

Residential Paint Estimator 4.1 Users Manual

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Introduction

Congratulations, you have purchased the most comprehensive bid-pricing program on the market for the Residential and Light Commercial Painting Contractor. Its use will significantly reduce the possibility of mathematical errors when totaling your bid and the time involved in looking up production and material coverage rates. You will always have a very detailed bid with a total breakdown of hours for each step of the job and an accurate detailed amount of the materials that will be needed. You will be able to instruct your Foreman or Field Supervisors as to how long each phase of the job should take and how much material will be needed and then track their productivity to see how well they are doing. This will help track each job so that you know not only how this job is doing, but how your business is performing as well. This will give you the ability to catch problems sooner and correct the situation if needed. The program is completely user programmable for materials, and production rates to suit your company and the way you do business. We have endeavored to include many practical aspects used in the estimating of residential and commercial work. For those unusual things such as “widgets”, there is a section on page “Misc.25”, where you can enter the estimated man-hours and the estimated cost of the material, and the price for those “widgets” will be included in your bid total

To my Dad and all the other old timers who
gave me the benefit of their painting experience.

Thank you,
Les Lieser

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Programming Introduction

In the following tutorial you will be taken through a sample setup for a small painting company. Many small, and sometimes not so small, companies do not have a good understanding of how their overhead affects what they need to charge per hour to make a profit. All too often, an arbitrary markup figure is used with the hope that it will cover the overhead and leave something for profit. Without establishing what your overhead is, and what your break-even hourly rate is, you are only guessing at what you should be charging. Guessing can either leave you short on your estimate to the point where you will lose money, or your bid may be higher than it needs to be and you may not get the job. In the economy we live with today, you cannot afford to guess, you need to be right on the mark. This program will take the guesswork out of your bidding process and show you what you need to charge to make the profit margin you desire. It is strongly suggested that you go through this entire sample setup before setting up your own company. It won't take very long and it will give you a good idea as to how the program functions. For the sample setup please use the figures and rates suggested so that you can see how the program works. It's not hard; just follow the directions and examples in this user manual.

As you move through the program, you will want to be mindful of the help tips on the right of each screen. On a small screen computer, you may have to scroll to the right to see them. They will usually be in columns K through Q and will give you advice and directions for that page.

If you get this ##### or this #VALUE! in the program, it is an error message. Don't panic, you have just accidentally entered a letter or punctuation mark in a number entry area. This can occur when entering the price of material if you mistakenly enter a comma instead of a period between dollars and cents. Just go find your mistaken entry and remove it, the program will correct itself.

Programming the Job Setup page

At the top of the page, “Job Setup”, is “Job Name, Estimators Name, and Date”. These are not part of the initial setup; they will be filed in at the start on each bid. By filling in these fields, they are displayed on all pages identifying them as part of that bid.

Labor Rates:

Calculating your break-even rate can be a time consuming and somewhat difficult task. Contractors who have tried to tackle this manually say it can take them many hours if not days to complete. Once the calculation is complete, they discover that one change in their business can cause them to start the process all over again. Meaning wasted time and effort. We also hear from contractors who say that they try to calculate it but are not sure where to start or what to include in their break-even rate to get an accurate number.

Here is the simple solution, the set-up page of this estimating program. It only takes setting it up once with an easy to follow format and changes are made, quickly and easily.

Your break-even rate consists of your average direct labor rate, burden rate, any fringe rates that may apply, and your overhead rate. Our estimating program calculates all these numbers and takes all the guesswork out of what to include to get an accurate break-even rate for your business. With out an accurate break-even figure you have no idea what to charge let alone what your profit might be.

Let's get started.

Line 8, column H, “Average Employees Hourly Rate” is part of your initial setup and is the average hourly rate of pay for all field employees including working field Foremen. These are the employees that do the work and produce the income for your company. It would be very impractical if not impossible to calculate the hourly rate for each employee into a bid, so we use an average labor rate. For an example, let's say you have five Employees; one Laborer at \$13.00, one Apprentice at \$14.00, a Journeyman at \$18.50, a Master Painters at \$19.00, and one Foreman at \$20.50. Your total hourly rate is \$85.00 per hour. Divide that by five, the five employees, and you get your average hourly rate of \$17.00. Now enter this figure on line 8, column H, “Average Employees Hourly Rate”, on the Job Setup page. It is very important that this figure accurately represents your average labor rate. You will want to track this figure and update it as needed when hourly rates change or employees are added or subtracted.

Prevailing Wage:

Some government sponsored projects may use Davis Bacon or Prevailing Wage rates. If the job is to use Davis Bacon or Prevailing Wage, add the prevailing Labor rate and the Fringe rate together and replace your Average Employees Hourly Rate on row 8 in column H with the total Prevailing Wage Rate. Be sure to add both the wage rate and fringe rate together.

The two together make up the Prevailing Wage Rate. You will usually be notified of the requirements to use these rates on your bid invitation. Be sure and always check what the current Prevailing wage and Fringe rate is. Not only does it change often, it may vary in different counties and areas. In some instances, the Prevailing rate may be lower than your normal rate. In this case, you would probably want to use your normal rate, the higher rate.

Sales Tax:

On line 14, column I, enter the Sales Tax for the area where you normally work. If the job you are bidding is in a municipality that has a different tax rate than where you usually work you may want to use that rate. Some jobs may also have a tax exemption or reduction and you can make those changes as needed for the job you are bidding. For this example will use 7.60%.

Miscellaneous Materials:

On line 15, column I, enter a percentage for miscellaneous materials. Items such as caulking, masking, and solvents are not directly covered in the bid. This percentage of markup on the material is to cover these items, which will generally run between 5 and 15 percent of the overall material cost on any given job. You will want to track this percentage and adjust it as necessary. Typically, smaller jobs will need to be at a higher rate than larger jobs. For this example, we will use 5%.

Labor Overhead:

Contract painting can generally be considered a labor intense business. Labor, in most cases, is the most important component, often the highest single cost item. No contract can be performed without labor, however, it is entirely possible to perform a contract with little or no material cost. There are situations where the owner may furnish most if not all of the materials needed. Labor is by far the best measurement of time, therefore, the best measurement in determining the degree of completion of any given job.

Because of these and many more facts relating to the importance of labor, labor is the most desirable method with which to monitor overhead or operating cost. By applying overhead cost as a percentage of labor cost, the contractor has a better opportunity to measure and recover his overhead.

Many contractors make the mistake of using an arbitrary or inaccurate figure to cover their overhead cost. This will often result in an inaccurate profit figure. The contractor must establish precisely what his overhead cost will be for the year ahead. This can be done accurately by following this simple procedure.

This information most likely will be considered confidential and the general manager or the owner may not want to reveal it to the estimating department. The general manager or owner themselves can follow the following instruction and generate the percentages that your estimating department will need to setup the program.

Variable Overhead:

Lines 19 through 32, column C, fall into the category of Variable Overhead. Variable Overhead cost is that overhead cost generated by your workers themselves, a cost which you would not have if you did not have employees. Variable Overhead can be broken down into two basic categories, lines 19 through 24 represent Labor Burden which would include FICA, Medicare, FUTA, SUTA, Workers Comp, and General Liability, and lines 26 through 29 represent Fringe Benefits which would include Health, and Disability / Life insurance, 401K, and Vacations to name some. Labor Burden is mandatory to the cost of your labor while Fringe Benefits is just that, Fringe Benefits, and may or may not be offered as part of your pay package. FICA, Medicare, FUTA, and SUTA tax rates can be found from your accountant or the government agencies that represent them. FICA is Social Security, FUTA is Federal Unemployment and SUTA is State Unemployment. FUTA and SUTA may be based on a limited amount of salary, example, as in the first \$7000.00. Do not try to take it off once an employ has meet that criteria. Remember you are establishing an average hourly rate, not each employee's rate. Workers Comp, General Liability, Health, and Disability / Life insurance rates or percentages can be found from your insurance providers. For this example let's assume that FICA is 6.20%, Medicare is 1.45% FUTA is 0.80%, SUTA is 2.00%, WorkComp.8.20%, General Liability is 2.13% and you do not offer any of the rest. Your total Variable Overhead would be 20.78% for this example.

