



ProTime Estimation 2016

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1 ProTime Estimation

ProTime Estimation is an application that allows the user to estimate the time it takes for a set of tasks to be performed by an operator.

The ProTime Estimation module supports the study of task times via stopwatch methods, predetermined time standard methods, or a unique integration of both methods. In addition, this application supports the integration of pre-recorded video from which stopwatch times can be derived, and from which predetermined time studies can be linked to the tasks.

Note: ALL USERS WILL REQUIRE READ/WRITE PERMISSIONS ON THE DOCUMENTS FOLDER INSIDE THE PROTIME ESTIMATION INSTALLATION FOLDER. ALSO, PLEASE ENSURE THAT THE READ ONLY ATTRIBUTE ON THE DOCUMENTS FOLDER IS UNCHECKED.

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2 Language Settings

ProTime Estimation is currently available for English, Portuguese, and Italian operating systems. All settings except templates will be set automatically according to the language setting of the operating system in which ProTime Estimation is installed.

To change the language settings for Templates, go to Tools>Template Manager. Click on the Import icon, and browse to the ProTime Estimation folder when the application was installed. Open the Templates folder and then the desired language folder. Select all files inside and click Open. This will replace the English version of predetermined time standard templates with the new language.

3 Introduction

The ProTime Estimation module allows the user to perform three different types of time studies: Calculated, Estimated, and Observed. Note that you can have multiple study files open at one time (if you were working on multiple process or operation studies, for example).

1. **Calculated Time** - The calculated time is based on predetermined time systems (i.e. languages for describing human motion). Proplanner supports [MODAPTS](#), [MOST](#) and all [MTM](#) standards, such as MTM-1, MTM-B, MTM-UAS, etc. See the [Predetermined Time Studies](#) section to see the systems currently supported. We also support user-defined standards.

To begin a calculated time study, please click [here](#).

2. **Estimated Time** - The estimated time is typically based on historical data, or past experience.

To begin an estimated time study, please click [here](#).

3. **Observed Time** - The observed time is based on classical stopwatch time studies. The user can either perform a stop watch study by observing the task directly, or record a video of the task and perform the stop watch study from that video.

To begin an observed time study, please click [here](#).

The user can select a standard, select a time unit, set an allowance and also set percentages for 'value added (VA)', 'non-value added (NVA)' and 'semi-value added (SVA)', or non value added but necessary (NVBN)' for all three studies. For Observed and Predetermined time standards, the VA, NVA, and SVA values are computed from the time standards files (calculated) or from the observed time task settings (observed), and therefore, these fields cannot be directly edited by the user.

The allowance percentage is used to compute the net time of the task. For estimated and predetermined times, the allowance can be set by the user. However, for observed times, this allowance is the summation of the four types of allowances set by the user in the settings tab (i.e. Personal, Variable Fatigue, Basic Fatigue, and Delay).

Net Time = Total time (1 + (Allowance percentage/100))

4 Tools Menu

4.1 Options

ProTime Estimation Default Options Menu

Before starting to perform studies, you may want to edit the preference settings that affect your study. To do so, open the Tools > Options menu. The options control lets you set default time units, default allowances, time precision (number of decimal places), and more.

Time Std Rank: The time standard rank sets the precedence for the order the types of task times are used (for generating Reports, for example). You are allowed to associate three different types of times to tasks: observed times, calculated times, and estimated times. Some tasks may have all three of these recorded while other tasks only have one time.

If you were to choose Calculated-Estimated-Observed as your ranking, ProTime would look first for a calculated time for a task. If there is a calculated time associated, that time will be used. If there is not a calculated time, ProTime moves to the second standard on the list and looks for an Estimated time. ProTime works this way for any ranking. It looks first for your first choice ranking, and if that is not available, it moves to the second choice, and finally to the third. This happens on a task-by-task basis, so if ProTime is rolling up (adding up) several tasks to find an operation time, it is possible that some calculated times will be added to some estimated times and some observed times, depending on how the individual tasks have times associated.

Est Time Allowance: The estimated time allowance is a percent allowance added to all estimated times entered by the user. For example, if the allowance is set to 10.0, an activity with a time of 30 seconds would have a 3 second allowance added.

Calc Time Allowance: The calculated time allowance is a percent allowance added to all calculated times associated with an activity.

Default Calc. Time Standard allows you to set a default system for predetermined time studies. ProTime provides several popular systems.

- MTM1 is the Methods-Time Measurement system
- MTMB is a derivative of MTM1 that is designed for longer, less repetitive processes.
- MTMUAS was designed for batch production and was created based on MTM1.
- MODAPTS is popular in industries like healthcare and automotive.
- BMOST contains Basic assembly, as well as General, Tooling, Equipment, and Crane elements.
- STDS is a company-specific standard.

Default Time Unit: Default Time Unit specifies the unit that will be used throughout ProTime. Choices include Minutes, Hours, Days, TMUs (Time Measurement Units—1 TMU=0.00001 hour=0.036 seconds), MUs (Measurement Units—1 MU=0.1 TMU), MOD (MODAPTS Time Units—1 MOD=0.129 seconds) or TWTMIN (Task Weighted Time in minutes). *Note: Set this preference before starting a new time study. If you change this setting and open an existing study, the time unit for that study will not change.*

TO CONVERT FROM:	TO MICROSECONDS, MULTIPLY BY	TO SECONDS, MULTIPLY BY	TO MINUTES, MULTIPLY BY
Microseconds	1.0000	0.000001	1.66667E-08
Seconds	1000000.0000	1.00000	0.01667
Minutes	60000000.0000	60.00000	1.00000
Hours	3600000000.0000	3600.00000	60.00000
Days	86400000000.0000	86400.00000	1440.00000
TMUs	36000.0000	0.03600	0.00060
MUs	3600.0000	0.00360	0.00006
MODs	129032.2580	0.12903	0.00215
TWTMINs	70796460.1770	70.79646	1.17994

Table 1: Default Conversion Between Time Units

Use Default Time Unit for Calc Time: If Use Default Time for Calc Time is set to "True", ProTime will display calculated times in the default time unit instead of TMUs.

Use Percent for VA/NVA/SVA: When set to False (default), you can enter time values in the VA/NVA/SVA columns. When set to True, you can enter percentage values to represent the portion of the task that is VA/NVA/SVA.

Replace Calc Time Descriptions: This sets your preference for how existing rows in calculated time studies are updated. If this is set to "True", it means that all elements of a calculated time study (including the description) will be updated when the time code is changed. If the setting is "False", a code may be updated and the time will change, but the description will not be updated (the old description will remain).

Time Precision: Time Precision specifies the number of places shown after decimal points. For example, if Time Precision is set to three, and the time units are seconds, the activity time could be displayed as 32.256 seconds.

TMUConversionFactor: This sets the conversion factor for 1 unit (TMU) to seconds. The default is 1 TMU = .036 sec.

MOD Conversion Factor: This sets the conversion factor for 1 unit (MOD) to seconds. The default is 1 MOD = .129 sec.

Observed Time Study - Time Study Unit: Default Time Unit specifies the unit that will be used for observed time studies. (can be different from Default Time Unit).

Observed Time Study - Study Type: Study Type allows the user to choose which observed time method to default for use in the study.

- **Video** studies are performed via pre-recorded video files. If you do not have a video or prefer not to use this method, you can choose to use a Stopwatch study.
- **Stopwatch** studies provide an integrated spreadsheet and stopwatch. The elements of the task can be entered in the spreadsheet. Then, using the stopwatch, observe the task, following along with the stopwatch.

Observed Time Study - Labor Rating affects the way the Observed Time Rating value is calculated. The R value is a factor that allows the observer to adjust time based on the skill level of the operator performing the task. The factor applied to the observed time is calculated by taking the entry in the R value column divided by the Labor Rating. Changing the Labor Rating value here will adjust the denominator in the equation for all new observed time studies. Changing the preference will *not* retroactively affect previous observed time studies.

Observed Time Study - Prompt For Rating when Adding Observations: If this box is checked, a window will appear after every observation, prompting the user to adjust the performance rating for that observation.

Observed Time Study - Import Activities for New Study: N/A for ProTime Estimation

Observed Time Study - Allowances: (PF&D allowances) are used in the Observed Time studies. The following four settings populate the default values shown in the Observed Time > Settings Tab.

- **Personal**
- **Special**
- **Basic Fatigue**
- **Variable Fatigue**

4.1.1 Edit MUDA Classifications

ProTime allows you to not only define tasks as value-added, non value-added, or semi value-added (or a combination thereof), but also allows you to define specific categories within each of those. There are default categories sets, but you can edit this by going to Tools>Options, then clicking on the Edit MUDA Classifications button.

Select the category you wish to edit, then enter/edit the Category names and colors associated to each category. You can break down each category further by entering a list of Details. In the example below, There are six different types of work that would be categorized into Packing/Unpacking, which is defined as non value-added.

If you only wish to define categories, and not the details within each category, a default detail will be set to match each category you've set as shown in Figure 2.1.0.

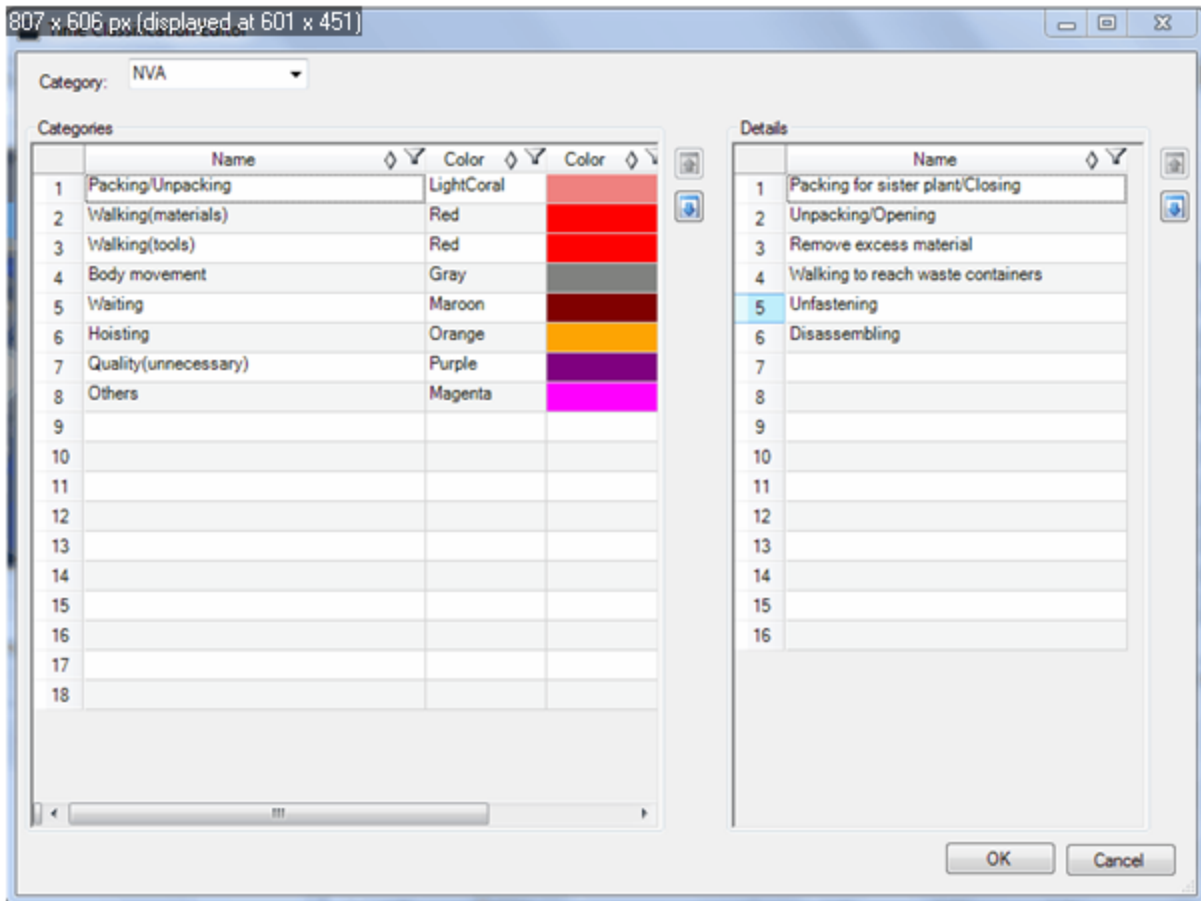


Figure 2.1.0.0: Edit MUDA Classifications Window to Edit VA/NVA/SVA Categories and Details

4.1.2 Edit Allowance Codes

In ProTime Estimation, you can set personal, fatigue, and special allowances for all tasks in a study, but you can also assign allowances to individual tasks. This may apply in cases of heavy lifting or moving, for example. There are default values set, but you can edit allowance codes and their values to fit your needs.

To do this, go to Tools>Options and click on the Allowance Codes button. Simply edit the spreadsheet and click OK. You will be warned that you will need to restart the application for the changes to take effect.

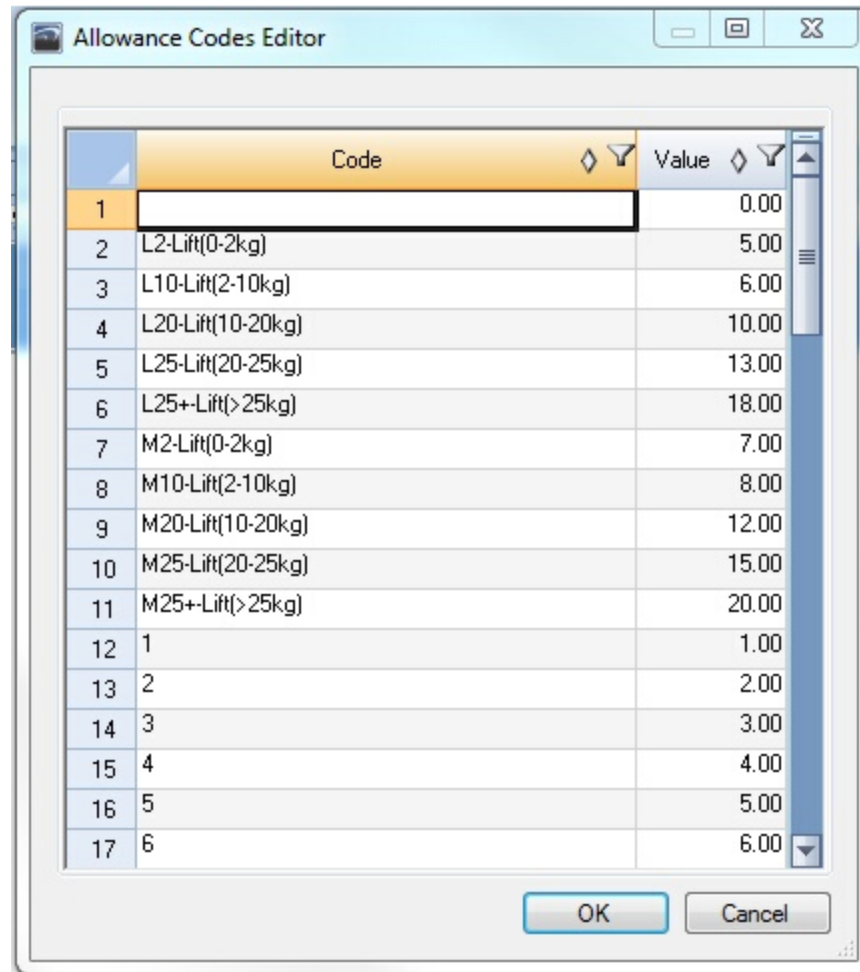


Figure 2.2.0.0: Edit Allowance Codes Window to Set Default Allowances that can be Applied to Individual Tasks

4.1.3 Edit Man Machine Colors

You can edit the colors that represent each type of task in the Man/Machine Utilization Report. You can get to the window shown below by going to Tools>Options and clicking on the Man Machine Colors button. Then select the colors you wish to be displayed for each task type.

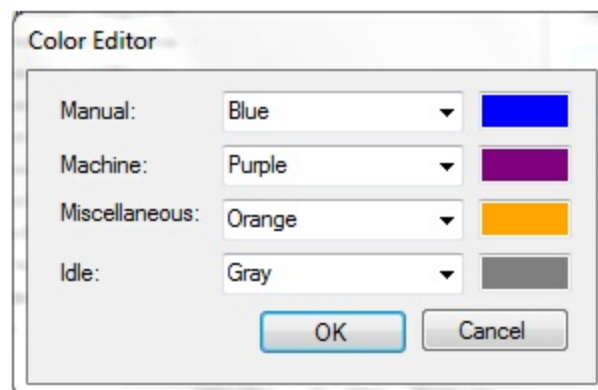


Figure 2.3.0.0: Edit Man/Machine Colors Window

4.2 Refresh Templates

The documents folder in the ProTime Estimation installation files contains all of the predetermined time templates. You can to change these templates and add custom time codes. You can edit these codes by opening the templates from the documents folder, making changes, and saving the files (overwrite existing files). Once the changes have been made, the user must click Refresh Templates for the lookup file to show the latest changes.

4.3 Template Manager

Standard templates for Basic MOST, MTMB, MTM-1, MTM-UAS, and Modapts are pre-loaded into ProTime Estimation.

If you wish to use Metric MTM-1 templates, follow these steps:

1. Go to Tools>Template Manager.
2. Select the following files from the template list:

mtm1-motion.csv

mtm-move.csv

mtm-reach.csv

mtm-weight.csv

All files beginning MTM1 with the .xls file extension. (MTM1.xls, MTM1-ApplyPressure, Release.xls, etc.)

3. Click the Import button (leftmost button) and browse to your ProTime Estimation folder where the software was installed (typically C:\Program Files\Proplanner\ProTimeEstimation).
4. Browse to the files contained in ...ProTimeEstimation\Templates\TimeEstimation\Metric.
5. Select all files and click OK.
6. When the files have finished importing, click Close, and then close ProTime Estimation. When you reopen the application, you should see the new Metric templates in the Calculated Time tab when you select the MTM-1 standard.

If you wish to alter any of the standard templates, see [Editing Code Templates](#).

