Absorption costing problems

Absorption costing

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We allocate costs for several reasons:

- decision management
- decision control
- cost-based contracts
- financial reporting
- taxes

Absorption costing: key features

- either directly traces or allocates **all manufacturing costs** to products
- differentiates costs for products still in process, finished and sold
- inherently backward looking
- useful (and required) for financial accounting
- inclusion of fix costs requires care if used for decision making

DeJure Scents

Problem details:

DeJure Scents manufactures an aftershave and uses **process costing**. All materials are added at the beginning of the process, and **conversion costs** are incurred uniformly over time. In May, DeJure started 15,000 gallons. There was no beginning inventory. May's ending inventory of work-in-process was 2,000 gallons, which were 50 percent complete with respect to conversion costs. In May, conversion costs were $28,000 and materials costs were $45,000.

Questions:

1. Calculate the equivalent units of conversion and materials.
2. Calculate the cost per equivalent unit of conversion and materials.
3. Calculate the cost of the ending inventory and the cost transferred to finished goods inventory.

Concepts:

1. Process costing
2. Conversion costs
3. Equivalent units

Process costing

- Useful when production is a *process* that produces identical units.
- Liquids like petrol, aftershave, perfume, and orange juice are classic examples.
- We track product in three places:

1. beginning work-in-process inventory,
2. units started and finished this period, and
3. ending work-in-process inventory.

Conversion costs

- capture the cost of **converting** direct materials into finished goods
- labor and overhead (these may or may not be fixed)
- these are the cost we need to *allocate*

Equivalent units

- we use equivalent units to state the amount of completed work in terms of finished units
- e.g. if three units are one third complete then we have one equivalent unit

Setup:

Physical flow:	Gallons	E.U Conversion	E.U. Materials
WIP, begin.	0	0	0
Units started	15,000		
Units to account for	15,000		

_Note: E.U. is ‘equivalent units.’

WIP-Effective Units

	Gallons	E.U Conversion	E.U. Materials
Work-In-Process, ending (50%)	2,000	?	?

What information do we have to help us fill in this table?

WIP-Effective Units

	Gallons	E.U Conversion	E.U. Materials
Work-In-Process, ending (50%)	2,000	?	2,000

All materials are added at the beginning of the process.

WIP-Effective Units

	Gallons	E.U Conversion	E.U. Materials
Work-In-Process, ending (50%)	2,000	$.5 \times 2{,}000$	2,000

Conversion costs are incurred uniformly over time.

Units accounted for

	Gallons	E.U Conversion	E.U. Materials
Work-In-Process, ending (50%)	2,000	1,000	2,000
Completed	13,000	13,000	13,000
Units accounted for	15,000	14,000	15,000

Cost per equivalent unit

	Total	E.U. Conversion	E.U. Materials
Units	15,000	14,000	15,000
Costs	$73,000	$28,000	$45,000
per equi. unit		$2.00	$3.00

Overhead rate:

- The conversion cost per equivalent unit is where the overhead allocation occurs.
- Adjusting this rate in response to short-term changes in production can cause a death spiral!
  - For example: Imagine that your machinery breaks and you end up incurring that same conversion costs (labor and overhead) such that only 7,000 effective units have been converted, but for the same cost. Now the conversion cost is $4.00 per unit. Should you use this number for future planning? Or should you continue using $2.00.

Cost of inventory and transfer to finished goods

	Gallons	E.U Conversion	E.U. Materials
Work-In-Process, ending	$ 8,000	$2,000 ($2 \times 1000$)	$6,000 ($3 \times 2000$)
Finished goods inventory	$65,000	$26,000 ($2 \times 13,000$)	$39,000 ($3 \times 13,000$)
Total costs	$73,000	$28,000	$45,000

Did we learn anything interesting here?

- The technique is relatively straightforward.
- But what are the $2.00 and $3.00 amounts doing?

But what are the $2.00 and $3.00 amounts doing?

- If we are doing tax or financial accounting then they just track the flow of costs through the firm, and link them to revenue. (important but not interesting)
- What if we are trying to use these numbers to communicate information to internal decision makers?
- Can we use these numbers to align incentives?
- What does a cost number communicate if you use it internally?
- *It should capture the marginal cost of the decision to produce.* Does it?

Kitchen Rite: Outsourcing and job order costing

Job order costing

- Classic example is shipbuilding.
- Products are produced in batches which each require different raw materials and classes of labor.

Kitchen Rite

Kitchen Rite is considering outsourcing the production of a steel chassis that is used in a kitchen appliance. Two thousand chassis are produced per month. An outside vendor will supply an identical chassis for $9.90. The chassis is manufactured in two steps. A stamping press punches out the part from sheet metal, bends the sides, and cuts holes in it, all in one operation. Then a welding machine welds the corners. Both the welding and stamping machines are used to produce only this one chassis model.

Job cost sheet

The following job order cost sheet summarizes the costs of producing a single chassis.

	Cost per Unit
Steel Plate	$4.75
Direct Labor:	
- Stamping ($20/hr)	1.60
- Welding ($30/hr)	2.50
Overhead:	
- Stamping (depreciation)	3.60
- Welding (lease payment)	2.15
General plant	5.90
	$ 20.50

Machine details

The stamping machine is old and has little economic value. A used equipment dealer is willing to remove the machine and haul it away at no cost. The stamping machine was purchased 13 years ago for $1,728,000. For both tax and reporting purposes, it is being depreciated using a 20-year life, straight-line method, and it has zero salvage value. The welding machine is leased for $4,300 per month, and the lease can be canceled at any time and the machine returned. However, an early termination penalty of $1,800 per month for the next 42 months must be paid.

Plant overhead

General plant overhead consists primarily of the allocated cost of depreciation on the plant, property taxes, and fire insurance on the plant. Kitchen Rite currently has excess plant space. The manufacturing space freed up if the chassis is outsourced has no other use.

Labor

Employees are unionized and have a clause in their contract that prevents the firm from firing them if their jobs are eliminated due to outsourcing. The employees working on the stamping machine will be placed on indefinite furlough at 75 percent of their current pay. The employees operating the welding machine can be reassigned to other positions in the firm as job openings occur. Given the high demand for welders, these reassignments will occur within a few weeks of outsourcing the chassis.

Taxes

Kitchen Rite has a tax loss for the current and the previous two years.

Questions

Should Kitchen Rite outsource the chassis? Support your recommendation with a clear financial analysis of the facts.

Consider:

This problem illustrates that not all direct labor costs are incremental and not all fixed overhead costs are sunk.

Current cash flows

The current cash outflows of manufacturing the chassis per unit are:

Direct material	$ 4.75
Direct labor:	
Stamping	1.60
Welding	2.50
Overhead:	
Stamping	0
Welding ($4,300 ÷ 2,000)	2.15
Total	$11.00

Cash outflows if we outsource

Purchased chassis	$ 9.90
Stamping labor (75% $\times$ 1.60)	1.20
Welding lease early termination ($1,800 $\div$ 2,000)	.90
Total	$12.00

Recommendation:

Do not outsource because the net cash flows of outsourcing are lower than continuing to manufacture the chassis internally.

Are these numbers that we can use?

- For taxes, reporting, and contracting: YES.
- For the outsourcing decision: NO!
- Absorption costing (i.e. financial accounting) does not capture the effect of production choices on cost.
- In general absorption costing is *inappropriate* for the following decisions:
  - Choice to process further.
  - Discontinuing a product line (closing a division).
  - Outsourcing a process.