For this sample setup do not change the pre-programmed percentages, just leave the figures the way they are. You will want to change them however when you setup for your own business.

Fixed or Operations Overhead:

Line 31, column C, Operations Overhead, is also referred to as Fixed Overhead. The term "Fixed" is a little misleading. Actually, all cost can vary if sales volume fluctuates significantly, from what is normal or expected. Cost referred to under this heading is simply less variable than other overhead costs. Tools and Equipment, such as brushes and rollers may be considered as Variable Overhead by your accountant with the though that if you did not have employees you would not have the cost of these items. I prefer to consider them as Fixed Overhead and find it easier to track them as such.

Management salaries are also usually considered as Fixed Overhead. Management Overhead is the salaries of all non-productive employees in your company. This would include the Owner if he or she draws a salary and does not work in the field and produce direct income. General Managers, Estimators, Receptionist, Secretary, Bookkeepers, Warehouse Manager, and Project Managers are all usually non-productive employees. These employees may be essential to your operation but they do not directly produce income. Where as Management salaries have a very significant impact on your overhead, I prefer to track them separately to be able to keep a close track of this cost. We will address Management Overhead shortly.

Your Fixed Overhead is the cost of everything your company uses to make it function besides labor. If you are using a balance sheet from your bookkeeper or accountant to find

your Fixed Overhead, it may show things like equipment rental, housing for employees when working away from home, drug testing for employees. Do not include these cost in when calculating your Fixed Overhead, these types of expenses are direct job cost and are charged directly to the job when needed. Fixed Overhead or Operations Overhead includes: Advertising and Business Promotions, Accounting and Legal Fees, Auto and Truck cost and expenses, Insurance and Taxes not related to labor, Licenses, Building rent or payment, Utilities, Dues and Subscriptions, Office Supplies and Expense, Depreciation, Interest on long term loans, Travel Expenses that are not charged to the job, Bad Debts, Tools and Equipment including equipment repair and any other cost you might have. Make sure all of these costs are realistic and reflect anticipated expenses for the coming year. If you have been in business for a while, you will want to look back at that history and use it as a guide for setting up your new year. Again, your accountant should be able to help you with this.

Let's set up an example of Operations Overhead, (Fixed Overhead). You anticipate spending \$600 on advertising, and your accounting fees to be \$1,500. You have two trucks that with their payment, maintenance, gas, insurance and licenses will run \$15,000 each for a total for the two of \$30,000 for the year. Your building rent is \$1,000 per month and the utilities are an average of \$450 per month. The rent and utilities would be \$17,400 for the year. You estimate spending \$1,200 on office supplies and \$10,000 on equipment and repairs. Your Fixed Overhead or Operations Overhead for the year is \$60,700.00. This is a very simplified example; your Operations Overhead will most likely contain many more factors.

Management Overhead:

Line 32, column C, Management Overhead is the salaries of all non-productive employees in your company. This would include the Owner if he or she draws a salary and does not work in the field and produce work. General Managers, Estimators, Receptionist, Secretary, Bookkeepers, Warehouse Manager, and Project Managers are all usually non-productive employees. These employees may have yearly salaries or may be hourly paid. They are essential to your operation but they do not directly produce income.

Management Labor Cost represents the estimated hours and labor cost involved in preparing the estimate, supervising the job and all office hours involved in clerical work for a project from start to finish. Management Overhead needs to be added not only to your general overhead, but to your sub contracts as well to cover the cost of bidding the job, acquiring the contract, collecting the money, supervising the job and paying the Sub Contractor. Without adding this overhead your Management personal would be working for nothing.

Whereas the cost to manage sub contract work may not be as high as managing in house cost, you can enter a percentage to modify your Management Overhead on the Job Setup page. For an example, if you only want to apply a third of your Management Overhead to your sub contracts. On the Job Setup page at line 32 column G, you would enter 33% at percent to modify. Using the pre entered example of Management Overhead of 49.11% modified by a third, "33%", 16.21% would be applied to your sub-contractors for your Management Overhead cost.

Let us look at a couple of examples as how to set up the program for Management Overhead. For the first example let's say the Owner draws a salary of \$75,000 a year and has a Secretary/Bookkeeper with a salary of \$30,000. An Estimator at \$45,000 and a Project Manager with a salary of \$40,000 for a total of \$150,000 for Management salaries projected for the year. At this point, we are going to calculate an average hourly rate for our Management employees. This is done a little differently than it was with the hourly people. Let's take the \$150,000 salaries package and divide it by the total hours for our Management team. Four employees at 2080 hours per year give us a total of 8320 hours, which equals \$18.03 per hour. Enter this rate on the Program Sheet at line 37, column C, "Average Management Labor per Hour". This hourly rate will be used by the program to budget the management hours to each job. These salary packages include any vacations you may offer. You are in effect just giving them time off with pay and it does not cost you any extra as it would with hourly employees. Now at lines 38 through 47 in column C, you need to add Burden and any Fringe Benefits that you may offer to your Management personnel. These are very similar to your hourly employees. FICA, Medicare, FUTA, SUTA, Work Comp, General Liability, Health, Disability / Life, and any 401K contribution you may offer. Some of these rates may be different than the hourly employees because their exposure is less so be sure to get actual rates from your insurance agent. For this example let's assume that FICA is 5.65%, Medicare 2.00%, FUTA is 0.80%, SUTA is 2.00%, WorkComp.3.20%, General Liability is 2.13% and you do not offer any of the rest. The total of these Burdens is 15.78% or \$23,670 based on the salary package of \$150,000. Remember this is Fixed Overhead, you have to pay these Burdens as part of you Management teams' salary package. The \$23,670.00 needs to be added to the \$150,000 for a total Management teams' salary package cost to your company of \$173,670.

Converting to Percentages:

Now let's convert the Operations Overhead and Management Overhead to percentages that you can use in this program. For this example we used ten employees with an average wage of \$17 per hour. There are 2,080 working hours in a year so these ten employees will work 20,800 hours at \$17 to generate \$353,600 in revenue. As a painting company you are selling labor. You may include some material in your bids to your customers but in reality you are only selling your labor and that is where all your overhead needs to come from.

In our example, we determined we were going to have a Fixed or Operations Overhead of \$60,700. Divide this amount by the \$353,600 of revenue and you will get 17.17% for your Operations Overhead. The Management Overhead of \$173,670 divided by the revenue of \$353,600 gives us a Management Overhead of 49.11%. Add the Operations Overhead of 17.17%, the Management Overhead of 49.11% and the Variable Overhead on our employees pay of 20.78% that we determined earlier and we have our total labor overhead of 87.06%. On the Job Setup Sheet at Operations Overhead, line 31, in column C, enter the 17.17%. At Management Overhead, line 32, column C, enter 49.11%.

Management Overhead For a Small Company:

Let's take a minute here to look at a small company where the owner may work in the field painting. For an example let's say he has two employees that he pays \$17.00 per hour each

and he work with them except when he has to bid a job or run for material. The only time he is earning his pay is when he is painting. When he is bidding a job or going for materials, he is Management Overhead. He needs to evaluate how much time is spent painting and how much is spent in the management of his business. For this example let's say it's about 50-50 and he pays him self \$40,000 a year. \$20,000 or 50% needs to be considered as Management salary and treated as such. In this example, the owner's \$40,000 salary would represent \$19.23 per hour based on a 2080-hour working year, but he is only working or producing in come for half of the year and is Management or overhead for the other half. Divide the \$19.23 per hour by 2 to get \$9.62 per hour, which will generate the \$20,000.00 over the course of the 2080 working hours in the year. To find the company's "Average Hourly Rate", add the \$9.62 to the two employee's hourly rate of \$17.00 each for a total of \$43.62. Now divide by 3, the two employees and the owner, for an Average Employees Hourly Rate of \$14.54. This average hourly rate would be entered at, Average Employees Hourly Rate on the Job Setup page on line 8 at column H.