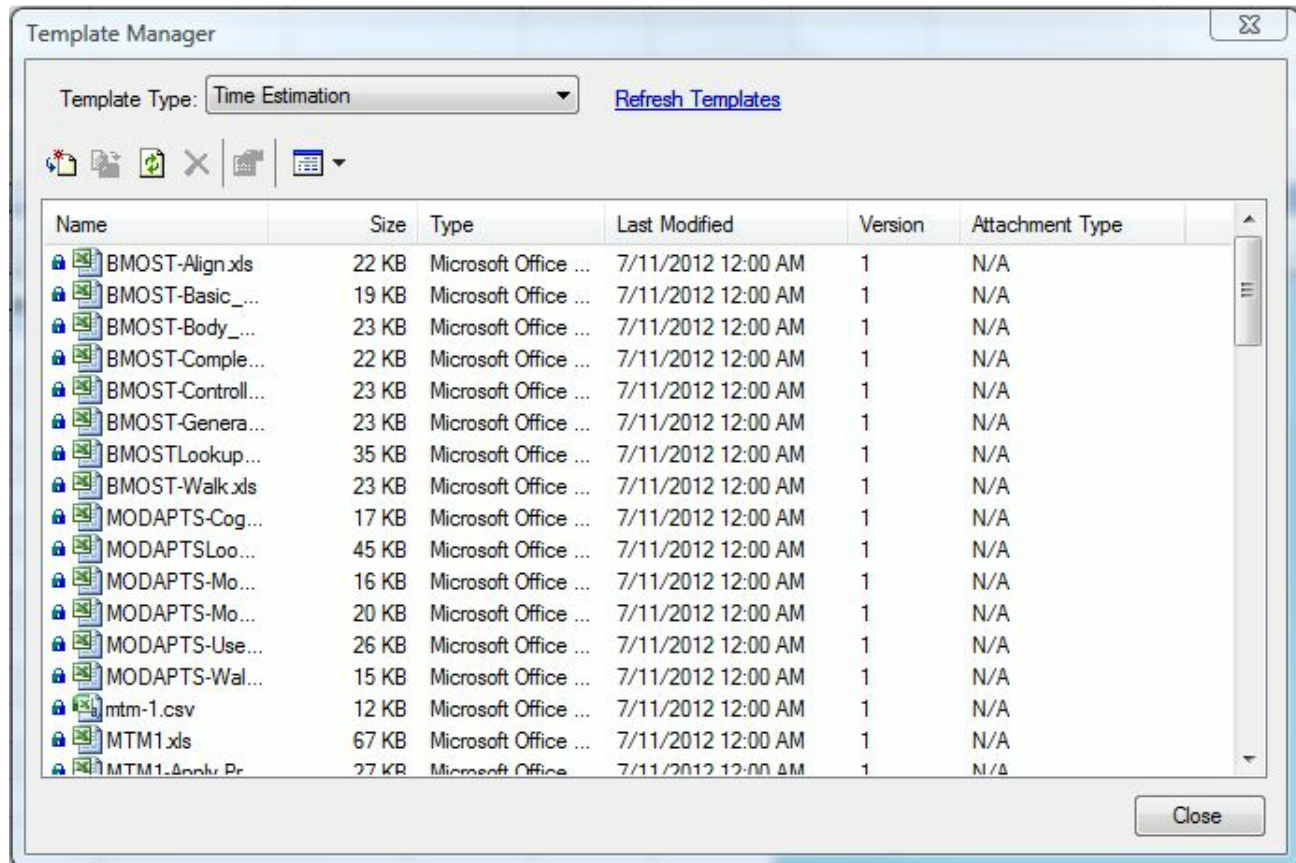
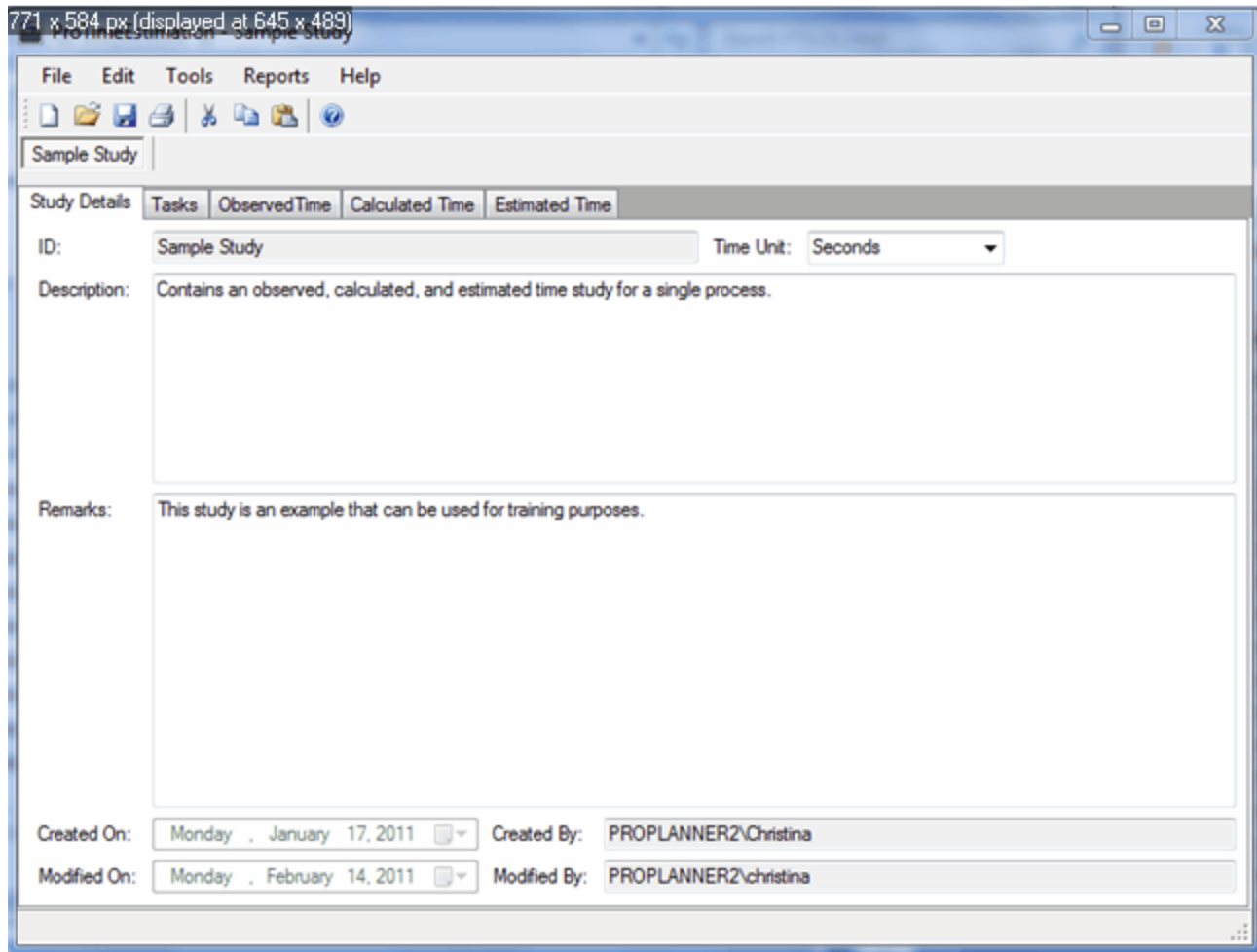


Figure 2.4.0.0: Template Manager

5 Study Details

The Study Details tab is the first tab you will see when opening a new or existing study. In this tab, you can view information about the study, including ID, description, remarks, and when and by whom the study was created and last modified. You can also edit the description and remarks here.



2.5.0.0: Study Details Tab Displaying Study ID, Description, and Remarks

In addition, you may edit the time units for the study. You may set your default time units for new studies by changing the Default Time Unit preference in Tools>Options. If you want to create a new study in a different unit than the default, you can change the time unit for that study using the drop-down in the Study Details tab. If you change the unit in an existing study, all of your time values will be converted to the new unit specified.

6 Tasks Tab

The Tasks tab contains summary information about your time studies. You can edit the tasks you will be studying and modify the overall process sequence in this tab. Listed below are further details about each of the tables in the Tasks tab.

Task Summary (Seconds)

ID	Task Index	Man/Mach/Misc	Task Image	Normal Time	Allowance	Standard Time	VA	NVA	SVA	ification	Count	Minimum	Maximum
1	4.01	1 Manual		4.96	6.00	5.26	0.00	5.76	0.00	5.76	2	4.47	5.45
2	4.02	2 Manual		3.28	6.00	3.47	0.00	0.00	2.12	2.12	2	2.03	4.52
3	4.03	3 Manual		9.39	6.00	9.96	0.00	4.19	0.00	0.00	1	9.39	9.39
4	4.04	4 Manual		9.69	6.00	10.27	0.00	10.07	0.00	10.07	2	9.24	10.13
5	4.05	5 Manual		3.96	6.00	4.19	0.00	5.51	0.00	5.51	1	3.96	3.96
6	4.06	6 Manual		0.00	6.00	0.00	0.00	3.10	0.00	3.10	0	0.00	0.00
7	4.07	7 Manual		2.22	6.00	2.35	0.00	0.00	0.00	0.00	1	2.22	2.22
8	4.08	8 Manual		0.00	6.00	0.00	0.00	0.00	3.21	3.21	0	0.00	0.00
9	4.09	9 Manual		0.00	6.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00

Task Sequence

ID	Desc	Sequence	Frequency	Resource	Predecessors (Row #)	Obs. Time	Calc. Time	Est. Time
1	4.01 Collect filter assemblies and place in stand	1.00	1	Operator		5.26	20.16	22.59
2	4.02 Adjust alignment on pins	2.00	1	Operator	1	3.47	2.52	5.00
3	4.03 Turn in hand screws to secure assy to fixtures	3.00	1	Operator	2	9.96	5.04	17.00
4	4.04 Remove caps	4.00	1	Operator	1	10.27	14.76	8.81
5	4.05 Collect connector fittings	5.00	1	Operator		4.19	3.96	20.60
6	4.06 Remove and toss caps	6.00	2	Operator	5	0.00	5.76	16.90
7	4.07 Apply vaseline to connector fitting o-rings	7.00	1	Operator	6	2.35	3.60	1.85
8	4.08 Thread connector fittings into filter housings	8.00	2	Operator	7	0.00	5.04	21.08
9	4.06 Remove and toss caps	9.00	2	Operator	8	0.00	5.76	16.90
10	4.07 Apply vaseline to connector fitting o-rings	10.00	1	Operator	9	2.35	3.60	1.85
11	4.08 Thread connector fittings into filter housings	11.00	2	Operator	10	0.00	5.04	21.08
12	4.09 Remove caps from connector fittings	12.00	1	Operator	11	0.00	5.76	21.25

Figure 2.6.0.0: Tasks Tab Example

Task Summary

One purpose of the Task Summary table is to allow the user to add and edit tasks in the study. The task lists in this tab, as well as the three time study tabs, are linked. Therefore, any task changes made in any of the tables will be reflected in the other task tables.

The Task Summary table also displays summary information about the studies performed for each task.

- **Task Index:** A non-editable field that displays the order in which the tasks were organized at the time of the last save.
- **ID:** The ID of the task, as set by the user. If no task ID is manually entered, a default value will be assigned.
- **Description:** Here you can add more detail about which element is being studied in this row.
- **Man/Mach/Misc:** You can choose to define a type for each task: manual, machine, or miscellaneous. The default setting is 'Manual'. Both Manual and Machine correspond to labor times; Miscellaneous is an optional category, and you can choose not to use it.
- **Video:** A default video can be set for a each task. Any video from which an observation has been recorded for a particular task can be selected from the drop-down menu in this cell.

- **Task Image:** If an image has been captured for a task, it will be displayed in this cell. The image can be enlarged by double-clicking on the cell.

The following fields are non-editable from the Tasks tab and are displayed for the Observed Time study performed:

- **Normal Time:** Displays the normal time for a task within the study.
- **Allowance:** Displays the allowance assigned to a task.
- **Standard Time:** Displays the standard time of the task, which accounts for the allowance set.
- **VA:** Displays the value-added time defined for a task.
- **NVA:** Displays the non value-added time defined for a task.
- **SVA:** Displays the semi value-added time defined for a task.
- **Classification Total:** This signals how VA/NVA/SVA values have been edited previously. If a non-zero value is displayed in the Classification Total Column, there is data stored in the [Time Classification](#) window. If the value in the Classification Total Column is zero, values have only been edited in the spreadsheet directly.
- **Count:** Displays the number of observations recorded for a task.
- **Minimum:** Displays the shortest observed time recorded for a task.
- **Maximum:** Displays the longest observed time recorded for a task.
- **Average:** Displays the average of all observed times recorded for a task.

The following fields are non-editable from the Tasks tab and are displayed for the Calculated and Estimated Time studies performed:

- **Normal Time:** Displays the normal time for a task within the study.
- **Allowance:** Displays the allowance assigned to a task.
- **Standard Time:** Displays the standard time of the task, which accounts for the allowance set.
- **VA:** Displays the value-added time defined for a task.
- **NVA:** Displays the non value-added time defined for a task.
- **SVA:** Displays the semi value-added time defined for a task.
- **Classification Total:** This signals to the user how VA/NVA/SVA values have been edited previously. If a value besides zero is displayed in the Classification Total Column, there is data stored in the [Time Classification](#) window. If the value is zero in the Classification Total Column, values have only been edited in the spreadsheet directly.

Task Sequence

The Task Sequence table can be used to define the process being studied exactly as it is performed. For example, if a task is performed multiple times in a row, you can set a frequency for that task within a process cycle. You can also define tasks that are predecessors to others. This control also allows you to re-use tasks (if they are performed at various points in the cycle). The task sequence defined in the Task Sequence table is used for sorting and reporting purposes.

You can add tasks to the Task Sequence table by selecting the task ID in the drop down menu in the ID column, or by double-clicking on the row header in the Task Summary table of the task you want to add.

The following fields are included in the Task Sequence table:

- **ID:** The ID of the task, as set by the user in the Task Summary table and selected using the drop down in the Task Sequence table.
- **Description:** The task description from the Task Summary table.
- **Sequence:** The order in which tasks are displayed on the vertical axis of the Gantt Chart and the order the tasks are displayed in the Task Sequence table when a save is called.
- **Frequency:** The number of times a task occurs within a given cycle. The default setting is 1.
- **Resource:** This is a user-defined name for the resource performing the task in the given sequence (Operator 1, Operator 2, Machine A, Machine B, etc.). This information is used in correlation with the Man/Mach/Misc value for the Man Machine Utilization Report.
- **Obs. Time:** The observed time for each task is displayed for reference.
- **Calc. Time:** The calculated time for each task is displayed for reference.
- **Est. Time:** The estimated time for the task is displayed for reference.
- **Predecessors:** List the row number(s) of any tasks listed in the Task Sequence table that must be completed before the selected task can begin.

Note: In the [Man-Machine Utilization Report](#), a timeline will be shown for each resource individually; then, a timeline will be shown for all resources collectively. Vertically, the order of the tasks is defined by the Sequence values set in the Task Sequence table. Horizontally, the order of the tasks in the timeline is determined by the Predecessors defined in the Task Sequence table.

Below is an example of Task Sequencing and the resulting output generated when a Time Study Report is run. To demonstrate the correlation with which the Proplanner tools complement each other, the tasks included in the example are from Proplanner's Mixed Pump ProBalance Tutorial. A portion of the precedence network corresponding to the ProBalance Mixed Pump tutorial is included. The tasks included in Mixed Pump Tutorial precedence network have been used in the ProTime Estimation Task Sequencing Example below. No resource has been specified in this example because the process is completely manual. If you were generating a Man-Machine chart, you would want to specify the individual machines and operators responsible for each task listed in the sequence.

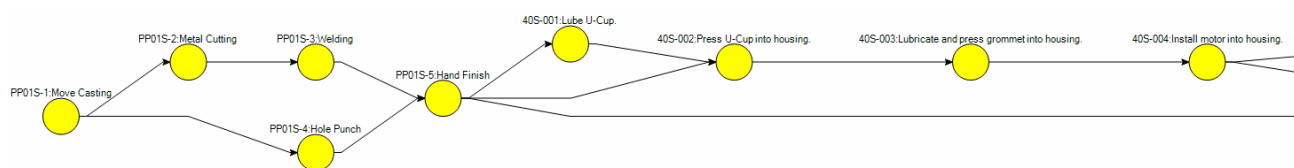


Figure 2.6.1.0: ProBalance Mixed Pumps Tutorial Precedence Network

The corresponding Task Sequencing window using ProTime Estimation is shown.

Task Sequence										
	ID	Desc	Sequence	Frequency	Resource	Obs. Time	Calc. Time	Predecessors (Row #)	Est. Time	
1	PP01S-1	Casting	1.00	1		0.00	0.00		12.00	
2	PP01S-2	Metal Cutting	2.00	1		0.00	0.00	1	14.00	
3	PP01S-3	Welding	3.00	1		0.00	0.00	2	20.50	
4	PP01S-4	Flame welding	4.00	1		0.00	0.00	1	18.00	
5	PP01S-5	Flame welding	5.00	1		0.00	0.00	3,4	18.00	
6	40S-001	Lube U-cup	6.00	1		0.00	0.00	5	9.00	
7	40S-002	Press U-cup into housing	7.00	1		0.00	0.00	5,6	6.00	
8	40S-003	Lubricate and press grommet into housing	8.00	1		0.00	0.00	7	8.00	
9	40S-004	Install motor into housing	9.00	1		0.00	0.00	8	8.00	
10	40S-005	Place tie wrap around loosely	10.00	1		0.00	0.00	9	7.50	
11	40S-006	Place nu on housing	11.00	1		0.00	0.00	10	3.50	
12	40S-007	Lubricate and feed two wires through grommet	12.00	1		0.00	0.00	11	18.00	
13	40S-008	Tin wire leads and motor terminals then solder wire leads to motor terminals	13.00	1		0.00	0.00	12	12.00	
14	40S-009	Place tie wrap around loosely	14.00	1		0.00	0.00	5,9,13	19.80	
15	40S-010	Pull tie wrap tight and trim	15.00	1		0.00	0.00	14	15.00	
16										

Figure 2.6.2.0: Task Sequencing Table in ProTime Estimation

When a Time Study Report is run, the sequence of the tasks is used to display the order of the tasks along the vertical axis of the Gantt chart, and the Predecessors information is used to determine the order the tasks are displayed along the horizontal time axis. The Gantt Chart generated within the Time Study Report is shown below.

