

ROMAC SERIES 7 ESTIMATING

Version 7.1

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OPERATOR'S MANUAL

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Installation

Romac Series 7 Fabrication Package is a multi-user application and can be installed on a standalone computer, as a single-user application on a computer attached to a network, or can be installed on several computers attached to a Windows network.

System Requirements

Operating System - Windows 95, 98, ME, NT4.0, 2000, and XP Professional

Network – Windows peer to peer (optional)

System memory – The programs should run on systems with the minimum amount of memory recommended for the operating system but at least 32 meg of memory. If you think your system may have a marginal amount of memory in which to run the program, try running the program with the marginal memory then buy additional memory only if necessary.

Hard disk space – varies from a few hundred meg. If you have been using our Series 5.3 system, data storage space will probably be 3-4 times as much as required for Series 5.3 data.

Monitor screen resolution – Minimum screen resolution is 800 x 600 with small or normal size (96 dpi) fonts.

The installation CD consists of two setup programs. Est7DataSetup.exe installs the data files. Est7Setup.exe installs the Estimating program.

Important note – when installing onto **Windows NT4.0, Windows 2000, or Windows XP**; a user with administrator rights must make installations. Also, upon installation, each application will start with a 45-day evaluation period that gives access to all program features without need to register the software. Prior to registering, the evaluation program must be run by a user with administrator (or super user) rights. If a person with regular user rights runs the evaluation program on a NT4.0, 2000, or XP system, it will cause the evaluation period to expire. Once registered, persons with user rights only can run the applications without problem.

Evaluation of the software should be done by a person with administrator or power user rights or on a Windows 95/98/ME system.

Single User installation (without network)

If installing onto a single computer not attached to a network, all setup programs would of course be run on that single computer. In this case we recommend that the default installation and folder names be used. Using installation defaults, data folders and files will be located as follows:

C:\Romic7 – Contains Fabrication Package data common to all applications.

C:\Romic7\EstData – Contains all Estimating data files

C:\Program Files\Romic – Contains program files for all applications.

When installing onto a single user, first run Est7DataSetup.exe then Est7Setup.exe. After installation, see “Linking programs to data files” below.

Single User installation (with network)

If installing a single user onto a computer connected to a network, you have two installation options. You can install everything onto a single computer as outlined above or you can install the data files onto one computer and the program files onto a separate computer similar to the network installation described below. The advantage to separating programs and data is that data files can be stored on a computer that has a regular backup routine. In either case, a frequent backup routine should be implemented.

Network installation

When installing onto a network with two or more users accessing the data files, the data files should be installed onto a single computer which can be accessed by all users. The program files must be installed onto each individual computer. The computer containing the data files can also contain program files and be used to access the data.

The data files should be installed first. Run Est7DataSetup.exe on the computer which you will be storing data. The setup program is designed to create folders Romic7 and Romic7\EstData. We recommend that you maintain this folder naming and structure. This makes it easier for troubleshooting and keeps all your data files together for simpler backups and restore. Romic7 can be placed in the root directory on the data drive or it can be placed in a subfolder. In any case, all users must have full read/write/create/delete rights for the Romic7 folder and all subfolders.

If you are running any of our Fabrication Package software, the Estimating data files are designed to be installed into the same folder as the Fabrication Package data. This keeps the materials database in a common location that can be shared by all users in all Romic applications. It also simplifies data backups as all data files can be backed up by backing up the folder Romic7 and all sub folders.

After data files are installed, the Estimating program should be installed onto each computer that will be running the application. Installation program is Est7Setup.exe.

Once installed, the estimating application can be run by accessing Programs | Romic Applications from the Windows Start menu.

Linking programs to data files

Before the Estimating application can be used, the installed program must be linked to the data files location. Upon initial startup, a screen will be displayed to allow you to browse to the data files location. This data files location will be the location files installed with Est7DataSetup.exe were installed to.

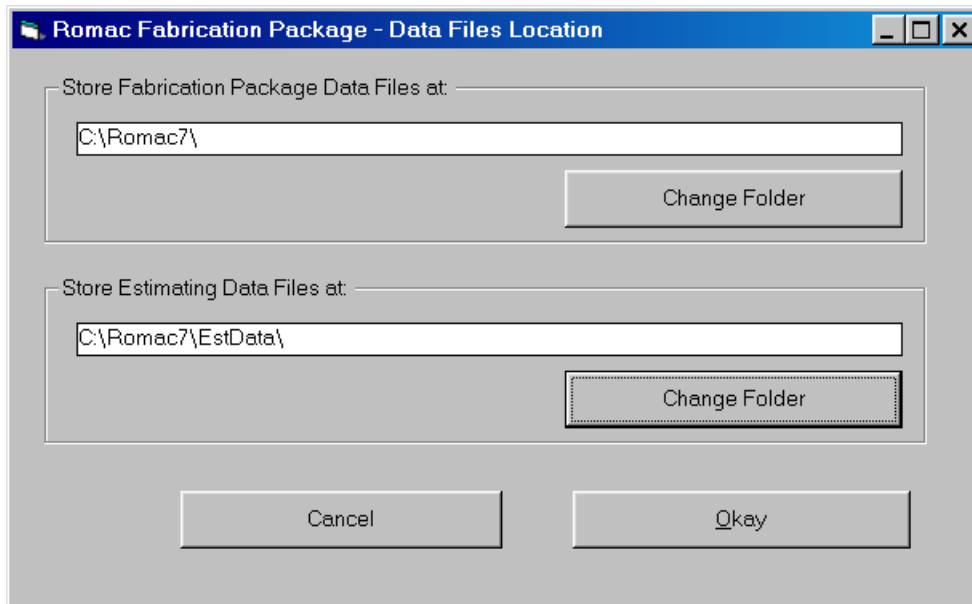
Each of the applications will need to be linked to the “Fabrication Package Data Files” location plus the location of its own data files.

Using the default installation, these locations will be:

Fabrication Package -\\Romac7\\

Estimating data files -\\Romac7\\EstData\\

This option can also be accessed using the menu chain Maintenance | Set Configuration | Data Files Location.



Adding Labor Groups to the Materials Database

For customer using our Series 7 Fabrication Package program, the default installation allows for sharing of the material database between the Fabrication Package and Estimating program. The Estimating program requires some additional data that is not included in the Materials Database distributed with the Fabrication Package programs. To facilitate both current Fabrication Package users and new Estimating users without the Fabrication Package, we are importing the estimating specific data from our Series 6 database. The Series 6 database files are included with this installation package. Users updating from Series 6 Estimating should copy their Series 6 database files to the new estimating data folder before importing the Series 6 database.

If updating from Series 6 Estimating, the Series 6 database files that are used for importing in the Series 7 applications are SSDB0006.FP and SSDB0306.FP. If the default installations were used for the Series 6 Estimating installation, the files will be located in the folder ...Romac6\EstData. If the default installation was used for the Series 7 Estimating installation, the two Series 6 database files should be copied to the folder ...Romac7\EstData before running the import routine. The copy will overwrite 2 files with the same name.

All users should run the 'Import Series 6 Database' routine as part of the installation process.

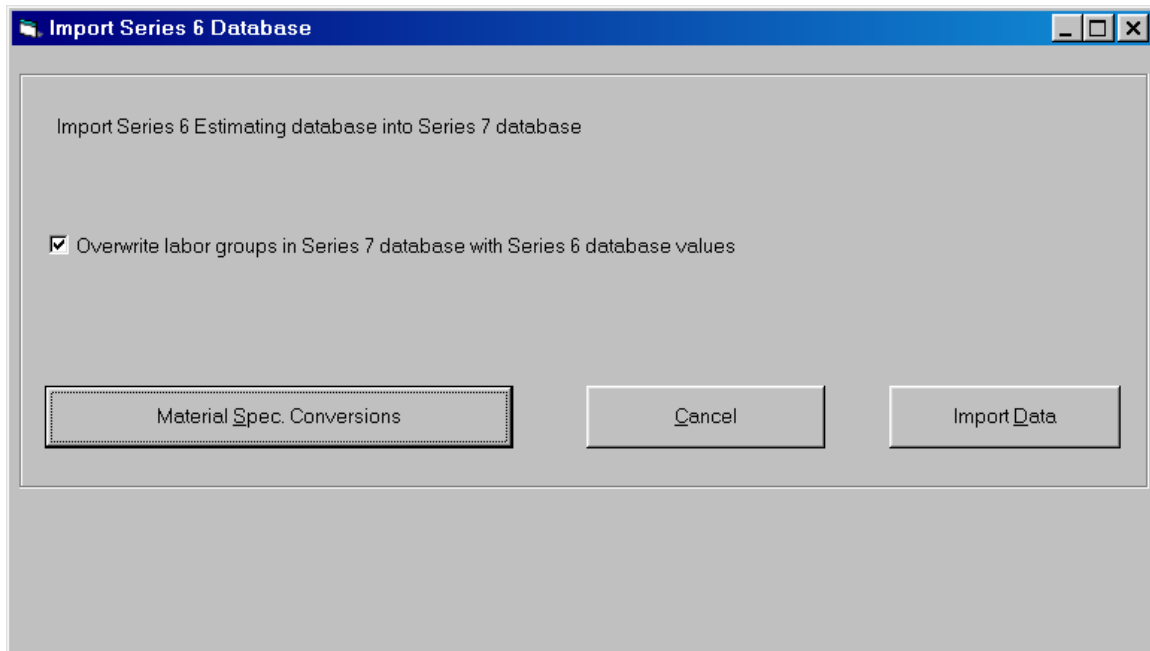
Import Series 6 Database

This routine allows you to import data from the Series 6 database distributed with the Series 6 estimating program to the Series 7 materials database. For Series 6 Estimating users, any items added to your old database can be transferred to the new database. Also, the import adds the labor group information required by the Series 7 Estimating program.

All users should run this routine whether a new user or upgrading from the Series 6 Estimating program. If this routine is not run, you will have to manually enter all labor group information into the materials database.

If updating from Series 6 Estimating and you wish to import your database, the Series 6 database files that are used for importing into the Series 7 applications are SSDB0006.FP and SSDB0306.FP. If the default installations were used for the Series 6 Estimating installation, the files will be located in the folder ...Romac6\EstData. If the default installation was used for the Series 7 Estimating installation, the two Series 6 database files should be copied to the folder ...Romac7\EstData before running the import routine. The copy will overwrite 2 files with the same name.

After importing, the files SSDB0006.FP and SSDB0306.FP in the Estimating Data folder should be renamed or deleted. This will prevent accidentally re-importing the data and overwriting any changes you have made.



The **Import Data** button will begin the import process. If the button is grayed out, there are specification descriptions in Series 6 database that are not defined in the Series 7 application. To cross reference or add the specification descriptions, select the **Material Spec. Conversions** button.

The option to overwrite labor groups in the Series 7 database with Series 6 database values is available. You would generally check this option so your new database is updated with the Series 6 labor group values.

Start Up

If the default installation was used; click the Start button, then click on 'Programs', nest click 'Romac Applications' and finally click Romac Series 7 application you wish to run.

Software Purchase and Registration

Upon installation of this software, you will be given a 30-day evaluation period which gives you access to most program features.

See separate instructions for activation information.

General Program User Interface

The Romac Series 7 applications generally follow the guidelines published by Microsoft for the user interface. A basic knowledge of the common Windows user interface should be enough to use the programs features.

One deviation from the Windows standard is that our applications can use the ENTER key in addition to the TAB key to exit a data entry field.

For users of our previous steel related applications, we have retained the same methods for entering steel material descriptions and lengths. The redefined fractions keys are still used to enter fractions in descriptions and dimensions.

The Series 7 Fabrication Package programs are multi-user applications. File locks are internally handled by the program. If a user attempts an operation that is in conflict with what another user is working on, the program will advise and not allow the second user to proceed.

Menu Structure Summary

File

- New Estimate
- Open Estimate
- Delete Estimate
- Estimate Material Costs
- Unlock Estimate
- Exit

Edit

- Project Title
- Material List
- Estimate Material Costs
- Cost Table Pricing Order

Reports

- Process/Print Estimate

Tools

- Estimate Material Costs
- Cost Table Pricing Order

Maintenance

- Materials Database
 - Edit Material Database
 - Display Materials Database
 - Synchronize Materials Databases
 - Import Series 6 Database
- Material Specifications
 - Edit Specifications Table
 - Edit Default Specifications
- Edit System Finishes Table
- Cost Tables
 - Add New Cost Table
 - With Unit Costs Only
 - With Lengths for Nesting
 - edit existing table*
- Labor Tables
 - Edit Type 3 Labor Table
- Set Configuration
 - Miscellaneous
 - Data Files Location
- Software Registration
 - Print Registration Form
 - Enter Registration Number

Help

- Contents
- About

Menu Options Overview

File

New Estimate

This option is used to create a new estimate. A unique estimate number identifies each estimate. This estimate number must be a combination of alpha (A through Z), numeric (0 through 9), or the hyphen characters and can be up to 12 characters in length. Data for an individual estimate project is stored in a single folder (or directory). The folder name will be the estimate number preceded by "Est_" (such as Est_999 or Est_A-999).

Open Estimate

This allows you to open and log in an estimate. An estimate can be logged in by several users at the same time but locked for access only when a user is working on an option that requires exclusive access. Exclusive access is required by most operations that change the data files. An individual user can have only one estimate logged in at a time.

Delete Estimate

Once deleted, there is no reliable method to recover the data other than using an archive or backup copy you had made. It is strongly recommended that you make a daily backup of your data files. Also, prior to deleting an estimate, you may want to make an archive copy onto a CD or some other media.

Estimate Material Cost

Material costing options for an individual estimate are available through this option. The same routines can be accessed through the Edit and Tools menu.

Unlock Estimate

A power failure, hardware malfunction, improper shutdown, etc. can leave an estimate marked as "in use" when no one is accessing the estimate. This option will allow you to unlock an estimate. Caution should be exercised when unlocking an estimate – If someone actually has the estimate open, unlocking it could cause data corruption that would make your estimate files useless and inaccessible.

Exit

You can exit the program using this option or by closing the window. In either case, if you have unsaved data, you will be prompted with an opportunity to save the data before exiting.

Edit

Estimate Title

Basic estimate information such as customer name, project location, etc. is entered using this option. Other parameters such as shop labor options, estimate bid items and other estimate defaults entered using this option. See the separate section for additional information.

Material List

The estimate material list can be manually entered or edited using this option. See the separate section for bill of material entry specifics.

Estimate Material Cost

Material costing options for an individual estimate are available through this option. The same routines can be accessed through the File and Tools menu.

Cost Table Pricing Order

The estimating system can contain up to 24 material cost tables. This option allows you designate the order in which the tables are accessed for pricing of the estimate. See the Estimate Material Cost section for additional information. This option can also be accessed through the Tools menu.

Reports

The reports are designed to print to Windows printers using the Courier New font. Reports will adjust the font size to fit the sheet width using the nearest available size font. If the font size chosen by the program results in a report with characters too small to read, you can change the report to print in landscape mode or in some cases, the report criterion allows exclusion of certain columns in the printout.

Reports will print to the default printer device using the default orientation (portrait or landscape). To print to a printer (or orientation) other than the system default, you have two choices. The system default printer can be changed from the Windows desktop or the printer can be changed from within the program.

To change the selected printer from within the program, after selecting the report to print, click the "Printer Setup" button. The printer you selected will then be used for all subsequent reports printed from that application until you change the selected printer or exit the application. However, the orientation will revert back to the printer's default after each report is printed.