Let's do a quick check: \$43.62, the average hourly rate for the two employees and the owner times 2080 the working hours in a year, equals \$90,729.60 payroll for the year. Or, take the Average Employees Hourly Rate of \$14.54 times 6240 hours, the total hours of the two employees and the owner for the year and you get the same thing, \$90,729.60. The employees at \$17.00 per hour earn \$35,360.00 each for a total of \$70,720.00 for the year. The owner at \$9.62 per hour over the course of the year will earn \$20,009.60, half of the owner's yearly salary, for a total payroll of \$90,729.60. The other half, \$20,000.00 is to be figured with the Management Overhead.

To set up this small companies Management Overhead for the owners non-productive time we need to take the \$20,000.00 and add the Burden and any Fringe Benefits offered as we did in our example earlier in Management Overhead section. For this example, we will use the total Burdens of 15.78% as we used earlier. Based on Management salary of \$20,000.00, 15.78% represents \$3,156.00. Added to the \$20,000.00 gives a total Management cost of \$23,156.00. In the paragraph above, we determined that this small company would produce \$90,729.60 of payroll in the year. Divide the cost of Management, \$23,156.00 by \$90,729.60 payroll and you get the Management Overhead of 26% to be entered on line 32 in column C, on the Job Setup page.

If your wife does your books for you and draws a salary, that would fall in this Management category also. Her salary with Burden and any Fringe Benefits offered would be added to the owner's non-productive salary with Burden and Fringe Benefits of \$23,156.00 and divide by the \$90,729.60 payroll.

Setting up the program for a Sole Proprietor:

For a sole proprietor wanting to make a \$40,000.00 a year salary based on 2080 working hours represents approximately \$19.24 per hour. On the Job Setup Sheet at line 8 in column "H" Average Painters Labor Rate, and line 37 column "C" Average Management Labor, enter \$19.24. Most of the Labor Burden, lines 19 through 24 would be the same except a

sole proprietor or owner of a company may not have to care Work Comp on them selves. Check these regulations in your area. For this example, we will assume that you do not have to care Work Comp and delete the example of 8.20% on line 23. Also, delete the 3.20% Work Comp at Management Overhead line 42. You can include any of the Fringe Benefits if you want it to be part of your overhead. Be aware that it will raise your hourly rate. Note: As a Sole Proprietor you not only have to pay your payroll taxes that are deducted from your pay check by your employer but you also have to pay the taxes on an employee that your employer pays.

When you are bidding or doing other management or clerical work for your company, you are not producing income so this work needs to be looked at as overhead. The work is necessary to your business so you should be paid for doing it. For this example, we will assume you spend 25% of your time doing this management work. 25% would represent 2 hours per day or 520 hours for the year, leaving 1,560 for producing income. At \$19.24 per hour, you would produce \$30,014.40 in the 1,560 hours.

To find the percent of overhead that the 520 hours of management work represents, take 520 hours times \$19.24, your hourly rate and it equals \$10,004.80. Now we have to add the management Labor Burdens. Remember this is Fixed Overhead; you have to pay these burdens as part of Managements salary. In our example, we have established that the total management burden, line 44 column, "C" is 12.58%. \$10,004.80 times 12.58% equals \$1,258.60 for a total value of the management labor of \$11,263.40. The \$11,263.40 management labor, divided by \$30,014.40 the amount of income produced, equals 37.50%, which is your management overhead. Enter the 37.50% on line 32 column "C" of the Job Setup sheet.

For Operations Overhead let us assume that you have a work van that with monthly payments, insurance, gas and maintenance will run \$10,500 for the year. Your accountant will charge \$1,200 for the year, and tools and miscellaneous will cost \$4,000 for a years total of \$15,700. To find your Operations Overhead percentage divide the \$15,700 by \$30,014.40, the amount of income produced, equals 52.31%. Enter the 52.31% on line 31 in column C.

Now to check this all out go to Sheet "Misc. Hours 25" and at line 7 column "C" enter the 1560 hours that the sole proprietor will be able to produce work. Now go back to the "Job Total Sheet and see the results. On line 24 in column "J", is the 1560 hours at \$19.24 for \$30,014.40. The rest of the Sole Proprietor income is on line 33 in the form of Management. 520 hours at \$19.24 per hour for \$9,997.69. This equals \$40,012.09, the \$40,000.00 sought. It is a little different because the computer rounds things off differently then the calculator. Also are shone the labor taxes for the year, the operations overhead cost and \$9,111.92 in profit based on the 15% markup we set up on the Setup Sheet.

Now remember these are only examples. Do not use these figures in your own business. In order to be able to establish an accurate hourly rate to charge your customer and to be able to control your profit you must determine what these overheads are. Accurately establishing these overhead rates will make it possible to create a break-even rate to build on and control you profit margins.

Profit:

At the top of page “Job Setup”, “Cost of Labor per hr. with Overhead”, line 9, column I, you will see that your cost of labor is \$31.80. **This is your break-even rate.** This labor has no profit but it would pay all the bills and salaries. At “Enter the Percentage of Gross Markup to be used”, line 10, column H, enter the percent of mark up for profit that you want to use. For this example, place 15% in the yellow square. Now you will note the “Total Selling Labor with Overhead and Profit” has changed to \$36.57 reflecting your labor with profit. This is the rate that you would sell your labor for. Profit should normally generate from all items of cost; that is labor, material, overhead, and other job cost. This is the way this program will apply profit to your bid. Any one of these factors not being clearly defined will distort your profit figure.

Let’s take a minute to look at what profit is. The Webster Dictionary says profit is; “excess of income over expenditures”, “income from an investment or transaction”, “an advantage or benefit derived from an activity”, “making money on something”, and that is precisely why you are in business, to make money.

Hypothetically without profit all bills would be paid, all salaries would be paid and every one would go home happy. However this is not a perfect world and estimating is not an exact science. It is an estimate of what it will take to do the job. Mistakes will be made and jobs will not go exactly as planned. You will need a profit margin as a buffer to cover this. You will need profit to grow your company, buy new equipment, to build a reserve to cover those mistakes and unforeseen problems. The owner of the company has their assets invested in the company. Invested capital includes all money in fixed assets, working capital, and the value of intangibles, such as a trained organized crew, goodwill, business contacts, technical competence, and so forth. The owner needs to be rewarded for their investment. As the dictionary said, “Income from an investment”. Don’t make the mistake that you can leave profit out of your bid, or set the profit too low just to get jobs. You won’t be in business long doing that, but don’t get greedy either. Set a realistic profit margin that will cover the things we have been over and allow your company to grow, prosper and the owner to make a reward on their investment of assets.

Test Bid:

It is important to stress that this program is only as accurate as what you put into it. First you need to do an accurate and detailed takeoff of the project you are bidding. It can be a field takeoff from an existing building or from a set of plans. It is best to do your takeoff in sections. On the exterior of a building you may want to do the takeoff by the side as in the North side, the East side and so on. On the interior, it is suggested by the room. You will find that this is easier to keep track of what you are doing and you won’t be as likely to miss something.

Let’s say we are doing a bid on a small new office and it has a Reception room with a GWB ceiling at 10 feet high. The room is 20 feet long and 13 feet wide. That will give us 66 feet of wall at 10 high for 660 square feet of walls and 260 square feet of ceiling. Now we have two

offices with tile ceilings at 8 feet high. Office #1 is 14 feet long and 12 feet wide for 52 feet times 8 feet high for 416 square feet. Office #2 is 12 feet long and 12 feet wide for 48 feet times 8 feet high for 384 square feet. We have a total of 260 square feet of ceiling, 1460 square feet of walls and will say there are 4 hollow metal door frames to paint.

