

## **A Case Method Approach of Teaching How Cost-Volume-Profit Analysis is Connected to the Flexible Budgeting Process and Variance Analysis**

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*To start a successful business, students need to understand the steps necessary to achieve their desired profits. While Managerial textbooks teach each step independently, we demonstrate how these steps are integrated. We present a Multi-Disciplinary Case-Method approach to teaching Cost-Volume-Profit (CVP) Analysis. Students use their own assumptions to simulate a real-life business startup analysis to calculate the number of units necessary to achieve their desired profits. Students are required to build upon their CVP analyses to develop budgets necessary for planning and control purposes. Finally, students prepare a Flexible Budget demonstrating the importance of distinguishing between activity and revenue/spending variances.*

### **INTRODUCTION**

“We first present an alternative, more comprehensive teaching approach, for Cost-Volume-Profit (CVP) analysis from the commonly used approach which simply teaches students how to use a series of equations to solve various questions related to CVP analysis, in which unit selling price, total fixed costs, and unit variable costs are assumed to remain constant (Garrison et al., 2010; Choo and Tan, 2010). We use a multi-disciplinary approach in the context of a realistic case-analysis. We believe this approach offers useful insights and provides a useful learning tool for students pursuing an advanced Master’s Degree.” (Machuga, 2012). This case requires students to: (a) make assumptions about cost behavior in a dynamic and interactive way, and (b) research a variety of marketing issues for the proposed business that simulates a real life business situation, and (c) use the information from their CVP analysis for planning purposes, applying what they typically learn when they read about budgeting, and (d) compare the results of their business venture using the Income Statement prepared based on their planned level of sales volume to the results that should have occurred based on the actual level of sales volume, as well as the actual results we provide in the case. This allows students to see how budgets are used to develop goals, as well as to determine if actual results were achieved. This paper’s approach emphasizes the importance of CVP analysis and how it ties directly into planning and control processes management must take in order to start a potentially successful business. More importantly, we show students the importance of these key practical yet very relevant management-accounting tools, all done in one integrative setting instead of teaching those concepts separately.

We assume students will already have a basic understanding of concepts learned in core courses in their MBA program such as Finance, Financial Accounting, Marketing and Management. In addition to being familiar with concepts of fixed versus variable costs, students are assumed to be familiar with how changes in these costs interact with changes in sales revenue to determine net income, as well as understand the budgeting process, concepts which should have already been covered in their Managerial Accounting course. “An additional benefit of this case is that students can treat it as a simulation exercise in which they vary assumptions about different variables such as: sales price, direct materials’ quality, total fixed costs, depreciation lives, and sales mix, etc. to see how all variables, individually and collectively, affect their break-even points. This point is often overlooked in textbooks that focus more on an equation approach in a static rather than a dynamic analytical approach” (Machuga, 2012).

A very important concept for students to understand is whether they have accomplished profit goals they set in their CVP analysis. In other words, they need to understand how to take their assumptions from the first part of the case and use them to develop the necessary budgets in order to finally prepare a projected Income Statement. Budgets force management to plan for the future as does CVP analysis. In addition, preparing a number of budgets allows students to understand that in order to accomplish their profit goal they must also prepare budgets to coordinate activities throughout the company. This case will allow students to understand how budgets can help them coordinate activities throughout the entire company by integrating material purchases’ plans, and labor use, etc. Even more importantly, students will learn the importance of budgets and their use for evaluation and control purposes. Because the actual level of activity will most likely differ from the planned level of activity, we also require the students to prepare a Flexible budget. The Flexible budget allows them to understand the reason planned results differ from actual results in terms of activity variances versus revenues and spending variances (Horngren et al., 2012).

## DEVELOPMENT OF THE CASE

“The case assumes students will open a milkshake shack on the beach of a resort on the “big Island” of Hawaii. I have studied existing restaurants, read industry reports, and have done some research on expected minimum costs to be incurred in operating the business. A unique feature of my milkshakes is that I will serve them with flavored straws that match the flavor of the chosen milkshakes by customers. My research embeds the following assumptions:” (see Machuga, 2012)

Sales prices of milkshakes (\$7.00 for small, and \$10.00 for large)

Cost of materials needed to make milkshakes:

<b>DIRECT MATERIAL INGREDIENTS</b>	<b>Small (8 oz. size)</b>	<b>Large (12 oz. size)</b>
<b>Whole Milk (\$15 for a 5 gallon=640 oz.)</b>	(need 2 oz. of milk)	(need 3 oz. of milk)
<b>Cream (\$20 for 1 gallon=128 oz.)</b>	(need 2 oz. of cream)	(need 3 oz. of cream)
<b>Sugar (\$10 for a 15 lb. bag=30 cups)</b>	(need ½ cup of sugar)	(need ¾ cup of sugar)
<b>Premium Vanilla Ice Cream (\$24 for 600 oz.)</b>	(need 6 oz. of ice cream)	(need 9 oz. of ice cream)
<b>Flavorings</b>	.25 per shake	.40 per shake
<b>Flavored specialty straws</b>	.75 per straw	.75 per straw
<b>Cups (500 8 oz. cups @ a cost of \$200)</b>		-----
<b>Cups (500 12 oz. cups @ a cost of \$250)</b>	-----	