Tools

Estimate Material Cost

Material costing options for an individual estimate are available through this option. The same routines can be accessed through the File and Edit menu.

Cost Table Pricing Order

The estimating system can contain up to 24 material cost tables. This option allows you designate the order in which the tables are accessed for pricing of the estimate. See the Estimate Material Cost section for additional information. This option can also be accessed through the Edit menu.

Maintenance

Set Configuration

Miscellaneous

This option allows you to enter your company name. The company name is printed at the top of each printed report.

Data Files Location

Software Registration

Print Registration Form

Enter Registration Number

Help

Contents

On line help files.

About

Displays information showing program version, license status, program serial number, and contact information.

Setting up a new Estimate

Estimate Number

A unique estimate job number identifies each estimate. This number is limited to a combination of alpha (A through Z), numeric (0 through 9), or the hyphen characters and can be up to 12 characters in length.

Data for each estimate is stored in a single folder (or directory). The folder name will be the job number preceded by "Est_" (such as Est_999 or Est_A-999). It is strongly recommended that a daily backup be made of the estimating data files.

The data files in an estimate folder (Est_nnnn) should be considered as a synchronized unit. Individual files should not be copied to this folder or deleted from this folder. If restoring estimate data files from a backup or copying job files from another location, all files in the Est_nnn folder should be deleted before restoring the backup. If you don't feel comfortable deleting the files, copy them to a temporary location before deleting. Failure to maintain all files in the Est_nnn folder as a synchronized unit could result in file corruption and lost or inaccurate data.

Estimate Project Title

The master estimate information can be edited immediately after creating a new estimate or by selection the menu option 'Edit | Project Title'. The edit screens are:

General

The screenshot shows the 'Romac Series 7 Estimating' window. At the top, the 'Estimate Number' is 1000. Below it is a 'Name:' label. A tabbed interface at the top shows five tabs: '1) General' (selected), '2) Extra Fields', '3) Labor Defaults', '4) Special Item Wts.', and '5) Bid Items'. The 'General' tab contains several input fields: 'Project Name:', 'Location:', 'Customer:', 'Remark:', 'Estimate Date:', 'Bid Date:', and 'Delivery Date:'. Below these are three radio buttons for 'Shop Labor': 'Type 3' (selected), 'Manual', and 'No Shop Labor'. A 'Default Finish:' dropdown menu shows 'S) Standard' and 'Clean: 1 Paint: 2'. At the bottom of the main area are two buttons: 'Edit Finishes' and 'Edit Default Specifications'. At the very bottom of the window are three buttons: 'Okay', 'Cancel', and 'Apply'.

The General tab allows you to Project Name, Location, Customer, Remark, Estimate Date, Bid Date and Delivery Date fields. These data item will show up on most printed reports.

The **Shop Labor** options for an estimate are:

No Shop Labor – Shop Labor is not considered for the estimate.

Manual – For each material list entry you will be prompted to enter shop labor in man hours per each. Shop labor is calculated from this value.

Type 3 – This selection allows you to enter a shop labor code for each material list entry. Shop labor is then calculated from values in the labor tables. This option also allow for automatic calculation of standard end connections with shop and field bolts for these connections. You also have the ability to override the labor codes and make a manual labor entry.

The Default Finish selection determines which finish is assigned to a material list item at data entry. The default should be set for the most prevalent finish used on the estimate. You are never locked into the default; the finish for the item can always be changed as required.

Edit Finishes

The values in the estimate finishes table are used for this estimate only. Editing this table does not affect the system table or the finishes table for any other estimate.

Twenty-four different finishes can be defined. The finish codes A through X are used in the estimating program to reference the finishes. The finish description can be up to 12 characters in length.

When using "type 3" estimating labor, cleaning and painting can be calculated based upon the type finish. The value in the clean and paint columns determine the labor calculated for a finish. If calculated labor is not utilized, the clean and paint values are irrelevant.

Clean values can be 0 through 4. 0 denotes that cleaning is not required for that finish and cleaning labor will not be calculated. Values 1 or 2 will calculate cleaning labor from table HC1. Values 3 and 4 will calculate cleaning labor from tables HC1, MC1 or MC2 depending upon the cleaning method.

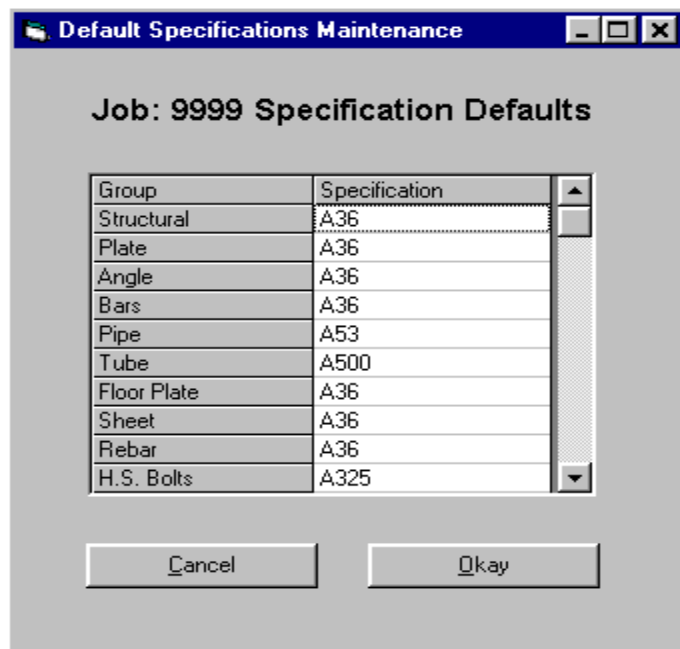
Paint values can be 0 through 4. 0 denotes that painting is not required for that finish and painting labor will not be calculated. Values 1 through 4 will calculate painting labor from table P.

CODE	FINISH DESCRIPTION	CLEAN	PAINT
A)	Finish A	0	0
B)	Finish B	0	0
C)	Finish C	0	0
D)	Finish D	0	0
E)	Finish E	0	0
F)	Finish F	0	0
G)	Finish G	0	0
H)	Finish H	0	0

Edit Default Specifications

The Default Specifications table determines which material specification is assigned to a material list item at data entry. The default should be set for the most prevalent material specification used for the shape. You are never locked into the default; the material specification for the item can always be changed as required.

The Edit Default Specifications button allows you to edit the specification defaults table. This table is used by this job only. The master default specification table can be edited elsewhere.



For specification default purposes, the various shapes are grouped as follows:

- Structural – W, WT, HP, S, ST, M, MT, C
- Plate - PL
- Angle – L, BC
- Bars – BR, SQ, RD
- Pipe – PI, PS, PE, PD
- Tube – TS, TO
- Floor Plate – FP
- Sheet – GA
- Rebar – RB
- H.S. Bolts – BTH, BTN, WHF, WHB, WHL, TC
- Mach. Bolts – BTM
- Other Bolts – BTE, BTW, AB, SC
- Other Matls. – SA, SI, SL, FEM, REM, GR

Extra Fields

The Extra Fields tabs allows you to denote which extra data fields will be required for the estimate's material list, the length of those fields, and the field titles. Currently, the software allows a remark type field and a special process. The special process field is for future use. Maximum total length of the two fields is 30 characters.

A field can be added after an estimate has commenced but once added the extra field parameters cannot be changed.

The screenshot shows the 'Romac Series 7 Estimating' window. At the top, the 'Estimate Number' is 1000 and the 'Name' field is empty. Below this is a tabbed interface with five tabs: '1) General', '2) Extra Fields' (which is selected), '3) Labor Defaults', '4) Special Item Wts.', and '5) Bid Items'. The 'Extra Fields' tab contains two sections. The first section is 'Special Process', which includes a checkbox labeled 'Use Special Process' (which is unchecked), a 'Field Length' input field containing the number '12', and a 'Field Title' input field containing the text 'Spcl Process'. The second section is 'Remark', which includes a checkbox labeled 'Use Remark' (which is unchecked), a 'Field Length' input field containing the number '12', and a 'Field Title' input field containing the text 'Remark'. At the bottom of the window are three buttons: 'Okay', 'Cancel', and 'Apply'.

Labor Defaults

This tab is used to enter the estimate default labor information for “type 3” labor estimates.

Romac Series 7 Estimating

Estimate Number: 1000

Name:

1) General | 2) Extra Fields | 3) Labor Defaults | 4) Special Item Wts. | 5) Bid Items

Type 3 Labor Defaults:

Connection Type: ☒ Standard ☐ Maximum

Shop Connection Method: ☒ Welded ☐ Bolted

Connections Material Spec: A36

Shop Bolt Size: 3/4 HS Bolt A325

Field Bolt Size: 3/4 HS Bolt A325

Add C&P to Manual Labor: ☐ Yes ☒ No

Blast Clean Method: ☒ Hand ☐ Machine

Okay Cancel Apply

Connection Type: This determines the size end connections automatically applied for beams if the "B" labor code is used. For each structural section in the material database, you are required to enter a connection size for Standard and Maximum connections. This entry determines the connection size (rows of holes) that is applied for “B” labor code items.

Shop Connection Method: When “Type 3” labor is used, bolts are counted for all standard BC connections. In all cases, field bolts are counted. If the shop connection method is bolted, shop bolts are also counted.

Beam connections (BC shape) are designated by rows of holes (1 through 10). Two field bolts are counted for each row of holes. When shop bolted connections are specified, one shop bolt is counted for each row of holes except two shop bolts are counted for 1 row connections. There is a provision in the program to enter a field bolt deduct amount for cases where beams frame into opposite sides of a beam or column web and share common connection bolts.

Connection Material Spec: The material specification to use for beam connections applied by the program.

Shop Bolt Size and Field Bolt Size: Bolt size and specification for shop and field bolts.

Add C&P to Manual Labor: This denotes whether to add labor for cleaning and painting to manual labor items. When using type 3 labor, cleaning and painting labor is added to coded labor items where applicable. If manual labor is entered for a line item, this entry determines whether clean and paint labor is applied in addition to the labor amount that was entered.

Blast Clean Method: The program is designed to recognize clean 3 and clean 4 (see Finishes Table for additional information) as blast cleaning. This determines which labor table entry to use for blast cleaning (clean 3 and 4). Hand cleaning applies shop labor based on surface area and uses labor table HC1, columns C and D. Machine cleaning applies labor based on member size and uses labor tables MC1 and MC2.

Special Item Wts.

The program requires that all materials in the material list be included in the materials database with the exception of bolts and special items (SI, SA, and SL shapes). This tab lets you denote whether bolts and special items will require weights. In either case, weight units for these special items can be entered as they are being entered into the shop bill of material. During material list entry, if a bolt or special item is entered, the materials database is checked. If the item is found in the materials database, that weight is used. If the item is not found in the materials database, you will be prompted to enter a weight unit, that weight unit entry is either optional or required depending upon your selections on this tab.

Romac Series 7 Estimating

Estimate Number: **1000**

Name:

1) General | 2) Extra Fields | 3) Labor Defaults | **4) Special Item Wts.** | 5) Bid Items

Bolt Weights

☒ Optional ☐ Required ☐ Omit

SI Weights

☒ Optional ☐ Required

SL Weights

☒ Optional ☐ Required

SA Weights

☒ Optional ☐ Required

Okay Cancel Apply

Bid Items

The estimate can contain up to six bid items. A separate cost summary and worksheet is available for each bid item.

Romac Series 7 Estimating

Estimate Number: **1000**

Name:

1) General 2) Extra Fields 3) Labor Defaults 4) Special Item Wts. 5) Bid Items

Number of Bid Items:

Bid Item 1:

Bid Item 2:

Bid Item 3:

Bid Item 4:

Bid Item 5:

Bid Item 6:

Material List Entry

The Material List Editor has three modes; Append, Edit, and Browse.

The append mode is used to add items to the end of the material list. When you create a new estimate, you are placed in the append mode. You remain in the append mode until you exit the material list editor or switch to the browse mode. While in the append mode, you can add items to the end of the list or edit the current item. To review the material list or edit a previously entered line item, you must switch to the browse/edit mode.

The browse mode allows you to scroll through the material list and edit individual items. To edit a line item, highlight the item then click the "Edit Item" button.

Each line item in the material list is assigned a Line Item Number. This number starts at 0001 and progresses in increments of one. Currently, you cannot insert lines into the middle of an estimate material list. If you need to delete an item from the material list, edit the line and change it to void. Void lines will remain in the material and can be reused. Void lines are not included on any printed reports. On estimates with "Type 3" labor, line item number "0000" are beam connections and bolt calculated by the program.

An estimate can consist of five types of material list line items. They are:

Title: A title entry is used to denote a section or area of similar items such as Columns, Floor Framing, Stair at location X, etc. Subtotals are available for each title group. A title entry includes a 24 character description and allows you to assign the title group to a bid item (if the estimate uses more than one bid item). If "Type 3" labor is used, the field bolt deduct count can be entered for the title group. The first item in the estimate material list must be a title.

Bill of Material item: Most material list lines will be Bill of Material items.

Note: These are 24 character descriptions that can be entered randomly in the estimate. They are not related to material and can be used by the estimator for any purpose.

Exclude: Similar to a note. The 24 character description is preceded by "Exclude". Exclude lines along with title descriptions and notes are listed on the scope of work report.

Void: A blank line. Can be left to reserve lines in the estimate or used to take items out of the estimate.

Roman Series 7 Estimating
 Estimate Number: 1000 Project Name: Sample Estimate 1000
 Item Count: 1 Set Point: 0.58 - inches
 Invalid Items: 0

Line	Qty	Description	Length	Spec	Fin.	Wt. Unit	Shop Labor
1001	1	NORTH WING COLUMN					

Append Mode

Item	Qty	Description	Length	Spec	Fin.	Wt. Unit
7000	1	W 8 x 11	7-8 1/2	5997		8

Shop Labor

C2

OK Cancel Browse list Exit

Material list entry consists of:

Item

Line item number is generated by the system.

Quantity

The quantity entry is the quantity of pieces for that line or can be a control code. Control Codes are:

TI – Used to make a Title entry.

NT – Used to make a Note entry.

EX – Used to make an Exclude entry.

V - Used to insert a blank line during input or to delete a line during edit.

END – End the material list data input session

Description

The bill of material description is entered into this field. If the item has a width (such as plates), the width would be included in the description field. In most cases, the item length is not entered into the description field but entered into the separate length field. An exception is that bolt lengths are entered into the description field.

The description entry is made by entering the shape code followed by [ENTER] (or the space bar) then the description dimensions. For most entries, if the description contains fractions, the fraction entry is made using re-defined fractions keys. This allows you to make fraction entries using one keystroke. The re-defined fraction keys are:

W=1/16, E=1/8, R=3/16, T=1/4, Y= 5/16,
U=3/8, I=7/16, O=1/2, S=9/16, D=5/8,
F=11/16, G=3/4, H=13/16, J=7/8, K=15/16

The shape codes and corresponding description formats are:

W, WT, C, MC, S, ST, M, MT, & HP - (Structural shapes as per AISC designations).

Description is entered by typing in the shape followed by [ENTER] (or space) then the depth, then X, then the weight per foot followed by [ENTER]. Spaces are automatically inserted before and after the 'X'. Use the decimal point where required. Optionally, the '+' key can be used rather than 'X'.