Now that we have our takeoff let's enter it into the Estimating program and see what it is going to cost to do this job, how many hours it will take, and how much materials will be needed. At the top of the Job Totals page, enter Test Bid for the job name. You can put in the date and an estimator name if you would like. The program is already setup with \$17 for average painter labor rate and all of our overheads. We have previously entered 15% for our profit margin and for this test bid let's leave it that way. Now go to sheet "Walls 1" and at line 6 enter the square feet of the wall, 1460. You will see we are priming one coat and two finish coats. Priming will take 5 hours and need 4 gallons of primer. Two finish coats will take 9 hours and 8 gallons of material. The information should be self-explanatory. The cost Per Square Foot of .45 cents is before profit and the Selling per Square Foot of .52 cents is with the profit added. On sheet "Ceilings 3" at line 6 enter the 260 square feet of the Reception room ceiling. Go to sheet "Frames 6" and enter the 4 Hollow Metal frames on line 6. You will note that we are not priming these. Most Hollow Metal frames are pre primed. When you start using the program you will see that some programs, like this one round up the amount on just a few items to compensate for minimum labor and material. The more frames you enter the cheaper they will get to a limit. For an example the 4 frames are \$45.97 each, 10 frames are \$33.02 and 100 frames are \$32.28 each.

Let's go back to sheet "Job Totals" and look at the bid we just created. It should be self-explanatory. Line 9, column J you will see the total estimated materials, the sales tax at the programmed 7.60%, and the miscellaneous materials at the programmed 5%. As you go down the sheet you will see how the program builds your bid. Line 9 estimated material cost at \$265.70. Line 11 is sales tax on the material at \$20.19. Line 24 is the estimated man-hours at 21 hours. Line 29 is the total cost of field labor of \$667.80. Line 42 is the total in house bid at \$1,112.03. In column "L", you will see a "Yes" telling you, which sheets you have made entries on and may want to print out. You only need to print the pages that pertain to your bid.

Remember this is only a test or setup bid and the square foot and unit prices may not represent what the going rates really are. In this example, our little painting company is probably quite top heavy in that ten painters would probably not support a company with the overhead we setup. You do not want to use this program for a real bid yet. Now delete the amounts we just entered at walls, ceilings, frames, and the job name on the Job Setup Sheet. The "Job Totals" sheet should be blank except for average labor rate, sales tax, percent of miscellaneous materials, and gross percent of markup.

Now would be a good time to go back and put in the real figures that represent what your company will need for the next year or until the end of the period you are working in now. Just follow the instructions that we just went through for the demonstration, only use real figures that represent your business and save the program when finished.

Setting Up the Work Sheets

Now assuming that you have gone back and programmed the Job Totals Sheet for your company, we will take the time to setup the rest of the program to work the way you do business so you can get started bidding work. There are many factors that will affect production and material usage rates achieved on any particular job. The tables contained in this program may need to be modified to fit a particular contractor's experience and the company workforce's ability.

Materials:

Looking at sheet "GYP or Plaster Walls 1", you will see that under the heading of "Primer" it just lists "Latex Wall Primer" and at a cost per gallon of \$13.89. At "Finish" it just lists "Latex E/S" at a cost of \$16.72 per gallon. **NOTE: All of the material prices that come pre-programmed are only for demonstration and test purposes and do not reflect the real price of any product.** You must record the real price you pay for the products you use. All of the areas in yellow are programmable on the fly. It is a good idea however to set them up with the products and prices you normally use, then you only have to change them if the situation changes. For example if you normally use Sherwin Williams' products you may want to enter Prep Rite 200 B28W200 for the primer and Pro Mar 200 E/S B20W2251 for the finish material with the prices you pay for them.

NOTE: As you work in the program in the yellow or green fields, you can write over or delete entries to change them. You can also move products and prices around by Copying and Pasting. **DO NOT cut and past.** When you cut and past, you remove the formatting from the area that you cut. If you accidently do this, you can restore the formatting by copying a similar area and pasting it in the area you cut. Then you can delete or write over the text to change the information to what you want it to be. **DO NOT cut and past.**

In the green squares in column "K" the material coverage rates are pre set at basic industry standards. Coverage rates can vary from manufacturer to manufacturer on the same type of product. Paint manufacture product information sheets or there container labels usually indicate there Coverage rates. However, the listed rates are theoretical and do not take into account absorption of the substrate, application technique, or waste.

Guideline for application waste:

Brush & Roll	Add 5 to 10%
Airless spray	Add 20 to 25%
Conventional spray	Add 25 to 30%

Paint Coverage Rates by Calculation:

You can calculate the theoretical coverage rate specified or indicated by data if you know the dry film thickness (DFT) of a coat of paint and the percent by volume of solids of the paint.

Coverage Rate (SF/GAL) equals percent of Solids by Volume times 1604 divided by Dry Film Thickness in mils. (DFT).

For example, paint with 38% solids by volume, and a specified dry film thickness of two mils would yield a theoretical coverage of 305 SF/GAL. **.38 x 1604 / 2 = 305 SF/GAL**

To be accurate you need to check the material coverage specifications for the manufacturer of materials you are using and program them into the green squares. So take the time and go through the program and fill in the products that you normally use and the prices that you pay for them. You will want to fill in a detailed name of the products so that your job foreman or project manager will be able to know what you bid. Once you have entered all the products and the prices you pay for them in to the program, **save it**. You will want to upgrade the prices whenever your supplier changes your cost.

Production Rates:

The production rates in the green squares in column K are preset based on industry standards. They are user changeable to fit your needs or situation. When any particular form of work is performed on a routine basis, the experience and increased skill may result in increased production rates. If or when you establish that a production rate is not right for your company and you always have to change it, then you would probably want to change the program to represent the way you do business most of the time. On the right side of the screen, in the blue shaded area at the top of some pages, you will see a notice regarding the use of man lifts, rolling staging, extension ladders, etc. With this notice is a percentage of deduction that should be used if these systems are anticipated to be used on the work you are bidding. The use of this equipment can have a significant impact on the man hours for your job. You may also find notices at some sections for a percent of production rate decrease for such things as breaks, downtime, cleanup, and etc. Be sure to take their use into consideration when setting production rates. A fifteen minute morning break, a couple bath room breaks and cleanup at the end of the day are not productive, but they will be part of your work day. If your painters can produce at 400 square feet per hour they would produce 3,200 square feet of walls in eight hours. If they take the above break, go to the bathroom, and use 10 or 15 minutes to cleanup at the end of the day they will lose about 45 minutes. If you deduct 10% you will have a production rate of 360 square feet per hour for 2,880 for the day which will compensate for the 45 to 50 minutes of downtime. The industry standards production rates do not take in consideration for down time or prep.

Now if you have programmed the Job Setup Sheet for your business, entered the materials you will be using, entered the price you pay for them, and you accept the production rates or have changed them to what you believe they should be; you are ready to price your work.

It is recommended that each estimator in your company have their own password to protect their work. This password prevents an unauthorized person from changing the bid. Anyone can open and read the bid but if they change it they have to save it under a new name and the original is unchanged. To setup a password in Excel 2002 to 2003 click on Tools then Options and then Security. At "Password to Modify", click in the box and type in your

password and click OK. You will be asked to reenter password to modify. After reentering your password again, click OK. Now don't forget your password.

To setup a password in Excel 2007 click on the round windows button in the upper left corner of your screen and scroll down to "Save As" and select "Excel Workbook". In the save as screen select the "Tools" button at the bottom of the window just to the left of the save button. Click the tools button and select "General Options". In the general options box at password to modify click in the box, type in your new password, and click "Ok". Reenter your new password and click "Ok" again, click save. You will be notified that Residential Paint Estimator 3.5 already exists. Do you want to replace it? Click "yes" and you have added your password. Again, don't forget it.

These next two situations were pointed out earlier on page 5 but a reminder is appropriate here also.

As you move through the program, you will want to be mindful of the help tips on the right of each screen. On a small screen computer, you may have to scroll to the right to see them. They will usually be in columns K through Q and will give you advice and directions for that page.

If you get this ##### or this #VALUE! in the program, it is an error message. Don't panic, you have just accidentally entered a letter or punctuation mark in a number entry area. This can occur when entering the price of material if you mistakenly enter a coma instead of a period between dollars and cents. Just go find your mistaken entry and remove it, the program will correct itself.

Entering Work into the Program

Job Setup Page:

When you are going to price a job start at the “Job Setup” page, enter the job name, the estimator’s name, and the date. Now go to “Save As” and save the job in a different file on your desktop or in some other job folder that you would normally use such as the “Jones Job”. Now you can do your entry without contaminating the program. You will always have a fresh program for your next bid. In some situations, you may need to enter a different wage rate, adjust the tax rate and miscellaneous materials percentage and change the profit margin for a particular job.