Gantt Chart

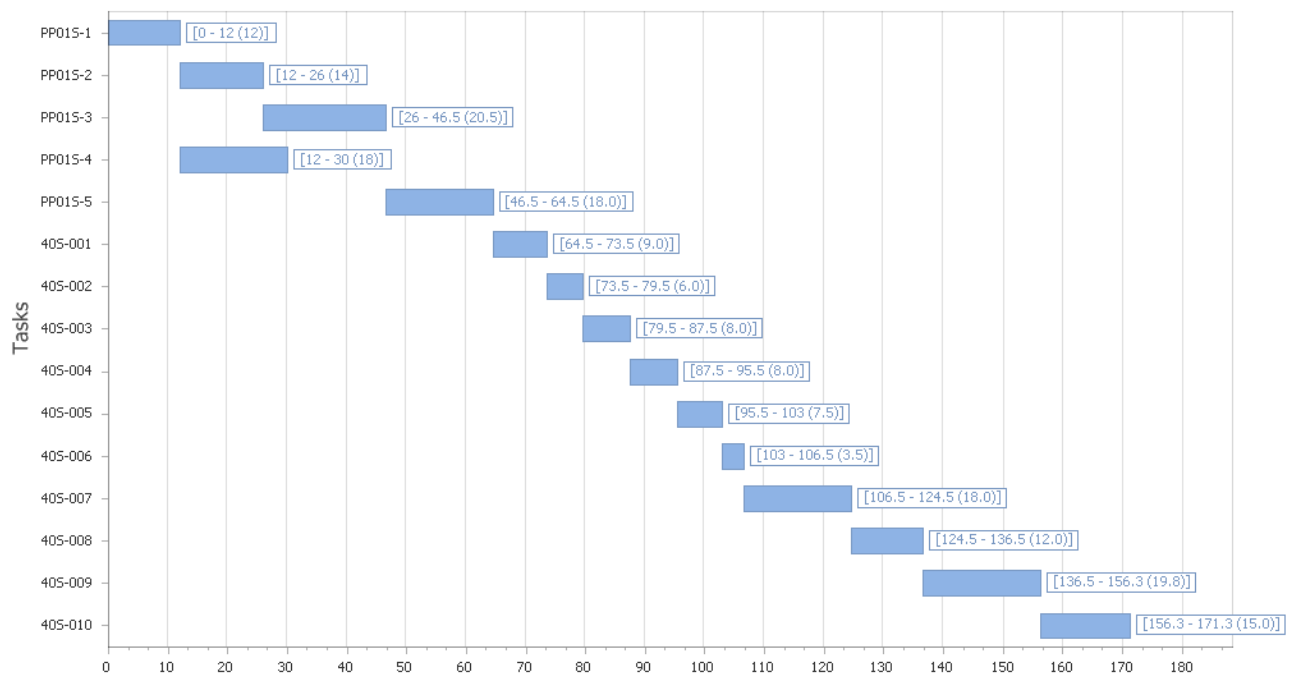


Figure 2.6.3.0: Gantt Chart with Task Sequence Population the Vertical Axis and Predecessors Information Determining the Location of Tasks Along the Time Axis

7 Observed Time Tab

The observed time control allows you to record stopwatch time. You can do a stopwatch study by either observing the operator live or by tagging frames from a video.

Performing an Observed Time Study

To perform an observed time study, open an existing study by going to File>Open, or create a new one by following the steps below.

1. Open the application and go to File>New.

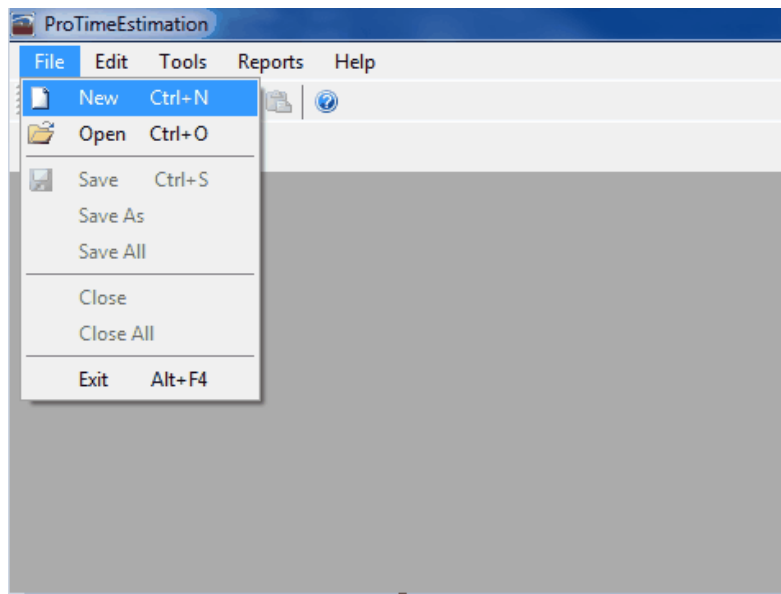
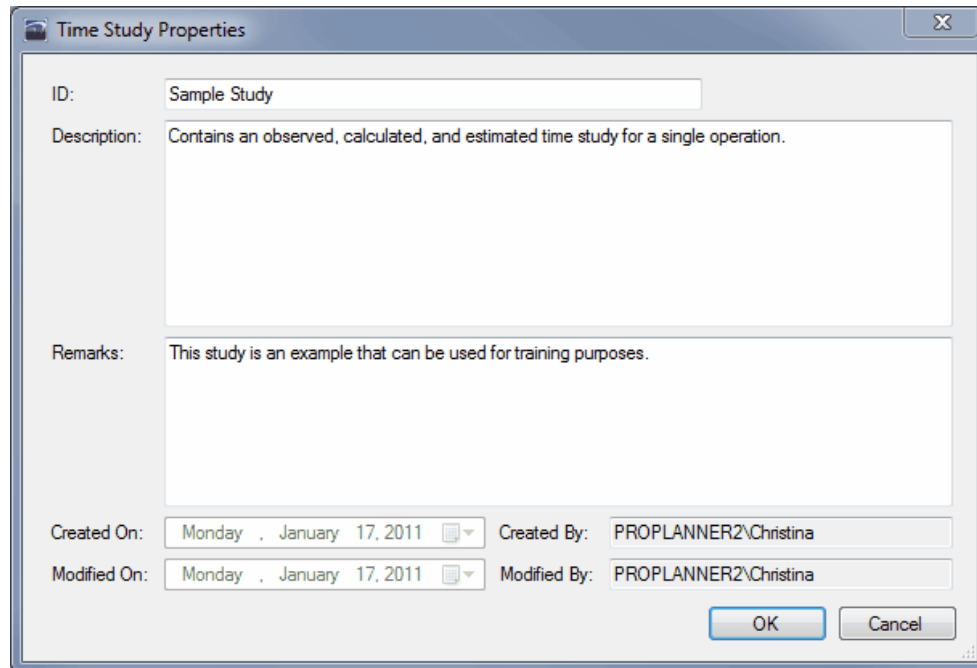


Figure 3.1.0.0: ProTime Estimation File Drop Down Menu

2. Enter the study properties. A Study ID is required; the other fields are optional.



Time Study Properties

ID: Sample Study

Description: Contains an observed, calculated, and estimated time study for a single operation.

Remarks: This study is an example that can be used for training purposes.

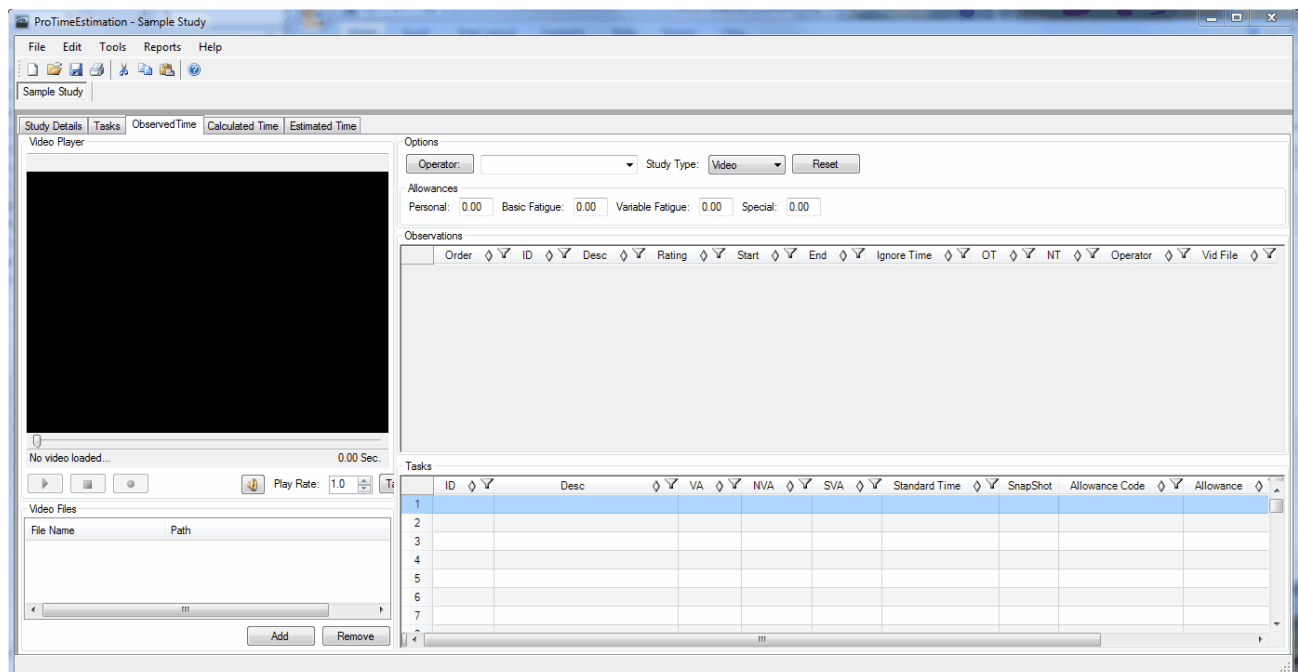
Created On: Monday, January 17, 2011 Created By: PROPLANNER2\Christina

Modified On: Monday, January 17, 2011 Modified By: PROPLANNER2\Christina

OK Cancel

Figure 3.1.0.1: New Study Screen

3. You can begin by entering your list of tasks in the [Tasks](#) tab, or go to the Observed Time tab immediately and enter the tasks there.



ProTimeEstimation - Sample Study

File Edit Tools Reports Help

Sample Study

Study Details Tasks ObservedTime Calculated Time Estimated Time

Video Player

No video loaded... 0.00 Sec.

Play Rate: 1.0

Video Files

File Name	Path

Add Remove

Options

Operator: Study Type: Video Reset

Allowances

Personal: 0.00 Basic Fatigue: 0.00 Variable Fatigue: 0.00 Special: 0.00

Observations

Order	ID	Desc	Rating	Start	End	Ignore Time	OT	NT	Operator	Vid File
1										
2										
3										
4										
5										
6										
7										

Tasks

ID	Desc	VA	NVA	SVA	Standard Time	SnapShot	Allowance Code	Allowance
1								
2								
3								
4								
5								
6								
7								



Figure 3.1.0.2: Observed Time Study Window

4. Continue to the [Video Observation Method](#) or [Stopwatch Observation Method](#) instructions to proceed.

7.1 Video Observation Method

1. Click on 'Add' to select a video from which to record observations. You can add and use multiple videos for a single study.

Note: Avoid moving the file path of a video file before completing a time study that uses that video file. A study that references a video file that has been moved can be opened and used, but times recorded will no longer be associated to the video file.

2. Click the Play button to preview the video. *Note: For .wmv video files, you may choose to increase or decrease the speed of the video and the stopwatch will adjust accordingly. This control does not work if the video file is in any format other than .wmv.*
3. As you watch the video, you can create a list of tasks in the Tasks list by providing an ID for each. If you leave the ID column blank, but add a description, an ID will be automatically generated. *Note: if you're working with an existing study, your task list will already be populated.*
4. To begin recording observations, click the play button  and the record button . *Note: These buttons do not need to be clicked simultaneously. If, for example, your video file contains content at the beginning that does not pertain to the current study, you can play the video until the first task begins, then click the record button. The 'stopwatch' time will then begin.*
5. When the current task is completed, double click on the row header of the appropriate task in the Tasks list to add it to the Observations list. The start and end time of that task will be recorded, and the observed time for that task will be calculated and displayed. *Note: You can add observations while the video is still playing, or you can pause the video, make the observation, then click the play button to resume.*
6. Repeat Step 5 until you have finished recording all of your observations for that video. At that point you may choose to select another video and repeat Steps 4 and 5.

There are additional features to enhance your observed time study, including observing multiple operators in the same study, ignoring part of a video that may not be relevant to the task or study, and adjusting the start and ends times of your task observations. Please see the proceeding sections for more detail.

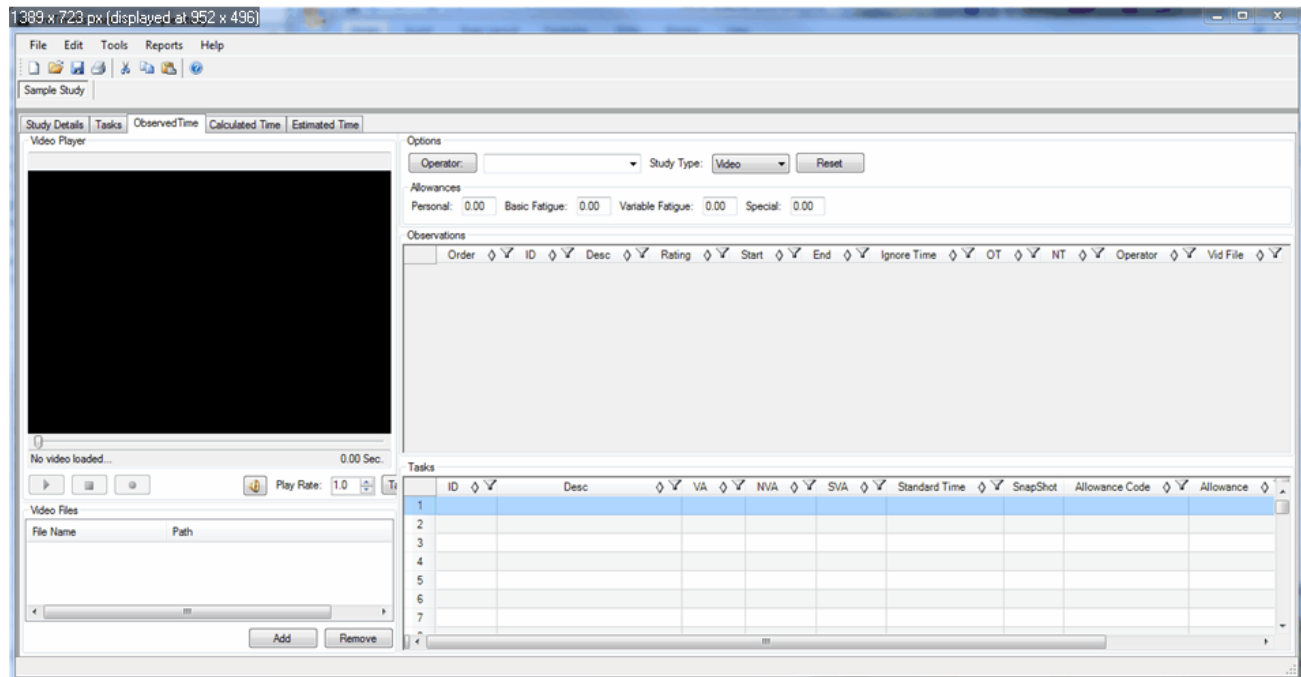


Figure 3.2.1.0: Observed Time Tab

7.1.1 Multiple Operators

You can choose to observe multiple operators in a single time study. To do so, first specify your operators.

1. Click on the Operator button to add or edit operators. *Note: To quickly add an operator in the middle of observing, you can also simply type the name into the Operator drop-down field.*



Multiple Operator Dropdown List

Figure 3.2.2.0: Multiple Operator Drop Down List

2. Edit the spreadsheet until you have all desired operators and ratings included. You must use the Delete button to remove anything from the spreadsheet you no longer wish to be there. When you are finished, click Close, and your changes will be saved.

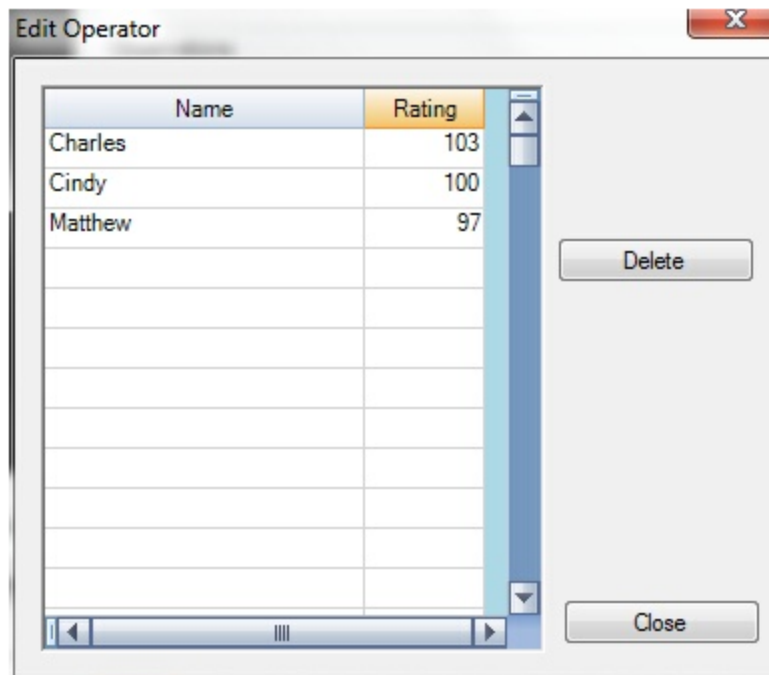




Figure 3.2.2.1: Edit Operator Window

3. Before recording an observation, you can select an operator from the drop-down menu, and then make the observation. The operator and his or her rating will be included in the task observation.
4. You can also edit the operator after an observation is made by selecting from the drop-down in the Operator column. The Rating column will change to reflect the operator's rating.

7.1.2 Ignoring Time

If your video includes content that does not pertain to the current tasks or you wish not to include in your study (operator is interrupted, operator leaves for a break, etc.) you can ignore that time. To do so, allow the video to continue playing, but click on the Ignore Time  button. Click the Record Time  button again when the video has reached content you wish to record.

7.1.3 Breakpoint Adjustment

You may not always record a task observation exactly when the task was completed. However, you can make adjustments to the end time of the task either manually (by typing a new time in the End column) or by using the breakpoint adjustment tool.

If you manually change the Start or End time of an observation that includes Ignore Time and has a consecutive observation before or after it, you will be prompted to indicate whether your change should add or subtract to the actual task time or to the ignored time. Basically, it is asking whether you are changing the length of the observed time or changing the amount of time that should be ignored. By selecting 'Ignored', you are saying that the ignored time falls at the end of the first task and the beginning of the second task.