Example: W 10 x 22

L – (Angles). Input is in inches and inch fractions. Description is entered by typing in the shape followed by [ENTER] (or space) then leg 1, then X, then leg 2, then X, then the thickness followed by [ENTER]. Fractions must be entered using the redefined single key. Spaces are inserted by the computer where required for clarity.

Example: L 3 1/2 x 3 1/2 x 5/16

BC – (Beam Connection). A numeric entry of 1 through 10 denoting the rows of holes for a standard beam connection. If no labor or manual labor is used, you must enter the number of field and shop bolts separately. If "Type 3" labor is used, field and shop bolts are counted by the program.

PL - (Plate). Input is in inches and inch fractions. Description is entered by typing in the shape followed by [ENTER] (or space) then the thickness, then X, then the width followed by [ENTER]. Maximum thickness is 9 15/16". Fractions must be entered using the redefined single key. Spaces are inserted by the computer where required for clarity.

Example: PL 1/2 x 15 3/4

BR - (Flat bar). Input is in inches and inch fractions. Description is entered by typing in the shape followed by [ENTER] (or space) then the thickness, then X, then the width followed by [ENTER]. The maximum width/thickness is 99 15/16".

Example: BR 1/2 x 4

SQ - (Square bar). Entry is in inches and inch fractions. The description is entered by typing in the shape followed by [ENTER] (or space) then the bar dimension followed by [ENTER]. Maximum dimension is 9 15/16". Fractions must be entered using the redefined single key.

Example: SQ 1/2

RD - (Round rod). Entry is in inches and inch fractions. The description is entered by typing in the shape followed by [ENTER] (or space) then the diameter followed by [ENTER]. Maximum diameter is 9 15/16". Fractions must be entered using the redefined single key.

Example: RD 3/4

RB - (Rebar). The description is entered by typing in the shape followed by [ENTER] (or space) then the bar size followed by [ENTER]. Allowed bar sizes are 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, and 18.

Example: RB 4

GA - (Gauge material). The description is entered by typing in the shape followed by [ENTER] (or space) then the gauge thickness, then X, then the width followed by [ENTER].

Example: GA 11 x 24

FP - (Floor Plate). Entry is similar to plate (PL).

Example: FP 3/8

TS - (Square and rectangular tube). Entry is similar to Angle. The wall thickness must always be the last entry. If the wall thickness entry is 7 - 28, then a gauge wall thickness is assumed.

Example: TS 4 x 4 x 1/4

TO - (Round tube). Entry format is shape followed by [ENTER] (or space) then the outside diameter in inches and inch fractions), X, then the wall thickness. The wall thickness must always be the last entry. If the wall thickness entry is 7 - 28, then a gauge wall thickness is assumed.

Example TO 4 x 1/2

PI - (Pipe). Schedule pipe can be entered using this Shape code. The entry format is Shape, [ENTER] (or space), diameter, <X>, then the schedule followed by [ENTER].

Example: PI 4 x 40

PS, PE, and PD - (Pipe). Standard (PS), Extra strong (PE), and Double extra strong (PD) pipe can be entered using these Shape codes. The entry format is Shape, [ENTER], then the diameter followed by [ENTER].

Example: PS 4

PE 4

PD 4

CB - (Bar Channel). Entry is similar to Angle.

Example: CB 1 1/2 x 1/2 x 1/8

TB - (Bar Tee). Entry is similar to Angle.

Example: TB 1 1/2 x 1 1/2 x 3/16

BTH - (High strength Bolt). Enter the shape then [ENTER] (or space), diameter, then X, then the length followed by [ENTER]. All entries are in inches and inch fractions.

Example: BTH 3/4 x 2 1/2

BTM - (Machine Bolt). Enter the shape then [ENTER] (or space), diameter, then X, then the length followed by [ENTER]. All entries are in inches and inch fractions.

Example: BTM 3/4 x 2 1/2

BTN - (Nut). Enter the shape then [ENTER] (or space), diameter in inches and inch fractions followed by [ENTER].

Example: BTN 3/4

WHF - (Flat Washer). Enter the shape then [ENTER] (or space), diameter in inches and inch fractions followed by [ENTER].

Example: WHF 3/4

WHB - (Bevel Washer). Enter the shape then [ENTER] (or space), diameter in inches and inch fractions followed by [ENTER].

Example: WHB 3/4

WHL - (Load indicator Washer). Enter the shape then [ENTER] (or space), diameter in inches and inch fractions followed by [ENTER].

Example WHL 3/4

BTE - (Expansion Bolt). Enter the shape then [ENTER] (or space), diameter, then X, then the length followed by [ENTER]. All entries are in inches and inch fractions.

Example: BTE 3/4 x 4

BTW - (Wedge insert). Enter the shape then [ENTER] (or space), diameter in inches and inch fractions followed by [ENTER].

Example: BTW 3/4

AB - (Anchor Bolt). Enter the shape then [ENTER] (or space), diameter, then X, then the length followed by [ENTER]. All entries are in inches and inch fractions.

Example: AB 3/4 x 12

SC -(Shear Connector). Enter the shape then [ENTER] (or space), diameter, then X, then the length followed by [ENTER]. All entries are in inches and inch fractions.

Example: SC 1/2 x 4

GR - (Bar Grating). Enter the shape then [ENTER] (or space) then the bearing bar depth, then X, then the bearing bar thickness, then X, then the thickness followed by [ENTER]. All entries are in inches and inch fractions.

Example: GR 1 1/4 x 3/16 x 24

REM - (Regular Expanded Metal). Enter the shape then [ENTER] (or space) then the diamond SWD, then X, then the gauge thickness, then X, then the thickness followed by [ENTER].

Example: REM 3/4 x 16 x 24

FEM - (Flattened Expanded Metal). Enter the shape then [ENTER] (or space) then the diamond SWD, then X, then the gauge thickness, then X, then the thickness followed by [ENTER].

Example: FEM 3/4 x 16 x 24

SI - (Special item with weight calculated per each or item). Used for entries such as castings where the weight is calculated by the item. SI can also be used for items that do not have a weight. At Shape type SI [ENTER], then a 24 character description followed by [ENTER]. Redefined fraction keys are not available for the description part of this entry.

Example: SI #101 CASTING

SA - (Special item with weight calculated by Area). Used for items such as grating where weight is calculated by area. At Shape type SA [ENTER], then a 15 character description followed by [ENTER] then the width. Redefined fraction keys are not available for the description part of this entry but must be used in the width entry section if applicable.

Example: SA 1/8" PERF. PL x 24

SL - (Special item with weight calculated by Length). Used for items such as extrusions or aluminum sections. At Shape type SL [ENTER], then a 24 character description followed by [ENTER]. Redefined fraction keys are not available for the description part of this entry.

Example: SL #101 EXTRUSION

LA – (Labor). Shop labor consisting of a 24 character description and a labor entry in man hours. Labor is calculated as the man hour entry multiplied by the quantity.

WAF--(Weld, Automatic, Fillet). Applicable to type 3 labor only. Entry is in inches and inch fractions. The description is entered by typing in the weld size followed by <ENTER>. Allowable weld sizes are 1/16, 1/18, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, & 2. Fractions must be entered using the redefined single key.

WMF--(Weld, Manual, Fillet). Applicable to type 3 labor only. Entry is in inches and inch fractions. The description is entered by typing in the weld size followed by <ENTER>. Allowable weld sizes are 1/16, 1/18, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, & 2. Fractions must be entered using the redefined single key.

WAB--(Weld, Automatic, Butt). Applicable to type 3 labor only. Entry is in inches and inch fractions. The description is entered by typing in the weld size followed by <ENTER>. Allowable weld sizes are 1/16, 1/18, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, & 2. Fractions must be entered using the redefined single key.

WMB--(Weld, Manual, Butt). Applicable to type 3 labor only. Entry is in inches and inch fractions. The description is entered by typing in the weld size followed by <ENTER>. Allowable weld sizes are 1/16, 1/18, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, & 2. Fractions must be entered using the redefined single key.

WAV--(Weld, Automatic, single bevel). Applicable to type 3 labor only. Entry is in inches and inch fractions. The description is entered by typing in the weld size followed by <ENTER>. Allowable weld sizes are 1/16, 1/18, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, & 2. Fractions must be entered using the redefined single key.

WMV--(Weld, Manual, single bevel). Applicable to type 3 labor only. Entry is in inches and inch fractions. The description is entered by typing in the weld size followed by <ENTER>. Allowable weld sizes are 1/16, 1/18, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, & 2. Fractions must be entered using the redefined single key.

WAK--(Weld, Automatic, double bevel). Applicable to type 3 labor only. Entry is in inches and inch fractions. The description is entered by typing in the weld size followed by <ENTER>. Allowable weld sizes are 1/16, 1/18, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, & 2. Fractions must be entered using the redefined single key.

WMK--(Weld, Manual, double bevel). Applicable to type 3 labor only. Entry is in inches and inch fractions. The description is entered by typing in the weld size followed by <ENTER>. Allowable weld sizes are 1/16, 1/18, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, & 2. Fractions must be entered using the redefined single key.

D – (Ditto the previous description). Dittos the previous line item description only. You must enter the length, remarks, etc.

Length

Length is entered in feet, inches, and inch fractions for US standard jobs and millimeters for metric jobs. Maximum length is 999'11 15/16 for US standard or 99999 mm for metric.

For US standard units the hyphen [-], period [.] , or single quote ['] can be used to separate feet and inches. Fractions must be entered using the redefined single key.

Spec

The spec field will be automatically filled in with the default specification based on the shape. If this is correct, you can tab or enter to the next field. A different spec can be selected from the specifications table or you can enter the material code (1-99) relating to the actual specification.

Regardless of which method is used to enter the specification, it must exist in the specifications table.

Finish

The finish code (A through X). If you tab or enter past this field, the finish default will be applied.

Wt. Unit

For most items, the wt. unit comes from the materials database through an internal lookup operation. If the item is a bolt or special item and not found in the materials database, you will be prompted to enter a weight unit. Depending on your selections on the Job Titles screen, the weight unit may or may not be required.

Labor

The labor entry for manual labor estimates can be entered as follows (or can be omitted):

Hours each - A numeric value. Labor computed for that line will be the item quantity times the labor unit.

Hours per Ton - To have the labor for an item computed based upon hours per ton, enter the hours per ton followed by "/T". For example 20/T would calculate labor at 20 hours per ton based on the weight calculated for that line item.

Lbs. per Hour - To have the labor for an item computed based upon pounds per hour, enter the pounds per hour followed by "/PH" or "/LBH". For example 300/PH would calculate labor at 300 pounds per hour based on the weight calculated for that line item.

Hours per Lin. Ft. - To have the labor for an item computed based upon hours per lin. ft., enter the hours per lin. ft. followed by "/LF". For example .5/LF would calculate labor at .5 hours per lin. ft. based on the length for that line item.

Hours per Sq. Ft. -

To have the labor for an item computed based upon hours per sq. ft., enter the hours per sq. ft. followed by "/SF". For example .5/SF would calculate labor at .5 hours per sq. ft. based on the area (width x length) for that line item.

For estimates using "Type 3" labor, the manual labor entries listed above can be used in addition to the labor codes prefixed with B, C, X, P, F, M, S or E.

Other entry fields

You may be prompted for other entries such as Remark, etc. In most cases, these entries are optional and may be skipped if not applicable.

Invalid entries

At the end of each line of data entry, you will be prompted if there were any errors. The error message will be descriptive of the error condition. If you choose to not correct the error; the item will be flagged as invalid and an asterisk will be placed in the line number column. Invalid items should be corrected before completing the estimate. A count of invalid items is shown at the top of the Material List Editor window.

The OK button will update the material list with the data just entered or changed. The Cancel button will undo the last line of data entry or change. If you are in Append Mode, the Browse List button will switch control into display/edit mode. The last line of data entry is not saved if the Browse List button is selected. The Exit button will save all data and close the project.

Estimate Material Pricing

The estimate material list can be priced from the material cost tables or you can enter pricing for individual items without using the cost tables. Use the menu options File | Estimate Material Costs to access the material pricing for the currently logged estimate.

The screenshot shows the 'Romac Series 7 Estimating' window. At the top, it displays 'Estimate Number: 1000', 'Project Name: Sample Estimate 1000', 'Item Count: 17', and 'Size Method: US Standard'. Below this is a table with the following data:

Description	Spec	Item Count	Amount	Weight (lbs)	Cost Source
W 24 x 55	A992	1	79.7 Lft	4,981.7	
W 10 x 26	A992	1	152.0 Lft	3,952.0	
W 10 x 22	A992	2	117.2 Lft	2,577.7	
W 8 x 31	A992	1	49.2 Lft	1,524.2	
W 8 x 24	A992	1	25.2 Lft	604.0	
C 8 x 11.5	A36	2	69.0 Lft	1,023.5	

At the bottom of the window, there are four buttons: 'Process/Price Entire Estimate', 'Material Costing (Selected Item)', 'Display', and 'Close'.

This option will display a summary listing of all material on the estimate. The summary listing will list the material descriptions, number of line items the material is listed within the estimate, total amount (in pieces, lineal feet or square feet), total weight of the item (if applicable) and source of the material pricing (if the material has been priced).

The **Display** button gives you a detailed listing of the highlighted summary item.

Romac Series 7 Estimating

Estimate Number: 1000 Project Name: Sample Estimate 1000
 Item Count: 17 Size Method: US Standard
 Invalid Items: 0

C 8 x 11.5, A36

Line	Qty	Description	Length	Spec	Wt Unit	Shop Labor
0012	6	C 8 x 11.5	9-11	A36	11.5	B122
0013	6	C 8 x 11.5	4-11	A36	11.5	B002

Close

Automatic pricing of an estimate from the price tables:

To price (or re-price) the entire estimate from the cost tables, select the **Price/Process Entire Estimate** button. You will be given a screen to enter the order in which to access the cost tables for pricing. This pricing order is saved for each estimate and used for future pricing if the estimate material list is revised.

Select Cost Tables

Estimate No: 1000

- 1) Mill, Structural
- 2) Warehouse, Plate
- 3) Warehouse, Structural
- 4) Warehouse - angle/bar
- 5) Nested, Pipe & Tube
- 6) Bolts, Misc.

Enter list of cost tables to use when selecting material prices for this estimate. Table numbers should appear in the order in which they will be checked for valid prices. Enter cost table numbers separated by commas.

3,2,4,5,6

Okay Cancel

For every material in the estimate that is not locked to a user entered price or not locked to a specific cost table, the pricing routine will scan the tables in the order that you specify until a table is found with valid pricing for that material. If a valid price is not found, the material will not be priced. The automatic pricing routine does not consider which table may have the best price, it simply prices from the first table in the pricing order that has a valid price.

Material pricing can be locked to a specific price table or the user can enter a price for a material item and lock that item so that the automatic pricing routine will not price that material from a different table. For material not locked to a price, the automatic pricing routine functions as follows:

The routine scans the tables in the order specified by the user.

If the item is found in a "unit costs only" table, the item is priced from that table and the pricing routine steps to the next material item. This is applicable to all items whether length, area or each items. Nesting is not considered if priced from the "unit costs only" table.

If the item is a length item and is found in a "with Lengths for nesting" table the item is nested for pricing if the longest available length is equal to or longer than the longest cut length.

If the item is a length item and is found in a "with Lengths for nesting" table and the longest available length is shorter than the longest cut length, the item will be priced from that table if there is a "No Nest" unit cost. If there is not a "No Nest" unit cost, the item is not priced from that table. The "No Nest" unit is applied to all items longer than the longest available cut from length, and then the balance of the list is nested.