Job Totals Page:

This page is a summary of your job. The only entire you can make on this page is to the number of unites in a Multi Family Complex. Lines 7 through 25 in column D, gives you a breakdown of hours, labor rate, burden, and fringe benefits that apply to this job. Lines 9 through 12 in column J, shows material cost, miscellaneous materials and sales tax. Line 16 shows Cost of Equipment. Line 20 is Miscellaneous Job Expenses. Line 24 through 30 in column J is a break down of field labor cost. Line 33 through 36 in column J is how management labor applies to your job. Lines 39 through 42 are the total in house bid with gross percent of markup and net margin. Lines 45 through 48 give a summary of any Sub Contracts that will apply to your bid. Lines 51 and 52 shows the total bid including any Sub Contracts that apply to the bid and the total net profit margin.

On line 54 in column J, you can enter the number of units when painting Multi Family Complexes as in Condos or Apartment Buildings and the program will give you a per unit price.

On the right of the screen in column “L”, you will see a “Yes or No” telling you which sheets you have made entries on in preparing your bid. This will guide you to the sheets you used for review or that you may want to print out. You only need to print the pages that pertain to your bid. On a small screen computer, you may have to scroll to the right to see all of the details.

Work Entry Pages:

The work entry pages are all typical in how you make entries on them. **We will look at “GYP or Plaster Walls 1”** for the typical and then examine some of the other pages that work a little differently. At “GYP or Plaster Walls 1”, you have GYP or Plaster Wall Systems #1, 2, 3, 4, and 5. These five systems can be set up all alike or if you have other systems you use often, such as a no VOC material or maybe an S/G system, you can program for those in advance. Or you may want to set them up for different production rates as in brush and roll, or spray application. If you followed the suggestion on page 13 at materials and entered the product you normally use, your basic materials and there prices are already programmed in for you. If your need to change one for a particular job just click in the

yellow area and you can type in the change. In some situations you may want to change how many coats you will apply. As an example you may have a job that only calls for primer and one finish coat. Just change the two to a one. As you are pricing your job if you see a production rate that is either too slow or too fast for the particular job you are doing you can fine tune it to suit the situation. Go to the green squares in column K and change the rate of production to what you want it to be. For an example Accent Walls, you would undoubtedly hand cut and roll the finish coats at a production rate of 200 to 350 square feet per hour, however you may very likely spray the primer along with all the other walls thus the priming production rate may be in the 500 to 800 square feet per hour range. Another example: You have 1200 square feet of textured walls in an occupied area where spray application would not be practical. You would enter the 1200 square feet and at "Description" you might enter, "Textured walls roller applied paint". If priming is required, be sure there is a one or two in the yellow square under "Primer" on the left side of the screen for one or two coats of primer. In the yellow square at "Finish", you would enter a one, two, or three for the number of finish coats desired.

As you can see the system is very user friendly and gives you the ability to set the production and coverage rates the way you want them. This also makes the user responsible that the rates are set right. Be sure the production rates you are using are achievable. If it's too fast you won't be able to get the work done in the time bid and you will lose money. If it's too slow it will make your bid higher than it should be and you may not get the job. As stated earlier, always pay attention to the help information on the right side of your screen.

On sheets "GYP or Plaster Walls 1 and GYP or Plaster Ceilings 3" the production rate of 90 to 100 square feet per hour for Repaints, includes one coat of paint in an occupied area of a home or office, having to protect floors and surroundings, with minor wall prep and clean up. The author has found this formula to be very affective how ever as stated earlier it may need to be adjusted or modified to fit a contractor's experience. Add coats would be at industry standard production rates.

"Sheet Misc. Ceilings 4" gives you the ability to accurately price a verity of different ceiling systems. Wood, Acoustic Tile, Popcorn Texture and Exposed Structural Ceilings. An Exposed Structural Lids is typically a metal deck with exposed bar joist, conduit, and ductwork. The author's formula is to paint all surfaces the same color with a dry fall material using the floor square feet. You would want to add for unusually large joist or framing members, excessive amounts of conduit or ductwork.

"Sheet Prep & Misc. 5" covers a verity of prep situations from wall covering removal, caulking, and door lockset remove and install to painting of pipe. As always, you will find helps on the right side of the sheet. As stated earlier, on small screen computers, you may have to scroll to the right to see all of the helps.

“Door Frames 6, Doors 7 and Windows 8”. These sheets are used to estimate interior and exterior frames, doors and windows. On the right side of the sheets are instructions to setup for a variety of different types of units.

“VWC 13 to Misc. WC 18”. These are entry sheets for different types of wall coverings. Note that wall priming for all wall coverings are calculated at the top of sheet “VWC 13”. If priming is not needed for a particular wall covering remove the “x” in the yellow square on the left side of the screen in column A at priming. Each sheet will calculate the man-hours and labor cost to install the wall covering that that sheet represents. However, if you price the installation for a sub contractor the estimated man hours and labor cost will not be displayed on the Job Totals page. Instead, it will be shown as a Sub Contract on line 45 column J. On line 47, your percent of Management Overhead is added to the amount of sub contract. Management Labor Cost represents the estimated hours and labor cost involved in preparing the estimate, supervising the job and all office hours involved in clerical work for the project from start to finish. *Management Overhead needs to be added to your sub contracts to cover the cost of bidding the job, acquiring the contract, collecting the money, supervising the job and paying the Sub Contractor.* Without adding this overhead your Management personal would be working for nothing.

Most wall covering contractors furnish their own paste. The program assumes that the Sub Contractor is furnishing his own paste. If you do not do this work in house and sub it out, always get a commitment of price from your sub contractor before you bid. It would be best that you get this commitment in the form of a written contract

Vinyl Wall Covering, pages 13 and 14. In the green squares on the right, enter the width of the VWC material to be used in inches. The program will calculate the square feet minus 10% for waste. Most Vinyl Wall Covering is 54 inches wide and has 12 square feet of usable material in a linear yard. When measuring to find the square feet of walls to receive VWC, do not deduct for windows and doors unless they are very large, at least 60 square feet each.

At Wallpaper, pages 15 and 16 you will need to determine the size of rolls that the material you are using comes in. American rolls have 30 square feet of usable material and European rolls have 25 square feet. Once you have determined which you are using enter either 25 or 30 at, "SF per Single Roll". **Note:** If you do encounter an odd size roll of wallpaper, for example 75 square feet to the roll, enter the 75 in the green square at “SF per Single Roll. Enter the price of that 75 square foot roll at the “Cost Per Single Roll and the program will calculate your wall covering material. When measuring to find the square footage of walls to receive wallpaper, do not deduct for windows and doors unless they are very large, at least 60 square feet each. If the wallpaper to be used has a pattern repeat, you will need to consider it in determining your ceiling height, or more appropriately, your sheet length. Example: The plans show a ceiling height of 8 feet which is 96 inches. The specs show that the wallpaper has a pattern repeat of 18 inches. Divide the 96 inches, (height of walls in inches); by the 18-inch repeat, you get 5.33 repeats. You will need six repeats or a

9-foot sheet to reach the ceiling. Take the 18 inches repeat times the six repeats needed = 108 inches or 9 feet. You are going to have 12 inches of waste on each sheet with this repeat. Now you need to select the type of wallpaper material being used from the chart on the right side of your screen. Once determined, enter the production rate for that material in the green square at "Wallpaper Labor at SF/HR".

For "Borders 17", Wallpaper borders are taken off by the linear foot. Borders are usually sold in 5-yard spools but may come in 10, 20, or 30-yard spools also. You will need to enter the size of spool that the border material you are using comes in. Enter the production rate of either 45 LFH (linear feet per hour) for 2 to 6 inch borders or 35 LFH for 6 to 12 inch wide borders

At "Fabric WC 18". Enter the width of the material to be used in inches. Fabric materials may come in widths from 36 to 60 inches wide. On the right side of the screen at, "Fabric Wall Covering Installation", determine the type of fabric to be used and select the corresponding production rate. Acoustical fabrics are probably the most common material to be used however, the production rate for installation varies greatly so be sure to verify what material will be installed.

