ 180
Direct labor per product (hours are basis for POHR)	\$ 180 (9 hrs at \$20)	\$ 220 (11 hrs at \$20)	\$ 260 (13 hrs at \$20)
Machine hours per product	10	12	17
Machine hours per product line	100,000	96,000	34,000
Budgeted manuf. overhead		\$ 4,896,000	

ACTIVITY-BASED COSTING

EXAMPLE: TRADITIONAL COSTING & ABC

- Traditional costing: Calculation of the predetermined overhead rate
- Budgeted manufacturing overhead: \$4,896,000
- Direct labor, budgeted hours:

STD: 10,000 units x 9 hours	90,000
DEL: 8,000 units x 11 hours	88,000
ULT: 2,000 units x 13 hours	26,000
Total direct-labor hours	204,000

- Predetermined overhead rate:

$$\$4,896,000 / 204,000 \text{ hours} = \$24/\text{hour}$$

ACTIVITY-BASED COSTING

EXAMPLE: TRADITIONAL COSTING & ABC

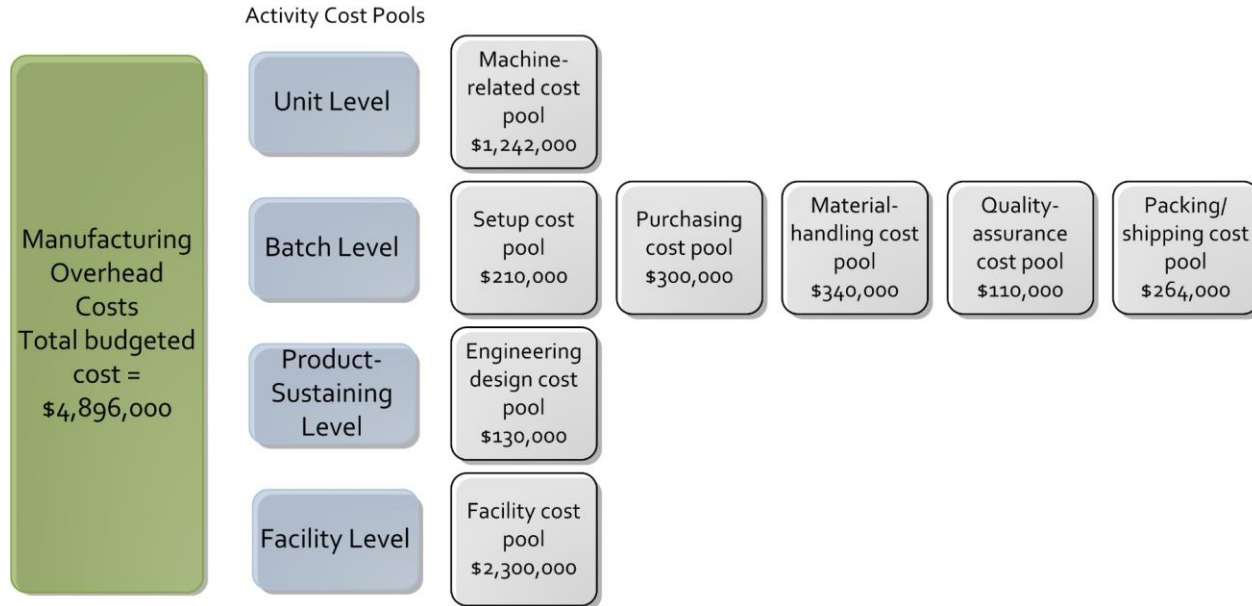
- Traditional costing: Calculation of product costs

	STD	DEL	ULT
Direct material	\$ 100	\$ 120	\$ 180
Direct labor	\$ 180	\$ 220	\$ 260
Manufacturing Overhead	\$ 216 (9 hrs at \$24)	\$ 264 (11 hrs at \$24)	\$ 312 (13 hrs at \$24)
Total	\$ 496	\$ 604	\$ 752
Target Price (20% mark-up)	\$ 595.2	\$ 724.8	\$ 902.4

