

## Design Firm Price/Volume Variance Analysis

Price/Volume Variance Analysis and Standard Costs is an accounting tool normally used in manufacturing and process job cost accounting. The concept of Price/Volume Variance Analysis can be applied to a Professional Services Firm where the unit of service is the Direct Labor Hour. Once the design firm has prepared an annual Profit Plan, the Standard Costs (Price) for Net Revenue, Direct Labor and Overhead and Operating Profit is determined. The Budget establishes the Standard Costs or benchmarks that the variances are measured from.

Volume refers to the total number of available Direct Labor Hours for the period. Standard cost refers to expected costs under anticipated conditions as shown in the annual budget or profit plan. Standard cost is the standard cost of a single unit, the direct labor hour. Budgeted cost is the cost, at standard, of the total number of budgeted direct labor hours. The total number of budgeted units is the total available direct labor hours from the profit plan labor budget.

The business of a professional service firm is the provision of an hour of labor. Labor and labor-related expense constitutes 65% to 80% of most professional services firms' expense and is the most readily adjustable item of expense. In a professional service firm, time is money. The unit of service is the direct labor hour. Available direct labor hours determine the capacity of a professional service firm to generate revenue. The other 20% to 35% of cost is Indirect Expense or Overhead costs not related to a project.

The focus here is on the unit price per hour for Net Revenue, Direct Labor, Overhead and Operating Profit per direct labor hour. It is assumed that all reimbursable and direct projects related costs are passed through to the client and billed dollar for dollar. There is no Direct Materials price or quantity in calculating standard costs for the professional services design firm.

The table below shows the variance analysis for Operating Profit and the components of Net Revenue for a professional services design firm. The Net Revenue variance is (178,500) less than planned. Direct Labor is (38,780) less than planned. Overhead is 88,780 more than planned and Operating Profit is (228,500) less than planned. The planned profit was 499,980 with 3,000,000 of net revenue. The actual profit was 271,480 with 2,821,500 of actual net revenue. So how much of the (228,500) profit variance is due to *price* and how much of the profit variance is due to *volume*?

The unit price variance per Direct Labor Hour for Net Revenue is \$(1.00) calculated as (\$99.00 actual less \$100.00 budget). The unit price variance for Direct Labor is \$0.39 more than planned (33.73 actual less 33.33 budgets). The unit price of Overhead per Direct Labor Hour is \$5.75 more than budget (55.75 actual less the 50.00 budget). The sum of the Net Revenue variance and the Total Cost variance is an unfavorable price variance of \$(7.14) per Direct Labor Hour. So the total *price* variance is (203,501) calculated by multiplying the (7.14) price variance per direct labor hour times the 28,500 actual number of direct labor hours for the period.

The Operating Profit *volume* variance is calculated by multiplying the Direct Hour variance of (1,500) hours under the 30,000 planned hours in the Labor Budget times the planned 16.67 profit per direct labor hour. So the unfavorable volume variance is (24,999). The net unfavorable Operating Profit variance of (228,500) is composed of the (203,501) *price* variance plus the (24,999) *volume* variance.

## Design Firm Price/Volume Variance Analysis

Price/Volume Variance Analysis		Net	Direct		Total	Operating
		Revenue	Labor	Overhead	Cost	Profit
Row	<u>Profit Plan (Multiples of Direct Labor)</u>	3.00	1.00	1.50	2.50	0.50
X	Budget (A x C)	3,000,000	1,000,020	1,500,000	2,500,020	499,980
Y	Actual (B x D)	2,821,500	961,240	1,588,780	2,550,020	271,480
	Variance (Y - X)	178,500)	(38,780)	8,780	50,000	(228,500)
		Net	Direct		Total	Operating
	Price	Revenue	Labor	Overhead	Cost	Profit
A	YTD Budget	100.00	33.33	50.00	83.33	16.67
B	YTD Actual	99.00	33.73	55.75	89.47	9.53
	Variance	(1.00)	0.39	5.75	6.14	(7.14)
	Volume					
C	Direct Labor Hours-Budget YTD	30,000	30,000	30,000	30,000	30,000
D	Direct Labor Hours-Actual YTD	28,500	28,500	28,500	28,500	28,500
	Variance	1,500)	(1,500)	(1,500)	(1,500)	(1,500)
		Net	Direct		Total	Operating
Row	Price/Volume Variance Analysis	Revenue	Labor	Overhead	Cost	Profit
1	Price Variance per Direct Labor Hour	1.00)	0.39	.75	6.14	(7.14)
2	Actual Direct Labor Hours Year to Date	28,500	28,500	8,500	28,500	28,500
3	Price Variance (1 x 2)	28,500)	11,221	63,780	175,001	(203,501)
4	Budget Price Per Direct Hour	100.00	33.33	50.00	83.33	16.67
5	Direct Hour Variance	1,500)	(1,500)	(1,500)	(1,500)	(1,500)
6	Volume Variance (4 x 5)	(150,000)	(50,001)	(75,000)	(125,001)	(24,999)
7	Actual Price Per Direct Hour (1 + 4)	99.00	33.73	55.75	89.47	9.53
8	Net Variance (3 + 6)	(178,500)	(38,780)	88,780	50,000	(228,500)