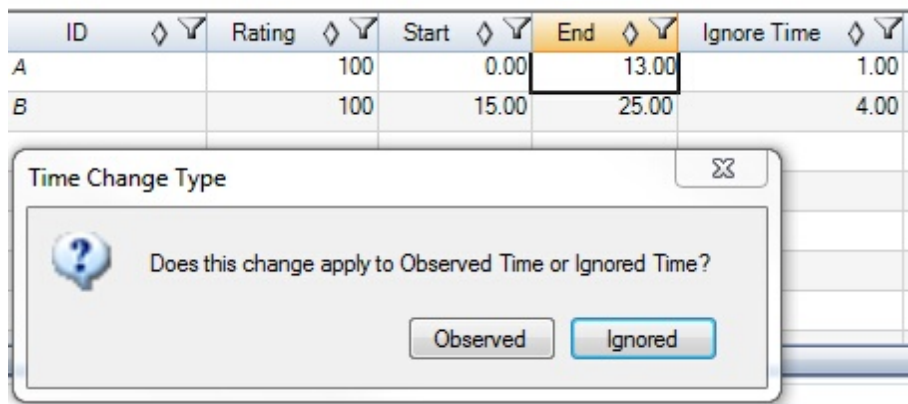


Figure 3.2.3.1: Time Change Type

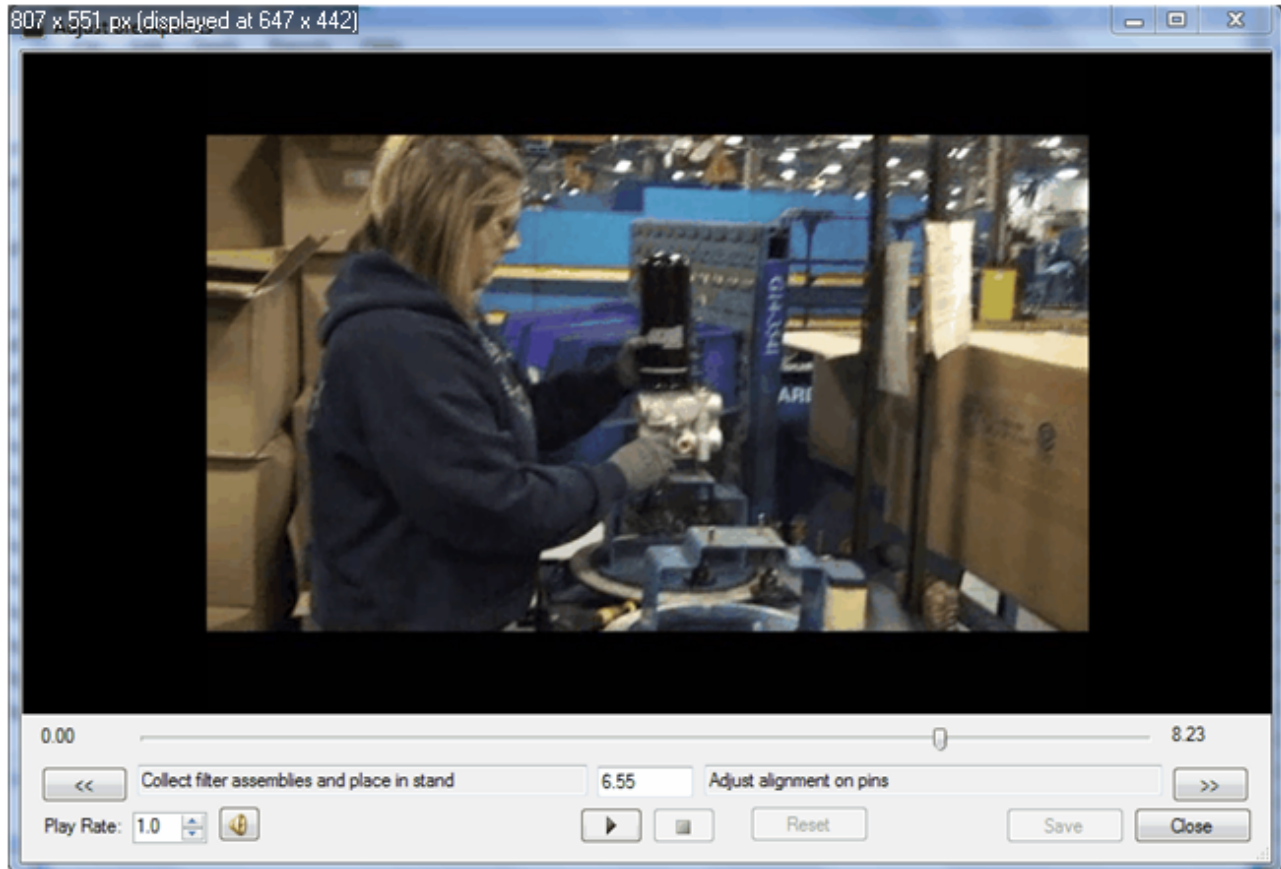


Figure 3.2.3.2: Break Point Editor

1. To use the Video Breakpoint Editor, right click on any cell in the row of the task whose breakpoint you want to adjust. Select either "Edit Start Time" or "Edit End Time." A window will appear displaying a video clip. If you have selected "Edit Start Time," the time cursor will be set at the start time of the selected task and the description of the selected task will be displayed on the right. If you have selected "Edit End Time," the time cursor will be set at the end time of the selected task and the description of the selected task will be displayed on the left.

2. Move the cursor forward or backward and review the video to edit the breakpoint. It may also help to slow down the speed of the video.
3. Once you've made the adjustment and the cursor and breakpoint is set, you can click 'Save' and either 'Close' or the Next or Previous arrow buttons to adjust the breakpoint of preceding or subsequent tasks.
4. If you made an adjustment, notice that the End time has changed as has the Start time of the subsequent task to reflect the adjustment. *Note: Two sequential tasks cannot overlap in time, so the end of one task is the start of another.*

7.1.4 Changing ID of Observation

If, while you are watching the video and recording observations, you click the wrong task ID to record, you can change the ID for that observation once you have completed all of your observations.

To do so, simply right click on the ID and select "Reassign Observation to Different Task." Select the correct ID and click "OK."

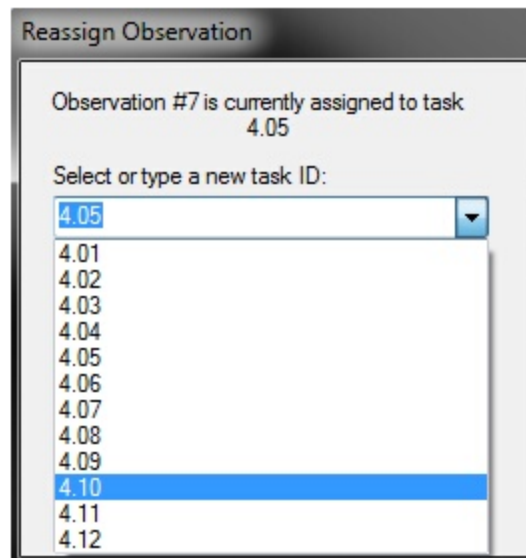


Figure 3.2.4.1: Reassign Observation Window

7.1.5 Required Observations Calculation

ProTime Estimation will automatically calculate the required number of observations that you would need to collect in order to attain a normal time within a given confidence level.

To calculate the required number of observations, enter the desired confidence level (ie 85%, 90%, 95%) for each task in the Confidence Interval column in the Observations tab's Task table. If multiple observations have been recorded for a task, its required number of observations will be displayed in the next column. *Note: Since the calculation requires a standard deviation between observations, if you have zero or one observations recorded, the required number of observations cannot be calculated and will display as 0.*

7.2 Stopwatch Observation Method

1. Select 'Stopwatch' as the Study Type from the drop-down menu.

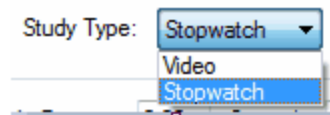



Figure 3.3.1.0: Study Type Drop Down Menu

2. Create the tasks in the sheet by providing an ID for each. If you leave the ID column blank, an ID will be automatically generated as you perform your study. *Note: If you're working with an existing study, your task list will already be populated.*
3. To begin recording observations, click the play button .
4. When the current task is completed, double click on the row header of the appropriate task in the Tasks list to add it to the Observations list. The start and end time of that task will be recorded, and the observed time for that task will be calculated and displayed. You can pause the stopwatch during the middle of the study if you'd like to resume later or you can stop the stopwatch if you've completed the study or would like to reset the timer.

Please see the [Observed Time Tab Details](#) for more information about other columns and features in this control. See [Multiple Operators](#) to learn how to observe multiple operators in the same study.

7.3 Pasting Existing Time Study Data

If you want to paste task observations taken outside of ProTime Estimation, please note the following rules. You need not create the tasks in the Tasks table prior to pasting observations; any new tasks will be automatically created when a new observation is manually entered for that task.

- *Before pasting data, make sure the order of the columns in your Excel file match the order of the columns in ProTime.*
- *Use the right click menu to Copy and Paste. The Windows keyboard shortcuts do not work in this version of the application.*

Rules for each field

- **Order** – This is a system-generated field that simply keeps track of the order in which observations are recorded in ProTime. It can never be edited by the user.
- **ID** – A new or existing ID can be pasted into this field. If the ID needs to be changed, you must right click on the cell and select 'Reassign Observation to Different Task.'
- **Description** – A description can be pasted if associated to a new task ID. If the ID already exists in the Tasks table, the description on the new observation will match the description existing in the Tasks table. The description of any existing task must be edited in the Tasks table, and then will be reflected in the Observations table.
- **Comments** – This field can be edited at any time.
- **Rating** – This field will be populated to the default rating for the selected Operator, but can be changed at any time by the user.
- **Start** – A start time for the task must be pasted and can be edited at any time.
- **End** – An end time for the task must be pasted and can be edited at any time.
- **Ignore Time** – An ignore time can be pasted, although it may not be valuable since there is no video associated with this observation.
- **OT** – This is a calculated field and cannot be edited by the user. $OT = Start - End - Ignore\ Time$. *Note: If you paste a value in OT that does not match the calculation from those three columns, the value will be overwritten when you save your study.*
- **NT** – This is a calculated field and cannot be edited. $NT = OT * Rating$. *Note: If you paste a value in NT that does not match the calculation from those two columns, the value will be overwritten when you save your study.*
- **Operator** – An existing operator name can be pasted into this field. If no operator is defined with the paste, or if the name pasted does not exist in the operator list, this field will be populated by default to the name displayed in the Operator dropdown list. If a new Operator is to be assigned to an observation, that Operator must be created through the [Operator edit menu](#) first.
- **Vid File** – This field will be populated by the default "-- Stopwatch Study --", indicating that the observation was

made outside of ProTime.

7.4 Manually Entering Existing Time Study Data

If you would like to manually insert observations taken outside of ProTime Estimation, please note the following rules for each of the fields in the Observations table. You need not create the tasks in the Tasks table prior to pasting observations; any new tasks will be automatically created when a new observation is manually entered for that task.

- Order – This is a system-generated field that simply keeps track of the order in which observations are recorded in ProTime. It can never be edited.
- ID – A new or existing ID can be typed into this field. If the ID needs to be changed, you must right click on the cell and select 'Reassign Observation to Different Task.'
- Description – A description can be typed if associated to a new task ID. If the ID already exists in the Tasks table, the description of the task must be edited in the Tasks table instead of the Observations table.
- Comments – This field can be edited at any time.
- Rating – This field will be populated to the default rating for the selected Operator, but can be changed at any time.
- Start – A start time of the task must be entered and can be edited at any time.
- End – An end time of the task must be entered and can be edited at any time.
- Ignore Time – An ignore time can be entered when manually entering an observation, although it may not be valuable since there is no video associated with this observation.
- OT – This is a calculated field and cannot be edited. $OT = Start - End - Ignore\ Time$
- NT – This is a calculated field and cannot be edited. $NT = OT * Rating$
- Operator – This field will be populated by default to the name displayed in the Operator dropdown list, but can be changed at any time. If a new Operator is to be assigned to an observation, that Operator must be created through the [Operator edit menu](#) first.
- Vid File – This field will be populated by the default "-- Stopwatch Study --", indicating that the observation was made outside of ProTime.

7.5 Video File Formats

ProTime Estimation can support any video file formats supported by your version of Windows Media Player and any additional codec packs (such as K-Lite) installed on your computer. If you do not currently have a version of Windows Media Player on your system, you can download it at <http://windows.microsoft.com/en-US/windows/downloads/windows-media-player>.

We recommend using .mp4 (MPEG-4) files when performing video observed time studies. We also recommend not using high definition videos, since the videos are converted within ProTime Estimation and the higher definition will be lost in the process. Note: A few video file formats may not allow you to alter the playback speed (speed up/slow down), although they may playback at normal speed without issue.

7.6 Post-Observation Analysis Tools

After completing your study, there are several tools you can use to analyze or improve your operations. Some of these tools include performing a value-added vs. non value-added analysis, viewing two task video clips at once, and capturing a single image of a task. Details of each tool are explained in the following sections.

7.6.1 VA/NVA/SVA Analysis

After you have added a task to the Observed Time Task table, you can define the breakdown of value-added, non value-added, and semi value-added time for each task.

You have two options to do this:

1. You can enter a value directly in the VA/NVA/SVA cells for each task (to change the preference for time or percentage values, go to Tools>Options, then check or uncheck "Use Percent for VA/NVA/SVA"), or you can specify specific classifications.
2. To specify specific classifications, you can double click on any of the VA/NVA/SVA columns (or right click and select View Time Classification Data) for a particular task in the Tasks list. If an observation has been made, your total time will be displayed, and you can type in the time the task fills for one or more LEAN categories. You can watch the video clip for that task as you do so. The categories will appear as they have been set in the [Edit MUDA Classifications](#) menu within Tools>Options.

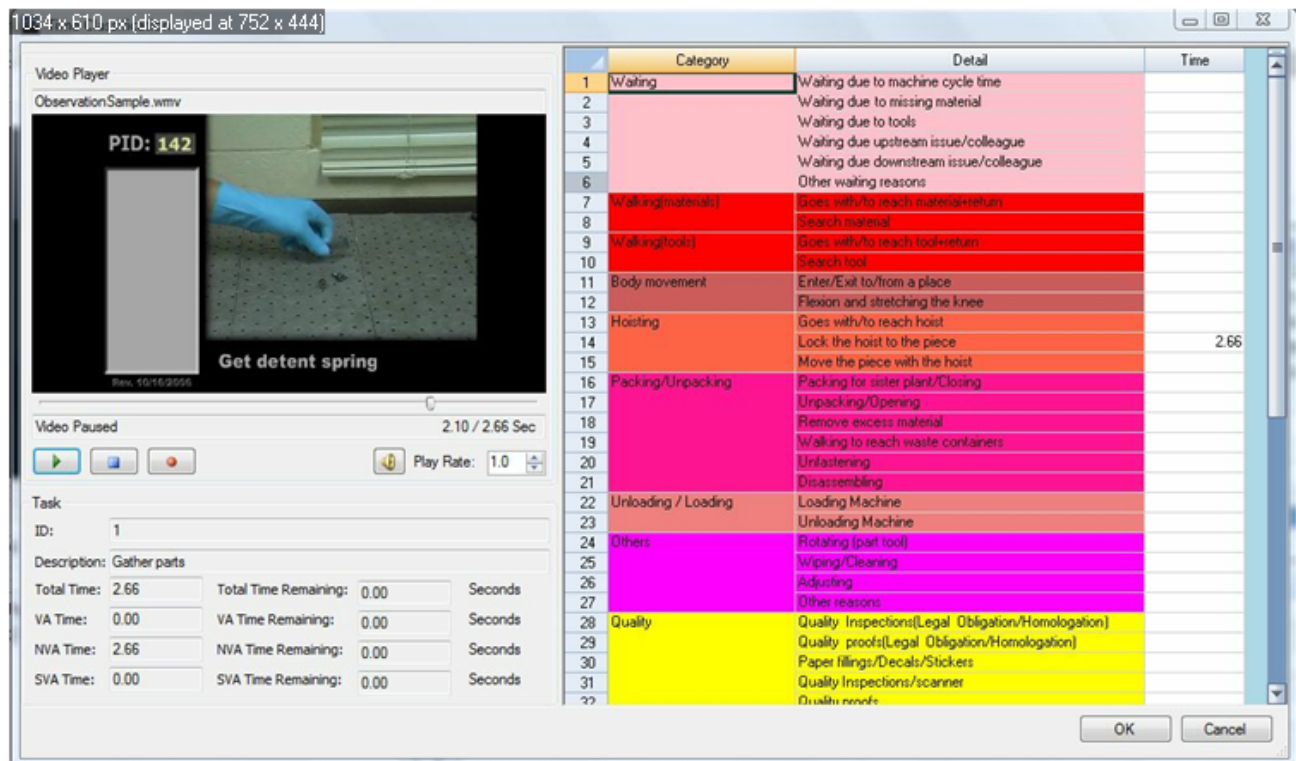


Figure 3.4.1.0: MUDA Editor

Note: If no video loads, set a default video in the [Tasks Tab](#).

7.6.2 Compare Two Videos

ProTime can help you understand the differences in operator performance or ways to improve an operation by allowing you to view two task video clips at once. The videos will be played side-by-side so you can see the similarities and differences between multiple observations of the same task.

To do so, select exactly two rows in the Observations table. Then right click and select 'Compare Two Videos.' Use the video controls to adjust playback for one video at a time or both videos at once.

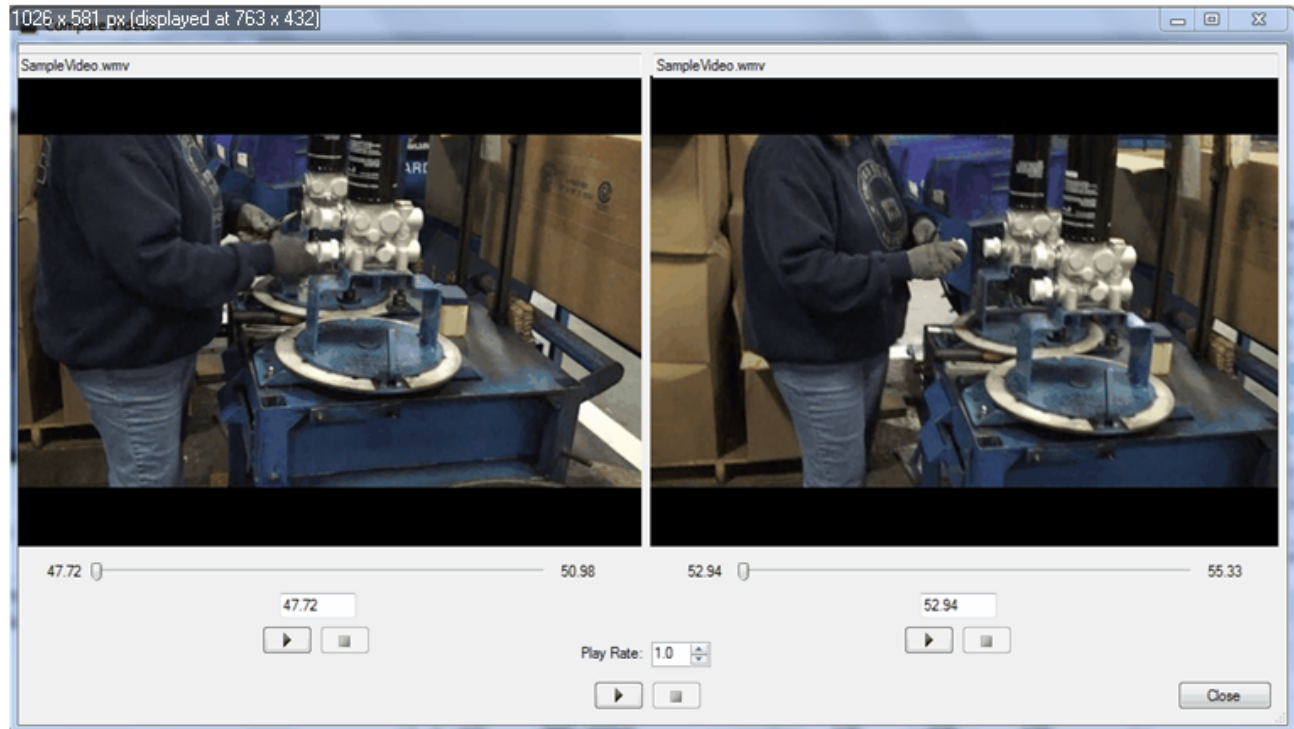


Figure 3.4.2.0: Video Comparison Control

7.6.3 Task Image

From a video, you can capture and store single images of each task observed in that video. *Note: The study must contain at least one observation of the task before an image can be captured for that task.*

To capture an image, play the video. When the video displays the image you want to capture for the current task, click the Capture Image button. (You can do so when the video is playing or paused.) Continue playing the video until you have captured the desired image for each task. Once an image is captured, a thumbnail of the image will be displayed in the appropriate cell. Double click on the thumbnail to view a larger image.