### Fixed costs:

- Shack rental: \$500 a month
- Cleaning and other miscellaneous supplies: \$100 a month
- Equipment: Industrial Milk Shake Maker: \$72 per machine x 10 machines=\$720

- Equipment: Industrial Refrigerator/freezer: \$480
- Countertops: \$1,200
- Tables and benches for customers to sit outside: \$108 per bench-set x 10=\$1,080
- Annual insurance: \$600 a year
- Sign: use your marketing knowledge to think of a good name= \$100
- Advertising expenses: \$5,000 a month
- Accounting and bookkeeping costs: \$500 a month
- Owner's salary: \$96,000 a year
- Dues and membership fees: \$2,000 a year.
- Licenses and permit fees: \$600 a year.
- Maintenance services: \$400 a month.
- Office supplies: \$300 a month.

### **Employees:**

- **Two** part-time employees: each receiving a monthly salary of \$800 (including benefits).

Total Start-up Costs = \$20,247 for which students are assumed to take out a non-owner loan for the first months expenses and cost of long-term assets, which consist of the following amounts: (\$500+\$100+\$720+\$480+\$1,200+\$1,080+\$50+\$100+\$5,000+\$500+\$8,000+\$167+\$50+\$400+\$300 +1,600=\$20,247). A self-amortizing loan is assumed to be obtained from a bank, and carries an annual interest rate of 6% payable over 2 years with monthly payments (each monthly payment consists of both principal and interest). The loan amortization schedule is included in the appendix of this case study (first months interest expense is \$101.24).

### **Other costs:**

10% of gross sales must be given to resort where shack will be located on its premises.  
Owner's capital will be used to cover direct materials' costs.

## **REQUIREMENTS OF THE FIRST PART OF THE CASE**

**In order to answer the questions below, you may make additional assumptions, and add/change fixed and variable costs (please clearly indicate all assumptions made).**

- 1) Using the above information, determine the number of milkshakes you will need to sell to break even. In order to do this, you will need to set a sales price as well as classify the above costs into fixed or variable. (Hint: keep all costs on either a weekly, monthly or yearly basis throughout your analysis). You also will need to vary assumption such as sales price, depreciable lives, and sales mix.
- 2) Should you leave your job to open the milkshake shack?

### **ANSWERS TO THE FIRST PART OF THE CASE:**

Presented below is one possible answer to this case using only information provided in the case with the following assumptions: 1) the milkshake's sales-mix will be 60% large and 40% small, 2) the suggested sales prices are used to be competitive with other vendors, and 3) the milkshake makers, tables and benches are assumed to last for 3 years, but the refrigerator/freezer and counter tops are assumed to last for 10 years and the sign is assumed to last only one year. Since this is a simulation exercise, the case allows students to see how the break-even sales volume changes depending upon different assumptions about product sales-mix, sale prices, depreciable lives of long-term assets as well as variable costs, and allows them to add other necessary fixed costs to the cost structure of the business conditional on their own unique business strategy. Consequently, their answers may vary.

Monthly fixed costs:

- Salary of 2 part-time workers 1,600.00
- Rental 500.00
- Supplies 100.00
- Milk Shake Maker depreciation 20.00 (720/ 36months)
- Refrigerator/freezer depreciation 4.00 (480/120 months)
- Counter tops depreciation 10.00 (1,200/120months)
- Tables and benches depreciation 30.00 (1,080/36 months)
- Annual insurance 50.00 (600/12months)
- Interest on loan 101.24
- Advertising expense 5,000.00
- Accounting and bookkeeping expense 500.00
- Owner's salary and benefits 8,000.00
- Dues and membership fees 167.00
- Licenses and permit fees 50.00
- Maintenance services 400.00
- Office supplies 300.00
- Sign 8.37 (100/12months)

**Total monthly Fixed Costs** \$16,840.61

**Variable Costs per unit:**

<b>Ingredient</b>	<b>Cost</b>		<b>Small</b>	<b>Large</b>
Whole milk	\$15 for 640 oz.	0.02344 per oz.	0.05	0.07
Cream	\$20 for 128 oz.	0.15625 per oz.	0.31	0.47
Sugar	\$10 for 30 cups	0.33333 per cup	0.17	0.25
Premium Vanilla Ice Cream	\$24 for 600 oz.	0.04000 per oz.	0.24	0.36
Flavorings			0.25	0.40
Flavored Specialty Straws			0.75	0.75
Cups-8 ounces	\$200 for 500 cups	0.40000 per cup	0.40	
Cups-12 ounces	\$250 for 500 cups	0.50000 per cup		0.50
<b>TOTAL DIRECT MATERIAL COST PER UNIT</b>			<b>\$2.17</b>	<b>\$2.80</b>

**Variable Cost Income Statement:** using a 40% (small) and 60% (large) sales-mix in determining the break-even sales volume:

	Small (40%)	Large (60%)	Weighted total
Sales after taking out the 10% owed to resort	\$7*90%=6.3*40%=2.520	\$10*90%=\$9*60%=5.400	7.920 per unit
Variable cost	2.17*40%=.868	2.80*60%=1.680	2.548 per unit
Contribution margin	1.652	3.720	5.372 per unit
Total Fixed costs			16,840.61 per month

1) You will need to sell 3,135 milkshakes/month to break even = (\$16,840.61/5.372) 1,254 (3,135\*40%) will be small and 1,881 (3,135\*60%) will be large.