Nesting is considered for length items only. Plate nesting is not available in the estimating program at this time.

When pricing a nested list; if all items are nested, the total cost is calculated from the gross amount of material used then divided by the net amount to arrive at an average unit cost. If there are any drops involved, this will result in the average unit cost on the net usage being higher than the unit material purchase cost.

Material cost credit is not considered for any remnants that may be usable on another project. If you wish to reduce the material cost for any usable remnants, you must list this manually on the cost worksheet.

Manual pricing of selected estimate items:

To price a selected estimate item, with the item highlighted, select the **Material Costing (Selected Item)** button. This will allow you to enter a price for the item or to select a cost table from which to price the item.

The screenshot shows the 'Romar Series 7 Estimating' window. The title bar is blue. The main area has a light blue header with the following text: 'Estimate Number: 1000', 'Project Name: Sample Estimate 1000', 'Item Count: 17', 'Invalid Items: 0', and 'Size Method: US Standard'. Below the header, the item 'C 8 x 11.5, A36' is selected. There are three input fields for dimensions: '12 pos', '89.0 lin ft', and '1,023.5 lbs'. To the right, there are two input fields for units: 'Weight unit: 11.5 /lin ft' and 'Surface area unit: 2.05 /lin ft'. Below these, there is a 'Cost Source' field, a 'Cost Unit' dropdown menu set to 'per Lb', and a 'Change Cost Source' button. There is also a checkbox labeled 'Lock pricing to this cost table' which is unchecked. At the bottom, there is a 'Cost Total' field. At the very bottom of the window are three buttons: 'Okay', 'Cancel', and 'Apply'.

Manually pricing the item - If you enter a cost for the item, the cost unit can be per pound, per foot or per each depending on the item. Your cost unit will be extended based upon the cost unit. If "Lock pricing to this cost table" is checked then the unit cost will be locked in for this item unless you manually change it.

Pricing from a specific cost table – To price the item from a specific cost table, click the button "Change Cost Source". This will display a list of the cost tables from which you can choose for pricing of the item. The item will be priced from the table if possible. The same criterion will be used as used with the automatic pricing except the select table will be the only table accessed for pricing. Length nesting will be considered if applicable.

Locking pricing to a source – Check the option box “Lock pricing to this cost table” to lock the pricing to a specific cost source. The option is also available if the item was priced with the automatic pricing routine.

Generally, unit cost changes in the cost tables are not reflected in an individual estimate unless you select the “Process/Price Entire Estimate” button from the Material Summary screen. When this option is chosen, estimate specific priced items are not affected, items locked to a specific table are re-priced from that table based upon the current units, and the balance of the items are re-priced using the automatic pricing procedures.

If changes are made to the estimate material list, a “behind the scenes” re-pricing occurs for changed items only.

Reports

The menu selection Report | Print/Process Estimate allows you to print most of the estimating reports.

The screenshot shows a 'Reports' dialog box with a blue title bar. It contains the following elements:

- Header:** 'Estimate Number: 1000' and 'Project Name: Sample Estimate 1000'.
- Print Extended List:** A checked checkbox with a sub-list of options: 'Print Weights' (checked), 'Print Surface Area' (unchecked), 'Print Material Cost' (checked), 'Print Shop Labor Data' (checked), and 'Print Sub-totals' (checked).
- Print Cost Worksheet:** A checked checkbox with a sub-option 'Print Scope of Work Listing' (unchecked).
- Print Sorted Listing:** A checked checkbox with a note: 'Note: The Sorted Listing prints the same fields as the Extended Listing.'
- Print Size Summary:** A checked checkbox with a sub-option 'Include Nesting Detail' (checked).
- Other Summary Options:** 'Print Shape Summary' (unchecked) and 'Print Finish Summary' (unchecked).
- Printer Setup:** A button that opens a settings window showing 'HP LaserJet 2200 Series PCL 6', 'Orientation: Portrait', and 'Copies: 1'.
- Buttons:** 'Printer Setup', 'Cancel', and 'OK (Print)'.

The Extended List is a listing of all bill of material items with weight, cost, and labor calculation extensions. This listing is in the same order that the estimate was entered and includes all TI, NT, and EX lines. The option is also available to print sub-totals for each title (TI) category.

The Cost Worksheet report lists the estimate totals. A separate summary and worksheet is printed for each bid item. The worksheet listed at the right side of the report can be modified by the user. The worksheet filename is Costsum.txt in the estimating data folder. You can modify this file using Windows Notepad or WordPad. The modified file should be saved as a MS-DOS text document. To omit the worksheet from the cost summary page, delete or rename the file Costsum.txt. To have the worksheet printed on a separate page, create a file named Costsum2.txt in the estimate data folder.

The Sorted Listing is similar to the Extended List but groups like items together. TI, NT and EX lines are not listed on the Sorted Listing.

The Size Summary is a totals summary of each material on the estimate. The Size Summary does not include the detail quantity for each line item. For nested items, a listing of the 'cut from' quantities and lengths along with a drops summary is included. Optionally, the nesting detail can be printed.

If the material for the estimate has not been previously priced when printing a report using this option, you will be prompted to select the cost table order to price from. If cost tables are selected, the estimate will be automatically priced before the reports are printed.

If any changes have been made to the material list of a previously priced estimate, the changed items will be re-priced. Changes in the cost tables will not be reflected in the printed reports unless the item has changed in the estimate material list or the estimate is re-priced through the "Estimate Material Costs" menu option.

Bill of material item errors are noted in the "Err" column on the Extended List and Sorted Listing. A count of these errors is shown in the Extended List sub-totals and on the Cost Summary. The estimate is not complete until all errors are corrected.

Materials Database

The Materials Database is used by the Romac Series 7 applications to lookup weights and surface areas. U. S. standard (imperial) and metric items can be entered into the database.

Each database record consists of; item description, type of material (Carbon Steel, Stainless, Aluminum, etc.), weight unit, surface area unit, and an option equivalent or substitute description in metric (or US standard) dimensions.

The supplied database contains most steel items listed in the AISC Manual of Steel Construction, Ninth Edition. The database also contains metric equivalents as listed in the AISC Metric Properties of Structural Shapes publication dated 1992. The database is supplied as is and Romac Computer Services, Inc. assumes no liability regarding the completeness or accuracy of the database.

Database records can be added, revised, or deleted using the Maintain | Update Materials Database option.

Update Materials Database

US Std Desc: W 10 x 22

Type of Material: Carbon Steel

Weight Unit: 22 Unit method: Per Lin. Foot

Surface Area Unit: 3.53

Description Type

☒ US Std

☐ Metric

Metric Equivalent/Substitute

Status

☐ Not Applicable ☒ Equivalent ☐ Substitute

Metric Desc: W 250 x 33

Estimating Labor

Group: B 3

Std. Connection Size: 3

Max. Connection Size: 3

Okay Delete Cancel Exit

Material Description

The material description entry is made by entering the shape code followed by [ENTER] (or the space bar) then the description. For most entries, if the description contains fractions, the fraction entry is made using re-defined fractions keys. This allows you to make fraction entries using one keystroke. The re-defined fraction keys are:

W=1/16, E=1/8, R=3/16, T=1/4, Y= 5/16,
U=3/8, I=7/16, O=1/2, S=9/16, D=5/8,
F=11/16, G=3/4, H=13/16, J=7/8, K=15/16

The shape codes and corresponding description formats are:

Note, these examples are based on US standard description entry. Metric description entries are similar except fractions are not applicable. Depending upon whether you are updating a US standard or metric item, the appropriate Description Type at the upper right of the window must be checked.

W, WT, C, MC, S, ST, M, MT, & HP - (Structural shapes as per AISC designations).

Description is entered by typing in the shape followed by [ENTER] (or space) then the depth, then X, then the weight per foot followed by [ENTER]. Spaces are automatically inserted before and after the 'X'. Use the decimal point where required. Optionally, the '+' key can be used rather than 'X'.

Example: W 10 x 22

L – (Angles). Input is in inches and inch fractions. Description is entered by typing in the shape followed by [ENTER] (or space) then leg 1, then X, then leg 2, then X, then the thickness followed by [ENTER]. Fractions must be entered using the redefined single key. Spaces are inserted by the computer where required for clarity.

Example: L 3 1/2 x 3 1/2 x 5/16

PL - (Plate). Input is in inches and inch fractions. Description is entered by typing in the shape followed by [ENTER] (or space) then the thickness followed by [ENTER]. Maximum thickness is 9 15/16". Fractions must be entered using the redefined single key.

Spaces are inserted by the computer where required for clarity.

Example: PL 1/2

BR - (Flat bar). Input is in inches and inch fractions. Description is entered by typing in the shape followed by [ENTER] (or space) then the thickness, then X, then the width followed by [ENTER]. The maximum width/thickness is 99 15/16".

Example: BR 1/2 x 4

SQ - (Square bar). Entry is in inches and inch fractions. The description is entered by typing in the shape followed by [ENTER] (or space) then the bar dimension followed by [ENTER]. Maximum dimension is 9 15/16". Fractions must be entered using the redefined single key.

Example: SQ 1/2

RD - (Round rod). Entry is in inches and inch fractions. The description is entered by typing in the shape followed by [ENTER] (or space) then the diameter followed by [ENTER]. Maximum diameter is 9 15/16". Fractions must be entered using the redefined single key.

Example: RD 3/4

RB - (Rebar). The description is entered by typing in the shape followed by [ENTER] (or space) then the bar size followed by [ENTER]. Allowed bar sizes are 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, and 18.

Example: RB 4

GA - (Gauge material). The description is entered by typing in the shape followed by [ENTER] (or space) then the gauge thickness followed by [ENTER].

Example: GA 11

FP - (Floor Plate). Entry is similar to plate (PL).

Example: FP 3/8

TS - (Square and rectangular tube). Entry is similar to Angle. The wall thickness must always be the last entry. If the wall thickness entry is 7 - 28, then a gauge wall thickness is assumed.

Example: TS 4 x 4 x 1/4

TO - (Round tube). Entry format is shape followed by [ENTER] (or space) then the outside diameter in inches and inch fractions), X, then the wall thickness. The wall thickness must always be the last entry. If the wall thickness entry is 7 - 28, then a gauge wall thickness is assumed.

Example TO 4 x 1/2

PI - (Pipe). Schedule pipe can be entered using this Shape code. The entry format is Shape, [ENTER] (or space), diameter, <X>, then the schedule followed by [ENTER].

Example: PI 4 x 40

PS, PE, and PD - (Pipe). Standard (PS), Extra strong (PE), and Double extra strong (PD) pipe can be entered using these Shape codes. The entry format is Shape, [ENTER], then the diameter followed by [ENTER].

Example: PS 4

PE 4

PD 4

CB - (Bar Channel). Entry is similar to Angle.

Example: CB 1 1/2 x 1/2 x 1/8

TB - (Bar Tee). Entry is similar to Angle.

Example: TB 1 1/2 x 1 1/2 x 3/16

BTH - (High strength Bolt). Enter the shape then [ENTER] (or space), diameter, then X, then the length followed by [ENTER]. All entries are in inches and inch fractions.

Example: BTH 3/4 x 2 1/2

BTM - (Machine Bolt). Enter the shape then [ENTER] (or space), diameter, then X, then the length followed by [ENTER]. All entries are in inches and inch fractions.

Example: BTM 3/4 x 2 1/2

BTN - (Nut). Enter the shape then [ENTER] (or space), diameter in inches and inch fractions followed by [ENTER].

Example: BTN 3/4

WHF - (Flat Washer). Enter the shape then [ENTER] (or space), diameter in inches and inch fractions followed by [ENTER].

Example: WHF 3/4

WHB - (Bevel Washer). Enter the shape then [ENTER] (or space), diameter in inches and inch fractions followed by [ENTER].

Example: WHB 3/4

WHL - (Load indicator Washer). Enter the shape then [ENTER] (or space), diameter in inches and inch fractions followed by [ENTER].

Example: WHL 3/4

BTE - (Expansion Bolt). Enter the shape then [ENTER] (or space), diameter, then X, then the length followed by [ENTER]. All entries are in inches and inch fractions.

Example: BTE 3/4 x 4

BTW - (Wedge insert). Enter the shape then [ENTER] (or space), diameter in inches and inch fractions followed by [ENTER].

Example: BTW 3/4

AB - (Anchor Bolt). Enter the shape then [ENTER] (or space), diameter, then X, then the length followed by [ENTER]. All entries are in inches and inch fractions.

Example: AB 3/4 x 12

SC - (Shear Connector). Enter the shape then [ENTER] (or space), diameter, then X, then the length followed by [ENTER]. All entries are in inches and inch fractions.

Example: SC 1/2 x 4

GR - (Bar Grating). Enter the shape then [ENTER] (or space) then the bearing bar depth, then X, then the bearing bar thickness followed by [ENTER]. All entries are in inches and inch fractions.

Example: GR 1 1/4 x 3/16

REM - (Regular Expanded Metal). Enter the shape then [ENTER] (or space) then the diamond SWD, then X, then the gauge thickness followed by [ENTER].

Example: REM 3/4 x 16

FEM - (Flattened Expanded Metal). Enter the shape then [ENTER] (or space) then the diamond SWD, then X, then the gauge thickness followed by [ENTER].

Example: FEM 3/4 x 16

SI - (Special item with weight calculated per each or item). Used for entries such as castings where the weight is calculated by the item. SI can also be used for items that do not have a weight. At Shape type SI [ENTER], then a 24 character description followed by [ENTER]. Redefined fraction keys are not available for the description part of this entry.

Example: SI #101 CASTING

SA - (Special item with weight calculated by Area). Used for items such as grating where weight is calculated by area. At Shape type SA [ENTER], then a 15 character description followed by [ENTER]. Redefined fraction keys are not available for the description part of this entry.

Example: SA 1/8" PERF. PL

SL - (Special item with weight calculated by Length). Used for items such as extrusions or aluminum sections. At Shape type SL [ENTER], then a 24 character description followed by [ENTER]. Redefined fraction keys are not available for the description part of this entry.

Example: SL #101 EXTRUSION

Type of Material

Type of Material is used to tie Material Specifications to the Materials Database. For instance, a W 10 x 22 could be listed in the Materials Database as 'Carbon Steel'. Specifications A36, A572/50, and A992 could be listed in the Material Specifications table as 'Carbon Steel'. These three specifications would be tied to the W 10 x 22 through the common Material Type 'Carbon Steel'.

Additionally, the same material description can be entered into the Materials Database with different Material Types. You could have L 3 x 3 x 5/16 listed as 'Carbon Steel', a second entry as 'Stainless', and a third entry as 'Aluminum'. Each entry would have a different weight unit and would be tied to the appropriate Material Specification by the Material Type.

Available Material Types are:

- Carbon Steel
- Stainless
- Aluminum
- Brass
- Bronze
- Copper
- Steel Bolt
- Plastic
- Not Appl.

The above Material Types cannot be modified by the user. If you need additional Material Types, please contact the program vendor, Romac Computer Services.

Weight Unit

The weight unit entry is in pounds (lbs.) or kilograms (kgs.) depending upon the record item's Description Type (US standard or Metric).

Weight units are per each for all bolt shapes (BTH, BTM, TC, BTN, WHF, WHB, WHL, BTE, BTW, AB, SC) and SI shapes.

Weight units are per area (square foot or square meter) for PL, GA, FP, GR, REM, and FEM shapes.

Weight units are per length (foot or meter) for all other shapes.

Surface Area Unit

The surface area unit entry is in square feet or meters depending upon the record item's Description Type.