Note: The image is captured based on the current playback time of the selected video and which task was observed at that time. Only one image will be stored for each task; if there are multiple observations of the same task, or multiple images are taken for the same observations, only the most recent one will be saved.

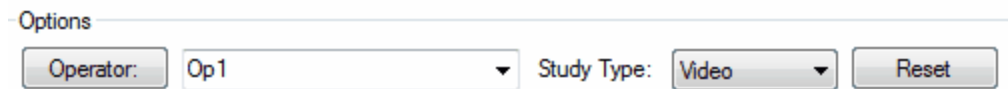
7.7 Observed Time Tab Details

The observed time tab contains two data tables: the Tasks table and the Observations table. You will notice a feature of all table columns is the ability to sort and filter row data. You can filter row data by clicking on the filter in any column header and selecting an entry to view all occurrences of that entry. You can also choose to sort and display rows in the table in ascending or descending order based on the column you are sorting. Do this by clicking on the up and down arrows in the column header.

See details of all columns and menu options below.

Options

In the Options section, you can define the operator performing each task, select the Study Type (Video or Stopwatch), and reset the study data.



The screenshot shows a section titled "Options" with a light blue header. Below the header, there are three input fields: "Operator:" with a dropdown menu showing "Op1", "Study Type:" with a dropdown menu showing "Video", and a "Reset" button.

Figure 3.4.3.0: Options Section

Allowances

You can set a personal, basic fatigue, variable fatigue, and/or delay allowance for the study as a whole.



The screenshot shows a section titled "Allowances" with a light blue header. Below the header, there are four input fields: "Personal:" with a value of 5.00, "Basic Fatigue:" with a value of 2.00, "Variable Fatigue:" with a value of 0.00, and "Delay:" with a value of 1.00.

Figure 3.4.3.1: Allowance Section

Personal: Accounts for maintaining general well-being of the employee.

Basic Fatigue: Accounts for monotony or energy expended while performing tasks.

Variable Fatigue: Accounts for physical or mental strain or fatigue, caused by environmental conditions or nature of the work (temperature, posture, tediousness, etc.)

Delay: Accounts for interruptions, material irregularities, machine interference, etc.

Observations Table

Order: The order in which observations were recorded.

ID: The ID of the task, as entered by the user. If no entry is made here, the row is given a default "New Task" ID.

Description: More detail about the task may be entered here.

Rating: The rating is a factor that allows the observer to adjust time based on the skill level of the operator performing the task.

The value entered in the rating column is divided by the Labor Rating, a default setting that may be changed in Tools > Options. Suppose the Labor Rating value is 100 (which is typical), and an average operator is observed. This operator would likely be given a rating of 100; there would be no net change in the time. If the worker is slower than average, assign him or her a rating less than 100. If they are significantly faster than average, assign him or her a rating higher than 100.

Start: The stopwatch time at which this element began.

End: The stopwatch time at which this element ended.

Ignore Time: If time was ignored during an observation of a task, the total ignored time for that task will be displayed.

OT: The observed time, which is the difference between the End Time and the Start Time, excluding any ignored time.

NT: The normal time, which is the observed time multiplied by the operator rating.

Operator: Displays the operator that performed the observed task.

Vid File: Displays the video file from which the observation was made.

Comments: This field can be used to make any note related to the observation recorded.

Tasks Table

Task Index: A non-editable field that displays the order in which the tasks were organized at the time of the last save.

ID: The ID of the task, as entered. If no entry is made here, the row is given a default a "New Task" ID.

Description: More detail about the task may be entered here, if desired.

VA: Displays the value-added time of the task as defined by the double-click menu of the cell.

NVA: Displays the non value-added time of the task as defined by the double-click menu of the cell.

SVA: Displays the semi value-added (non value-added but necessary) time of the task as defined by the double-click menu of the cell.

Has Classification: This signals how VA/NVA/SVA values have been edited previously. If the box is checked, there is data stored in the Task Classification window. If the box is unchecked, values have only been edited in the spreadsheet directly.

Standard Time: The standard time for a task is calculated as the average of all normal time observations for that task, multiplied by any allowances defined for the study and/or the task.

Snapshot: Displays the most recent snapshot taken of the task. Double click on the cell to see a larger image.

Allowance: The user can specify an individual allowance for each task using an allowance code. The allowance associated with that code is displayed in this cell.

Allowance Code: There is a set of allowance codes loaded; if you wish, you can select an allowance code to be applied to a task. The corresponding allowance value will be populated in the Allowance cell.

Confidence Interval: The confidence interval set for each task helps determine the required number of observations. You can reset the default confidence interval in Tools>Options.

Req. Observations: This column displays the number of observations required to achieve the confidence interval set for each task. See [Required Observations Calculation](#) for more details.

Right Click Menu

Undo: Reverses your most recent task.

Redo: Reverses your Undo action.

Cut: Copies and cuts the information from the selected cell or row.

Copy: Copies the selected cell or row.

Paste: Pastes the copied data.

Insert Row: Adds a blank row above the selected row.

Remove Selected Rows: Removes the selected rows and the data they may contain.

Clear Selected Data: Deletes the editable values from the selected cell(s) or row(s).

Customize View: A window will appear like the one below. Columns in the selected table can be hidden,

shown, or reordered. Choose the given column you want to perform an action on. Then click the up and down arrows to move the column into the desired order. If you want to hide the column, select the column and hit remove.

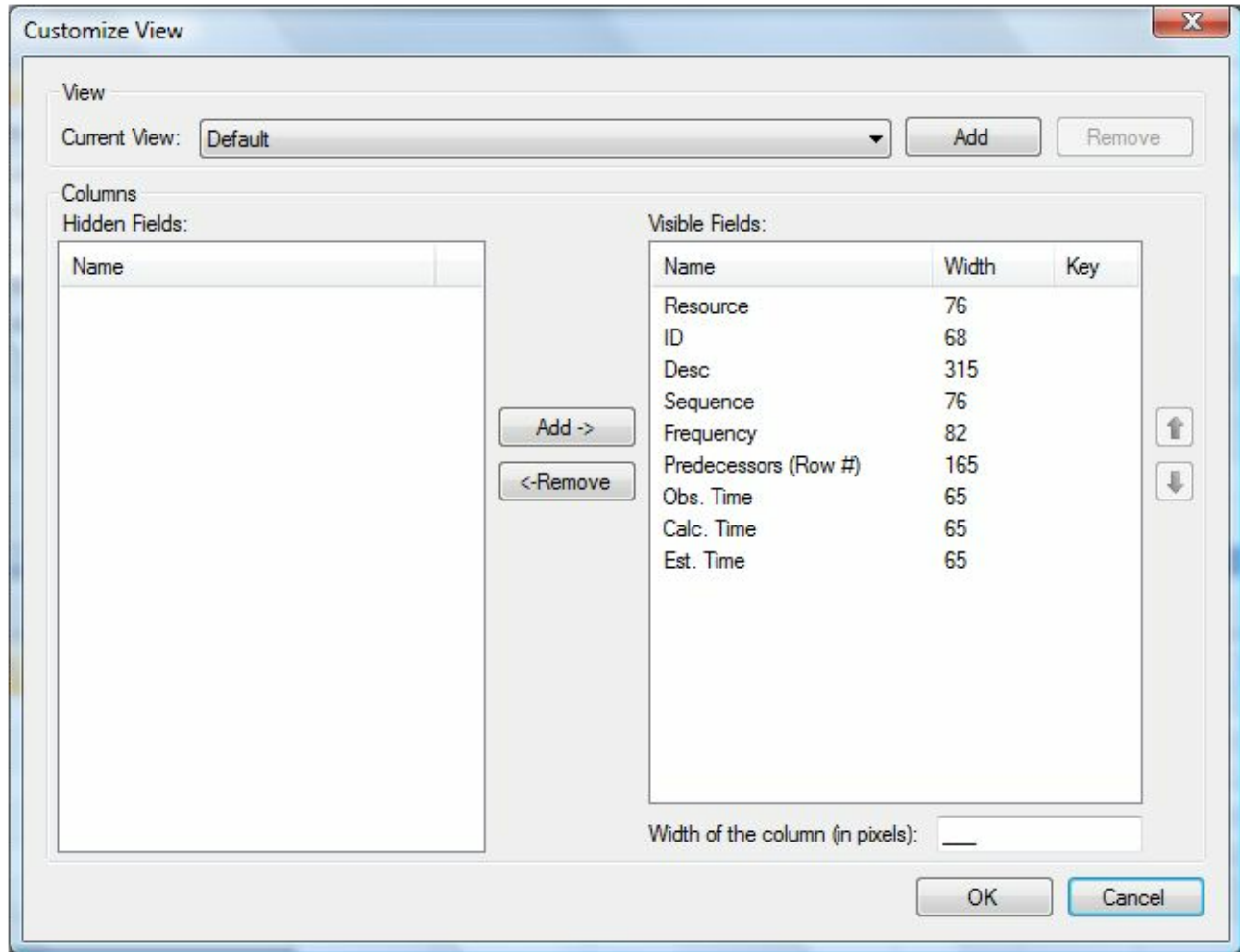
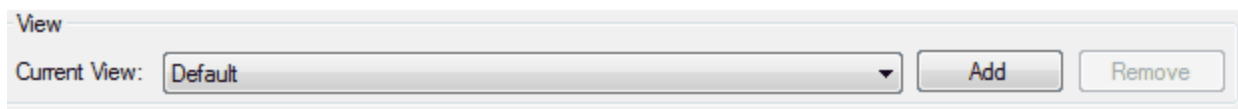


Figure 3.4.3.2: Customized View

You can also create commonly used views. These store what should be hidden or visible so the view does not have to be customized more than needed. Simply click the Add button below the Current View drop down.



3.4.3.3: Adding a View

In the following screen, name your view and hit OK. It should now appear in the Current View drop-down.

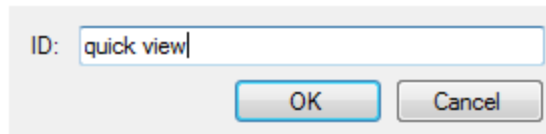


Figure 3.4.3.4: Click "OK" to Add

With this view active (its name is in the Current View dropdown), all changes to the view will be saved when OK is clicked at the bottom. Next time the view is needed, setting it to the Current View will change the hidden/visible fields to the last time the view was saved.

Compare Two Videos (Observations table only): A window will appear that allows you to view video clips of any two task observations for analysis and improvement purposes. Please see [Compare Two Videos](#) for more details.

8 Calculated Time Tab

The Calculated Time tab allows you to perform a time study based on a predetermined time system.

To perform a calculated time study, open an existing study by going to File>Open, or create a new one.

1. Open the application and go to File>New.

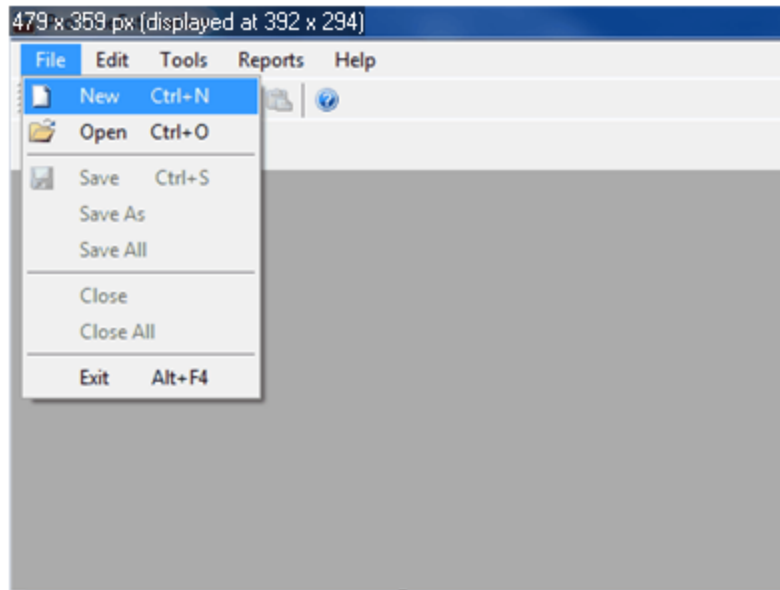


Figure 4.0.0.0: Creating a New Study

2. Enter the study properties. A Study ID is required; the other fields are optional.

A screenshot of a 'Study Details' dialog box. The title bar reads '610 x 416 px [displayed at 491 x 335]'. The dialog has three text input areas: 'ID:' with the text 'Sample Study', 'Description:' with the text 'Contains an observed, calculated, and estimated time study for a single operation.', and 'Remarks:' with the text 'This study is an example that can be used for training purposes.'. At the bottom, there are two rows of date and user selection. The first row is 'Created On:' with a date picker set to 'Monday, January 17, 2011' and a 'Created By:' field with the text 'PROPLANNER2\Christina'. The second row is 'Modified On:' with a date picker set to 'Monday, January 17, 2011' and a 'Modified By:' field with the text 'PROPLANNER2\Christina'. At the bottom right are 'OK' and 'Cancel' buttons.

Figure 4.0.0.1: Study Details

3. You can begin by entering your list of tasks in the [Tasks](#) tab, or go to the Calculated Time tab immediately.
Note: If you're working with an existing study, your task list will already be populated.

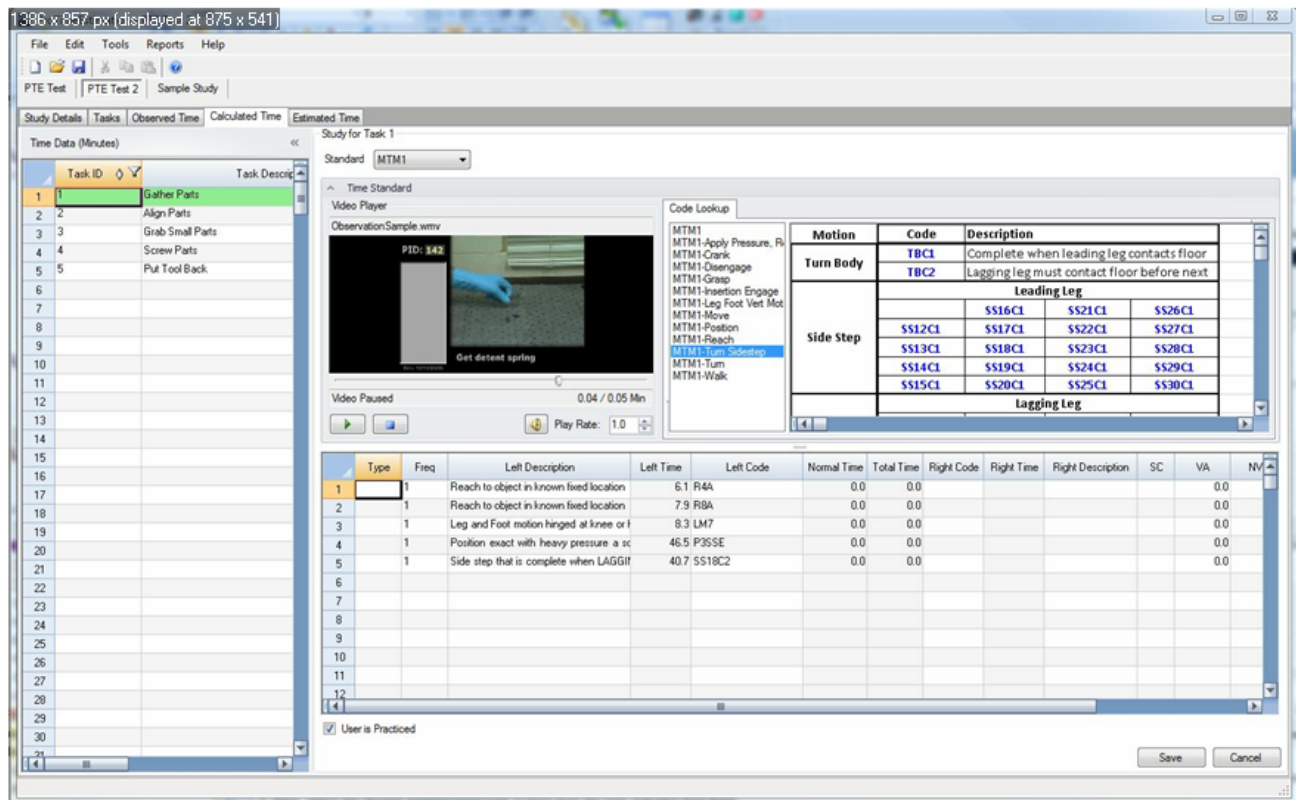


Figure 4.0.0.2: Calculated Time Tab

4. Enter your list of tasks in the Time Data table on the left by entering an ID for each, or a task description.
Note: If you add a task description without a task ID, an ID will be automatically populated for you.

5. Next, select the desired predetermined time system from the time standard drop-down.

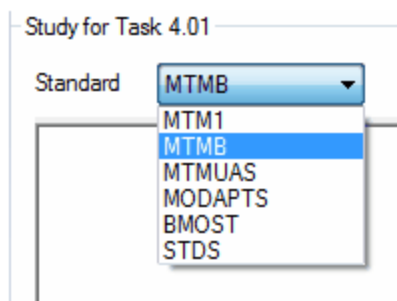


Figure 4.0.0.3: Time Standard Drop Down Menu

6. Once the standard is selected, the editor format at the bottom will change. For example, MTM-B is a text-

based system whereas MODAPTS is a code-based system, so their respective editors look different.