**Variable Cost Income Statement:** using 40% (small) and 60% (large) sales-mix in determining the break-even sales volume (no salary allowance for owner):

	Small (40%)	Large (60%)	Weighted total
Sales after taking out 10% owed to resort	\$6.30*1,254milkshakes \$7,900.20	\$9*1,881milkshakes \$16,929.00	\$24,829.20
- Variable cost	\$2.17*1,254milkshakes \$2,721.18	\$2.80*1,881milkshakes \$5,266.80	\$ 7,987.98
Contribution margin	\$5,179.02	\$11,662.20	\$16,841.22
Total Fixed costs			\$16,840.61
Net Income			0.61 rounding error

*Note: The break even sales volume is 3,134.89 milkshakes. The Variable Cost Income Statement uses the breakeven quantity of 3,135 milkshakes. A small gain is shown due to rounding error since you cannot sell fractional milkshakes.*

## REQUIREMENTS OF THE SECOND PART OF THE CASE

The second part of this case is intended to demonstrate the importance of using a BUDGET process to plan, direct and control the organization. As stated in the answers to the first part of the case, since this is a simulation exercise emulating a real-life business start-up analysis, their budgets may vary based on assumptions they selected in the first part of the case. In addition, assumptions made with respect to “safety stock” or ending inventory in production and raw materials budgets will also most likely vary.

- 1) Using assumptions you made in the first part of the case regarding, sales price per unit, variable costs per unit and total fixed costs, as well as the information about sales volume presented below, prepare the following budgets for the first quarter:
  - Sales budget
  - Production budget
  - Direct materials budget for each raw material necessary to make milk shakes
  - Manufacturing Overhead budget
  - Operating budget
- 2) Using the information from the budgets you prepared above, prepare a projected Income Statement for the first month.

The **Sales Budget** must be prepared first as it affects all the other budgets. In order to prepare the sales budget an estimate of the expected number of units to be sold and the expected sales price needs to be determined. To prepare the sales budget we used the following assumptions. Statistics for tourism in Hawaii are available from the [www.hawaiitourismauthority.org](http://www.hawaiitourismauthority.org) and the Department of Business, Economic Development and Tourism of the State of Hawaii ( [Hawaii.gov/debdt](http://Hawaii.gov/debdt) ).

- Number of visitors to the island from January 2007 to May 2007 were 125,000, 125,000, 150,000, 125,000 and 125,000, respectively. (For simplicity, we assume each visitor, on average, purchases one milk shake. *(Students can get more elaborate and research the average number of days visitors stay and the average number of couples, versus families with kids).*)

## ANSWERS TO THE SECOND PART OF THE CASE:

Presented below is one possible answer to this case using only information provided in the case with the same assumptions followed when we presented the answer to the first part of the case.

- The sales mix and the sales price will be consistent with the first part of the case at 40% small and 60% large with the sales price set at the competitors price of \$10 for large and \$7 for small (less the resort fee of 10%).

SALES BUDGET for 1 <sup>st</sup> qtr	January	February	March	1 <sup>st</sup> qtr Total	April	May
Large shakes expected to be sold: (visitors* .60)	75,000	75,000	90,000	240,000	75,000	75,000
Expected sales price (\$10*90%)	\$ 9.00	\$ 9.00	\$ 9.00	\$ 9.00	\$ 9.00	\$9.00
Total sales (\$)	\$675,000	\$675,000	\$810,000	\$2,160,000	\$675,000	\$675,000
Small shakes expected to be sold: (visitors * .40)	50,000	50,000	60,000	160,000	50,000	50,000
Expected sales price (\$7*90%)	\$ 6.30	\$ 6.30	\$ 6.30	\$ 6.30	\$ 6.30	\$6.30
Total sales (\$)	\$315,000	\$315,000	\$378,000	\$1,008,000	\$315,000	\$315,000
<b>TOTAL SALES</b>	<b>\$990,000</b>	<b>\$990,000</b>	<b>\$1,188,000</b>	<b>\$3,168,000</b>	<b>\$990,000</b>	<b>\$990,000</b>

The next budget to be prepared is the **Production budget**, where the number of milk shakes needed to be produced (based on the sales budget) are determined. This will equal:

Number of milk shakes expected to be sold  
+ safety stock (ending finished goods inventory) in case demand is higher than predicted  
Total milk shakes needed  
Less: Beginning finished goods inventory (which is zero at the start of business)  
Milk shakes needed to be produced

To prepare the production budget we used the following assumptions:

- 10% of next month's expected milk shake sales is desired to be left in ending inventory as a safety cushion.
- Remember, beginning inventory is last months ending inventory.