ACTIVITY-BASED COSTING

EXAMPLE: TRADITIONAL COSTING & ABC

- Activity-based costing: Cost Pool identification & OH allocation

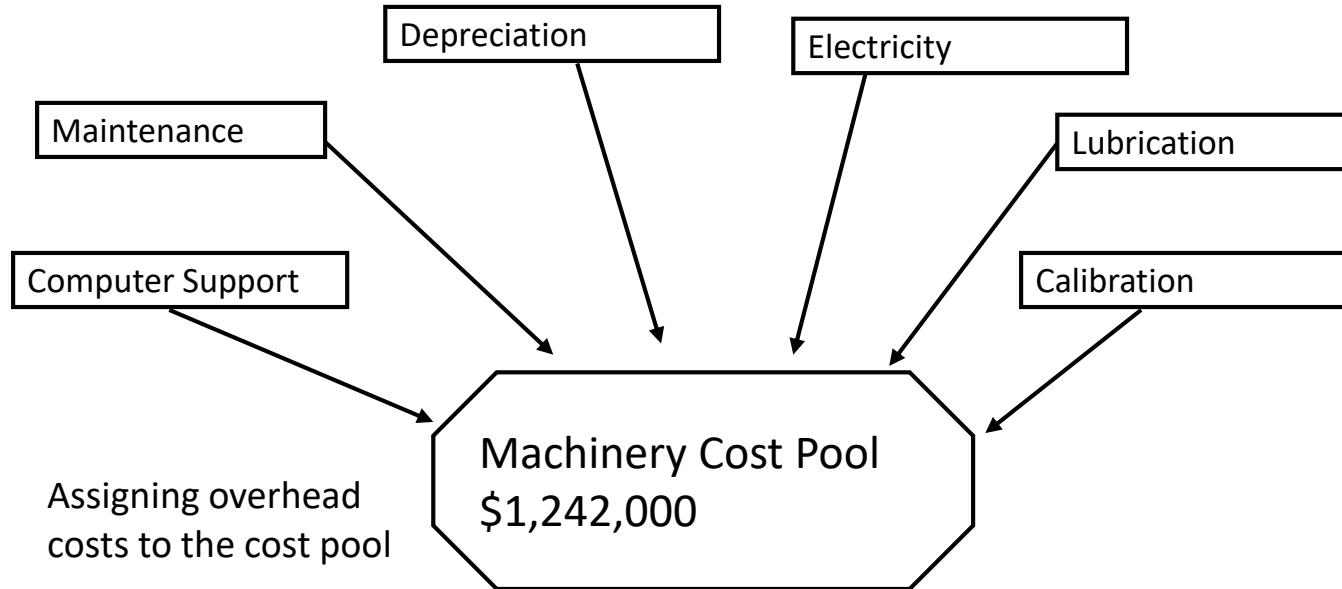


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ACTIVITY-BASED COSTING

EXAMPLE: TRADITIONAL COSTING & ABC

- Activity-based costing: Cost Pool identification & OH allocation



ACTIVITY-BASED COSTING

EXAMPLE: TRADITIONAL COSTING & ABC

- Activity-based costing: Cost Driver identification
 - Machine related → Machine hours
 - Setup → Production runs
 - Purchasing → Purchase orders
 - Material handling → Production runs
 - Quality assurance → Inspection hours
 - Packing/shipping → Shipments
 - Engineering design → Engineering hours
 - Facility → Machine hours

See book,
p. 173

ACTIVITY-BASED COSTING

EXAMPLE: TRADITIONAL COSTING & ABC

- Activity-based costing: Cost Driver and cost allocation
 - Activity: machine-related (\$ 1,242,000), cost driver: machine hours

	STD	DEL	ULT
Planned monthly production			
- Volume in Units	10,000	8,000	2,000
- Production runs	80 runs of 125 units	80 runs of 100 units	40 runs of 50 units
Direct material per product	\$ 100	\$ 120	\$ 180
Direct labor per product (hours are basis for POHR)	\$ 180 (9 hrs at \$20)	\$ 220 (11 hrs at \$20)	\$ 260 (13 hrs at \$20)
Machine hours per product	10	12	17
Machine hours per product line	100,000	96,000	34,000

ACTIVITY-BASED COSTING

EXAMPLE: TRADITIONAL COSTING & ABC

- Activity-based costing: Cost Driver and cost allocation
 - Activity: machine-related (\$ 1,242,000)
 - Cost driver: machine hours

ACTIVITY-BASED COSTING

EXAMPLE: TRADITIONAL COSTING & ABC

- Activity-based costing: Cost Driver and cost allocation
 - Activity: machine-related (\$ 1,242,000)
 - Cost driver: machine hours (230,000)
- Pool rate = $\$1,242,000 / 230,000 \text{ hours} = \5.40
- Which are the activity costs per product line & unit?