Study for Task 4.01

Standard

MTMB

MTM-B Display Format

Study for Task 4.01

Standard

MODAPTS

Code Lookup

	CODE	Description
(R2) Read Word	R2	Read a word in a sentence to determine overall me
(R3) Read Code	R3	Read each word with an independent meaning (i.e
(V3) Speak Word	V3	Vocalize a word or Listen to a word being spoken
(D3) Decide	D3	Binary Decision (yes/no, on/off, in/out, etc)
(N3) Count	N3	Count an item (mental retention of count)
(N6) Count	N6	Count a disarranged item (cognitive abilities requ
(E2) Eye Travel	E2	Eye Travel, or Eye Fixation
(E4) Eye Focus	E4	Eye Focus at an object at a different distance
(H4) Write cursive	H4	Write one CURSIVE (continuous) letter or punctuat
(H5) Write block	H5	Write one BLOCK PRINT lower case letter, digit or s
(H6) Write CURSIVE	H6	Write one Upper Case CURSIVE (continuous) letter

	Type	Freq	Left Description	Left Time	Left Code	Total Time	Right Code	Right Time	Rig
1									
2									
3									
4									
5									
6									
7									
8									

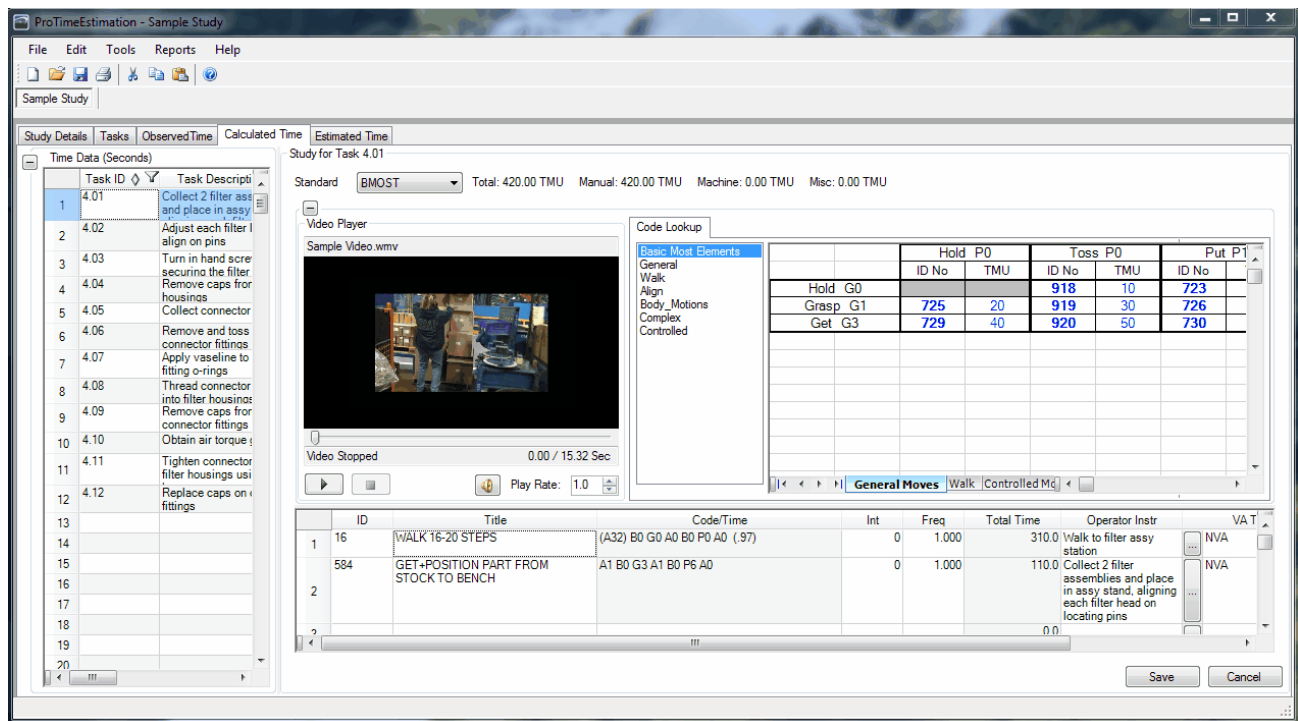
MODAPTS Display Format

For more detailed instruction in any of the time systems, please contact the publishing organization for the standard. Their documentation will give you a better idea of the specific formatting provided for that method.

8.1 Calculated Study Video Mode

If you have performed a video observed study on a task (meaning you have recorded time observations for that task), you can also use that video observation to assist you in performing your calculated time study. To do so, take the following steps:

1. Make sure you have recorded a video observation of a task in the [Observed Time](#) tab.
2. Go to the Tasks tab and select the video from the drop-down menu in the Video column for that task.
(You can consider this step to be a way to benchmark your tasks. If, for example, you have performed observations of a task from several different videos, you can select the video observation here that best represents how the task should be performed. This video will then be used to play in the Calculated time study.)
3. When you go to the Calculated Time tab and open the calculated study for the task, you will see the video player displaying the video you have chosen.



Calculated Time Tab

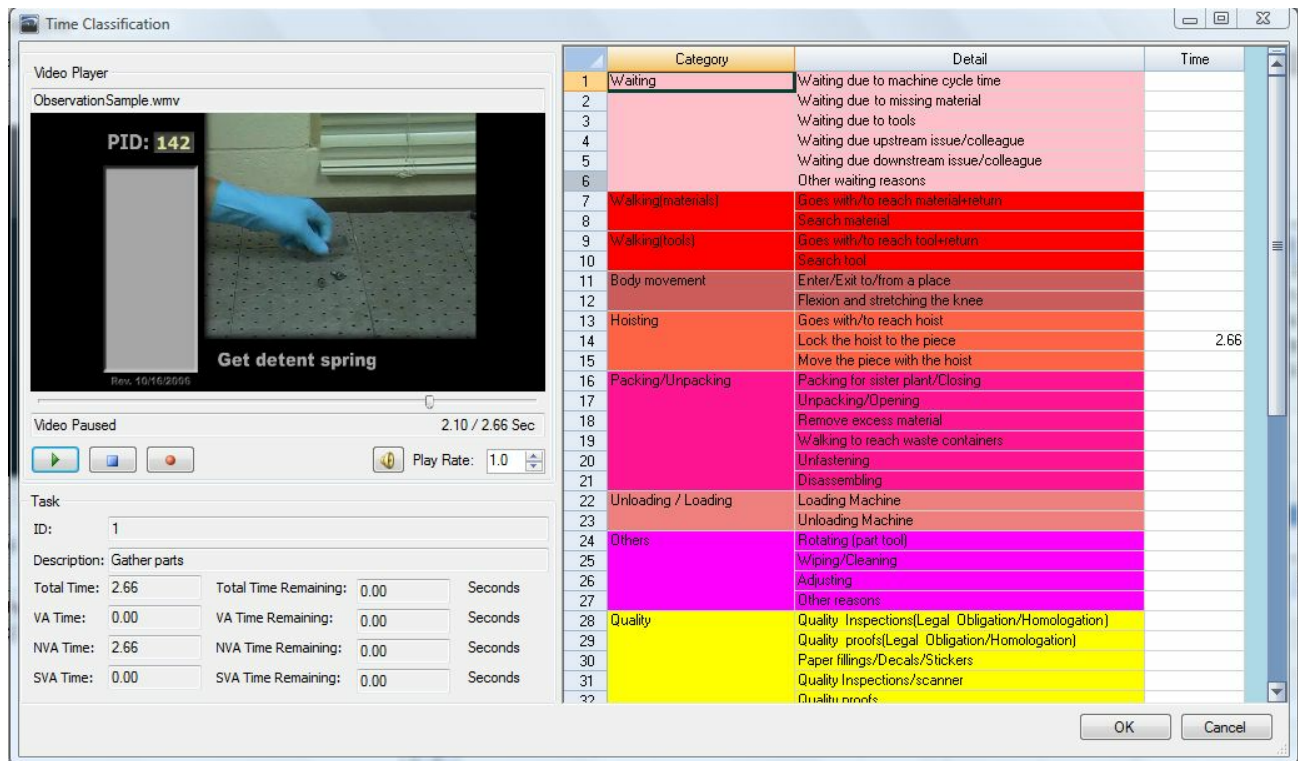
4. Click the play button to view the video clip for the task. You can watch the video as many times as you'd like to make sure you capture all of the time elements in your calculated study.

8.2 Calculated VA/NVA/SVA Analysis

After you have added a task to the Observed Time Task table, you can define the breakdown of value-added, non value-added, and semi value-added time for each task.

You have two options to do this:

1. You can enter a value directly in the VA/NVA/SVA cells for each task (to change the preference for time or percentage values, go to Tools>Options>Then check or uncheck "Use Percent for VA/NVA/SVA"), or you can specify specific classifications.
2. To specify specific classifications, you can double click on any of the VA/NVA/SVA columns (or right click and select View Time Classification Data...) for a particular task in the Tasks list. If an observation has been made, your total time will be displayed, and you can type in the time that the task fills for one or more LEAN categories. You can watch the video clip for that task as you do so. The categories will appear as they have been set in the [Edit MUDA Classifications](#) menu within Tools>Options.



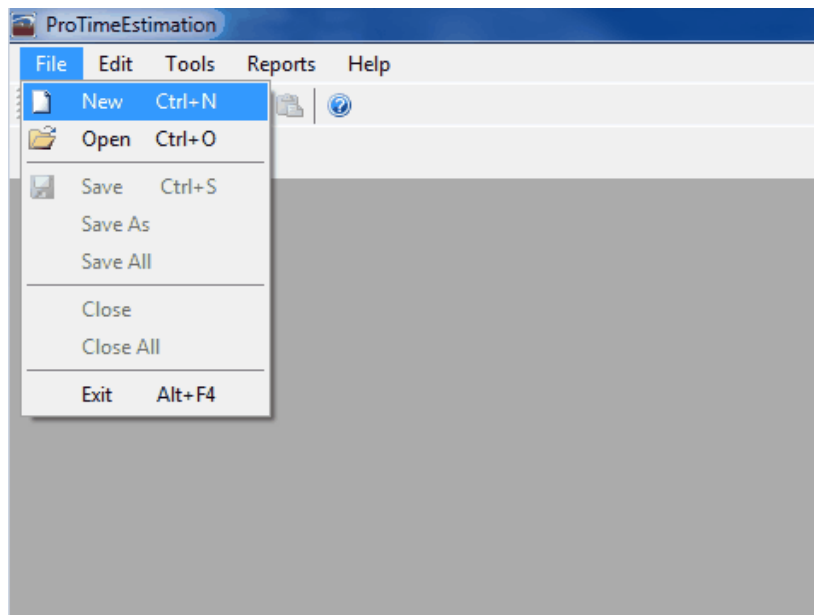
MUDA Editor

Note: If no video loads, set a default video in the [Tasks Tab](#).

9 Estimated Time Tab

The estimated time control allows the user to enter an estimated (typically historical) time value for a given task. To perform an estimated time study, open an existing study by going to File>Open, or create a new one.

1. Open the application and go to File>New.



Create New Study

2. Enter the study properties. A Study ID is required; the other fields are optional.

A screenshot of the 'Time Study Properties' dialog box. It contains the following fields:

- ID: A text box containing 'Sample Study'.
- Description: A text area containing 'Contains an observed, calculated, and estimated time study for a single operation.'
- Remarks: A text area containing 'This study is an example that can be used for training purposes.'
- Created On: A date picker showing 'Monday, January 17, 2011'.
- Created By: A text box containing 'PROPLANNER2\Christina'.
- Modified On: A date picker showing 'Monday, January 17, 2011'.
- Modified By: A text box containing 'PROPLANNER2\Christina'.

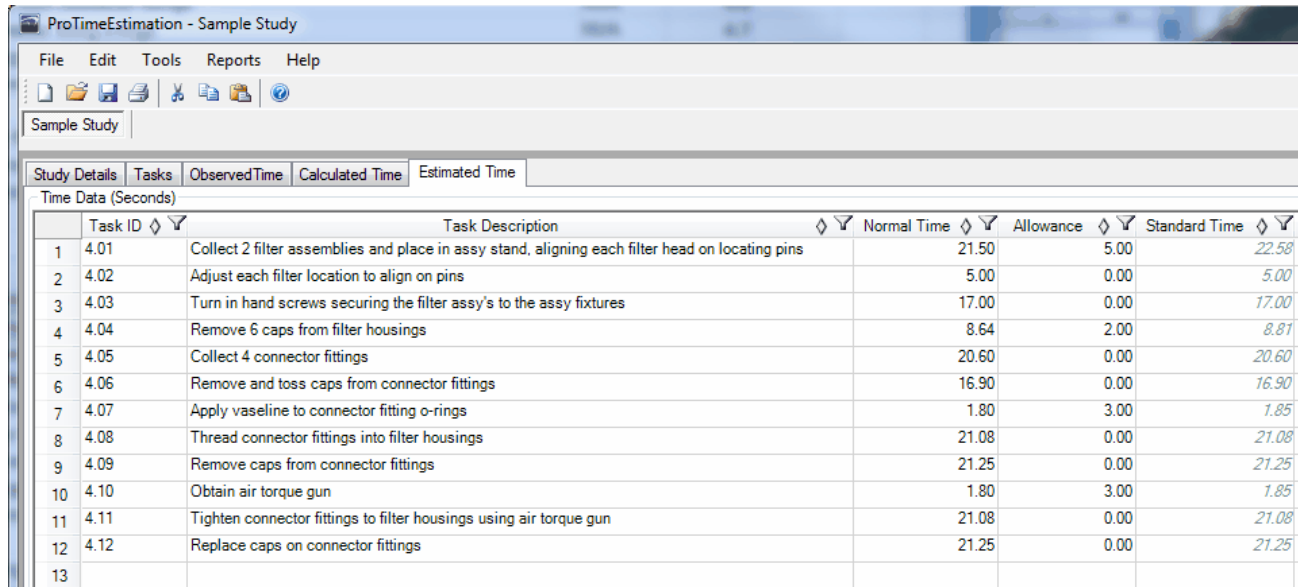
At the bottom right are 'OK' and 'Cancel' buttons.

Study Details

3. You can begin by entering your list of tasks in the [Tasks](#) tab, or go to the Estimated Time tab immediately.

Note that if you're working with an existing study, your task list will already be populated.

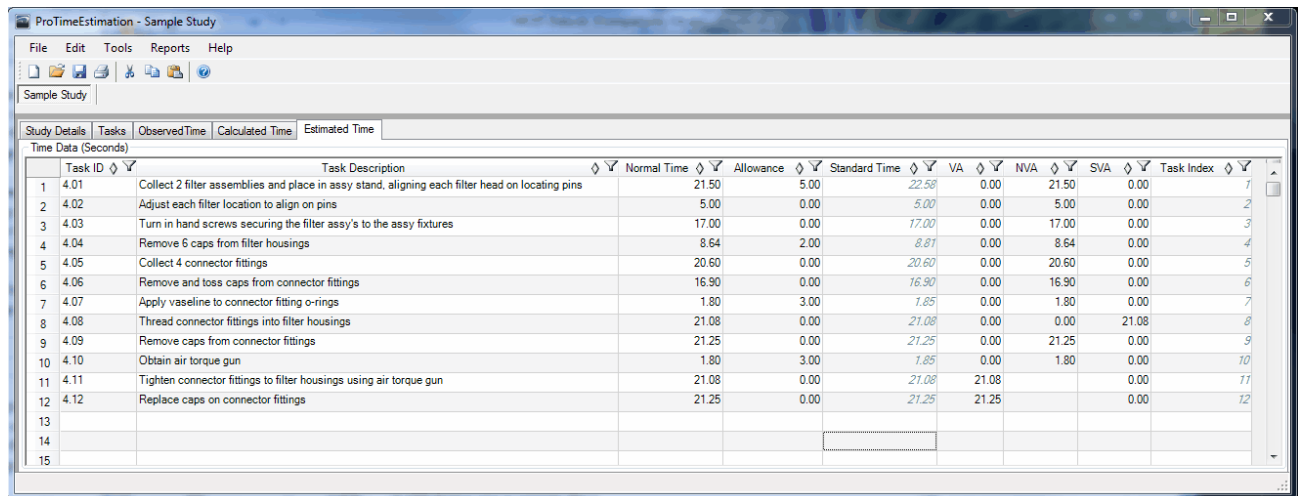
4. Enter your list of tasks by entering an ID for each, or a task description. *Note: If you add a task description without a task ID, an ID will be automatically populated for you.*
5. Type (or paste from an outside spreadsheet) a Normal Time and Allowance, if desired, for each task. The standard time of each task will be calculated and displayed for you.



Task ID	Task Description	Normal Time	Allowance	Standard Time
1 4.01	Collect 2 filter assemblies and place in assy stand, aligning each filter head on locating pins	21.50	5.00	22.58
2 4.02	Adjust each filter location to align on pins	5.00	0.00	5.00
3 4.03	Turn in hand screws securing the filter assy's to the assy fixtures	17.00	0.00	17.00
4 4.04	Remove 6 caps from filter housings	8.64	2.00	8.81
5 4.05	Collect 4 connector fittings	20.60	0.00	20.60
6 4.06	Remove and toss caps from connector fittings	16.90	0.00	16.90
7 4.07	Apply vaseline to connector fitting o-rings	1.80	3.00	1.85
8 4.08	Thread connector fittings into filter housings	21.08	0.00	21.08
9 4.09	Remove caps from connector fittings	21.25	0.00	21.25
10 4.10	Obtain air torque gun	1.80	3.00	1.85
11 4.11	Tighten connector fittings to filter housings using air torque gun	21.08	0.00	21.08
12 4.12	Replace caps on connector fittings	21.25	0.00	21.25
13				

Estimated Time Tab

6. You can also define each task as value-added, non value-added, semi value-added, or a combination of each. Type in a time value in the appropriate cell, or double click on the VA, NVA, or SVA cells for a particular task row to open up a detailed task classification interface in which to enter these values.



Task ID	Task Description	Normal Time	Allowance	Standard Time	VA	NVA	SVA	Task Index
1 4.01	Collect 2 filter assemblies and place in assy stand, aligning each filter head on locating pins	21.50	5.00	22.58	0.00	21.50	0.00	1
2 4.02	Adjust each filter location to align on pins	5.00	0.00	5.00	0.00	5.00	0.00	2
3 4.03	Turn in hand screws securing the filter assy's to the assy fixtures	17.00	0.00	17.00	0.00	17.00	0.00	3
4 4.04	Remove 6 caps from filter housings	8.64	2.00	8.81	0.00	8.64	0.00	4
5 4.05	Collect 4 connector fittings	20.60	0.00	20.60	0.00	20.60	0.00	5
6 4.06	Remove and toss caps from connector fittings	16.90	0.00	16.90	0.00	16.90	0.00	6
7 4.07	Apply vaseline to connector fitting o-rings	1.80	3.00	1.85	0.00	1.80	0.00	7
8 4.08	Thread connector fittings into filter housings	21.08	0.00	21.08	0.00	0.00	21.08	8
9 4.09	Remove caps from connector fittings	21.25	0.00	21.25	0.00	21.25	0.00	9
10 4.10	Obtain air torque gun	1.80	3.00	1.85	0.00	1.80	0.00	10
11 4.11	Tighten connector fittings to filter housings using air torque gun	21.08	0.00	21.08	21.08		0.00	11
12 4.12	Replace caps on connector fittings	21.25	0.00	21.25	21.25		0.00	12
13								
14								
15								

VA/NVA/SVA Classification

Note: The Task Index is a non-editable field that displays the order in which the tasks were organized at the time of the last save.