**Large Milk Shakes:**

January's ending inventory: February sales of 75,000 \* .10 = 7,500  
February's ending inventory: March sales of 90,000 \* .10 = 9,000  
March's ending inventory: April sales of 75,000 \* .10 = 7,500  
April's ending inventory: May sales of 75,000 \* .10 = 7,500

**Small Milk Shakes:**

January's ending inventory: February sales of 50,000 \* .10 = 5,000  
February's ending inventory: March sales of 60,000 \* .10 = 6,000  
March's ending inventory: April sales of 50,000 \* .10 = 5,000  
April's ending inventory: May sales of 50,000 \* .10 = 5,000

PRODUCTION BUDGET - 1 <sup>st</sup> QTR	January	February	March	1 <sup>st</sup> Qtr total	April
Large shakes (sales budget)	75,000	75,000	90,000	240,000	75,000
+ desired ending inventory	7,500	9,000	7,500	7,500	7,500
Total needed	82,500	84,000	97,500	247,500	82,500
Less: beginning inventory	-0-	7,500	9,000	-0-	7,500
Large shakes to produce	82,500	76,500	88,500	247,500	75,000

PRODUCTION BUDGET - 1 <sup>st</sup> QTR	January	February	March	1 <sup>st</sup> Qtr total	April
Small shakes (sales budget)	50,000	50,000	60,000	160,000	50,000
+ desired ending inventory	5,000	6,000	5,000	5,000	5,000
Total needed	55,000	56,000	65,000	165,000	55,000
Less: beginning inventory	-0-	5,000	6,000	-0-	5,000
Small shakes to produce	55,000	51,000	59,000	165,000	50,000

After the number of milk shakes needed to be produced is determined, we can plan for the amount of direct materials, direct labor and manufacturing overhead that will be needed.

A **DIRECT MATERIALS** budget will need to be produced for each ingredient used to make the milk shakes. The direct materials budget for whole milk was prepared using the following assumptions:

- 10% of next month's expected milk needs are desired to be left in ending inventory as a safety cushion.
- Remember, beginning inventory is last months ending inventory.
- Cost of whole milk was determined to be \$0.02344 per ounce

<b>Milk Purchases Budget – 1<sup>st</sup> quarter</b>					
	January	February	March	Total	April
Large Milk Shake Production	82,500	76,500	88,500	247,500	75,000
Milk required per shake (ounces)	3 ounces	3 ounces	3 ounces	3 ounces	3 ounces
Ounces Needed for Large Milk Shake Production	247,500	229,500	265,500	742,500	225,000
Small Milk Shake Production	55,000	51,000	59,000	165,000	50,000
Milk required per shake (ounces)	2 ounces	2 ounces	2 ounces	2 ounces	2 ounces
Ounces needed for Small Milk Shake Production	110,000	102,000	118,000	330,000	100,000
Total Ounces Required for Production	357,500	331,500	383,500	1,072,500	325,000
Plus: Desired ending Inventory	33,150	38,350	32,500	32,500	32,500
Total Ounces Available	390,650	369,850	416,000	1,105,000	357,500
Less: Beginning Inventory	-0-	33,150	38,350	-0-	32,500
Total Ounces to be Purchased	390,650	336,700	377,650	1,105,000	325,000
Cost per Ounce	\$0.02344	\$0.02344	\$0.02344	\$0.02344	\$0.02344
Total Cost of Milk to be Purchased	\$9,156.84	\$7,892.25	\$8,852.12	\$25,901.21	\$7,618.00

#### **DIRECT MATERIALS BUDGET – CREAM.**

The direct materials budget for cream was prepared using the following assumptions:

- 10% of next month's expected cream needs are desired to be left in ending inventory as a safety cushion.
- Remember, beginning inventory is last months ending inventory.
- Cost of cream was determined to be \$0.15625 per ounce

<b>Cream Purchases budget – 1<sup>st</sup> Quarter</b>					
	January	February	March	Total	April
Large Milk Shake production	82,500	76,500	88,500	247,500	75,000
Cream required per shake(ounces)	3 ounces	3 ounces	3 ounces	3 ounces	3 ounces
Ounces Needed for Large Milk Shake Production	247,500	229,500	265,500	742,500	225,000
Small Milk Shake Production	55,000	51,000	59,000	165,000	50,000
Cream required per shake(ounces)	2 ounces	2 ounces	2 ounces	2 ounces	2 ounces
Ounces Needed for Small Milk Shake Production	110,000	102,000	118,000	330,000	100,000
Total Ounces Required for Production	357,500	331,500	383,500	1,072,500	325,000
Plus: Desired Ending Inventory	33,150	38,350	32,500	32,500	32,500
Total Ounces Available	390,650	369,850	416,000	1,105,000	357,500
Less: Beginning Inventory	-0-	33,150	38,350	-0-	32,500
Total Ounces to be Purchased	390,650	336,700	377,650	1,105,000	325,000
Cost per Ounce	\$0.15625	\$0.15625	\$0.15625	\$0.15625	\$0.15625
Total Cost of Cream to be Purchased	\$61,039.06	\$52,609.38	\$59,007.81	\$172,656.25	\$50,781.25

#### **DIRECT MATERIALS BUDGET – SUGAR.**

The direct materials budget for sugar was prepared using the following assumptions:

- 10% of next month's expected sugar needs are desired to be left in ending inventory as a safety cushion.
- Remember, beginning inventory is last months ending inventory.
- Cost of sugar was determined to be \$0.33333 per cup.

