

**White Paper**

# ***How To: Calculate Burden Rates for Costing Systems***

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## How to calculate and apply burden rates

Burden rates, otherwise known as overhead rates, are used by cost estimators to assign a portion of overhead to estimates. Even to estimators the term is not universally used or applied. Our previous white paper, “Costing System Considerations” deals with some of the difficulties faced when apportioning overhead to an estimate.

A simple yet consistent methodology for the calculation and usage of burden rates is essential for the generation of accurate cost estimates. If you are using our product, eTurboQuote, Excel spreadsheets, or a different system, the proper calculation of application of burden rates is essential. We have developed a simple system and developed an Excel based [burden rate calculator](#) which is free to download and use.

### The Process:

A good understanding of your cost structure is necessary before you can begin thinking about calculating burden rates. You must work through these five steps:

- Collect and summarize the overhead costs associated with your business. The time period used is up to you, but you must be consistent throughout the analysis. Generally speaking, the maximum time frame should be one year, but we prefer to recalculate burden rates quarterly. Business today changes too rapidly to depend on results that are a year or more old.



Burden Rate Calculator			
Zone 1		Revision Date: 13-Aug-13	
Overhead Description	Total Cost	Total Cost Assigned to Activity Centers	Comments
<b>SUPPLIES</b>			
OPERATING SUPPLIES	\$1,500.00	\$300.00	
SHIPPING SUPPLIES	\$2,500.00	\$345.00	
PACKAGING SUPPLIES	\$500.00	\$54.00	
OFFICE SUPPLIES	\$1,000.00	\$25.00	
<b>PAYROLL</b>			
SIMPLE IRA 2% Match	\$145,137.20	\$145,137.20	
INSURANCE - WORKMENS COMP	\$81,120.00	\$81,120.00	
INSURANCE - HEALTH	\$1,012,500.00	\$1,012,500.00	
TUITION & REIMBURSEMENT	\$93,750.00	\$93,750.00	
TAXES - FICA	\$449,925.32	\$449,925.32	
TAXES - MEDICARE	\$105,224.47	\$105,224.47	
TAXES - UNEMPLOYMENT	\$27,040.00	\$27,040.00	
Vacation and Holiday Allocation	\$254,637.50	\$254,637.50	
<b>TAXES</b>			
TAXES - PROPERTY (EQUIPMENT)	\$10,000.00	\$1,000.00	
TAXES - PROPERTY (FACILITY)	\$234,000.00	\$34,000.00	
<b>FACILITIES</b>			
EQUIPMENT LEASE	\$10,000.00	\$0.00	
BUILDING LEASE	\$25,000.00	\$2,000.00	
UTILITIES - GAS	\$1,250.00	\$250.00	
UTILITIES - ELECTRIC	\$12,500.00	\$1,253.00	
REPAIR MAINTENANCE	\$100,000.00	\$10,000.00	
DEPRECIATION	\$15,000.00	\$190.00	
<b>VEHICLES</b>			
AUTOMOBILE EXPENSE	\$2,500.00	\$0.00	
FUEL	\$250.00	\$0.00	
REPAIRS & MAINTENANCE	\$2,500.00	\$0.00	
<b>Total Cost</b>	<b>\$2,587,834.49</b>		

Table 1

In our [burden rate calculator](#) the overhead cost summary is found on the **Zone 1 - Overhead Summary** tab.

- Define all of your Activity Cost Centers (Operations, Work Cells, or Machines), and put them on a list

Area Identifier Number	Activity Center Name	Activity Center Description
100	General	Shop Labor - No Specific Cost Center
200	Machining	Milling and Grinding
300	Injection Molding Machine 1	Injection Molding Machine 1

Table 2

- Determine the amount of each overhead cost that will be applied against the activity cost center. There are many different approaches to this; for example facility costs are often proportioned by the square footage used.

Once it has been decided how to apportion the overhead costs, record the information on a list; one list for each Activity Cost Center. If you are using our [calculator](#), you will find these lists ready to use on the Activity Center 1 – Activity Center 25 tabs.