ACTIVITY-BASED COSTING

EXAMPLE: TRADITIONAL COSTING & ABC

- Activity-based costing: Cost Driver and cost allocation
 - Activity: machine-related (\$ 1,242,000), cost driver: machine hours (230,000)
- Pool rate = $\$1,242,000 / 230,000 \text{ hours} = \5.40
- Activity costs per product line & unit:

Product Line	Cost driver quantity (hours)	Activity Cost per product line	Production volume	Activity costs per unit
STD	100,000	\$540,000	10,000	\$54.00
DEL	96,000	\$518,400	8,000	\$64.80
ULT	34,000	\$183,600	2,000	\$91.80

ACTIVITY-BASED COSTING

EXAMPLE: TRADITIONAL COSTING & ABC

Product Costs	STD	DEL	ULT
Direct material	\$100.00	\$120.00	\$180.00
Direct labor	\$180.00	\$220.00	\$260.00
Total direct costs per unit	\$ 280.00	\$ 340.00	\$ 440.00
Manufacturing OH			
Machine related	\$54.00	\$64.80	\$ 91.80
Setup	\$8.40	\$10.50	\$ 21.00
Purchasing	\$10.00	\$12.00	\$ 52.00
Material handling	\$13.60	\$17.00	\$ 34.00
Quality assurance	\$4.00	\$5.00	\$ 15.00
Packing/shipping	\$12.00	\$12.00	\$ 24.00
Engineering design	\$5.00	\$5.00	\$ 20.00
Facility		20.00	\$ 170.00
Total ABC OH/unit	\$207.00	\$246.30	
Total product cost per unit	\$487.00	\$586.30	\$ 867.80
From traditional product costing	\$496.00	\$ 604.00	\$ 752.00

See book,
p. 173

overcosted

undercosted

ACTIVITY-BASED COSTING

EXAMPLE: TRADITIONAL COSTING & ABC

- Activity-based costing
- Compare actual prices with target prices (120% of product costs) from traditional and activity-based costing

	STD	DEL	ULT
Target Price			
- Traditional	595.20	724.80	902.40
- ABC costing	584.40	703.56	1,041.36
	Overcosted	Overcosted	Undercosted
Actual price	585.00	705.00	940.00

ACTIVITY-BASED COSTING

ABC: BENEFITS AND CRITIQUES

BENEFITS

- Identification of products that were overcosted or undercosted by traditional methods
- If some products are overcosted, other products are undercosted → overcosted products are subsidizing the undercosted products (called cost cross-subsidization)
- Traditional, volume-based costing systems overcost high-volume products and undercost complex, low-volume lines

ACTIVITY-BASED COSTING

ABC: BENEFITS AND CRITIQUES

BENEFITS

- Two conditions where ABC is beneficial, (i.e., there would be a significant difference between a traditional costing system and ABC):
 1. There is a large portion of non-unit-level activities such that a unit-level volume-based cost driver will not appropriately allocate the costs, and
 2. There is diversity among the products in the consumption of the various activities.

ACTIVITY-BASED COSTING

ABC: BENEFITS AND CRITIQUES

CRITIQUE:

- Requires a significant amount of time and cost to implement
- Portion of OH still allocated to products by means of some arbitrary base (observations/subjective assessments of capacity & activities)

COST/BENEFIT ANALYSIS WITH RESPECT TO THE NUMBER OF DIFFERENT COST POOLS

ACTIVITY-BASED COSTING

KEY ISSUES IN ABC

- Cost Driver: A characteristic of an event or activity that results in the incurrence of costs.
- In selecting a cost driver, we must consider . . .