<b>Sugar Purchases Budget – 1<sup>st</sup> Quarter</b>					
	January	February	March	Total	April
Large Milk Shake Production	82,500	76,500	88,500	247,500	75,000
Sugar required per shake (in cups)	$\frac{3}{4}$ cup	$\frac{3}{4}$ cup	$\frac{3}{4}$ cup	$\frac{3}{4}$ cup	$\frac{3}{4}$ cup
Cups Needed for Large Milk Shake Production	61,875	57,375	66,375	185,625	56,250
Small Milk Shake Production	55,000	51,000	59,000	165,000	50,000
Sugar required per shake (in cups)	$\frac{1}{2}$ cup	$\frac{1}{2}$ cup	$\frac{1}{2}$ cup	$\frac{1}{2}$ cup	$\frac{1}{2}$ cup
Cups Needed for Small Milk Shake Production	27,500	25,500	29,500	82,500	25,000
Total Cups Required for Production	89,375	82,875	95,875	268,125	81,250
Plus: Desired Ending Inventory	8,288	9,588	8,125	8,125	8,125
Total Cups Available	97,663	92,463	104,000	276,250	89,375
Less: Beginning Inventory	-0-	8,288	9,588	-0-	8,125
Total Cups to be Purchased	97,663	84,175	94,412	276,250	81,250
Cost per Cup	\$ 0.33333	\$ 0.33333	\$ 0.33333	\$ 0.33333	\$ 0.33333
Total Cost of Sugar to be Purchased	\$32,554.01	\$28,058.05	\$31,470.35	\$92,082.41	\$27,083.06

#### **DIRECT MATERIALS BUDGET – ICE CREAM.**

The direct materials budget for ice cream was prepared using the following assumptions:

- 10% of next month's expected ice cream needs are desired to be left in ending inventory as a safety cushion.
- Remember, beginning inventory is last months ending inventory.
- Cost of ice cream was determined to be \$0.04 per ounce.



<b>Ice Cream Purchases Budget – 1<sup>st</sup> Quarter</b>					
	January	February	March	Total	April
Large Milk Shake Production	82,500	76,500	88,500	247,500	75,000
Ice Cream Required per shake	9 ounces	9 ounces	9 ounces	9 ounces	9 ounces
Ounces needed for Large Milk Shake Production	742,500	688,500	796,500	2,227,500	675,000
Small Milk Shake Production	55,000	51,000	59,000	165,000	50,000
Ice Cream Required per shake	6 ounces	6 ounces	6 ounces	6 ounces	6 ounces
Ounces needed for Small Milk Shake Production	330,000	306,000	354,000	990,000	300,000
Total Ounces Required for Production	1,072,500	994,500	1,150,500	3,217,500	975,000
Plus: Desired Ending Inventory	99,450	115,050	97,500	97,500	97,500
Total Ounces Available	1,171,950	1,109,550	1,248,000	3,315,000	1,072,500
Less: Beginning	-0-	99,450	115,050	-0-	97,500
Total Ounces to be Purchased	1,171,950	1,010,100	1,132,950	3,315,000	975,000
Cost per ounce	\$ 0.04	\$ 0.04	\$ 0.04	\$ 0.04	\$ 0.04
Total Cost of Ice Cream to be Purchased	\$46,878.00	\$40,404.00	\$45,318.00	\$132,600.00	\$39,000.00

#### **DIRECT MATERIALS BUDGET – FLAVORINGS.**

The direct materials budget for flavorings was prepared using the following assumptions:

- 10% of next month's expected flavoring needs are desired to be left in ending inventory as a safety cushion.
- Remember, beginning inventory is last months ending inventory.
- Cost of flavorings was \$ 0.40 for a large shake and \$ 0 .25 for a small shake.