Burden Rate Calculator				
Operation Name:	Machining	Revision Date:	13-Aug-13	
Operation Number:	200			
Operation Description:	Milling and Grinding			
Equivalent Heads:	4			
Average Labor Rate:	\$11.65			
Forecasted Hours / Week per head:	41			
	<b>Zone 1</b>		<b>Zone 2</b>	
Overhead Description	Total Cost	Cost Assigned to Machining	Fixed	Variable
<b>SUPPLIES</b>				
OPERATING SUPPLIES	\$1,500	\$150.00	\$100.00	\$50.00
SHIPPING SUPPLIES	\$2,500			
PACKAGING SUPPLIES	\$500			
OFFICE SUPPLIES	\$1,000			
<b>PAYROLL</b>				
SIMPLE IRA 2% Match	\$145,137	\$496.76		\$496.76
INSURANCE - WORKMEN'S COMP	\$81,120	\$639.60		\$639.60
INSURANCE - HEALTH	\$1,012,500	\$10,800.00		\$10,800.00
TUITION & REIMBURSEMENT	\$93,750	\$1,000.00		\$1,000.00
TAXES - FICA	\$449,925	\$1,539.94		\$1,539.94
TAXES - MEDICARE	\$105,224	\$360.15		\$360.15
TAXES - UNEMPLOYMENT	\$27,040	\$213.20		\$213.20
Vacation and Holiday Allocation	\$254,638	\$1,211.60		\$1,211.60
<b>TAXES</b>				
TAXES - PROPERTY (EQUIPMENT)	\$10,000			
TAXES - PROPERTY (FACILITY)				
<b>FACILITIES</b>				
EQUIPMENT LEASE	\$10,000			
BUILDING LEASE	\$25,000			
UTILITIES - GAS	\$1,250	\$125.00	\$125.00	
UTILITIES - ELECTRIC	\$12,500			
REPAIR MAINTENANCE	\$100,000			
DEPRECIATION	\$15,000			
<b>VEHICLES</b>				
AUTOMOBILE EXPENSE	\$2,500			
FUEL	\$250			
Blue Cells indicate where you can enter data. Green	\$2,500			
<b>Total Overhead Cost</b>	<b>2,352,834.49</b>	<b>16,536.25</b>	<b>225.00</b>	<b>16,311.25</b>
	<b>Zone 3</b>			
<b>Projected Annual Labor \$</b>		<b>\$99,351.20</b>		
<b>Burden Rate</b>		<b>16.64%</b>	<b>0.23%</b>	<b>16.42%</b>

Table 3

Often overhead costs are equally distributed across all operations or activity cost centers, but this results in some activity cost centers being over-burdened and others being under-burdened.

- Once costs are assigned to activity cost centers, you must decide which costs are FIXED and which are VARIABLE. Variable costs are those costs that can be expected to increase in direct proportion to labor hours. Fixed costs are those costs that are mostly independent from hours worked.



Burden Rate Calculator			
Zone 1		Zone 2	
Overhead Description	Total Cost	Fixed	Variable
<b>SUPPLIES</b>			
OPERATING SUPPLIES	\$1,500		
SHIPPING SUPPLIES	\$2,500		
PACKAGING SUPPLIES	\$500		
OFFICE SUPPLIES	\$1,000		
<b>PAYROLL</b>			
SIMPLE IRA 2% Match	\$145,137		\$1,173.17
INSURANCE - WORKMENS COMP	\$81,120		\$1,201.20
INSURANCE - HEALTH	\$1,012,500		\$18,900.00
TUITION & REIMBURSEMENT	\$93,750		\$1,750.00
TAXES - FICA	\$449,925		\$3,636.83
TAXES - MEDICARE	\$105,224		\$850.55
TAXES - UNEMPLOYMENT	\$27,040		\$400.40
Vacation and Holiday Allocation	\$254,638		\$2,666.30
<b>TAXES</b>			
TAXES - PROPERTY (EQUIPMENT)	\$10,000		
TAXES - PROPERTY (FACILITY)			
<b>FACILITIES</b>			
EQUIPMENT LEASE	\$10,000		
BUILDING LEASE	\$25,000		
UTILITIES - GAS	\$1,250		
UTILITIES - ELECTRIC	\$12,500		
REPAIR MAINTENANCE	\$100,000		
DEPRECIATION	\$15,000		
<b>VEHICLES</b>			
AUTOMOBILE EXPENSE	\$2,500		
FUEL	\$250		
Blue Cells indicate where you can enter data. Green	\$2,500		
<b>Total Overhead Cost</b>	2,352,834.49	0.00	30,578.45

Table 4

If you are using our [calculator](#), you will find these allocation tables, ready to fill-in, on the Activity Center 1 – Activity Center 25 tabs.