The above table shows that Net Revenue unfavorable price/volume variance of (178,000) is composed of a (28,500) **price** variance and a (150,000) **volume** variance. The unfavorable Direct Labor price/volume variance of (38,780) is composed of a favorable 11,221 price variance and (50,001) unfavorable volume variance. The favorable price variance of \$0.39 means that higher paid staff had above average utilization and billed more hours to projects than planned. The Overhead variance of 88,780 is composed of 163,780 price variance and (75,000) volume variance. The planned unit price for overhead is 5.75 more than the 50.00 planned direct labor hour. Just as in manufacturing standard cost accounting, a "favorable" variance may in fact be "unfavorable" as is the Price Variance for Overhead in this example.

### Case Study: Another application of price/volume variance analysis in the professional services design firm

Facts: The firm has quoted a fixed fee for a large project to a client for \$3,000,000. For some reason for either economic or zoning problems, the project is put on hold. Preliminary and design work is stopped. Two years later the project comes back to life. During that two year period, the design firm's labor cost has increased 3% and overhead costs have

## Design Firm Price/Volume Variance Analysis

increased 2%. The client has also changed the scope of the project by adding additional tasks to the project increasing the original estimate from 30,000 to 31,500 hours thus adding 1,500 or 5% additional hours to produce the project.

The Principal-In-Charge of the project submits a revised project fee to the client increasing the fee \$228,782 from \$3,000,000 to \$3,228,782. The client wants to know why such a "big increase" in the original fee of \$3,000,000. From the price/volume analysis table below, we can see that \$150,000 or 65.56% of the \$228,782 increase is from the additional scope (**volume**) of work requiring an additional 1,500 hours to produce the project. The fee **price** increase is \$78,782 or 34.44% to cover the 3.15% increase of \$31,501 in direct labor cost and 2.10% increase of \$31,500 in overhead cost over the two year period.

Price/Volume Variance Analysis		Net	Direct		Total	Operating
		Revenue	Labor	Overhead	Cost	Profit
Row	<u>Profit Plan (Multiples of Direct Labor)</u>	3.00	1.00	1.50	2.50	0.50
X	Budget (A x C) <i>Original Fee</i>	3,000,000	1,000,020	1,500,000	2,500,020	499,980
Y	Actual (B x D) <i>Revised Fee</i>	3,228,782	1,081,522	1,606,500	2,688,022	540,761
	Variance (Y - X)	228,782	81,502	106,500	188,002	40,781
	Multiples of Direct Labor	2.99	1.00	1.49	2.49	0.50
		Net	Direct		Total	Operating
	Price	Revenue	Labor	Overhead	Cost	Profit
A	Budget <i>Original Price</i>	100.00	33.33	50.00	83.33	16.67
B	Actual <i>Revised Price</i>	102.50	34.33	51.00	85.33	17.17
	Variance	2.50	1.00	1.00	2.00	0.50
		2.50%	3.00%	2.00%	2.40%	3.01%
	Volume					
C	Direct Labor Hours-Budget <i>Original</i>	30,000	30,000	30,000	30,000	30,000
D	Direct Labor Hours-Actual <i>Revised</i>	31,500	31,500	31,500	31,500	31,500
	Variance	1,500	1,500	1,500	1,500	1,500
		5.00%	5.00%	5.00%	5.00%	5.00%
		Net	Direct		Total	Operating
Row	Price/Volume Variance Analysis	Revenue	Labor	Overhead	Cost	Profit
1	Price Variance per Direct Labor Hour	2.50	1.00	1.00	2.00	0.50
2	Revised Direct Labor Hours	31,500	31,500	31,500	31,500	31,500
3	Price Variance (1 x 2)	78,782	31,501	31,500	63,001	15,782
		2.63%	3.15%	2.10%	2.52%	3.16%
		34.44%				
4	Original Price Per Direct Hour	100.00	33.33	50.00	83.33	16.67
5	Direct Hour Variance	1,500	1,500	1,500	1,500	1,500
6	Volume Variance (4 x 5)	150,000	50,001	75,000	125,001	24,999
		5.00%	5.00%	5.00%	5.00%	5.00%
		65.56%				
7	Actual Price Per Direct Hour (1 + 4)	102.50	34.33	51.00	85.33	17.17
8	Net Variance (3 + 6)	228,782	81,502	106,500	188,002	40,781
		7.63%	8.15%	7.10%	7.52%	8.16%