## Context

* Pen company has recently ventured into colored pens in an attempt to capitalize on the high margins they propose
* Overall profitability is shrinking; analysis using overhead allocation of 300% does not point to an obvious explanations as to why

## Problem Statement

* Re-assess profitability per pen color for Pen company using activity based cost allocation
* Recommend potential ways to enhance profitability

## Analysis

* From Table 1:
	+ Indirect labor has been split into 3 categories based on contribution to managing the number of runs, setup time and managing products
	+ Computer systems costs has been split between its contribution to managing runs and managing product data
	+ For all overhead expenses, cost per cost driver units have been computed
	+ Fringe benefits have been excluded; a 40% premium on labor costs will be added subsequently
* As documented on Table 3, all overhead cost contributions have been aggregated per cost drivers. The outcome of which yielded:
	+ $147$/Run
	+ 21$/Setup Hour
	+ $1.4/Machine Hour
	+ $1,200 per product line
* As documented on Table 4, overhead costs have been re-calculated based on resource utilization. The outcome of which is:
	+ Blue: $23,792
	+ Black: $18,398
	+ Red: $13,608
	+ Purple: $4,202
* Based on revised overhead allocation, a revised income statement has been produced (see Table 4). With the new cost allocation, Purple and Red pens actually generate operating losses

## Recommendation

* Unless market demand clearly indicates a significantly larger sales potential for RED and PURPLE pens, both products should be discontinued.
* If market demand is clearly present for PURPLE and RED pens, Pen company should use the market analysis performed to forecast demand for RED and PURPLE pens. If feasible, pen company could invest in additional warehouse capacity in order to store more inventory, and PURPLE and RED pens should only be manufactured once per year. If the company can somewhat accurately forecast pen demand, it could, as an example, spend one month manufacturing RED pens, 0.5 months manufacturing PURPLE pens, 5.5 months making black pens and 5.5 months making blue pens (exact numbers to be determined based on inventory capacity and market demand). With overheads costs related to switching production at $26k/$150k = 17% of sales, significant savings could be realized.
* The sales manager seems to be pushing products based on price premium, regardless of margins and market demand (Assuming sales are representative of market potential, as per Table 3, RED and PURPLE pens only represents 10% of sales). Sales force’s commissions should be re-adjusted as a % of margins, such that less emphasis is made on promoting items based on price. This would align sales motivation with enterprise profitability.

Note: With a total annual revenue of 100k$ after material costs, it is hard to believe that the company can afford to have a Sales manager, a Controller, a manufacturing manager, manufacturing staff on the payroll (as documented on the case), as well as production facilities, maintenance staff, IT staff, a sales force, HR and purchasing (as can be assume necessary to run operations as described). Either the numbers are fictitious, or the primary source of revenues of Classic pen company do not come from pens.

## Exhibits

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Expense Category** | **Expense** | Cost Driver | Total Cost Driver | $ / unit driver |
| Ind. Labor - Scheduling Runs | $10,000.00 | # Runs | 150 | $66.67 |
| Ind. Labor - Changeover | $8,000.00 | Setup Time | 526 | $15.21 |
| Ind. Labor - Records | $2,000.00 | # of Products | 4 | $500.00 |
| Fringe Benefits | $16,000.00 | Total Labor H | Add 40% on LH |   |
| Computer Systems /Run | $8,000.00 | # Runs | 150 | $53.33 |
| Computer Systems - Records | $2,000.00 | # Products | 4 | $500.00 |
| Machinery | $8,000.00 | Machine H | 10000 | $0.80 |
| Maintenance | $4,000.00 | Machine H | 10000 | $0.40 |
| Energy | $2,000.00 | Machine H | 10000 | $0.20 |
| TOTAL | $60,000.00 |   |   |   |

Table 1: Overhead allocation based on activity

|  |  |
| --- | --- |
| # Runs |   |
|   | Ind. Labor - Scheduling Runs | $66.67 |
|   | 40% Frings on ind. Labor | $26.67 |
|   | Computer Systems /Run | $53.33 |
| Total OH cost / # Runs | $146.67 |
|   |   |   |
| Setup Time |   |
|   | Ind. Labor - Cangeover | $15.21 |
|   | 40% Frings on ind. Labor | $6.08 |
| Total OH / Setup H | $21.29 |
|   |   |   |
| Machine Hour |   |
|   | Machinery | $0.80 |
|   | Maintenance | $0.40 |
|   | Energy | $0.20 |
| Total OH / Machine Hour | $1.40 |
|   |   |   |
| # Products |   |
|   | Ind. Labor - Records | $500.00 |
|   | 40% Frings on ind. Labor | $200.00 |
|   | Computer Systems - Records | $500.00 |
| Total OH / # Products | $1,200.00 |

Table 2: Total overhead cost per cost driver



Table 3: Re-calculated overhead costs based on resource utilization

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   |   | BLUE |   | BLACK |   | RED |   | PURPLE |   | TOTAL |
| Sales | $75,000 |   | $60,000 |   | $13,950 |   | $1,650 |   | $150,600 |
|   |   |   |   |   |   |   |   |   |   |   |
|   | Materials | $25,000 |   | $20,000 |   | $4,680 |   | $550 |   | $50,230 |
|   | Direct Labor | $10,000 |   | $8,000 |   | $1,800 |   | $200 |   | $20,000 |
| Total COGS | $35,000 |   | $28,000 |   | $6,480 |   | $750 |   | $70,230 |
|   |   |   |   |   |   |   |   |   |   |   |
| Gross Margins | $40,000 |   | $32,000 |   | $7,470 |   | $900 |   | $80,370 |
|   |   |   |   |   |   |   |   |   |   |   |
| SGA | $23,792 |   | $18,398 |   | $13,608 |   | $4,202 |   | $60,000 |
|   |   |   |   |   |   |   |   |   |   |   |
| **Operating Income** | **$16,208** |  | **$13,602** |  | **-$6,138** |  | **-$3,302** |  | **$20,370** |

Table 4: Revised Income Statement

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | BLUE |   | BLACK |   | RED |   | PURPLE |   | TOTAL |
| $ Sales  | $75,000 |   | $60,000 |   | $13,950 |   | $1,650 |   | $150,600 |
| % Total Sales | 50% |   | 40% |   | 9% |   | 1% |   | 100% |

Table 5: Revenue % per pen color