Degree of
Correlation

Cost of
Measurement

Behavioral
Effects

ACTIVITY-BASED COSTING

KEY ISSUES IN ABC

CONSIDERATIONS FOR CHANGE TO ABC

- Direct labor is a small percentage of total costs.
- Sales are increasing, but profits are declining.
- Marketing does not use costs reports for pricing decisions.
- Product-line profit margins are hard to explain.
- Line managers do not believe the product costs reported.
- Some products that have reported high profit margins are not sold by competitors.

ACTIVITY-BASED COSTING

ABC EXAMPLE (E5-29)

- Rainbow Spray Paints, Inc. has used a traditional costing system to apply Quality Control costs to all products at 16% of D/L cost. Monthly direct labor cost for enamel paint line is \$98,000.
- Management is considering to implement ABC and gathered the following information for the enamel paint product line:

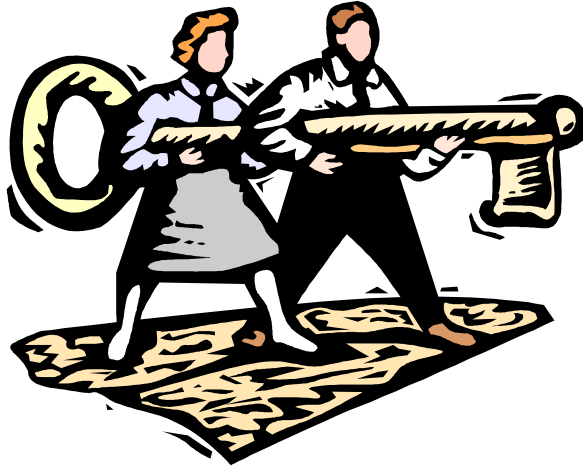
Activity Cost Pool	Cost Driver	Pool Rates	Quantity of Driver
Incoming mat. inspection	Type of mat.	\$23.00/type	24 types
In-process inspection	Number of units	\$.28/unit	35,000 units
Product certification	Per order	\$144.00/order	50 orders

1. Calculate quality control cost to be assigned to the enamel paint line under (a) traditional costing and (b) ABC.
2. Does traditional costing over- or undercost the paint line with respect to quality control costs? By how much?

ACTIVITY-BASED COSTING

CUSTOMER PROFITABILITY ANALYSIS

- Customer profitability analysis uses activity-based costing to determine the activities, costs, and profit associated with serving particular customers.



ACTIVITY-BASED COSTING

CUSTOMER PROFITABILITY ANALYSIS

- Even when a firm has profitable products, customer-related costs can make certain customer relationships unprofitable.
- What are characteristics of a “good” (profitable) vs. “bad” (unprofitable) customer?

ACTIVITY-BASED COSTING

CUSTOMER PROFITABILITY ANALYSIS

- “The customer is always right!”
- But what if (s)he ...

- Orders very frequently,
- Orders small quantities,
- Requires special packaging,
- Demands fast services,
- Often changes orders,
- ...?



Customer profitability includes much more than order quantity and prices!

ACTIVITY-BASED COSTING

CUSTOMER PROFITABILITY ANALYSIS

- A company may use these customer-related costs to help determine the profitability of each customer.

Customer-Related Activities	Cost Driver Base	Cost Driver Rate
Order processing	Purchase orders	\$ 150
Sales contacts (phone calls, faxes, etc.)	Contacts	100
Sales visits	Visits	1,000
Shipment processing	Shipments	200
Billing and collection	Invoices	160
Design/engineering change orders	Design changes	4,000
Special packaging	Units packaged	40
Special handling	Units handled	60

ACTIVITY-BASED COSTING

CUSTOMER PROFITABILITY ANALYSIS

- During 2015, customer A and customer B each have ordered 250 units at \$30 which cost the firm \$15 to produce.
 - Customer A ordered the units in 7 orders, while customer B placed 2 big orders (orders cause order processing, shipment processing and billing/collection activities).
 - Customer A had 6 sales contacts throughout the year, while customer B had 1 visit. Neither needed special handling or packaging.
1. Which customer is more profitable?
 2. Based on your analysis, what is your recommendation to management?