<b>Flavorings Purchases Budget - 1<sup>st</sup> Quarter</b>					
	January	February	March	Total	April
Large Milk Shake Production	82,500	76,500	88,500	247,500	75,000
Plus: Desired Ending Inventory	7,650	8,850	7,500	7,500	7,500
Total Available	90,150	85,350	96,000	255,000	82,500
Less: Beginning Inventory	-0-	7,650	8,850	-0-	7,500
Total to be Purchased	90,150	77,700	87,150	255,000	75,000
Cost per unit	\$ 0.40	\$ 0.40	\$ 0.40	\$ 0.40	\$ 0.40
Total Cost of Flavorings to be Purchased for Large Milk Shakes	\$36,060.00	\$31,080.00	\$34,860.00	\$102,000.00	\$30,000.00
Small Milk Shake Production	55,000	51,000	59,000	165,000	50,000
Plus: Desired Ending Inventory	5,100	5,900	5,000	5,000	5,000
Total Available	60,100	56,900	64,000	170,000	55,000
Less: Beginning Inventory	-0-	5,100	5,900	-0-	5,000
Total to be Purchase	60,100	51,800	58,100	170,000	50,000
Cost per unit	\$ 0.25	\$ 0.25	\$ 0.025	\$ 0.25	\$ 0.25
Total Cost of Flavorings to be Purchased for Small Milk Shakes	\$15,025.00	\$12,950.00	\$14,525.00	\$42,500.00	\$12,500.00
Total Cost of Flavorings to be Purchased for ALL Milk Shakes	\$51,085.00	\$44,030.00	\$49,385.00	\$144,500.00	\$42,500.00

**DIRECT MATERIALS BUDGET – STRAWS.**

The direct materials budget for straws was prepared using the following assumptions:

- 10% of next month's expected straw needs are desired to be left in ending inventory as a safety cushion.
- Remember, beginning inventory is last months ending inventory.
- Cost per straw is \$ 0.75.

<b>Straws Purchases Budget – 1<sup>st</sup> Quarter</b>					
	January	February	March	Total	April
Large Milk Shake Production	82,500	76,500	88,500	247,500	75,000
Small milk shake Production	55,000	51,000	59,000	165,000	50,000
Total straws Required for Production	137,500	127,500	147,500	412,500	125,000
Plus: Desired Ending Inventory	12,750	14,750	12,500	12,500	12,500
Total Available	150,250	142,250	160,000	425,000	137,500
Less: Beginning Inventory	-0-	12,750	14,750	-0-	12,500
Total Straws to be Purchased	150,250	129,500	145,250	425,000	125,000
Cost per straw	\$ 0.75	\$ 0.75	\$ 0.75	\$ 0.75	\$ 0.75
Total cost of straws to be Purchased	\$112,687.50	\$97,125.00	\$108,937.50	\$318,750.00	\$93,750.00

**DIRECT MATERIALS BUDGET –CUPS.**

The direct materials budget for cups was prepared using the following assumptions:

- 10% of next month's expected cup needs are desired to be left in ending inventory as a safety cushion.
- Remember, beginning inventory is last months ending inventory.
- Cost per cup is \$ 0.50 for a large shake and \$ 0.40 for a small shake.

<b>Cups Purchases Budget – 1<sup>st</sup> Quarter</b>					
	January	February	March	Total	April
Large Milk Shake Production	82,500	76,500	88,500	247,500	75,000
Plus: Desired Ending Inventory	7,650	8,850	7,500	7,500	7,500
Total Available	90,150	85,350	96,000	255,000	82,500
Less: Beginning Inventory	-0-	7,650	8,850	-0-	7,500
Total cups to be Purchased	90,150	77,700	87,150	255,000	75,000
Cost per Cup	\$ 0.50	\$ 0.50	\$ 0.50	\$ 0.50	\$ 0.50
Total Cost of Cups to be Purchased	\$45,075.00	\$38,850.00	\$43,575.00	\$127,500.00	\$37,500.00

<b>Cups Purchases Budget – 1<sup>st</sup> Quarter</b>					
	January	February	March	Total	April
Small Milk Shake Production	55,000	51,000	59,000	165,000	50,000
Plus: Desired Ending Inventory	5,100	5,900	5,000	5,000	5,000
Total Available	60,100	56,900	64,000	170,000	55,000
Less: Beginning Inventory	-0-	5,100	5,900	-0-	5,000
Total cups to be Purchased	60,100	51,800	58,100	170,000	50,000
Cost per Cup	\$ 0.40	\$ 0.40	\$ 0.40	\$ 0.40	\$ 0.40
Total Cost of Cups to be Purchased	\$24,040.00	\$20,720.00	\$23,240.00	\$68,000.00	\$20,000.00

## MANUFACTURING OVERHEAD BUDGET

First, we need to determine whether each manufacturing overhead expense is variable or fixed. It has been determined that all the manufacturing overhead costs are fixed, although salary of part-time workers and utilities can be variable or mixed expenses as well.

Manufacturing Overhead Budget – 1 <sup>st</sup> Quarter				
	January	February	March	Total
<b>Fixed manufacturing overhead costs:</b>				
Salary of 2 part-time workers	1,600.00	1,600.00	1,600.00	4,800.00
Rent and utilities expense	500.00	500.00	500.00	1,500.00
Supplies for making milk shakes	100.00	100.00	100.00	300.00
Depreciation – milk shake maker	20.00	20.00	20.00	60.00
Depreciation – refrigerator/freezer	4.00	4.00	4.00	12.00
Depreciation – counter tops	<u>10.00</u>	<u>10.00</u>	<u>10.00</u>	<u>30.00</u>
<b>TOTAL FIXED COSTS</b>	<b>\$2,234.00</b>	<b>\$2,234.00</b>	<b>\$2,234.00</b>	<b>\$6,702.00</b>

## OPERATING BUDGET

First we need to determine whether each operating budget expense is variable or fixed. It has been determined that all the operating costs are fixed.