"Ext. CMU 20". This sheet is for exterior masonry and allows you to build the system you need. In column "A" you will select the systems to be used by placing a number in the yellow box. The number will represent the number of coats to be applied. Example, on a block building you may install one coat block filler and two coats of paint. On a tilt up you may use one coat of a masonry primer and two coats of a Tex coat material.

"Steel Railing and Stairs 24". This sheet paints Guard Rail, Pipe Railing and steel Stair systems. Example: Steel Stair system with a length of 20 feet and a width of 4 feet will show 50 square feet to paint. This is the skirts on either side of the stairs. If the treads are to paint put an "X" in the yellow box at; To Paint Treads and you have 130 square feet to paint. Put an "X" in the box for risers and the square feet to paint changes to 234 square feet adding the risers. If the pan or under side of the stair system paints put an "X" at Pan or Under side and you see 468 square feet to paint. An example; if the stair system did not have risers you would leave the yellow box for risers blank and the total square feet of the stair system to paint would be 260 square feet minus both sides of the risers.. At "Primer" enter the number of coats of primer; at "Finish" enter the number of finish coats to be applied.

"Misc, EPA, Caulk, Prep 26". This is an area where you can enter a price for something that will not fit anywhere else. It may be that you just want to add some hours and money for miscellaneous or unforeseen work. You can type in a description of the work or purpose; enter anticipated hours and material cost and a description of the material. On this page you can also estimate caulking, hand tool prep and power washing.

“Eqpt, Subs, Travel 27” If you need to rent or charge for the use of equipment, you would make the entry here. Type in a description of the equipment to be used. At “Time Needed”, enter a 1, 2 or what ever and at “Duration” enter what that duration is, as in weeks or months. At “Rate per day, week, or month”, enter the rate for that duration. Example, enter 2 at “Time Needed”, enter weeks at “Duration”, enter \$125.00 for a weekly rate at “Rate per day, week, or month”, and we will assume that there will be a \$25.00 delivery and pickup charge and enter that at “Delivery and Pickup”. The program takes the \$125.00 per week rate times the two weeks needed and adds the \$25.00 for pick up and delivery plus sales tax for the total cost of \$295.90. The total selling of \$340.29 is with the percent of gross markup you have entered on the Setup page. This is what this equipment well be sold for in your bid.

At Sub Contractors, you can enter a description of the work you will be subbing, the amount of the sub contract and a percent of markup that you would like to make on the sub. To be competitive you may not want to mark up sub work as much as you would in house work. On lines 28, 33 and 38 your percent of Management Overhead will be added to the amount of sub contract. This is the cost of bidding the job, acquiring the contract, collecting the money, supervising the job and paying the Sub Contractor. With out adding this you would be working for nothing. Always get a commitment of price from your sub contractor before you bid. It would be best that you get this commitment in the form of a written contract

At Miscellaneous Job Expenses. Miscellaneous Job Expense category may be used to add a wide variety of job expenses to your bid such as meals and housing when working out of area, or parking permits when required. For some jobs, you may be required to do drug testing or background checks and the coast can be added to your bid here. On the other hand, you may just want to add money to your bid to adjust it a little.

As you can see all sheets work pretty much the same and they do have helps on the right side in columns K through Q to guide you.

Estimating

Estimating is a combination of art and science. While it may be difficult to consider all of the factors that can affect the cost of completing any particular job, a sound method must be employed to accurately estimate all cost. A well defined estimate will normally consist of four basic components: Labor, Material, Overhead, and Profit. The estimate may also contain such other items as travel expenses, special scaffolding, equipment, etc. The amount of labor and material for a job should be calculated by applying production rates and material coverage rates to a sound takeoff of the square feet of surface to be covered. This method is usually referred to as developed price estimating. While it can be more time consuming than unit pricing or labor pricing, developed pricing has the advantage of separating the various factors that influence price. Each factor, labor, material, overhead, and profit, is separately adjusted to allow for change in cost, unusual conditions, etc. Each cost retains the proper relation to the other when a change is made.

Estimating is so important that the tempo and performance of the entire company hinge on how well or how poorly it is done. Go over the plans and spec book thoroughly so that you have a good understanding of the job and how it is to be done. Be precise in your takeoff and be thorough with the specs. The estimate should properly record what was seen and understood at the time of the takeoff, and accurately summarize the measurements used. A good estimate is neatly organized and clearly written so that it is easy to read by people other than the estimator. It is the responsibility of the user of this estimating program to correctly and thoroughly study each individual project and bid accurately to the specifications with labor, material, overhead, and profit rates appropriate for your company and the region where you do business.

As stated earlier the use of this program will significantly reduce the possibility of mathematical errors when totaling your bid and the time involved in looking up production and material coverage rates. You will have a detailed breakdown of hours, amounts of materials, cost of materials, and cost of all other overheads as they apply to your job. This will help you accurately bid more work, have a better understanding of the job bid, and be more profitable.

Following are seven steps that should be included in the estimating process:

- 1) Identifying all items and surfaces to be finished.
- 2) Measuring or counting all items and surfaces to be finished.
- 3) Calculating the labor cost to perform the job.
- 4) Calculating the cost of material to perform the job.
- 5) Identifying and estimating additional job cost such as rental equipment, bonds, subcontracts, etc.
- 6) Adding proper overhead cost.
- 7) Applying the desired profit.

Following are nine rules of measurement used in estimating that should be employed when doing a takeoff:

- Rule #1)** No object is considered less than one linear foot long and shall be measured as one square foot per linear foot.
- Rule #2)** Pipes, rods, structural steel, lumber, and other items to be finished whose circumference or perimeter is less than one foot is measured as one foot, otherwise the actual measurement is used.
- Rule #3)** Items having similar surface, finishes, application method, and accessibility may be grouped together and an appropriate production rate may be applied to the entire group.
- Rule #4)** When items are adjacent, which do not have all grouping factors in common; they should be listed separately on the quantity take off and measured at no less than one square foot per linear foot.
- Rule#5)** When items having equivalent surfaces, finishes, application method, and accessibility change direction at sharp angles and continue for a significant distance in the new direction, then measurement of the object increases by the length of the new direction, but usually not less than one square foot per linear foot.
- Rule #6)** When measuring non-uniformly shaped and curved items, the added length of the surface due to its curvature, change of direction, or non-uniformity must be measured.
- Rule #7)** Closely fabricated items, such as chain link fence, open web joists, and grating, should be measured as being solid. If both sides of a closely fabricated item are finished, double the surface area. When a closely fabricated item is attached to a framework finished in a different color or material, measure the framework separately as described in rule 2.
- Rule #8)** When a small opening interrupts a continuous surface, the opening is disregarded and considered part of the continuous surface. Any openings extending from floor to ceiling and exceeding five feet in width should be deducted. All openings 100 square feet or larger are deducted.
- Rule #9)** Cabinets, tubs, showers and other items that restrict movement or access shall not be deducted from measurements of total surface area.

It is best to do your takeoff in sections. On the exterior of a building you may want to do the takeoff by the side as in the North side, the East side and so on. For the interior, it is best to do each room separately. You will find that this is easier to keep track of what you are doing and you won't be as likely to miss something.

Following are some formulas and take off information that may help in taking off a project. If you are new to estimating it is strongly recommend that you acquire a copy of PDCA's Cost and Estimating, Volume 2: Rates and Tables. PDCA, Painting and Decorating Contractors of America are a great organization that you may want to join. This organization has done wonders to improve the painting industry over the years and their ongoing training would be an asset to any growing painting company.

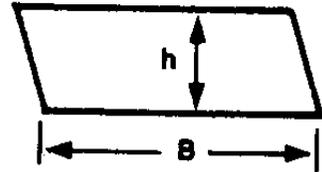
Formulas for Geometric Shapes:

Geometric shapes may be found all over a floor plan or a building in odd shaped rooms, walls and exterior details. They are really not hard to accurately take off if you know a few formulas.

