## Problem Statement

Determine unit cost per pair of BBs and LLs using:

1. A single rate plant wide overhead cost allocation based on direct labor hours
2. Step-down cost allocation method to trickle Maintenance/Setup OH costs to Cutting and Assembly departments, then to batches using appropriate cost drivers
3. Activity based costing (ABC)

## Quantitative Analysis

1. Single rate method

* As seen on Table 1, the single plant wide OH cost per DLH is 24.49$. As seen on Table 2, allocating this costs to products using DLH as input yields unit costs of $18.40 and $8.09 for BBs and LLs respectively

1. Step Down Cost Allocation

As outlined in Table 3:

* Using Machine hours as cost drivers, 56% and 44% of Maintenance OH, for a total of $90,040 and $69,960 can be allocated to Cutting and Assembly respectively
* Using Setup Hours as cost drivers, 65% and 35% of Setup OH costs can be allocated to Cutting and Assembly, for a total Setup overhead cost of $261,538 and $138,462 for Cutting and Assembly
* Adding both the above and the ‘native’ department costs of $440k and $200k, total departments costs add up to $791,579 and $408,421 for Cutting and Assembly respectively
* Using machine hours as a cost driver for Cutting department and Direct Labor Hours (DLH) as a cost driver for Assembly, overhead cost allocation for Cutting can be established at $28.47/Machine Hour, and for Assembly at $14.80/DLH (this includes setup and maintenance OHs already)

As outlined in Table 4: Total cost for a batch of BBs can be established at $24,432, yielding a unit cost of $24.43 per pair of BBs, and total cost for a batch of LLs can be established at $28,771, yielding a unit cost of $24.43 per pair of LLs

1. Activity Base Cost Allocation

* Table 5 Outlines OH costs per OH activity type. Adding costs per cost drivers yields total OH costs of $7.29/Machine Hour, $1,307.69/Setup Hour and $3.27 per DLH (as seen on table 6)
* Scaling the hourly OH cost per number of cost driver unit used per batch, we arrive at $21.42 per pair of BBs produced, and $7.29 per pair of LL Produced (As seen on table 7)

## Conclusion

* Single rate plant wide overhead cost allocation is simple to implement, but in completely oblivious to many realities of overhead cost allocation, like cost to setup batches and machine usage.
* If the company prices it’s units based on computed manufacturing costs, using a single plant wide rate yields lower cost than the ABC method for BBs ($18.40 instead of $21.42) and higher cost than the ABC method for LLs ($8.29 instead of $7.29). The company is most likely gaining market share on BBs because its margins are in actually smaller, whereas it is losing market shares on LLs because of unnecessarily inflated margins. Selling more of less profitable items and less of more profitable items is not ideal
* Although ABC is more complex to maintain than the current costing system, the company should still consider it as a costing method to avoid losing market share on overpriced items and loosing profits on underpriced items
* Data collection revealed that DLH as a cost driver only accounts for 13% of total overheads costs, whereas setup hours accounts for 57% of overheads. If implementing ABC is not a feasible alternative, the company should consider using setup hours as a single cost driver instead of DLH. Results would still be diluted and inacurate, but would be more reflective of reality because of the larger weight of Setup hours.

## Exhibits

|  |  |
| --- | --- |
| Total MFG OH ($) | $1,200,000 |
| Total Direct Labor (H) | 49,000 |
| **MFG OH $/LDH** | **$24.49** |

Table 1: Single plant wide overhead rate based on Direct Labor Hours

|  |  |  |
| --- | --- | --- |
|  | **BB** | **LL** |
| Total Labor Hours | 200 | 330 |
| OH Cost ($24.49/H) | $4,898.00 | $8,081.70 |
| Direct Cost | $13,500.00 | $16,200.00 |
| Total Cost / Batch | $18,398.00 | $24,281.70 |
|  |  |  |
| Batch Size | 1000 | 3000 |
| **Cost per Unit** | **$18.40** | **$8.09** |

Table 2: Cost per unit, with all manufacturing overhead allocated on a $ per labor hour method



Table 3: Step down cost allocation step 1: allocating Maintenance and Setup overheads to Cutting and Assembly departments



Table 4: Cost per batch and units of BBs and LLs, including overhead cost allocations

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **OH Activity** | **Cost** | **Category** | **Cost Driver** | **Plant Wide driver Qty** | **Activity OH $/H** |
| Maintenance | $160,000.00 | Product | Machine H | 49400 | $3.24 |
| Setup | $400,000.00 | Batch | Setup H | 520 | $769.23 |
| Cutting Supervision | $280,000.00 | Batch | Setup H | 520 | $538.46 |
| Cutting Depreciation | $160,000.00 | Facility | Machine H | 49400 | $3.24 |
| Assembly Supervision | $160,000.00 | Unit | DLH | 49000 | $3.27 |
| Assembly Depreciation | $40,000.00 | Facility | Machine H | 49400 | $0.81 |
| TOTAL | $1,200,000.00 |  |  |  |  |

Table 5: ABC – OH Cost allocation per OH Activity

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Machine H** | |  |  | **Setup H** | |  |  | **DLH** | |  |
|  | Maintenance | $3.24 |  |  | Setup | $769.23 |  |  | Assembly Sup. | $3.27 |
|  | Cutting Dep. | $3.24 |  |  | Cutting Sup. | $538.46 |  |  |  |  |
|  | Assembly Dep | $0.81 |  |  |  |  |  |  |  |  |
| **Total / MH** | | **$7.29** |  | **Total / Set. H** | | **$1,307.69** |  |  | **Total / DLH** | **$3.27** |

Table 6: Total hourly OH cost per type of cost driver



Table 7: ABC Cost allocation per activity, associated per batch and per unit of BBs and LLs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Per Unit of BBs | | | Per Unit of LLs | | |
|  | Plant Wide Single cost | Step Down Allocation | ABC | Plant Wide Single cost | Step Down Allocation | ABC |
| Direct Cost | $13.50 | | | $5.40 | | |
| OH Cost | $4.90 | $10.93 | $7.92 | $2.69 | $4.19 | $1.89 |
| Total Cost | $18.40 | $24.43 | $21.42 | $8.09 | $9.59 | $7.29 |

Table 8: Summary of OH Cost allocation per unit produced for various cost allocation methods

|  |  |  |  |
| --- | --- | --- | --- |
| **OH Activity** | **Cost** | **Cost Driver** | **% of total Cost** |
| Assembly Supervision | $160,000.00 | DLH | 13% |
| Maintenance | $160,000.00 | Machine H | 30% |
| Cutting Depreciation | $160,000.00 | Machine H |
| Assembly Depreciation | $40,000.00 | Machine H |
| Setup | $400,000.00 | Setup H | 57% |
| Cutting Supervision | $280,000.00 | Setup H |
| **TOTAL** | **$1,200,000.00** |  | **100%** |

Table 9: Contribution of total overhead costs per cost drivers