Surface Area units are per each for all bolt shapes (BTH, BTM, TC, BTN, WHF, WHB, WHL, BTE, BTW, AB, SC) and SI shapes.

Surface Area units are per area (square foot or square meter) for PL, GA, FP, GR, REM, and FEM shapes. For most area items, the unit would be 2 square units of surface area for each square unit of the item. For items such as grating or expanded metal, the exact surface area unit would need to be calculated.

Surface Area units are per length (foot or meter) for all other shapes. For hollow sections such as pipe or tube, the surface area units in the database supplied by Romac Computer Services are

for outside surfaces only. The surface area would need to be approximately doubled to include the inside surface (such as calculations for hot dipped galvanized areas).

Equivalent / Substitute Description

For certain shapes, a soft conversion exists between US standard and metric dimensions. If an item has a US standard nomenclature and a metric nomenclature that refer to the same item then the items would have Equivalent status. In these cases the database would have two entries. The first entry would be the US standard with the metric equivalent; the second entry would be the metric description with the US standard description as the equivalent.

Substitute status would apply when you could use a US standard item in place of a metric item but could not use the same metric item in place of a US standard item. This might be applicable for plates where the US standard inch fraction thickness does not convert to a common mm thickness. For instance, you might substitute a thicker US standard plate for a specified metric thickness but could not substitute the thinner metric thickness for the specified US standard. The database supplied by Romac Computer Services does not contain any substitute entries.

Estimating Labor

Most steel items are assigned to groups for calculating shop labor in the estimating program. See the shop labor section of the estimating documentation for more specific information relating to labor groups.

For “type 3” estimating labor, valid groups are:

- Structurals – B1 through B27
- Angles, bars – L1 through L5
- Plates – P1 through P5
- Pipe, tube – O1 through O4

Additionally, for structurals, you will be prompted to enter “Std. Connection Size” and “Max. Connection Size”. This is the beam connection size calculated for that member in the estimating program. Valid connection sizes are 1 through 10.

Display Materials Database

The Menu option Maintain | Display Materials Database gives you a scrollable screen listing of all items in the Materials Database.

Edit Specifications Table

The Specifications Table is a listing of all materials specifications used by the Romac Series 7 applications. The table is referenced whenever a steel material item is entered into a Romac Series 7 bill of material or other application. The table consists of the specification description, a material type, and an optional material code and can be accessed using menu option Maintain | Edit Specifications Table.

SPEC	MATL TYPE	MC
A36	Carbon Steel	1
A572/50	Carbon Steel	2
A992	Carbon Steel	3
A500	Carbon Steel	10
A53	Carbon Steel	13
A325	Steel Bolt	31
A490	Steel Bolt	32

Spec. Description:

Type of Material:

Material Code:

The Specification Description is an alpha/numeric entry of up to 8 characters. Typical descriptions would be as defined by ASTM or other standards organizations. Once entered into the system, the specification description cannot be deleted.

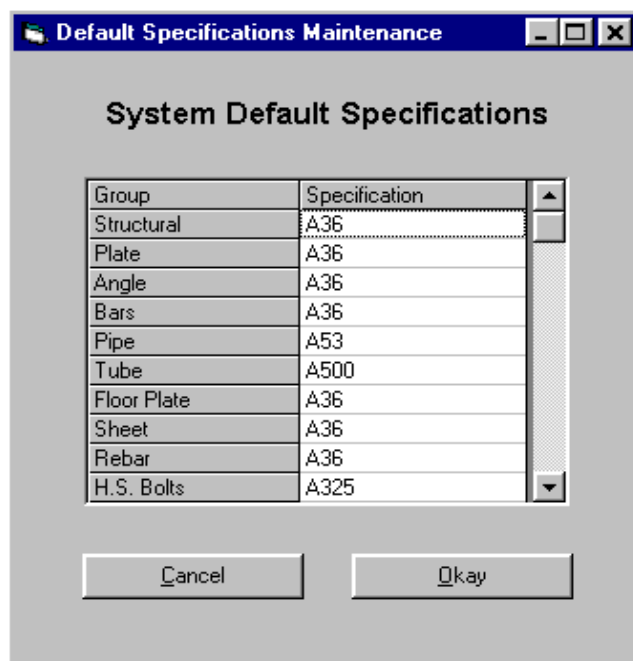
The Type of Material is one of the fixed material types as described in the materials database section. The material type ties a specification description to items in the Materials Database. The material type can be changed but the change does not affect any data previously entered into the system. If you had previously entered a specification with material type 'Aluminum' then entered bill of material into a job with weights calculated with the aluminum weights, changing the specification in this table to material type 'Carbon Steel' would not change the weights on the previously enter items.

The Material Code is an optional numeric entry in the range of 1 to 99. The material code is provided for data entry operators who have previously used DOS versions of Romac applications and is not required in Romac Series 7 applications. The numeric codes can be used as a shortcut at data entry (enter the numeric code rather than entering or selecting the actual specification description).

Edit Default Specifications

The Specifications Defaults table determines which material specification is assigned to a bill of material item at data entry. The default should be set for the most prevalent material specification in use for the shape. You are never locked into the default; the material specification for the item entry can always be changed as required.

The menu option Maintain | Edit Default Specifications allows you to edit the master defaults specifications table. This table is used by Romac Series 7 Inventory Control and Purchase Order applications and is also the initial default table for bill of material applications. A separate table is created for each job and can be edited elsewhere.



Group	Specification
Structural	A36
Plate	A36
Angle	A36
Bars	A36
Pipe	A53
Tube	A500
Floor Plate	A36
Sheet	A36
Rebar	A36
H.S. Bolts	A325

For default specification purposes, the various shapes are grouped as follows:

- Structural – W, WT, HP, S, ST, M, MT, C
- Plate - PL
- Angle – L, BC
- Bars – BR, SQ, RD
- Pipe – PI, PS, PE, PD
- Tube – TS, TO
- Floor Plate – FP
- Sheet – GA
- Rebar – RB
- H.S. Bolts – BTH, BTN, WHF, WHB, WHL, TC
- Mach. Bolts – BTM
- Other Bolts – BTE, BTW, AB, SC
- Other Matls. – SA, SI, SL, FEM, REM, GR

Edit System Finishes Table

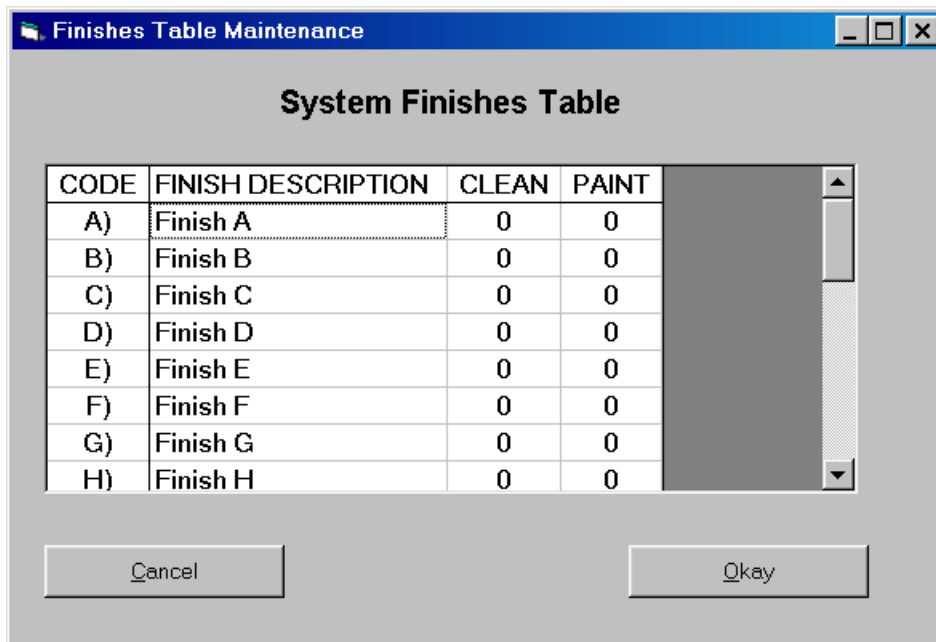
Use the menu options Maintenance | Edit System Finishes Table to access this feature. The values in the system finishes table are used when a new estimate is created. Editing the system table does not affect the finishes table in any existing estimates. Editing the finishes table within an estimate does not affect the system table.

Twenty-four different finishes can be defined. The finish codes A through X are used in the estimating program to reference the finishes. The finish description can be up to 12 characters in length.

When using “type 3” estimating labor, cleaning and painting can be calculated based upon the type finish. The value in the clean and paint columns determine the labor calculated for a finish. If calculated labor is not utilized, the clean and paint values are irrelevant.

Clean values can be 0 through 4. 0 denotes that cleaning is not required for that finish and cleaning labor will not be calculated. Values 1 or 2 will calculate cleaning labor from table HC1. Values 3 and 4 will calculate cleaning labor from tables HC1, MC1 or MC2 depending upon the cleaning method.

Paint values can be 0 through 4. 0 denotes that painting is not required for that finish and painting labor will not be calculated. Values 1 through 4 will calculate painting labor from table P.



CODE	FINISH DESCRIPTION	CLEAN	PAINT
A)	Finish A	0	0
B)	Finish B	0	0
C)	Finish C	0	0
D)	Finish D	0	0
E)	Finish E	0	0
F)	Finish F	0	0
G)	Finish G	0	0
H)	Finish H	0	0

Material Cost Tables

The Estimating System allows you to maintain 24 different material cost tables for automatic pricing of your estimates.

Each table can be structured for unit costs only or with specific lengths for nesting.

Unit cost only tables have a single unit cost for each item in the table. Unit cost only table can contain any type of item including structural sections, angles, plates, bolts, etc. Items with width and length such as plate and per each items such as bolts must be priced from a unit cost only table. Structural, angles, bars, pipe, tube, etc. can be included in a unit cost only table.

Cost tables with lengths for nesting can contain linear items only. This type table allows you to enter available lengths for items in the table. Your estimate is nested from these lengths. Up to 10 different available lengths can be designated for each table. You will probably need to set up different tables for product groups based upon the lengths that are generally available for that product. Typical table configurations might be:

- Structurals – from mill
- Structurals – from warehouse
- Angles and bars
- Pipe and tube

Creating a new cost table

Use the menu options Maintenance | Cost Tables | Add New Cost Table | then “with Unit Costs only” or “with Lengths for Nesting”.

If you chose “with Lengths for Nesting”, you will be prompted to enter available lengths. Up to ten different lengths can be entered. After, you complete the entries on this screen; you cannot modify the available lengths for the table. You should enter all lengths that you might need for the product groups in the table. For instance, if you are setting up a table for pipe and tube, you could enter 20-0, 21-0 and 42-0 as available lengths. Later when entering cost for tube items, you could omit the price for 21-0 and 42-0 if the tube is not available in those lengths.

The next step should be to name the table. The name should be descriptive of what the table includes such as “XYZ Mill – Structural” or “ABC – Tube and Pipe”. Use the menu option Edit | Table Name to change the table name.

Cost table groups

The next step is to add items to your cost table. Items are added to the table by shape and material specification combination we refer to as a group. Typical groups may be W shape, A992 material specification; L shape, A36 material specification; Pipe shape, A53 material specification; etc.

You also specify what method is used for pricing for the group (per lb., lin. ft., sq. ft., each). All items within a group will be priced using the same cost method. However, you can use different cost methods in the same table.

Use the menu option Edit | Edit Groups to add groups to your cost table.

Cost Table No. 1 - Warehouse - angle/br

Shape:

Wall Speed:

Cost Method:

Okay Cancel

Cost Table No. 1 - Warehouse - angle/br

Shape	Speed	Cost	Method
L	A35	lb.	Add
Flat Bar	A35	lb.	Add
Material	A35	lb.	Add
Qty. Bar	A35	lb.	Add

Delete Selected Group Okay - update cost table

Add Group Cancel

Once the groups have been selected for the cost table, the “Okay – update cost table” button will add the items to the cost table. The Material Database is scanned and any items matching the groups’ shape and material specification will be added to the cost table.

Note, you can use the Edit | Edit Groups menu option to change the groups in a cost table at any time. Groups can be added or deleted at any time. If you must change the cost method for an existing group, you must first delete the group then add it back with the new cost method.

Cost Units

If the cost table type is “with Unit Costs only” then each item in the cost table will have a single unit cost. If this table is used for pricing an item on the estimate, the unit is applied based on the weight or amount without any nesting.

If the cost table type is “with Lengths for Nesting” then you can enter a unit cost for each length that was specified when the table was created plus a ‘No Nest’ unit cost. The ‘No Nest’ unit is used to price estimate items that are longer than the longest available length. For example, if an estimate contains several entries of L 3x3x1/4 of various lengths less than 40-0 in length plus an entry of L 3x3x1/4 at 100-0 and the cost table has lengths of 20-0 and 40-0, pricing would be applied as follows:

If the L 3x3x1/4 item has unit prices entered for ‘No Nest’, 20-0 and 40-0 then the program would apply the ‘No Nest’ unit to the 100-0 entry then nest the balance of the material from 20-0 and 40-0 lengths, total all costs for the 100-0 pieces plus the gross amount for the 20-0 and 40-0 pieces then calculate the average unit to apply to all L 3x3x1/4 in the estimate.

If the L 3x3x1/4 has unit prices entered for the 20-0 and 40-0 lengths but no unit price for ‘No Nest’ then none of the L 3x3x1/4 would be priced from this table. An estimate item will not be priced from a cost table if all items of the same size cannot be priced from the same table.

If the L 3x3x1/4 has a unit price entered for ‘No Nest’ but no unit prices entered for 20-0 and 40-0 lengths the ‘No Nest’ unit would be applied to all L 3x3x1/4 on the estimate without regard to nesting.