10 Right Click Menus

The Tasks, Observed Time, Calculated Time, and Estimated Time tabs each have right-click menus. Below are descriptions of each option in the right-click menus. *Note: Not all menus will contain each of these options.*

Cut: Copies and cuts the information from the selected cell or row. Note: If a cell is system-maintained or read-only, the data inside of it will not be cut. You can use 'Remove Selected Rows' to clear all data from a row.

Copy: Copies the selected cell or row.

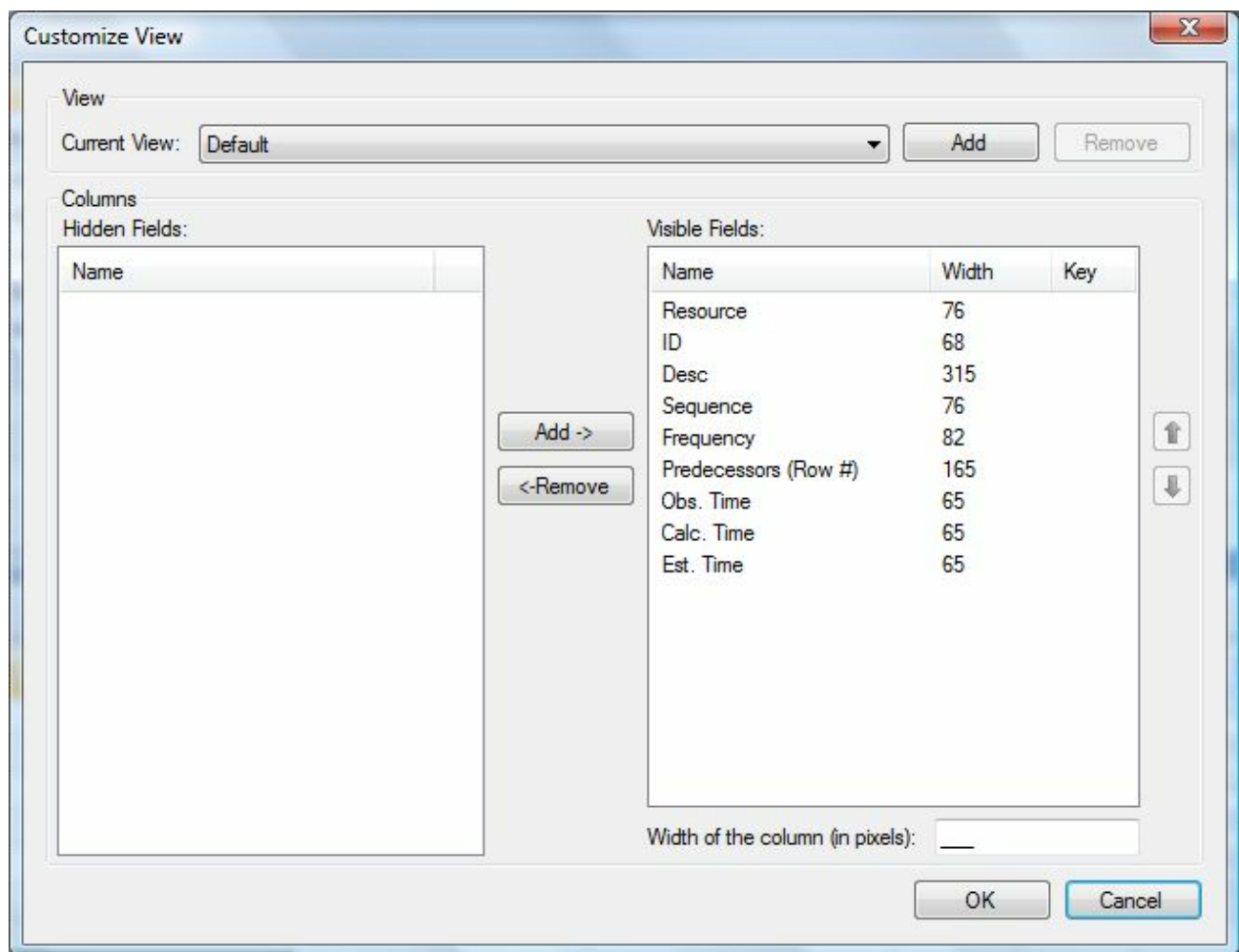
Paste: Pastes the copied data.

Insert Row: Adds a blank row above the selected row.

Remove Selected Rows: Removes the selected rows and the data they may contain.

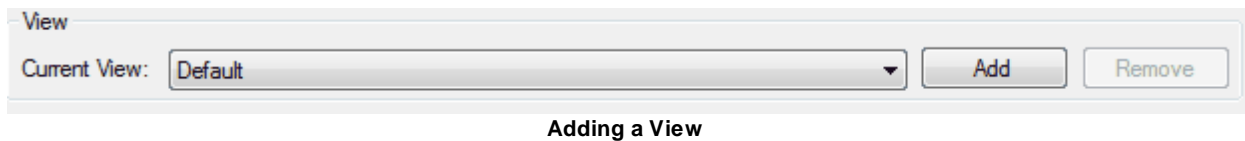
Clear Selected Data: Deletes the selected cell(s) or row(s).

Customize View: A window will appear like the one below. Columns in the selected table can be hidden, shown, or moved up and down to each user's needs. Choose the given column that you want an action done to. Then selecting the up and down arrows will move the column into the order that is desired. If having the column hidden is wanted then select the column and hit remove.



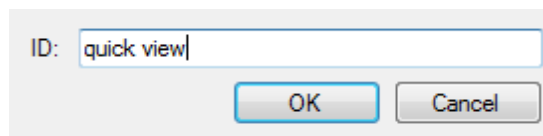
Customized View

You can also create views that are commonly used. These store what should be hidden or visible so the view does not have to be customized more than needed. Simply click the Add button below the Current View drop down.



Adding a View

In the following screen, name your view and hit OK. It should now appear in the Current View drop-down.



Click "OK" to Add

With this view active, meaning it is the name in the Current View dropdown, all changes to the view will be saved when OK is clicked at the bottom. Next time the view is needed, setting it to the Current View will change the hidden/visible fields to the last time the current view was saved.

Compare Two Videos (Observed Time tab Observations table only): A window will appear that allows the user to view video clips of any two task observations for analysis and improvement purposes. Please see [Compare Two Videos](#) for more details.

Edit Start Time: The breakpoint editor will appear to allow the user to edit the start time of the task they have selected. The description of the task will be displayed on the right hand side and the description of the previous observed task will be displayed on the left hand side.

Edit End Time: The breakpoint editor will appear to allow the user to edit the end time of the task they have selected. The description of the task will be displayed on the left hand side and the description of the next observed task will be displayed on the right hand side.

Reassign Observation to different Task: This allows the user to change the Task ID that the observation is applied to.

View Time Classification Data (Estimated Time and Calculated Time tabs only): A window will appear that allow the user to define the VA/NVA/SVA breakdown of each task, along with specified categories if defined.

View Calculated Time Study (Calculated Time tab Time Data table only): Will refresh the bottom spreadsheet to reflect the time study for the selected task. (Double-clicking the row header of each task will do the same).

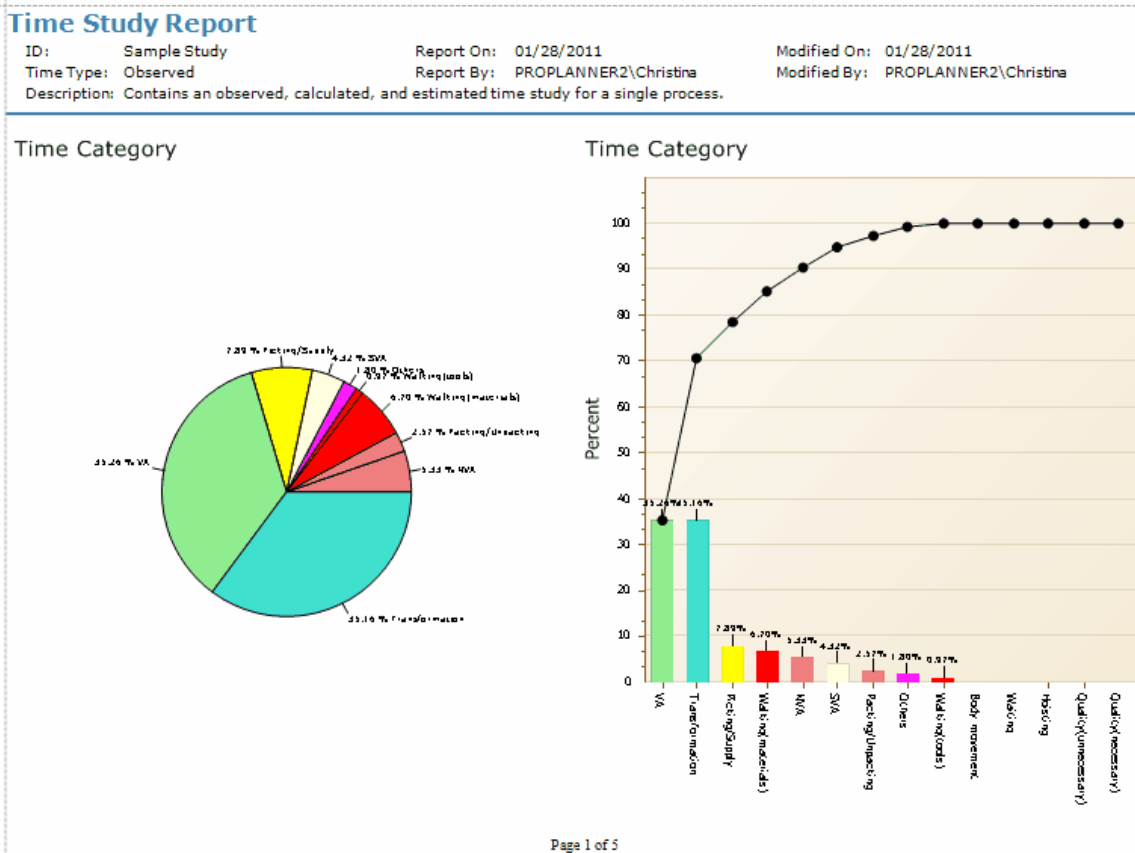
View Video: Select this menu item to view the observation of the select task.

View All Videos: Selecting this menu item will allow you to watch a series of video observations of all tasks, viewed in the sequence of tasks in the list in which you are working.

11 Reports

ProTime Estimation will generate summary reports for you after you've completed your time studies. Go to the Reports menu to select the report you would like to generate. There are four types of reports available:

1. **Time Study Report** - To summarize task classification results of Observed, Calculated, or Estimated studies. Pie charts, Pareto charts, and a Gantt chart are used to relay summarized information. You can also choose the Time Standard Rank option, which will generate graphs based on the TimeStdRank preference you have set in your [Options](#) settings. This report will look at the time study data for the highest priority time standard. If times are missing from some tasks, it will then look to the second priority time standard, and so forth. *Note: You must define a task sequence before running this report.*



Time Study Report Page 1

Time Study Report

ID: Sample Study

Report On: 01/28/2011

Modified On: 01/28/2011

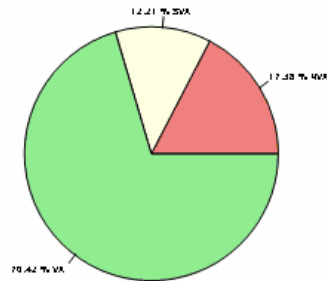
Time Type: Observed

Report By: PROPLANNER2\Christina

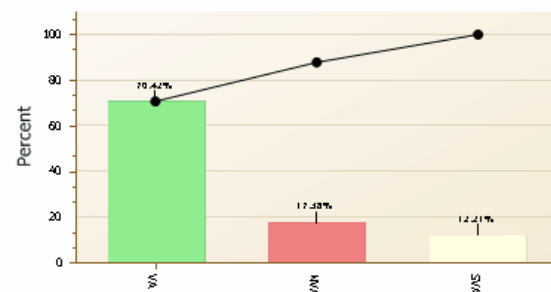
Modified By: PROPLANNER2\Christina

Description: Contains an observed, calculated, and estimated time study for a single process.

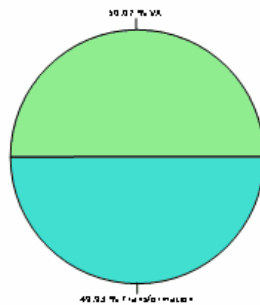
Time Class



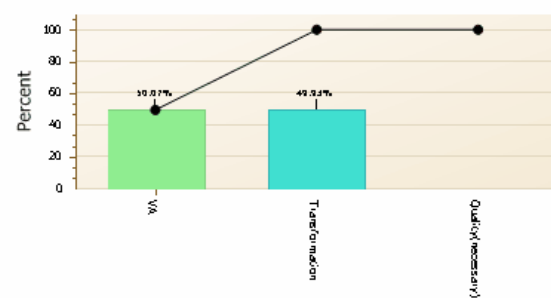
Time Class



VA Category



VA Category



Page 2 of 5

Time Study Report

ID: Sample Study

Report On: 01/28/2011

Modified On: 01/28/2011

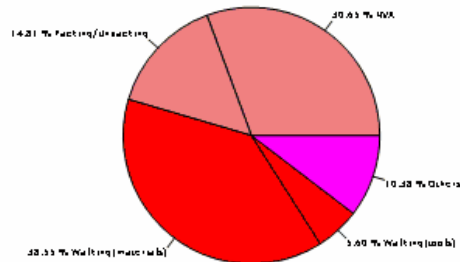
Time Type: Observed

Report By: PROPLANNER2\Christina

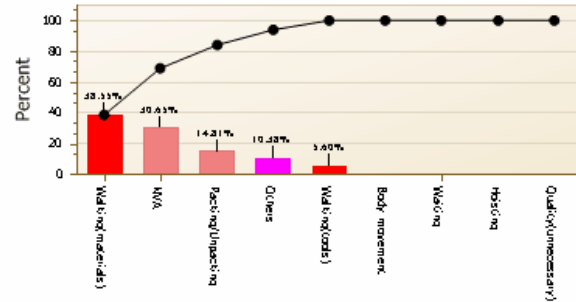
Modified By: PROPLANNER2\Christina

Description: Contains an observed, calculated, and estimated time study for a single process.

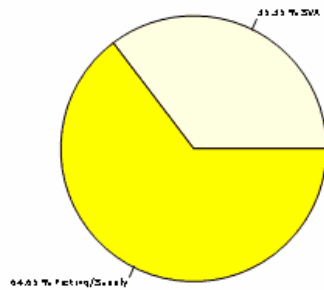
NVA Category



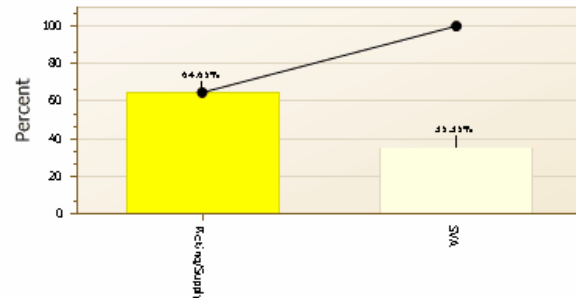
NVA Category



SVA Category



SVA Category

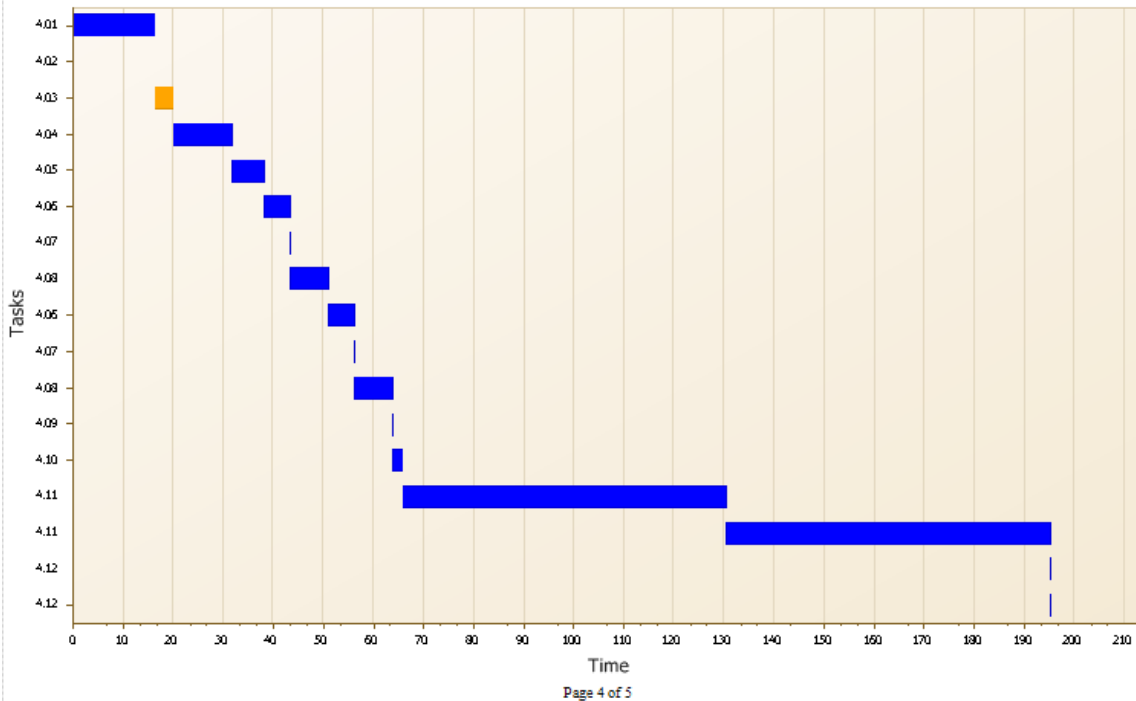


Page 3 of 5

Time Study Report

ID: Sample Study Report On: 01/28/2011 Modified On: 01/28/2011
 Time Type: Observed Report By: PROPLANNER2\Christina Modified By: PROPLANNER2\Christina
 Description: Contains an observed, calculated, and estimated time study for a single process.

Gantt Chart



Time Study Report Page 4

Time Study Report

ID: Sample Study Report On: 01/28/2011 Modified On: 01/28/2011
 Time Type: Observed Report By: PROPLANNER2\Christina Modified By: PROPLANNER2\Christina
 Description: Contains an observed, calculated, and estimated time study for a single process.