ACTIVITY-BASED COSTING

P5-69

MADISON ELECTRIC PUMP CORPORATION:

- 3 models: Regular, Advanced, and Deluxe
- Job order costing, OH applied based on DL hours
- Target price: 110% of costs, regular sold at discount (\$220)

	Regular Model	Advanced Model	Deluxe Model
Annual sales(units)	20,000	1,000	10,000
Direct Material	\$ 20	\$ 50	\$ 84
Direct Labor	20 (1h at \$ 20)	40 (2h at \$ 20)	40 (2h at \$ 20)
Manufacturing OH	170 (1h at \$ 170)	340 (2h at \$ 170)	340 (2h at \$ 170)
Total product cost	\$ 210	\$ 430	\$ 464
Target price	\$ 231	\$ 473	\$ 510.40

ACTIVITY-BASED COSTING

P5-69

OVERHEAD BUDGET

Depreciation, machinery	\$2,960,000
Maintenance, machinery	\$240,000
Depreciation, taxes, and insurance for factory	\$600,000
Engineering	\$700,000
Purchasing, receiving, and shipping	\$500,000
Inspection and repair of defects	\$750,000
Material Handling	\$800,000
Miscellaneous manufacturing overhead costs	\$590,000
Total	\$7,140,000

ACTIVITY-BASED COSTING

P5-69

- The following activity cost pools and cost drivers were identified

Activity Cost Pool	Cost Driver	Regular Model	Advanced Model	Deluxe Model
I: Depreciation, machinery Maintenance, machinery	Machine time	39%	13%	48%
II: Engineering Inspection and repair of defects	Engineering hours	47%	6%	47%
III: Purchasing, receiving, and shipping Material handling	Number of material orders	47%	8%	45%
IV: Depreciation, taxes, and insurance for factory Miscellaneous manufacturing overhead	Factory space usage	42%	15%	43%

ACTIVITY-BASED COSTING

P5-69

- Calculate product costs based on ABC!
- Compare target prices!
- Memo to explain differences and provide recommendations!

ACTIVITY-BASED COSTING

P5-50

Meditech, Inc. manufactures two types of medical devices, Medform and Procel, and applies overhead on the basis of direct-labor hours. Anticipated overhead and direct-labor time for the upcoming accounting period are \$710,000 and 20,000 hours, respectively. Information about the company's products follows.

Medform:

- Estimated production volume, 2,500 units
- Direct-material cost, \$30 per unit
- Direct labor per unit, 3 hours at \$15 per hour

Procel:

- Estimated production volume, 3,125 units
- Direct-material cost, \$45 per unit
- Direct labor per unit, 4 hours at \$15 per hour

ACTIVITY-BASED COSTING

P5-50

Meditech's overhead of \$710,000 can be identified with three major activities: order processing (\$120,000), machine processing (\$500,000), and product inspection (\$90,000). These activities are driven by number of orders processed, machine hours worked, and inspection hours, respectively. Data relevant to these activities follow.

	Orders Processed	Machine Hours Worked	Inspection Hours
• Medform	350	23,000	4,000
• Procel	250	27,000	11,000
• Total	600	50,000	15,000

ACTIVITY-BASED COSTING

P5-50

Management is very concerned about declining profitability despite a healthy increase in sales volume. The decrease in income is especially puzzling because the company recently undertook a massive plant renovation during which new, highly automated machinery was installed—machinery that was expected to produce significant operating efficiencies.

1. Assuming use of direct-labor hours to apply overhead to production, compute the unit manufacturing costs of the Medform and Procel products if the expected manufacturing volume is attained.
2. Assuming use of activity-based costing, compute the unit manufacturing costs of the Medform and Procel products if the expected manufacturing volume is attained.

A photograph of a large, modern brick building with many windows, viewed from a low angle. The image is overlaid with a semi-transparent blue filter. In the foreground, there is a green lawn and a few trees. The text 'THANKS FOR YOUR ATTENTION' is written in large, white, bold, sans-serif capital letters on the left side of the image. A small white horizontal line is positioned above the word 'THANKS'.

—
**THANKS
FOR YOUR
ATTENTION**



Frankfurt School of Finance and Management gGmbH

Adickesallee 32-34

60322 Frankfurt am Main

Timo Vogelsang

Associate Professor

Telefon: +49 69 154008-0

Fax: +49 69 154008-650

E-Mail: t.vogelsang@fs.de

www.frankfurt-school.de



[@frankfurtschool](https://twitter.com/frankfurtschool)



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