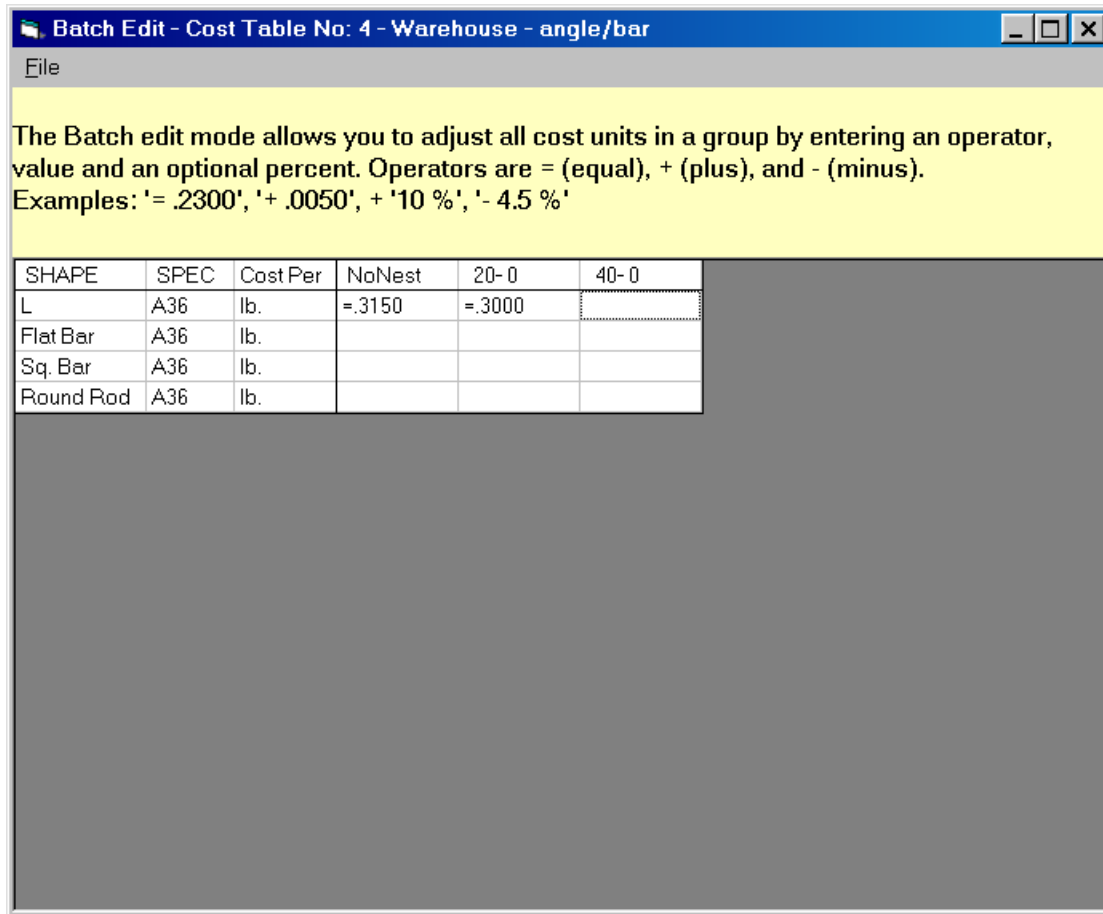
You probably would include a ‘No Nest’ unit for common sizes that may be listed on the estimate as total lineal feet of random length material.

Two methods are available for updating unit prices in a cost table. The “Item Edit” allows you to change individual unit prices. The “Batch Edit” allows you to change all units within a group.

Item Edit - Cost Table No: 4 - Warehouse - angle/bar					
File					
DESCRIPTION	SPEC	Cost Per	NoNest	20-0	40-0
L 3 x 2 x 1/4	A36	lb.	.3150	.3000	
L 3 x 2 x 5/16	A36	lb.	.3150	.3000	
L 3 x 2 x 3/8	A36	lb.	.3150	.3000	
L 3 x 2 x 7/16	A36	lb.	.3150	.3000	
L 3 x 2 x 1/2	A36	lb.	.3150	.3000	
L 3 x 2 1/2 x 3/16	A36	lb.	.3150	.3000	
L 3 x 2 1/2 x 1/4	A36	lb.	.3150	.3000	
L 3 x 2 1/2 x 5/16	A36	lb.	.3150	.3000	
L 3 x 2 1/2 x 3/8	A36	lb.	.3150	.3000	
L 3 x 2 1/2 x 7/16	A36	lb.	.3150	.3000	
L 3 x 2 1/2 x 1/2	A36	lb.	.3150	.3000	
L 3 x 3 x 3/16	A36	lb.	.3150	.3000	
L 3 x 3 x 1/4	A36	lb.	.3150	.3000	
L 3 x 3 x 5/16	A36	lb.	.3150	.3000	
L 3 x 3 x 3/8	A36	lb.	.3150	.3000	
L 3 x 3 x 7/16	A36	lb.	.3150	.3000	
L 3 x 3 x 1/2	A36	lb.	.3150	.3000	
L 3 1/2 x 2 1/2 x 1/4	A36	lb.	.3150	.3000	
L 3 1/2 x 2 1/2 x 5/16	A36	lb.	.3150	.3000	

With the cost table open, use the Edit | Item Edit menu option to update individual items in a cost table. Do not include pricing any for an item if it is not available from the table source. If the cost table type is "with Lengths for Nesting", omit the unit price for any lengths that are not available for that size. The nesting routine will not nest from a length without a unit price.

A second method to enter cost table unit prices is the Batch Edit mode. This mode allows you to enter or adjust all units with a group.



With the cost table open, use the Edit | Batch Edit menu option to access the batch edit mode. The batch edit mode allows you to enter an operator and an amount to set or adjust prices for a group. The options are:

Use the "=" operator to set all units to a single unit cost. For example "=.3150" would set all unit costs for the group to .3150.

Use the "+" or "-" operator to adjust the unit cost for that group. Unit costs can be adjusted by a fixed amount or by a percentage. If adjusting by a percentage, add "%" after the amount. Weather adjusting by a fixed amount or a percentage, only cost table entries with a unit cost will be adjusted. For example, +.0050 would add .0050 to all cost units in that group, +5% would add 5% to all cost units in that group.

Type 3 Shop Labor Estimating

Labor Codes

The Type 3 Shop Labor Estimating system is a carryover from our previous Structural Steel Estimating software.

The labor coding system allows the estimator to code each item within an estimate. This code tells the computer what labor operations are required to fabricate that item. The computer then figures shop labor based on labor values which are supplied by the fabricator.

For simplicity, labor coding has been reduced to eight different codes plus the option to enter a unit labor. The labor coding system has the ability to figure labor for most items within a structural steel estimate. Fabrications not covered by the coding system (such as trusses) can be handled through the unit labor option.

A high degree of speed, consistency, and accuracy can be achieved for your structural steel estimates. Since no two shops are identical in fabrication methods and estimating requirements, some modifications to the estimating system may be required.

The following two sections will give you a better understanding of the labor estimating system. The first section deals with labor codes and can be used as a quick reference guide for the estimator. Probably, few modifications to the labor codes will be required.

The tables which contain the labor values are explained in the second section. Depending on the fabrications equipment and estimating requirements, necessary modifications to the tables can range from moderate to extensive.

Labor Code Summary

BEAM _____ **Bnnn**
PUNCH _____
COPES-CUTS _____
END CONNECTIONS _____

COLUMN _____ **Cnnn**
PUNCH _____
COPES-CUTS _____
FINISHED ENDS _____

ANGLE BRACE _____ **Xnn**
SINGLE-DOUBLE _____
GUSSETS _____

PLAIN MATERIAL _____ **Pnn**
PUNCH _____
COPES-CUTS _____

FITTED PIECE _____ **Fnnn**
PUNCH _____
COPES-CUTS _____
TYPE OF FIT _____

MAIN MATERIAL _____ **Mnn**
PUNCH _____
COPES-CUTS _____

STIFFENER _____ **Snn**
PUNCH _____
TYPE OF FIT _____

END PLATE _____ **Enn**
PUNCH _____
LOOSE-FITTED _____

BEAMS

Bnnn

typical code B122

Use with shapes: W, WT, S, ST, M, MT, C, MC, HP

Use for: beams going through the fabrication process, with or without standard end connections and with or without additional attached pieces.

Code breakdown:

Bnnn

2nd character (0-3) designates degree of punch. 0=no holes, 1, 2, or 3 = number of surfaces (web or flange) requiring holes.

Bnnn

3rd character (0-9, normally 0-4) designates number of copes or cuts required per beam.

Bnnnn

4th character (0-9, normally 0-2) designates number of standard end connections per beam. It is not necessary to list standard end connections or end connection bolts separately, the computer will count and list them. You will need to make a reduction in the bolt count to allow for connections with common bolts.

Labor computed will include time to cut, punch, handle, clean, and paint plus time required for copes and cuts. End connection labor will be included with the end connections listed elsewhere. If required, labor for camber and skewed or sloped end connections must be listed separately. Labor for attachments such as stiffeners or cover plates will be figured with the attachments.

COLUMNS

Cnnn

typical code C301

Use with shapes: W, WT, S, ST, M, MT, C, MC, HP, PI, TS

Use for: column shafts and beams with end plates.

Code breakdown:

Cnnn

2nd character (0-3) designates degree of punch. 0=no holes, 1, 2, or 3 = number of surfaces requiring holes.

Cnnn

3rd character (0-9) designates number of copes or cuts required per member.

Cnnnn

4th character (0-2) designates number of machine finished ends per member.

Labor computed will include time to cut, punch, handle, clean, and paint plus time required for copes and cuts and machine finished ends. Labor for base plates, stiffeners, etc. will be figured with the attachment.

ANGLE BRACE Xnn

typical code X23

Use with shapes: L

Use for: single and double angle diagonal and X bracing.

Code breakdown:

Xnn

2nd character (1 or 2) designates single or double angle.

Xnn

3rd character (0-9) designates number of gusset plates per bracing set. A bracing set consists of 1 angle for single angle bracing and 2 angles for double angle bracing.

Examples;

single angle brace with a total of 2 gusset plates.

angle quantity=1, labor code=X12

double angle X brace with a total of 5 gusset plates.

angle quantity=2, labor code=X23 (long diagonals)

angle quantity=4, labor code=X21 (short diagonals)

Labor computed includes all time required to fabricate, clean, and paint the angle brace complete with gusset plates and spacer plates. Do not use a labor code when gusset and spacer plate material is listed. Labor for connection angles and plates which are attached to the gusset plate is not included; use a labor code when listing these extra items.

PLAIN MATERIAL

Pnn

typical code P10

Use with: all shapes

Use for: items not requiring additional attachments which can go from the cut and punch operation directly to the clean and paint operation.

Code breakdown:

Pnn

2nd character (0-3) designates degree of punch. 0=no holes, 1, 2, or 3=number of surfaces requiring holes.

Pnn

3rd character (0-9) designates number of copes or cuts required.

Labor computed will include time to cut, punch, handle, clean, and paint.

FITTED PIECE

Fnnn

typical code F001

Use with: all shapes

Use for: any item which is shop attached to another member such as cover plates, clip angles, shelf angles, etc.

Code breakdown:

Fnnn

2nd character (0-3) designates degree of punch. 0=no holes, 1, 2, or 3=number of surfaces requiring holes.

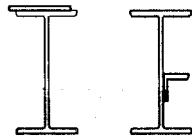
Fnnn

3rd character designates number of copes or cuts required.

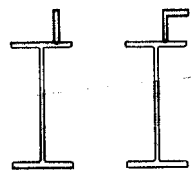
Fnnn

4th character designates type of fit

Type 1 fit:



Type 2 fit:



Labor computed includes time to cut, punch, fit, clean, and paint. It is necessary to list the required weld separately.

MAIN MATERIAL Mnn typical code M12

Use with: all shapes

Use for: any member which must go through the fit operation such as a girder web plate, or any member which will have additional pieces attached to it.

Code breakdown:

Mnn

2nd character (0-3) designates degree of punch. 0=no holes, 1, 2, or 3=number of surfaces requiring holes.

Mnn

3rd character designates number of copes or cuts required.

Labor computed includes time to cut, punch, handle, clean, and paint. Labor for items attached to this member will be figured with the attachment.

STIFFENER

Snn

typical code S03

Use with shapes: PL, BR

Use for: shop attached stiffener plates.

Code breakdown:

Snn

2nd character (0-2) designates degree of punch.

Snn

3rd character (1-3) designates type of fit

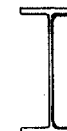
Type 1 fit;



Type 2 fit;



Type 3 fit;



Labor computed includes time to cut, punch, fit, and weld the stiffener plate.

END PLATE

Enn

typical code E11

Use with shapes: PL

Use for: shop attached end plates or base plates and loose base plates which require straightening or machining.

Code breakdown:

Enn

2nd character (0-2) designates degree of punch.

Enn

3rd character (0 or 1) designates type of fit. 0=shop loose, 1=shop attached.

Labor computed includes time to cut, punch, fit, weld, and straighten or machine.

OTHER

Hours each

The labor coding system can be overridden by entering a unit labor value rather than the labor code. Labor computed for that line will be the item quantity times the labor unit.

Hours per Ton

To have the labor for an item computed based upon hours per ton, enter the hours per ton followed by “/T”. For example 20/T would calculate labor at 20 hours per ton based on the weight calculated for that line item.

Lbs. per Hour

To have the labor for an item computed based upon pounds per hour, enter the pounds per hour followed by “/PH” or “/LBH”. For example 300/PH would calculate labor at 300 pounds per hour based on the weight calculated for that line item.

Hours per Lin. Ft.

To have the labor for an item computed based upon hours per lin. ft., enter the hours per lin. ft. followed by “/LF”. For example .5/LF would calculate labor at .5 hours per lin. ft. based on the length for that line item.

Hours per Sq. Ft.

To have the labor for an item computed based upon hours per sq. ft., enter the hours per sq. ft. followed by “/SF”. For example .5/SF would calculate labor at .5 hours per sq. ft. based on the area (width x length) for that line item.

Also, additional labor for special operations may be added by entering a separate line with a unit labor value. The shape code ‘LA’ lets you enter the labor operation description and a labor unit in man hours. Labor computed for that line will be the quantity times the labor unit.

Welding Labor

Labor for welding can be figured by the computer. Two types of welding operations, manual (WM) and automatic (WA), are supported. Four types of welds, fillet (F), butt (B), single bevel (V), and double bevel (K), are supported.

Entries for weld must include: quantity, type, size, and length.

Available type (Shape) entries are WMF, WMB, WMV, WMK, WAF, WAB, WAV and WAK.

Weld sizes supported are 1/16", 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2", 1 3/4" and 2".

The shop labor calculated for welding comes from the labor tables.

Labor Tables Overview

The estimating program labor module requires that the fabricator establish labor values for the various shop operations. These labor values are put together by the computer to arrive at the total fabrication time for a particular member. Because each shop is unique in its equipment and fabrication methods, labor values and labor tables will vary from shop to shop.

In order to effectively utilize the labor estimating module, two important areas must be addressed by the fabricator. First, you must determine how long it takes your shop to perform a particular operation. Most fabricators are reluctant to expend the time and money for detailed time studies which may prove inconclusive in establishing estimating standards. A more feasible alternate would be to start with your current estimating system; use as many parts as possible in the computerized system. Draw on the experience and knowledge of your personal, veteran production people usually have a good ideal of how much time a certain shop operation should require. In some instances, shop floor observation may be required to arrive at a labor value. These methods can produce some labor value estimates which are remarkably close to the actual time expended.

The format within the labor tables may require changes. The labor tables as illustrated will serve as a beginning point. The fabricator should consider the capacities of shearing, sawing, punching, drilling, handling, and cleaning equipment when reviewing the tables. Revisions to material size groupings, length ranges, quantity considerations, etc. can be made (to some degree). Any change to the labor table formats will require a change in the program. As we discuss each table, suggestions will be given for possible changes to suit your operation.

Once labor units have been established, you can run some of your previous jobs through the computer for a comparison between actual performance and the new estimating system. Some adjustments to the labor units may be required to bring them in line with actual performance.

Setting up a viable shop labor estimating system is not a project which can be completed overnight. However, once established, a simple and accurate estimating system can be the backbone of a profitable fabrication operation.

The following checklist is provided to assist in determining labor values. In some shops material handling, unloading, loading for shipment, etc. is considered indirect labor and not reported as time used on a job. Your shop's indirect labor should not be included in the labor tables.

unload and place in stock or temporary storage

handling between operations

layout, templates

cut to size

punch/drill holes

straightening, machining

fit, weld, bolt

handling associated with fit and weld operations

inspection

clean, paint

load for shipment

TABLES W0, W1, W2, and W3

All structural shapes (wide flange, channels, etc.) will pick up their initial labor from one of these tables. Values should include direct labor for unloading, stocking, moving to the first fabrication operation, cutting to length, punching or drilling holes, and moving to the next labor operation.

Table W0 is for members not requiring holes. Tables W1, W2, and W3 are for members requiring holes of degree 1, 2, or 3.