Operating Budget – 1 <sup>st</sup> Quarter				
	January	February	March	Total
<b>Fixed operating expenses:</b>				
Depreciation – tables and benches	30.00	30.00	30.00	90.00
Insurance expense	50.00	50.00	50.00	150.00
Interest expense	23.90	22.96	22.02	68.88
Advertising expense	5,000.00	5,000.00	5,000.00	15,000.00
Accounting and bookkeeping expense	500.00	500.00	500.00	1,500.00
Owner's salary expense	8,000.00	8,000.00	8,000.00	24,000.00
Dues and membership expense	167.00	167.00	166.00	500.00
Licenses and Permits expense	50.00	50.00	50.00	150.00
Maintenance expense	400.00	400.00	400.00	1,200.00
Office supplies expense	300.00	300.00	300.00	900.00
Depreciation – sign	<u>8.37</u>	<u>8.33</u>	<u>8.33</u>	<u>25.03</u>
<b>TOTAL FIXED COSTS</b>	<b>\$14,529.27</b>	<b>\$14,528.29</b>	<b>\$14,526.35</b>	<b>\$43,583.91</b>

**So what is the BUDGETED MANUFACTURING COST FOR ONE UNIT:**

**Direct Materials Variable Costs per unit:**

<b>Ingredient</b>	<b>Cost</b>		<b>Small</b>	<b>Large</b>
Whole milk	\$15 for 640 oz.	0.02344 per oz.	0.05	0.07
Cream	\$20 for 128 oz.	0.15625 per oz.	0.31	0.47
Sugar	\$10 for 30 cups	0.33333 per cup	0.17	0.25
Premium Vanilla Ice Cream	\$24 for 600 oz.	0.04000 per oz.	0.24	0.36
Flavorings			0.25	0.40
Flavored Specialty Straws			0.75	0.75
Cups-8 ounces	\$200 for 500 cups	0.40000 per cup	0.40	
Cups-12 ounces	\$250 for 500 cups	0.50000 per cup		0.50
<b>TOTAL DIRECT MATERIAL COST PER UNIT</b>			<b>\$2.17</b>	<b>\$2.80</b>

**LARGE MILK SHAKES** – per the PRODUCTION budget we expect to produce 1,580,000 in the first Year: (125,000+125,000+150,000+125,000+125,000+150,000+160,000+150,000+110,000+110,000+110,000+140,000).

(1) Direct materials cost per milk shake: = 2.80

(2) Manufacturing overhead:

**Fixed** (\$2,234.00 \* 12 months \* 60% per quarter) / 1,580,000 =  
milk shakes = 0.01

**Cost of manufacturing each large milk shake = \$2.81**

**SMALL MILK SHAKES** – per the PRODUCTION budget we expect to produce 165,000 in the first quarter.

(1) Direct materials cost per milk shake: = 2.17

(2) Manufacturing overhead:

**Fixed** (\$2,234.00 \* 12 months \* 40% per quarter) / 1,580,000 =  
milk shakes = 0.01

**Cost of manufacturing each small milk shake = \$2.18**

PROJECTED INCOME STATEMENT  
MONTH OF JANUARY

	Large (60%)	Small (40%)	Total
Number of milk shakes expected to be sold	75,000	50,000	125,000
Sales price per milk shake (less resort fee)	\$9.00	\$6.30	
Cost of goods sold per milk shake	\$2.81	\$2.18	
Sales	\$675,000	\$315,000	\$990,000
Less: cost of goods sold	<u>\$211,500</u>	<u>\$109,500</u>	<u>\$321,000</u>
Gross Profit	\$463,500	\$205,500	\$669,000
Less: Operating expenses	<u>26,150</u>	<u>17,434</u>	<u>43,584</u>
Operating Income	\$437,350	\$188,066	\$625,416
Income tax expense (income tax rate = 35%)	<u>\$153,073</u>	<u>\$ 65,823</u>	<u>\$218,896</u>
Net Income	<u>\$284,277</u>	<u>\$122,243</u>	<u>\$406,520</u>

Due to global warming, demand for milk shares was much larger than expected. The amount of large milk shakes actually sold in January were 85,000 (10,000 over budget) while the amount of small milk shakes actually sold in January were 45,000 (5,000 under budget). The budgets prepared above were planned prior to the beginning of the year and are valid for the planned level of sales activity. If the actual level of sales activity differs from the planned level, comparing our budgets above with actual results may lead to incorrect conclusions about performance. Therefore we must prepare a FLEXIBLE budget that adjusts revenues and expenses given the actual level of sales activity that occurred.