Parallelogram:

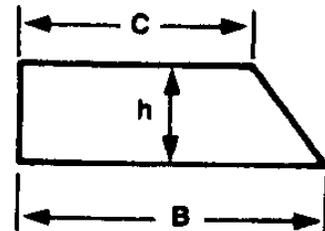
The Parallelogram along with a Rectangle and a Square are similar in how you would find the square feet or the area.

With the Rectangle, Square, and Parallelogram The opposite sides and opposite ends are of the same length and opposite angles are the same degrees. To find the area take the length (B) times the height (H). **Area = B x H**



Trapezoid:

The Trapezoid is different from the Parallelogram or Square in that all sides and ends may have different lengths and all the angles may be different however it will have two parallel sides. If you stood this shape on its end you might encounter it on a stair wall. To find the area add (B) and (C), the parallel sides, and divide by 2 then multiply by (H) the height or width depending how the figure is positioned. **Area = (B+C)/2 x H.**



Basically what you are doing when you add B plus C and divided by 2 is finding the average length. When you multiply the average length by the height or width you get the area of the figure.

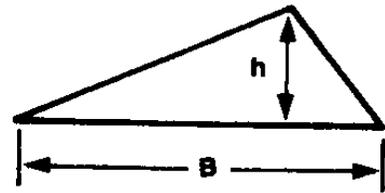
Trapezium:

Where as a Trapezium is similar to a Trapezoid in appearance there are no parallel sides. To find the area of a Trapezium divide it into two triangles and find there areas as in the example for Triangles below. **Area = Sum of the 2 triangles**



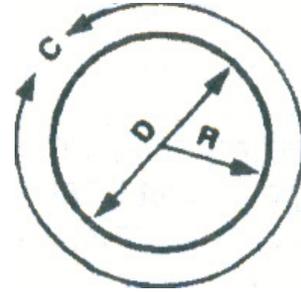
Triangle:

You could find a variation of this shape in the gables of buildings. To find the area take the length of the longest side (B) times the height (H) and divide by 2 **Area = B x H/2**



Circle:

Circles, Ellipse, Cylinders, Cones, and Spheres are shapes that you will encounter quite often on buildings and blueprints. They are not hard to calculate if you know a few formulas. Pi which may be represented by the symbol $\pi = 3.1416$. Two other numbers that you will be using are derivatives of Pi. .7854 and .0796. When you see a number or letter with a small 2 at the upper right hand corner as R^2 it says that that number is to be squared or taken times it's self. Example, 5^2 would be, $5 \times 5 = 25$. In the diagram C represents the Circumference or distance around the circle, D represents Diameter the distance across, and R represents the Radius or half the diameter. On a blueprint you may only be able to measure a duct, column, tank, or pipes diameter, distance across, and you need to know the circumference to find the square feet of its surface.



To find the circumference (C), take Pi, 3.1416, times (D) the diameter. **$C = \pi \times D$**

To find the area of a circle there are several formulas you can use depending on what information you have. If you know the radius (R) it would be Pi, 3.1416 times R squared. **Area = $\pi \times R^2$**

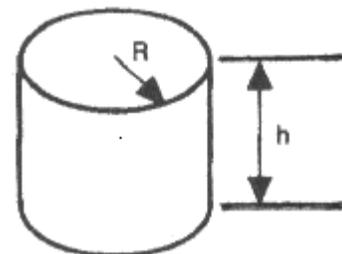
If you have the diameter (D) you would use the derivative of Pi, .7854 times D squared. **Area = .7854 x D²**

If you know the circumference (C) you would use another derivative of Pi, .0796 times C squared. **Area = .0796 x C²**

Cylinder or Tank:

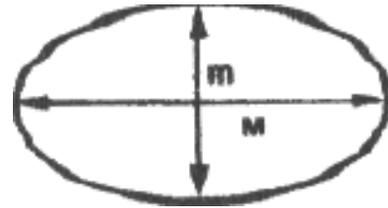
The area of the top or bottom of a tank or cylinder would be found using one of the formulas for the area of a circle. To find the area of the sides of the tank take the circumference (C) times the height (h). **Area = C x h**

If you just know the diameter the formula for the area of the sides of the tank would be; **Area = $\pi \times D \times h$** If needed you would add the area for the ends. You would find the area for pipe or duct the same way just substitute length for height.



Ellipse:

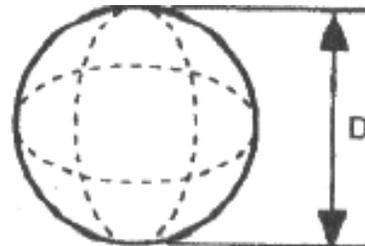
The area of an ellipse is easy to find with the right formula. Area = .7854 times height (m) times width (M). For an ellipse, a circle, or any egg shaped figure find the area of the box that it will fit in and times it by .7854 and you have the area of your ellipse, circle or egg shape. With the formula for the area of a circle, $.7854 \times D^2$, when you square D you are basically finding the area of a box. **Area = .7854 x M x m**



To find the perimeter, the distances around the ellipse, add $M + m$ and divide it by 2, then times by Pi, 3.1416. **Perimeter = $\pi \times (M + m / 2)$**

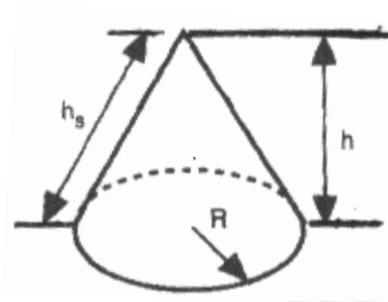
Sphere:

A sphere shape may be found as a tank or a decorative object on a building. The area is found by taking Pi, 3.1416 times the diameter squared. **Area = $\pi \times D^2$**



Cone:

You might find this as a steeple roof on a Church. The surface area of the cone shape excluding the base is found by taking 2 times Pi, 3.1416 times the radius (R) times the slant height (hs) divide by 2. If the radius is 5 feet and the slant height is 10 feet the calculation would look like this, $2 \times 3.1416 \times 5 \times 10 / 2 = 157.08$ square feet of surface area of the cone. **Area = $2 \times \pi \times R \times Hs / 2$**



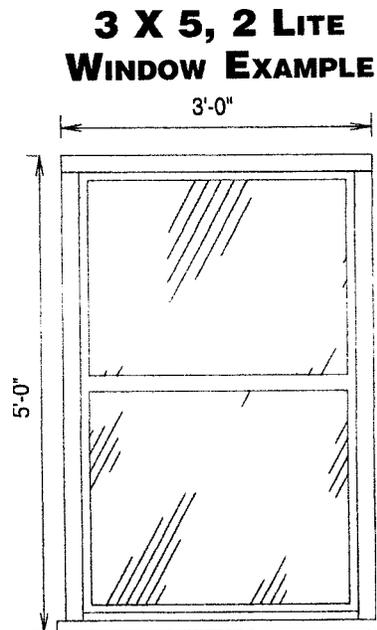
Window Sash and Trim

This 2 lite, 3X5 wood window example has a total of 35 LF of sash and trim. Labor Production rates in “Windows 12” of the program have been determined assuming the sash and perimeter trim detail components of a window assembly are measured individually and then totaled. The 3X5 window example has 19 LF of vertical and horizontal sash plus 16 LF of perimeter trim. Note that a linear foot of perimeter trim is assumed to include the jamb and casing. If this example was a double hung window it would have 38 LF of sash and trim. It would have 22 LF of vertical and horizontal sash because in the double hung window there are two center cross pieces, the bottom of the top sash, and the top of the bottom sash. The perimeter trim would still be 16 LF.

If this 3X5 window was hollow metal it would be measured at 19 LF total. Hollow metal windows do not have the complexity of a wood window. Usually the glass is set directly into what is the jamb and casing of a wood window.

Your take off would be two vertical sides for 10 LF and the three horizontal pieces, top, middle and bottom for 9 LF to give you the total of 19 LF for the window unit. Once in a while you will find hollow metal windows that are operable. If you encounter this type of a hollow metal window take it off as you would the wood windows.