Degree of punch can be defined by the fabricator. If your shop drills all holes with a magnetic base drill, you might make the following definitions.

Degree 1-any member requiring holes not exceeding one hole group per 8' of member length. In other words, a supporting beam with secondary members framing in at 8' intervals.

Degree 2-any member requiring holes in excess of one hole group per 8' of length.

Degree 3-any member requiring a large number of holes in 2 or 3 surfaces such as a beam with field bolted moment connections of a column with members framing to it from 3 directions.

Shops with equipment that require a separate pass to punch or drill holes in each surface can make the following definitions.

Degree 1 - members requiring holes in the web or one flange only.

Degree 2 - members requiring holes in the web and one flange or members requiring holes in both flanges.

Degree 3 - members requiring holes in the web and both flanges.

Shops with 3 press or 5 press hydraulic punch equipment can use on or a combination of the above definitions.

The degree of punch coding should be kept as simple as possible. This will help the estimator tremendously when the take-off is being coded. Probably the easiest method to understand is to set the degree of punch equal to the number of surfaces requiring holes. This method will produce some inconsistencies such as cases where a small number of holes is required in 3 surfaces but should average out to a workable solution.

Once a definition for "degree of punch" has been established, some re-arranging of the table structure may be required. The structural groups (B1-B27) can be split or combined to suit your fabrication equipment.

If you have the ability to shear to length the lighter structural sections, any groups containing the shearable sections can be split. Also, any group containing both members which can be punched

and members which must be drilled can be split. Groups can also be combined. Total number of groups after splitting and combining cannot exceed 27.

TABLES L0, L1, L2

All angles, flat bars, and round rods pick up their initial labor value from one of these tables. Include direct labor for unloading, stocking, moving to the first fabrication operation, cutting to length, punching or drilling holes, and moving to the next labor operation.

Labor values are arrived at using methods similar to structural shapes. Re-arranging of the groupings may be required to suit your shearing and punching capabilities. Note that an additional column of labor values allow you to reflect productivity gains for large quantities of short angles.

TABLES P0, P1, and P2

All plate, gauge material, and floor plate will pick up its initial labor from one of these tables. Include direct labor for unloading, stocking, moving to the first labor operation, cutting to size, punching or drilling holes, and moving to the next labor operation.

Table P0 is for plates without holes. Table P1 is for plates with an average number of holes such as a gusset plate. Table P2 is for plates with a large number of holes such as a column splice plate or an end connection plate for a field bolted moment connection.

Size groupings may be re-arranged to suit your shearing and punching capabilities. Also, table P2 may be deleted entirely.

TABLES O0 and O1

All pipe and tube will pick up its initial labor from one of these tables. Include direct labor for unloading, stocking, moving to the first fabrication operation, cutting to length, drilling holes, and moving to the next labor operation.

Although bolt holes are seldom required in pipe and tube members, holes can be allowed for in table O1.

TABLE BC

This table includes all labor required to cut, punch, fit, weld or bolt, and other operations necessary to shop attach a pair of standard end connection angles. Labor included is for 2 angles with size based on the rows of bolt holes.

TABLE C

This table includes labor for one cope or cut.

TABLE F

Unit labor to machine finish one column end.

TABLE H1 and H2

These tables include direct labor for material handling during the fit and weld operations, handling to the next labor operation, and labor to load for shipment.

Table H1 values are averages for beams and similar items requiring 1 or 2 turns during the fit and weld process. Table H2 is for column handling which usually requires additional handling during the fit and weld operation. If post weld straightening is usually required of your column fabrications, an average straightening time can be included in table H2.

TABLES X1, X2, and G

These tables are for single angle and double angle bracing.

Table X1 is for single angle bracing. Labor values should include all required labor for fabrication of one angle. This includes handling, cutting, holes, and loading for shipment. Do not include clean and paint labor.

Table X2 is for double angle bracing. Labor values should include labor for both angle members plus the necessary spacer plates. Include all necessary labor except clean and paint.

Table G is gusset plate labor for the above bracing angles. Base your labor value on an average size gusset plate for the specified angle group. Include all necessary labor except clean and paint.

TABLE ST

Table ST is for shop attached stiffener plates. Include values to fit and weld the stiffener. Labor required to cut and punch the plate or bar is figured elsewhere.

TABLE EP

Table EP is for end plates and base plates which may be shop attached or shipped loose. Labor required to cut and punch the plate is figured elsewhere.

Labor values in this table should include straightening or machining, labor to fit the plate and an average weld time. Loose plates will require straightening or machining only.

Optionally, weld time may be omitted from this table and included as a separate entry on the take-off. This will give you the ability to use labor values for fillet and full penetration welds but requires an additional entry for each base plate on the take-off.

TABLES WM and WA

These tables contain welding labor values in hours per lin. ft. Table WM is for manual welding, table WA is for automatic welding.

Four types of welds are included:

Fillet-

Butt-

Single Bevel-

Double Bevel-

TABLES FT1 and FT2

These tables include labor to fit one piece to another. Typically the member to be fitted could be a gusset plate, a shelf angle, or a girder flange plate.

Table FT1 is for type 1 fits, table FT2 for type 2 fits. Include direct labor to fit plus an average time for post weld straightening. Optionally, an average weld value can be included. A more flexible method would be to take off the weld separately.

TABLES HC1, MC1, and MC2

These tables are for material cleaning and can be arranged to suit your cleaning methods. The finish cleaning value (0 – 4) determines which column values are used. Cleaning labor is not calculated for finish cleaning value 0. Finish cleaning values 1 – 4 relate to clean 1 – clean 4. If the “Blast Clean Method” is set to “Hand” for the estimate, all cleaning labor is calculated using table HC1. If the “Blast Clean Method” is set to “Machine” for the estimate, clean 1 & 2 are calculated from table HC1, clean 3 is calculated from table MC1 and clean 4 is calculated from table MC2. “Blast Cleaning Method” is selected using the menu selection Edit | Project Title then the Labor Defaults tab.

Table HC1 contains labor values for hand cleaning such as hand tool, power tool or hand blast cleaning. HC1 values are in hours per sq. ft. For main pieces (labor codes B, C, X, P or M), Cleaning labor is calculated based on the total surface area of the piece. For secondary pieces (labor codes F, S or E), labor is calculated from the value in the 20-60 sq ft category.

Tables MC1 and MC2 are used for machine blast cleaning and calculates labor based on the weight and length of the piece. MC1 and MC2 values are in hours per piece. Machine blast cleaning is not calculated for secondary pieces (labor codes F, S or E).

The “Add C&P to Manual Labor” setting determines if cleaning labor is added to manual labor entries. If this option is set to “yes” for the estimate, clean and paint labor will be added to any manual labor entry such as hours each or hours/ton. This setting is selected using the menu selection Edit | Project Title then the Labor Defaults tab. This applies only to estimates using Type 3 labor calculations.

TABLE P

Table P contains labor values in hours per sq. ft. for shop painting. The finish paint value (0 – 4) determines which column's values are used. Painting labor is not calculated for finish paint value 0. Finish paint values 1 – 4 relate to paint 1 – paint 4. For main pieces (labor codes B, C, X, P or M), painting labor is calculated based on the total surface area of the piece. For secondary pieces (labor codes F, S or E), labor is calculated from the value in the 20-60 sq ft category. The labor value can be variable based on the total surface area of the piece. Four types of shop painting are supported and can be defined for each shop. The values entered into the tables will vary based on your shop's definition of the four different types of paint. They could be defined as:

Paint 1) Standard shop primer, contact surfaces not blocked out.

Paint 2) Standard shop primer, contact surfaces blocked out.

Paint 3) One shop coat inorganic zinc primer

Paint 4) One shop coat primer plus one shop coat finish paint.

The “Add C&P to Manual Labor” setting determines if painting labor is added to manual labor entries. If this option is set to “yes” for the estimate, clean and paint labor will be added to any manual labor entry such as hours each or hours/ton. This setting is selected using the menu selection Edit | Project Title then the Labor Defaults tab. This applies only to estimates using Type 3 labor calculations.

Labor Calculation Notes

Generally, labor is calculated for the following operations. The labor table used will depend on the item shape and the labor code.

CUT and PUNCH

Cut and Punch labor is calculated for all labor codes except labor code X. The labor table used depends upon the item shape and the second labor code entry. The tables are:

W0, W1, W2, and W3 for structural shapes W, C, etc.

L0, L1, and L2 for Angle, Round Rod, and Flat Bar shapes.

P0, P1, and P2 for Plate, Floor Plate, and GA material.

O0 and O1 for Pipe and Tube.

The table to use is selected based on the second labor code entry (PUNCH). For instance, the labor code B112 for a W shape would calculate cut and punch labor from labor table W1.

The specific table entry used will depend upon the material description, length, and sometimes the quantity.

HANDLE for fit and weld

Handling during the fit and weld process is calculated for labor codes B, C, and M. Table H1 is used for labor codes B and M. Table H2 is used for labor code C. The specific table entry used will depend upon the material weight per foot and the length.

FIT AND WELD

Fit and weld labor is calculated for labor codes F, S, and E.

Labor code F uses table FT1 or FT2.

Labor code S uses table ST.

Labor code E uses table EP.

OTHER

Cuts or copes are calculated for labor codes B, C, P, F, and M using table C. Cuts or copes can be calculated for all shapes.

Finished ends are calculated for labor code C using Table F.

Finished ends can be calculated for structural shapes (W, C, etc.) only.

CLEAN

Cleaning labor for clean types 1 and 2 is calculated using table HC1. Cleaning labor for clean types 3 and 4 is calculated using table HC1 if hand blast cleaning is specified.

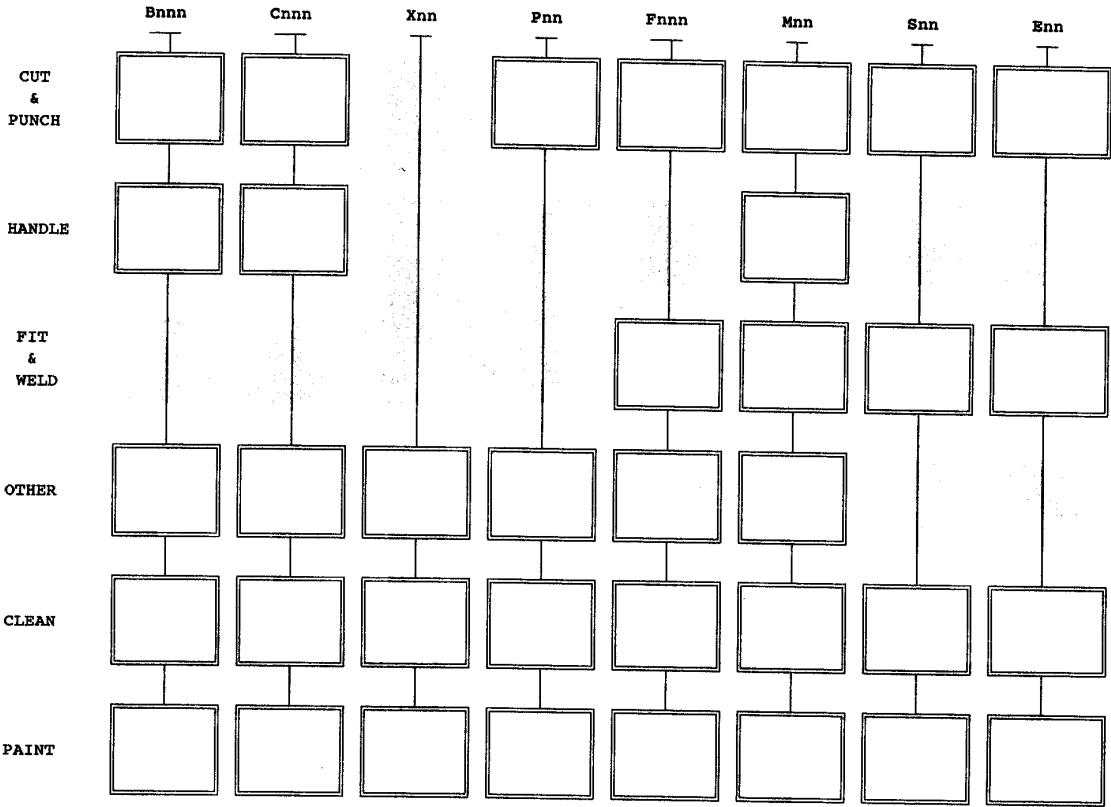
PAINT

Painting labor is calculated using table P.

NOTES

Labor for Beam Connections is not calculated with the beam. Beam connections are counted then the labor is calculated using labor table BC.

Labor Calculation Flow Chart

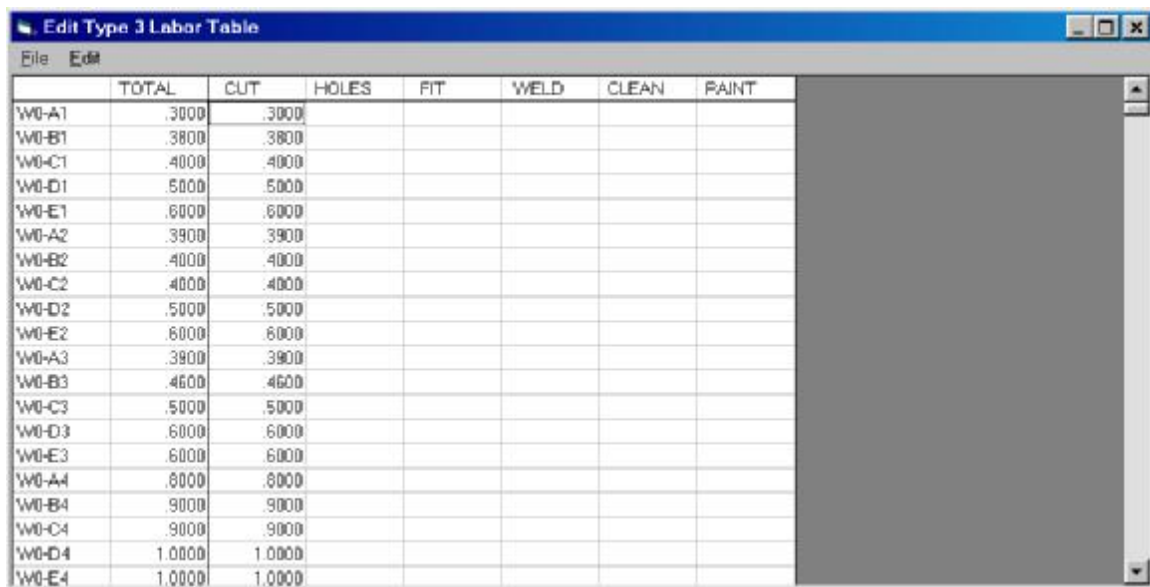


Update Labor Table Units

To edit the Type 3 Labor Tables, select the menu options Maintenance | Labor Tables | Edit Type 3 Labor Tables. This menu option allows you to change the values in the labor tables. The edit screen resembles a spreadsheet with columns and rows.

Copies of the various labor tables are included at the end of this section. The tables are set presented as grids with columns denoted as A, B, C, etc. and rows denoted as 1, 2, 3, etc. The table name, column, and row are combined to generate the labor table item number (such as W0-A1 or W1-B5).