- Finally, calculate the fixed, variable and total overhead rates for each activity cost center.

Since overhead rates are generally expressed as a percentage or ratio of direct labor dollars, you will need to develop a solid forecast of labor expenditures for each activity center for the time period specified. This is one of the reasons we prefer quarterly overhead reviews – no one can forecast effectively into the distant future.

<b>Projected Annual Labor \$</b>	\$66,456.00		
<b>Burden Rate</b>	91.83%	55.96%	35.87%

Table 5

Overhead rate equations:

Fixed Overhead Rate = Fixed Overhead Cost ÷ Direct Labor Forecast

Variable Overhead Rate = Variable Overhead Cost ÷ Direct Labor Forecast

Total Overhead Rate = Total Overhead Cost ÷ Direct Labor Forecast

Please download our Excel based [Burden Rate Calculator](#) to help with this. It is easy to use and it is free.

### **Some Considerations – Overhead versus SG&A:**

It is important to keep Overhead expenses distinct from Sales, General and Administrative expenses (SG&A). The difference – overhead expenses are those expenses that are directly related to the manufacture of your product, while SG&A expenses are related to the management of the overall company and the selling and distribution of the product. If you confuse or combine the two, you will generate a distorted cost picture that will make it more difficult to make good decisions.

For precise estimates, the best practice is to assign only the portion of actual overhead costs incurred by an operation or Activity Cost Center.

#### **A Case Study:**

The CEO was sure they were over-allocating their overhead expenses, but they had had expert consultants help them develop the overhead rates, and no one could find anything wrong with the math or the allocations.

When we reviewed the numbers, we also confirmed the math and the allocations were good... but the framework in which it had been developed was flawed. You see, they had combined overhead and SG&A costs, and **burdened** the manufacturing operations with covering both.

They might have gotten away with it, but a large portion of their sales were of products they purchased and redistributed. The distribution business was bearing none of the selling expense... it was all charged to the manufacturing operations. So it looked like the manufacturing operation was struggling when in fact it was carrying the day.

## ***Some Considerations - Activity Based Costing:***

We strongly recommend using Activity Based Cost estimating (ABC) for all businesses involving multiple processes or products where actual overhead utilization varies from one activity to another. Our cost estimating solution, eTurboQuote, is flexible enough to work with either ABC estimating or traditional estimating, but for accurate results and high quality estimates we always strive to move our clients towards ABC.

ABC costing is superior to traditional cost because it is more accurate. The differences in the costs to operate each Activity Cost Center are identified and accounted for. The likelihood of under-burdening and over-burdening cost centers is virtually eliminated.

### ***Why use ABC estimating?***

When multiple processes are used or multiple product families are being produced, usage of overhead resources is far from uniform. For example, a 75 ton injection molding machine will use dramatically less electricity than a 500 ton machine. Differences in depreciation costs of machines and the cost of technical support can be substantial.

When estimating a new project that will require new capital equipment or additional skilled support staff, ABC estimating easily allows the estimator to identify and separate the overall impact and produce realistic estimates.

Businesses routinely evaluate product line profitability. When overhead is spread evenly instead of realistically, the profitability of some product lines are overstated and others understated. This makes it difficult to make high quality decisions.

### ***Let us help:***

We are cost estimating and manufacturing experts who have years of experience in engineering, operations management, and cost estimating. We have used that experience to develop unique tools to standardize cost estimating systems and processes that are easy to implement and use. Most companies find that they are up and running with our tools in a couple of weeks. But best of all, our tools while powerful, are flexible enough to be set up to work the way you want.

If you need help in developing and applying burden rates for ABC estimating, we are here for you. Our team can train your staff or help you calculate and apply these burden rates in your quoting. Let us assist you in getting started today.