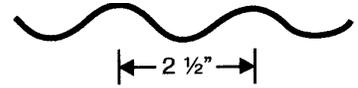
The above take off scenarios would paint one side of the window. If you have broved light units inside the building and both sides are to be painted be sure to enter the total LF for both side of all of the units in to the windows program at “Windows 10”. If one side of the widow units were to have a different finish than the other side, you would want to enter the LF in to two different programs. One setup for the finish system on the one side, and one setup for the finish system on the other side. Examples would be the above broved lights or the interior and exterior of windows.



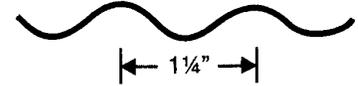
Metal Decking, Siding, and Sheeting

Corrugated Surfaces:

2 ½" Corrugated Sheet – to find width before corrugation, multiply the width after corrugation by 1.08. Assume depth to be 5/8".

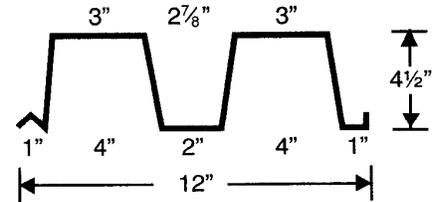


1 ¼" Corrugated Sheet – to find width before corrugation, multiply the width after corrugation by 1.11. Assume depth to be 5/8".



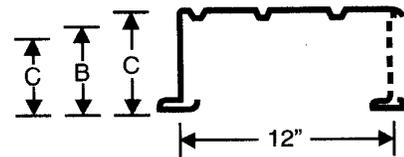
Roof Deck, Metal Sheeting:

If the surface has a cross sectional view similar to that shown, first figure the square foot area, then multiply by 2.42 to obtain the actual square foot.



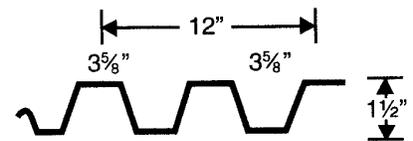
If the cross section has a view similar to that shown, figure the top side as the square foot area of the surface. Figure the underside as follows:

- A. For each square foot area multiply by 1.63 for actual surface area.
- B. Multiply by 1.75
- C. Multiply by 1.92

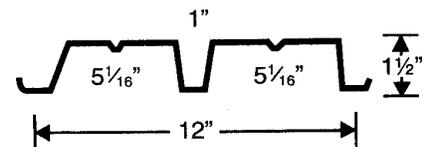


(A) 4½" (B) 6" (C) 8"

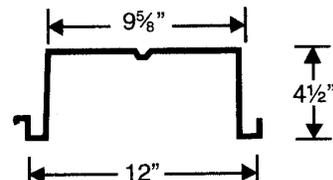
If the surface area has a cross sectional view similar to that shown, multiply the square foot of area by 1.5 to get the actual surface area per side.



If the surface area has a cross sectional view similar to that shown, multiply the square foot of area by 1.42 to get the actual surface area per side.



If the surface area has a cross sectional view similar to that shown, multiply the square foot of area by 1.75 to get the actual surface area per side.



Common Estimating Multipliers

Following is a list of some multipliers commonly used in paint estimating. The use of multipliers will save time while performing a quantity takeoff and they provide a reasonable approximation of the actual surface area of the various items that are to be painted.

Acoustical grid in linear feet	=	Area of the Ceiling
Chin link fencing	=	Length x Height x 2 sides
Closed cabinets	=	Length x Height x 6
Open shelving	=	Length x Height x 4
Fire sprinkler piping	=	12 to 15 LF for every 100 SF of ceiling area (add 15% for pipe hangers)
Open wood and steel joists	=	Length x Height x 2 sides
Standard flush door	=	42 Square Feet each
Standard doorframe	=	34 Square Feet each
Steel stairs and railing	=	20 Square Feet per riser
Typical 2 pipe railing	=	Length x 3.5
Typical 3 pipe railing	=	Length x 4.5
Typical 4 pipe railing	=	Length x 5.5
Typical 5 pipe railing	=	Length x 6.5
Standard Concrete Double Tees	=	2 times the floor area
Square Waffle Concrete Slabs	=	3 times the floor area

L = Length H = Height SF = Square Feet SF/EA = Square Feet / Each

Scaffolding, ladders, and other equipment required for access to work

The following percentages are to be deducted from the appropriate production rate to compensate for the reduced production involved with the use of the following equipment.

Rolling stage to 10 foot working height -----	10% to 15%
Rolling stage above 10 foot working height -----	10% to 15%
Extension ladders -----	25% to 50%
Swing staging -----	30% to 40%
Man lifts (Booms) -----	10% to 20%

Getting Extra Mileage from your Estimate

Once your bid is submitted, it would be easy to think that your estimate has served its purpose and can be filed away. Wrong! If you got the job, your estimate becomes a valuable planning and control tool. It will be the key to setting job performance standards and controlling the job in order to earn a maximum profit.

When the job is contracted the estimator will need to have a transfer meeting with the job foreman or project manager and go over the estimate. When an estimator looks at the job, he envisions it being accomplished in a particular manner. Ideas may be generated on scaffolding, sequence, method of application, crew size, etc. If these ideas are communicated to the foreman or project manager, they are given an approach which they can take or use to improve upon. If the estimator has filled out the estimating sheets with notes and materials by name, the foreman or project manager will have detailed description of each phase of the job with projected man hours and the gallons of the specified materials needed to do the job. This information combined with the production and material consumption rates used will help set goals for your employees so as to complete the job as scheduled.

Once your overall goal is set you can work with your employees to develop individual objectives which will meet that goal. Knowing how many man-hours it should take to do the job you can inform your employees what their production rate need to be. The production rates used throughout this program are all based on industry standards. These are rates that are tried and true and can easily be met by any qualified painter. The inability to meet a production goal is usually not that the rate is too high, but that an eight o'clock starting time may not happen until around eight twenty. A fifteen minute break ends up twenty and a thirty minute lunch stretches out to forty five minutes. Now add in four or five bathroom breaks at ten to fifteen minutes each and half dozen smoke breaks at five minutes each and you have lost two hours of production. If you want someone to put paint on at the rate of 400 square feet per hour you would expect him or her to produce for at least 7 hours at 400 square feet for a day's work of 2,800 square feet of painted wall. In the above scenario, they only produced 342 square feet per hour for a total of 2,400 square feet, because they only worked about 6 hours.

It is extremely important that the measurement of progress toward the goals can be made impartially and quantitatively in terms that are readily apparent and understood, such as square feet, number of doors or frames, lineal feet of trim, etc. Ideally, an employee should be able to judge his own progress toward a goal. For instance, if his goal is to paint at the rate of 400 square feet per hour to a good quality standard, he can determine his own progress by measuring the area and by comparing quality to visual standards. There should be little, if any, difference of opinion possible about whether or not the goal is being accomplished. You won't be put in the position of seeming arbitrary because you've set up a very subjective system of measuring progress. In this way, feedback is automatic for the employee and there is no room for argument. He knows when he's doing a good job and when he's not.

This also permits another solid management technique: “Management by Exception.” You as a manager need only focus your attention on the situations where performance is not meeting expectations and can let the other jobs be run, without interference, by those to whom responsibility and authority have been delegated. This conserves your manager’s time and energy, letting them work where they can be most productive.

Now your thinking, “Oh No, If a man knows he’s doing real well he’ll want more money.” So what! Of course, more money and promotions are eventually expected when performance consistently exceeds objectives or standards. If the performance is better, then can’t you afford more? Wouldn’t a raise be a good investment in the future productivity? I can’t think of a better reason to give a raise.

Also the estimate can be readily converted to a budget for controlling a successfully bid job if it is clearly set forth in terms of man-hours and gallons of materials for the various activities of the job. With an estimate like the one you will create with this program, as opposed to one which is vague and has unit prices or lumps together several activities with one total labor figure or dollar cost, it is easy for your bookkeeper to prepare schedule of values, payroll reports, or material cost records to track your job. An estimate prepared with this program will also show your bookkeeper all of the overhead cost, taxes and general condition cost that went into your bid. As the job progresses your bookkeeper will be able to tell at a glance how well the job is doing. If a problem has come up you will be able to respond in a timely fashion. Problems caught early can many times be corrected.

Happy Bidding