<b>Large Milk Shakes - Flexible Budget Performance Report for the Month ended January 31</b>					
	Planned Budget based on budgeted sales of 75,000 milk shakes	Activity and Spending Variances	Actual results based on actual sales of 85,000 milk shakes	Spending Variances	Flexible budget based on actual sales of 85,000 milk shakes
Revenue (\$9.00q)	\$675,000	90,000 F	\$765,000		\$765,000
Less: Cost of goods sold (\$2.82q)	<u>\$211,500</u>	8,500 U	<u>\$220,000</u>	19,700 F	<u>\$239,700</u>
Gross Profit	\$463,500	81,500 F	\$545,000	19,700 F	\$525,300
Less: Operating expenses	<u>26,150</u>	1,600 U	<u>27,750</u>	1,600 U	<u>26,150</u>
Operating Income	\$437,350	79,900 F	\$517,250	18,100 F	\$499,150
Income tax expense (tax rate = 35%)	<u>\$153,073</u>		<u>\$181,038</u>		<u>\$174,703</u>
Net Income	\$284,277		\$336,212		\$324,447

<b>Small Milk Shakes - Flexible Budget Performance Report for the Month ended January 31</b>					
	Planned Budget based on budgeted sales of 50,000 milk shakes	Activity and Spending Variances	Actual results based on actual sales of 45,000 milk shakes	Spending Variances	Flexible budget based on actual sales of 45,000 milk shakes
Revenue (\$6.30q)	\$315,000	31,500 U	\$283,500		\$283,500
Less: Cost of goods sold (\$2.19q)	<u>\$109,500</u>	<u>9,000 F</u>	<u>\$100,500</u>	1,950 U	\$98,550
Gross Profit	\$205,500	22,500 U	\$183,000	1,950 U	\$184,950
Less: Operating expenses	<u>17,434</u>	116 U	<u>17,550</u>	116 U	<u>17,434</u>
Operating Income	\$188,066	22,616 U	\$165,450	2,066 U	\$167,516
Income tax expense (tax rate = 35%)	<u>\$ 65,823</u>		<u>\$57,907</u>		<u>\$58,613</u>
Net Income	\$122,243		\$107,543		\$108,885

## CONCLUSION

This case integrates key concepts of Cost-Volume-Profit (CVP) analysis, and Flexible Budgeting in a case study-setting to enable students to understand the different stages involved in starting up a business, preparing required budgets, projecting out results, monitoring business performance, and reconciling variances between projected and actual results. We show students the importance of these key practical yet very relevant management-accounting tools, all done in one integrative setting instead of teaching those concepts separately. Furthermore, our case study accomplishes these goals in a dynamic simulation-style exercise that allows students to make their own assumptions about key input variables needed in the analysis and witness firsthand how changes in these assumptions impact their business performance results. Students often wonder how they can use and integrate concepts learned throughout different accounting courses with other business courses in the areas of finance, management and marketing. This case accomplishes precisely this very goal by enabling students who go through the exercise which the case presents to apply what they learned in various business disciplines in an integrated and comprehensible way. It is often viewed that flexible budgeting is a key starting point for developing a full cost-accounting system and subsequent analyses of variances between budgeted and actual results in an effort to improve cost control and operational performance. This case provides the necessary tools to both business school students in general, as well as accounting students in particular who will move on to higher-level accounting courses such as a cost-management class, typically taken in their major, to understand the full picture needed to start and maintain a successful small business.

## REFERENCES

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The Department of Business, Economic Development and Tourism of the State of Hawaii  
(Hawaii.gov/debdt ). www.hawaiiitourismauthority.org

**APPENDIX: LOAN AMORTIZATION SCHEDULE:**

<u>Beginning Balance</u>	<u>Payment</u>	<u>Interest Expense</u>	<u>Principle reduction</u>	<u>Ending balance</u>
20,247.00	897.36	101.24	796.12	19,450.88
19,450.88	897.36	97.25	800.11	18,650.77
18,650.77	897.36	93.25	804.11	17,846.66
17,846.66	897.36	89.23	808.13	17,038.53
17,038.53	897.36	85.19	812.17	16,226.36
16,226.36	897.36	81.13	816.23	15,410.13
15,410.13	897.36	77.05	820.31	14,589.82
14,589.82	897.36	72.95	824.41	13,765.41
13,765.41	897.36	68.83	828.53	12,936.88
12,936.88	897.36	64.68	832.68	12,104.20
12,104.20	897.36	60.52	836.84	11,267.36
11,267.36	897.36	56.34	841.02	10,426.34
10,426.34	897.36	52.13	845.23	9,581.11
9,581.11	897.36	47.91	849.45	8,731.66
8,731.66	897.36	43.66	853.70	7,877.96
7,877.96	897.36	39.39	857.97	7,019.99
7,019.99	897.36	35.10	862.26	6,157.73
6,157.73	897.36	30.79	866.57	5,291.16
5,291.16	897.36	26.46	870.90	4,420.26
4,420.26	897.36	22.10	875.26	3,545.00
3,545.00	897.36	17.73	879.63	2,665.37
2,665.37	897.36	13.33	884.03	1,781.34
1,781.34	897.36	8.91	888.45	892.89
892.89	897.36	4.46	892.89	0.00

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