Each row (or line) in the edit screen spreadsheet relates to a single labor table entry. The first column in this edit screen worksheet is the labor table item number. The second column is the total labor for that item. Up to 20 total columns can be defined for the various shop labor categories such as cut, punch, fit, etc. These labor categories are used to assist in adjusting the actual values and in reporting shop labor by category. The initial configuration includes the categories CUT, HOLES, FIT, WELD, CLEAN, and PAINT.



	TOTAL	CUT	HOLES	FIT	WELD	CLEAN	PAINT
W0-A1	.3000	.3000					
W0-B1	.3800	.3800					
W0-C1	.4000	.4000					
W0-D1	.5000	.5000					
W0-E1	.6000	.6000					
W0-A2	.3900	.3900					
W0-B2	.4000	.4000					
W0-C2	.4000	.4000					
W0-D2	.5000	.5000					
W0-E2	.6000	.6000					
W0-A3	.3900	.3900					
W0-B3	.4600	.4600					
W0-C3	.5000	.5000					
W0-D3	.6000	.6000					
W0-E3	.6000	.6000					
W0-A4	.6000	.6000					
W0-B4	.9000	.9000					
W0-C4	.9000	.9000					
W0-D4	1.0000	1.0000					
W0-E4	1.0000	1.0000					

To change a labor unit, use the arrow keys or mouse to move to the item then enter the new labor unit. The TOTAL unit cannot be directly changed but is automatically calculated as the sum of the various shop labor categories.

The Edit menu option allows you to insert or delete labor category columns. Warning, deleting a row will take any values in that row out of the table and deduct the value from the labor total.

The File menu allows you to save changes made to the table. If any unsaved changes have been made, you will be prompted with an option to save (or abandon) the changes.

Type 3 labor groups

Initially the materials database will be configured with labor group assignments as follows:

B1	W6 and under M all S7 and under C8 and under MC 10x6.5 & 8.4 MC 8x20 and under	B18	S20 W18 x 130, 143 W24 x 55-94	O1	Pipe and Tube to 4" (exc.)
B2	W8x10-67 S8 C9, MC9 MC 8x21.4 & 22.8 HP8	B19	W24 x 104-162, 103, 176	O2	Pipe and Tube 4" to 8" (exc.)
B3	W10 x 12-45 S10 C10 MC10 x 21.9-41.1	B20	S24 W27 x 84-114, 129	O3	Pipe and Tube 8" to 12" (exc.)
B4	W10 x 49-112 HP10	B21	W27 x 146-178, 194, 217	O4	Pipe and Tube 12" and over
B5	W12 x 14-58 S12 C12 MC12 x 10.6-37	B22	W30 x 99-132, 90, 148		
B6	W12 x 65-190 MC12 x 35-50- HP12	B23	W30 x 173-211, 235		
B7	W12 x 210-336	B24	W33 x 118-152, 169		
B8	W14 x 22-82	B25	W33 x 201-241		
B9	W14 x 90x132 MC13 HP13, HP14	B26	W36 x 135-210 W40 x 149-183		
B10	W14 x 145-193	B27	W36 x 230-848 W44 W40 x 192-655 W33 x 263-354 W27x 235-539 W24 x 192-492 W21 x 182-402 W18 x 158-311		
B11	W14 x 210-426				
B12	W14 x 455-730	L1	L under 2 x2		
B13	W16 x 26-100 S15 C15	L2	L 2x2 thru 3 ½ x 3 ½ Bar 3/8 thk. and under Rod under 1" dia.		
B14	W18 x 35-71	L3	L4x3 to 6x6x1/2 (inc.) Bar 7/16 thru ½ thk.		
B15	W18 x 76-119 S18 MC18	L4	L4x3x5/8 thru 6x6x1 Bar 9/16 thru 15/16 thk. Rod 1" dia. And over		
B16	W21 x 44-93	L5	L7x4 thru 9x4		
B17	W21 x 101-147, 166		Bar 1" thk. and over		

Labor Table Worksheets

-TABLE W0-

	A	B	C	D	E
GROUP	to 10'	10' to 20'	20' to 30'	30' to 40'	40' & over
1 B1					
2 B2					
3 B3					
4 B4					
5 B5					
6 B6					
7 B7					
8 B8					
9 B9					
10 B10					
11 B11					
12 B12					
13 B13					
14 B14					
15 B15					
16 B16					
17 B17					
18 B18					
19 B19					
20 B20					
21 B21					
22 B22					
23 B23					
24 B24					
25 B25					
26 B26					
27 B27					

-TABLE W1-

	A	B	C	D	E
GROUP	to 10'	10' to 20'	20' to 30'	30' to 40'	40' & over
1 B1					
2 B2					
3 B3					
4 B4					
5 B5					
6 B6					
7 B7					
8 B8					
9 B9					
10 B10					
11 B11					
12 B12					
13 B13					
14 B14					
15 B15					
16 B16					
17 B17					
18 B18					
19 B19					
20 B20					
21 B21					
22 B22					
23 B23					
24 B24					
25 B25					
26 B26					
27 B27					

-TABLE W2-

	A					B					C					D					E					
	GROUP	to 10'	10' to 20'	20' to 30'	30' to 40'	40' & over																				
1	B1																									
2	B2																									
3	B3																									
4	B4																									
5	B5																									
6	B6																									
7	B7																									
8	B8																									
9	B9																									
10	B10																									
11	B11																									
12	B12																									
13	B13																									
14	B14																									
15	B15																									
16	B16																									
17	B17																									
18	B18																									
19	B19																									
20	B20																									
21	B21																									
22	B22																									
23	B23																									
24	B24																									
25	B25																									
26	B26																									
27	B27																									

-TABLE W3-

		A					B					C					D					E				
	GROUP	to 10'	10' to 20'	20' to 30'	30' to 40'	40' & over																				
1	B1																									
2	B2																									
3	B3																									
4	B4																									
5	B5																									
6	B6																									
7	B7																									
8	B8																									
9	B9																									
10	B10																									
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21	B21																									
22	B22																									
23	B23																									
24	B24																									
25	B25																									
26	B26																									
27	B27																									

-TABLE I.0-

A B C D E F					
GROUP	1 to 9 pcs to 5'	5' to 10'	10' to 20'	20' to 30'	30' & over over 9 pcs to 5'
L1					
L2					
L3					
L4					
L5					

-TABLE I.1-

A B C D E F					
GROUP	1 to 9 pcs to 5'	5' to 10'	10' to 20'	20' to 30'	30' & over over 9 pcs to 5'
L1					
L2					
L3					
L4					
L5					

-TABLE I.2-

A B C D E F					
GROUP	1 to 9 pcs to 5'	5' to 10'	10' to 20'	20' to 30'	30' & over over 9 pcs to 5'
L1					
L2					
L3					
L4					
L5					

-TABLE P0-

-TABLE P0-

	A	B	C	D	E	F	G
						10 pcs & over	
0" thru 5/ 16" thk	to 2' 1g	2' to 6' 1g	6' to 12' 1g	12' to 20' 1g	20' 1g & over	to 2' 1g	2' to 6' 1g
1	to 8" wide						
2	8" to 18" wide						
3	18" to 36" wide						
4	over 36" wide						

	3/8" thru 3/4" thk							
5	to 8" wide							
6	8" to 18" wide							
7	18" to 36" wide							
8	over 36" wide							

	13/16" thru 1 1/2" thk							
9	to 8" wide							
10	8" to 18" wide							
11	18" to 36" wide							
12	over 36" wide							

	1 9/16" thru 3" thk							
13	to 8" wide							
14	8" to 18" wide							
15	18" to 36" wide							
16	over 36" wide							

	over 3" thk							
17	to 8" wide							
18	8" to 18" wide							
19	18" to 36" wide							
20	over 36" wide							

-TABLE P1-

-TABLE P1-

	A	B	C	D	E	F	G	
	0" thru 5/ 16" thk	to 2' 1g	2' to 6' 1g	6' to 12' 1g	12' to 20' 1g	20' 1g & over	to 2' 1g	2' to 6' 1g
1	to 8" wide							
2	8" to 18" wide							
3	18" to 36" wide							
4	over 36" wide							

3/8" thru 3/4" thk

5	to 8" wide							
6	8" to 18" wide							
7	18" to 36" wide							
8	over 36" wide							

13/16" thru 1 1/2" thk

9	to 8" wide							
10	8" to 18" wide							
11	18" to 36" wide							
12	over 36" wide							

1 9/16" thru 3" thk

13	to 8" wide							
14	8" to 18" wide							
15	18" to 36" wide							
16	over 36" wide							

over 3" thk

17	to 8" wide							
18	8" to 18" wide							
19	18" to 36" wide							
20	over 36" wide							

-TABLE P2-

-TABLE P2-

	A	B	C	D	E	F	G	
	0" thru 5/ 16" thk	to 2' 1g	2' to 6' 1g	6' to 12' 1g	12' to 20' 1g	20' 1g & over	to 2' 1g	2' to 6' 1g
1	to 8" wide							
2	8" to 18" wide							
3	18" to 36" wide							
4	over 36" wide							

3/8" thru 3/4" thk

5	to 8" wide							
6	8" to 18" wide							
7	18" to 36" wide							
8	over 36" wide							

13/16" thru 1 1/2" thk

9	to 8" wide							
10	8" to 18" wide							
11	18" to 36" wide							
12	over 36" wide							

1 9/16" thru 3" thk

13	to 8" wide							
14	8" to 18" wide							
15	18" to 36" wide							
16	over 36" wide							

over 3" thk

17	to 8" wide							
18	8" to 18" wide							
19	18" to 36" wide							
20	over 36" wide							

-TABLE 00-

A				
B		C		D
GROUP	to 10' 1g	10'-20' 1g	20'-30' 1g	30' & over
1	01			
2	02			
3	03			
4	04			

-TABLE 01-

A				
B		C		D
GROUP	to 10' 1g	10'-20' 1g	20'-30' 1g	30' & over
1	01			
2	02			
3	03			
4	04			

-TABLE BC-

A	
HOLES	LABOR
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

-TABLE C-

A		B	
GROUP	LABOR	GROUP	LABOR
1	B1	28	L1
2	B2	29	L2
3	B3	30	L3
4	B4	31	L4
5	B5	32	L5
6	B6	33	PL to 5/16"
7	B7	34	PL to 3/4"
8	B8	35	PL to 1 1/2"
9	B9	36	PL to 3"
10	B10	37	PL over 3"
11	B11	38	01
12	B12	39	02
13	B13	40	03
14	B14	41	04
15	B15		
16	B16		
17	B17		
18	B18		
19	B19		
20	B20		
21	B21		
22	B22		
23	B23		
24	B24		
25	B25		
26	B26		
27	B27		

-TABLE F-

A	
GROUP	LABOR
1	B1
2	B2
3	B3
4	B4
5	B5
6	B6
7	B7
8	B8
9	B9
10	B10
11	B11
12	B12
13	B13
14	B14
15	B15
16	B16
17	B17
18	B18
19	B19
20	B20
21	B21
22	B22
23	B23
24	B24
25	B25
26	B26
27	B27

-TABLE H1-

A		B	C	D	E	F
WEIGHT PER FOOT	to 5'	5'-10'	10'-20'	20'-30'	30'-40'	40' & OVER
1	to 10#					
2	10#-30#					
3	30#-60#					
4	60#-120#					
5	120#-250#					
6	250#-500#					
7	over 500#					

-TABLE H2-

A		B	C	D	E	F
WEIGHT PER FOOT	to 5'	5'-10'	10'-20'	20'-30'	30'-40'	40' & OVER
1	to 10#					
2	10#-30#					
3	30#-60#					
4	60#-120#					
5	120#-250#					
6	250#-500#					
7	over 500#					

-TABLE X1-

	A				
	to 5'	5'-10'	10'-20'	20'-30'	30' & over
1	L1				
2	L2				
3	L3				
4	L4				
5	L5				

-TABLE X2-

	A				
	to 5'	5'-10'	10'-20'	20'-30'	30' & over
1	L1				
2	L2				
3	L3				
4	L4				
5	L5				

-TABLE G-

A	
GROUP	LABOR
1	L1
2	L2
3	L3
4	L4
5	L5

-TABLE ST-

	A		
	to 5/16" thk	to 1' 1g	1' to 3' 1g
1	TYPE 1		
2	TYPE 2		
3	TYPE 3		

3/8" thru 3/4" thk

4	TYPE 1		
5	TYPE 2		
6	TYPE 3		

over 3/4" thk

7	TYPE 1		
8	TYPE 2		
9	TYPE 3		

-TABLE BP-

	A	
	LOOSE	ATTACHED
1	to 5/16" thk	
2	3/8" thru 3/4" thk	
3	13/16" thru 1 1/2" thk	
4	1 9/16" thru 3" thk	
5	over 3" thk	

-TABLE WM-

	A	B	C	D
SIZE	FILLET	BUTT	SINGLE BEVEL	DOUBLE BEVEL
1/16"				
1/8"				
3/16"				
1/4"				
5/16"				
3/8"				
7/16"				
1/2"				
5/8"				
3/4"				
7/8"				
1"				
1 1/4"				
1 1/2"				
1 3/4"				
2"				

-TABLE WA-

	A	B	C	D
SIZE	FILLET	BUTT	SINGLE BEVEL	DOUBLE BEVEL
1 1/16"				
1/8"				
3/16"				
1/4"				
5/16"				
3/8"				
7/16"				
1/2"				
5/8"				
3/4"				
7/8"				
1"				
1 1/4"				
1 1/2"				
1 3/4"				
2"				

-TABLE FT1-

	A	B	C	D	E	F	G	H
WEIGHT/FOOT	to 2' 1g	2'-5' 1g	5'-10' 1g	10'-15' 1g	15'-20' 1g	20'-30' 1g	30'-40' 1g	over 40' 1g
1	to 4#							
2	4# to 12#							
3	12# to 30#							
4	30# to 60#							
5	60# & over							

-TABLE FT1-

-TABLE FT2-

	A	B	C	D	E	F	G	H
WEIGHT/FOOT	to 2' 1g	2'-5' 1g	5'-10' 1g	10'-15' 1g	15'-20' 1g	20'-30' 1g	30'-40' 1g	over 40' 1g
1	to 4#							
2	4# to 12#							
3	12# to 30#							
4	30# to 60#							
5	60# & over							

-TABLE FT2-

TABLE HCL
A B C D

	SURFACE AREA/PIECE	CLEAN 1	CLEAN 2	CLEAN 3	CLEAN 4
1	to 2 sq ft				
2	2-5 sq ft				
3	5-20 sq ft				
4	20-60 sq ft				
5	60-150 sq ft				
6	150-400 sq ft				
7	over 400 sq ft				

TABLE MC1 (MACHINE CLEAN 3)
A B C D E F

	WT/FT	to 5'	5'-10'	10'-20'	20'-30'	30'-40'	over 40'
1	to 10#						
2	10#-30#						
3	30#-60#						
4	60#-120#						
5	120#-250#						
6	250#-500#						
7	over 500#						

TABLE MC2 (MACHINE CLEAN 4)
A B C D E F

	WT/FT	to 5'	5'-10'	10'-20'	20'-30'	30'-40'	over 40'
1	to 10#						
2	10#-30#						
3	30#-60#						
4	60#-120#						
5	120#-250#						
6	250#-500#						
7	over 500#						

TABLE P

A B C D

	SURFACE AREA/PIECE	PAINT 1	PAINT 2	PAINT 3	PAINT 4
1	to 2 sq ft				
2	2-5 sq ft				
3	5-20 sq ft				
4	20-60 sq ft				
5	60-150 sq ft				
6	150-400 sq ft				
7	over 400 sq ft				