Task Summary

	ID	Seq	Description	Man/Mach/Misc	Time	Ext. Time	Allowance	Int	Freq	VA	SVA	NVA
0	4.01	1.00	Collect filter assemblies and place in stand	Manual	15.32	16.24	6.00		1	0.00	8.82	7.42
1	4.02	2.00	Adjust alignment on pins	Machine	0.00	0.00	6.00		1	0.00	0.00	0.00
2	4.03	3.00	Turn in hand screws to secure assy to fixtures	Miscellaneous	3.52	3.73	6.00		1	0.00	0.00	3.73
3	4.04	4.00	Remove caps	Manual	11.01	11.67	6.00		1	8.02	0.00	0.00
4	4.05	5.00	Collect connector fittings	Manual	6.07	6.43	6.00		1	0.00	0.00	6.43
5	4.06	6.00	Remove and toss caps	Manual	2.51	5.31	6.00		2	0.00	0.00	5.32
6	4.07	7.00	Apply vaseline to connector fitting o-rings	Manual	0.00	0.00	6.00		1	0.00	0.00	0.00
7	4.08	8.00	Thread connector fittings into filter housings	Manual	3.54	7.51	6.00		2	0.00	7.50	0.00
8	4.06	9.00	Remove and toss caps	Manual	2.51	5.31	6.00		2	0.00	0.00	5.32
9	4.07	10.00	Apply vaseline to connector fitting o-rings	Manual	0.00	0.00	6.00		1	0.00	0.00	0.00
10	4.08	11.00	Thread connector fittings into filter housings	Manual	3.54	7.51	6.00		2	0.00	7.50	0.00
11	4.09	12.00	Remove caps from connector fittings	Manual	0.00	0.00	6.00		1	0.00	0.00	0.00
12	4.10	13.00	Obtain air torque gun	Manual	1.90	2.01	6.00		1	0.00	0.00	2.01
13	4.11	14.00	Tighten connector fittings to filter housings using air torque gun	Manual	30.51	64.69	6.00		2	64.68	0.00	0.00
14	4.11	16.00	Tighten connector fittings to filter housings using air torque gun	Manual	30.51	64.69	6.00		2	64.68	0.00	0.00
15	4.12	17.00	Replace caps on connector fittings	Manual	0.00	0.00	6.00		2	0.00	0.00	0.00
16	4.12	15.00	Replace caps on connector fittings	Manual	0.00	0.00	6.00		2	0.00	0.00	0.00

Time Study Report Page 5

2. **Observed Time Report** - To summarize Observed (stopwatch) time studies.

Observed Time Report

ID: Sample Study

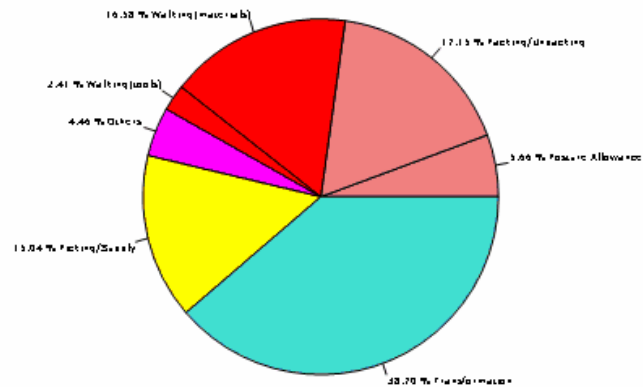
Description: Contains an observed, calculated, and estimated time study for a single process.

Report On: 01/19/2011

Report By: PROPLANNER2\christina

Modified On: 01/19/2011

Modified By: PROPLANNER2\christina



Standard Time: 78.84 Seconds

Personal Needs: 3.00%

Basic Fatigue: 3.00%

Variable Fatigue: 0.00%

Special: 0.00%

NVA:	46.26 %
SVA:	15.04 %
VA:	38.70 %

Task Summary

Task ID	Description	VA	NVA	SVA	Normal Time	Allowance Code	Standard Time
4.01	Collect filter assemblies and place in stand	0.00	7.00	8.32	15.32		16.24
4.02	Adjust alignment on pins	0.00	0.00	0.00	0.00		0
4.03	Turn in hand screws to secure assy to fixtures	0.00	3.52	0.00	3.52		3.73
4.04	Remove caps	0.00	11.01	0.00	11.01		11.67
4.05	Collect connector fittings	0.00	6.07	0.00	6.07		6.43
4.06	Remove and toss caps	0.00	2.51	0.00	2.51		2.66
4.07	Apply vaseline to connector fitting o-rings	0.00	0.00	0.00	0.00		0
4.08	Thread connector fittings into filter housings	0.00	0.00	3.54	3.54		3.75
4.09	Remove caps from connector fittings	0.00	0.00	0.00	0.00		0
4.10	Obtain air torque gun	0.00	1.90	0.00	1.90		2.01

Task ID	Description	VA	NVA	SVA	Normal Time	Allowance Code	Standard Time
4.11	Tighten connector fittings to filter housings using air torque gun	30.51	0.00	0.00	30.51		32.34
4.12	Replace caps on connector fittings	0.00	0.00	0.00	0.00		0

Task 4.01 - Collect filter assemblies and place in stand

Obs. No.	Rating	Start Time	End Time	Observed Time	Normal Time
1	100	0.00	15.32	15.32	15.32

Task 4.02 - Adjust alignment on pins

Obs. No.	Rating	Start Time	End Time	Observed Time	Normal Time
----------	--------	------------	----------	---------------	-------------

Task 4.03 - Turn in hand screws to secure assy to fixtures

Obs. No.	Rating	Start Time	End Time	Observed Time	Normal Time
2	103	15.32	18.74	3.42	3.52

Task 4.04 - Remove caps

Obs. No.	Rating	Start Time	End Time	Observed Time	Normal Time
3	100	18.74	29.75	11.01	11.01

Task 4.05 - Collect connector fittings

Obs. No.	Rating	Start Time	End Time	Observed Time	Normal Time
4	100	29.75	35.82	6.07	6.07

Task 4.06 - Remove and toss caps

Obs. No.	Rating	Start Time	End Time	Observed Time	Normal Time
5	100	35.85	39.25	3.40	3.40
7	100	42.59	44.21	1.62	1.62
9	100	47.11	49.70	2.59	2.59
11	100	52.13	54.55	2.42	2.42

Task 4.07 - Apply vaseline to connector fitting o-rings

Obs. No.	Rating	Start Time	End Time	Observed Time	Normal Time
----------	--------	------------	----------	---------------	-------------

Observed Time Report Page 2

3. Calculated Time Report - To summarize Calculated (predetermined) time studies.

Calculated Time Report

ID: 4.01

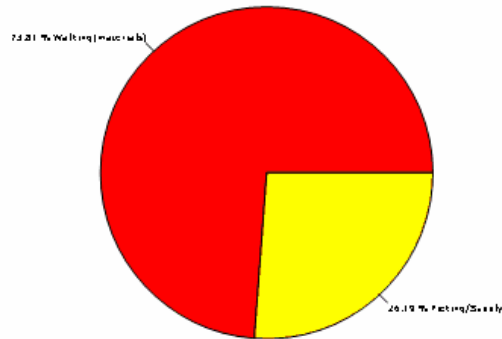
Description: Collect filter assemblies and place in stand

Report On: 01/19/2011

Report By: PROPLANNER2\christina

Modified On: 01/19/2011

Modified By: PROPLANNER2\christina



Manual:	15.12	Seconds
Machine:	0.00	Seconds
Misc:	0.00	Seconds

Normal Time:	15.12	Seconds
Allowance:	0.00	%

Standard Time:	15.12	Seconds
----------------	-------	---------

NVA:	73.81 %
SVA:	26.19 %
VA:	0.00 %

ID	Title	ABG Code	Internal	Frequency	Total Time (TMUs)	Operator Instructions
16	WALK 16-20 STEPS	(A32) B0 G0 A0 B0 P0 A0 (.97)	0	1.00	310.00	Walk to filter assy station
584	GET+POSITION PART FROM STOCK TO BENCH	A1 B0 G3 A1 B0 P6 A0	0	1.00	110.00	Collect 2 filter assemblies and place in assy stand, aligning each filter head on locating pins

Calculated Time Report

4. **Man/Machine Utilization Report** - To document the utilization and work sequence of multiple resources. Please see the [Edit Man Machine Colors](#) and [Tasks Tab](#) for details on generating this report.

Man / Machine Utilization Report

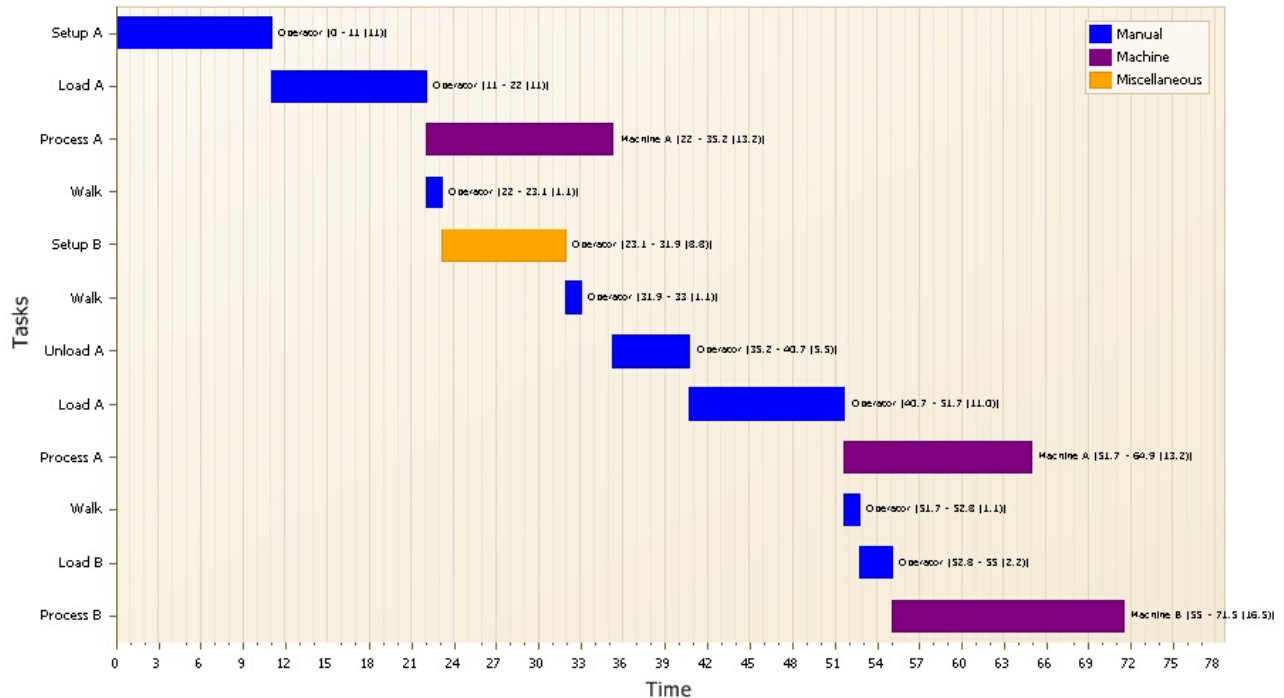
ID: MMM
Time Type: Estimated
Description:

Cycle Time: 71.50 Minutes

Report On: 11/07/2011
Report By: PROPLANNER2\Christina

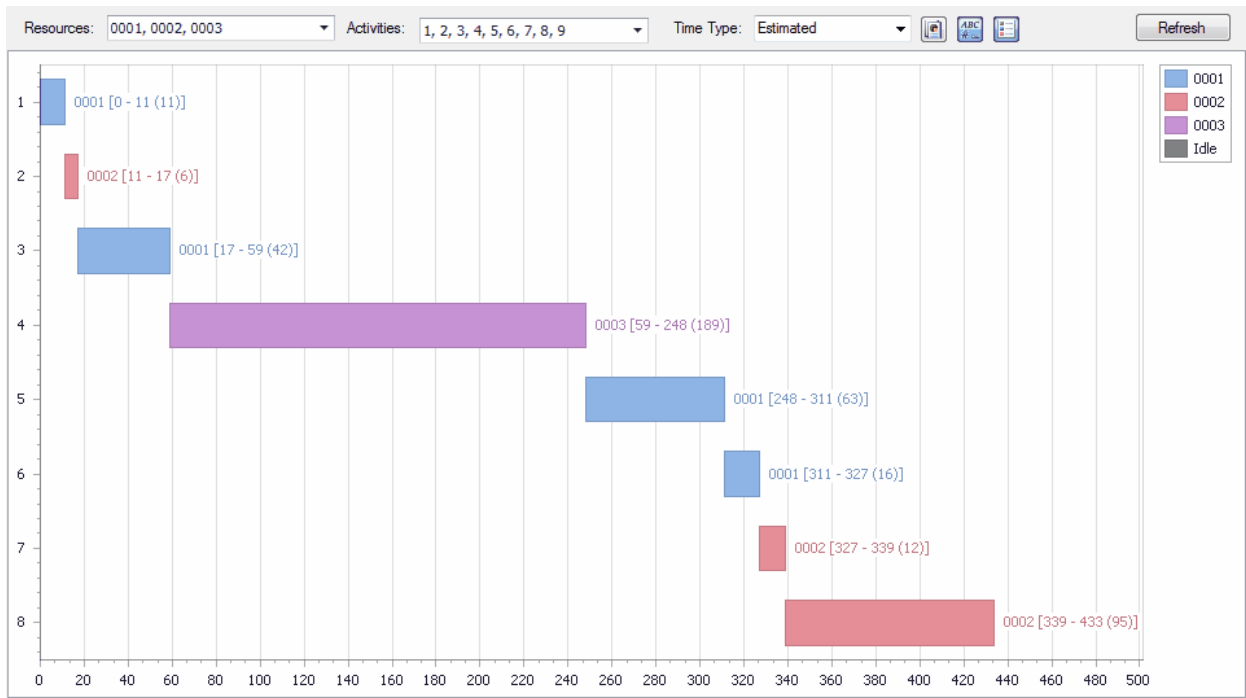
Modified On: 11/01/2011
Modified By: PROPLANNER2\Christina

All Resources



Man Machine Report Gantt Chart

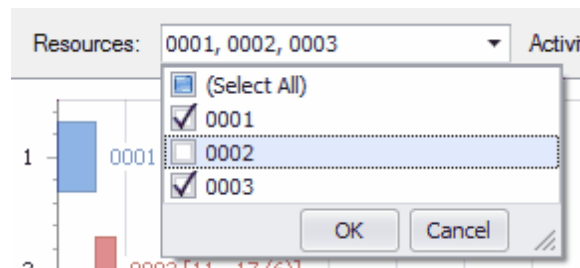
5. **View Man/Machine Utilization Chart** - This report can be generated to compare Man/Machine charts. This tool creates a chart that can be minimized in order to create new/updated charts. These charts can be brought up at the same time and compared. The tool is primarily used as a quicker check than the original Man/Machine Report, and is also useful for visual comparison. The charts are automatically updated when the original data is saved, but before saving, clicking on the Refresh button in the top right corner can update the chart with the current data without having to save and overwrite the original data.



Man/Machine Chart with 3 Resources

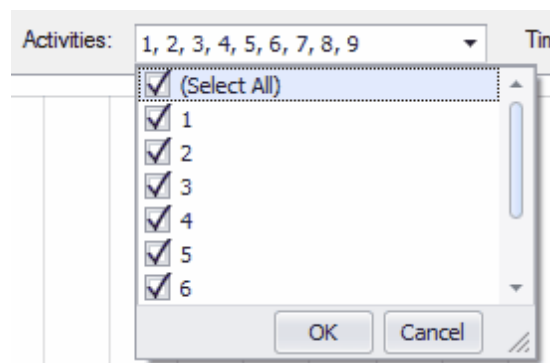
Man/Machine Chart Filters

The Resources dropdown is used to filter resources out of the chart, usually resulting in resource idle time to be shown instead. Check the boxes to be shown and uncheck what is not needed.



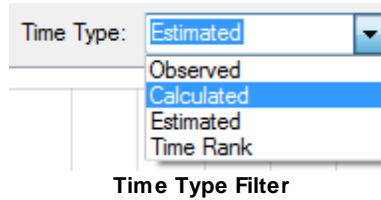
Resource Dropdown Filter

Similarly, the Activities dropdown can be used to filter activities.



Activities Dropdown Filter

Where the times are being pulled from (Observed, Calculated, Estimated) can also be chosen in the Time Type dropdown.

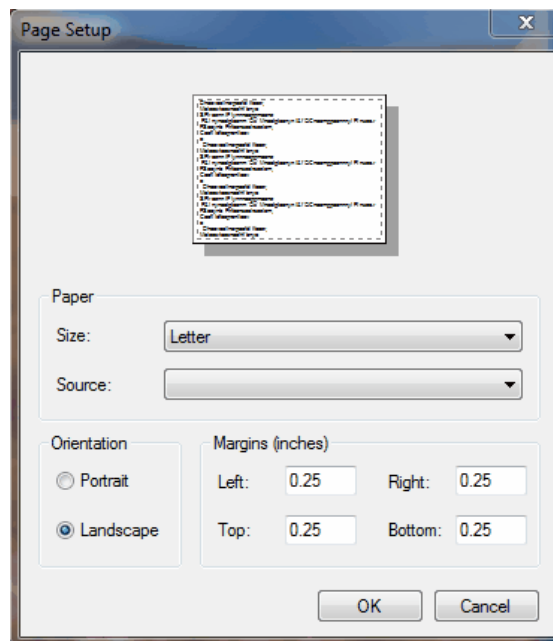


There are also buttons that can show/hide the legend and labels, copy the image to your clipboard, and pin the screen to the top of your Proplanner Application to stop it from being minimized.

Report Controls

Printing and Exporting Reports is accomplished via the File menu at the top left corner of the report. Reports can be saved and exported as PDF, HTML, MHT, RTF, XLS, XLSX, CSV, Text, or Image file.

Page Setup (from the File menu) allows users to change the margins and orientation of the report.



Page Setup Window

The View and Background menus have tools to alter the way the report is viewed, saved, or printed.

The menu bar, as shown below, contains short cuts to each menu item. In ProTime Estimation, if you hover your cursor over each button, a message will display its function.



Menu Bar

12 Editing Code Templates

Each predetermined time standard has its own set of template files in ProTime Estimation. For every standard there is a lookup file that contains all elements that exist for the standard, along with a description, time, code, value add number, etc. This lookup file is what the system uses to populate the calculated time study spreadsheet when an element is selected. There are also template files that contain element tables that the user sees when using ProTime Estimation. Template spreadsheets may have multiple internal sheets and different tables can be selected via tabs located at the bottom of the table view. This means that a user is able to select different code tables from either the list view on the upper left of the screen, or with the tabs at the bottom of the code table pane. There are typically multiple template files for each standard; this provides a way for the elements to be sorted into appropriate groups (Walk, Reach, Grasp, etc.) When these files are loaded into ProTime Estimation, the name of each file, or element group, is seen on the left hand side of the interface. When the element group is selected, the code table can be seen.

ProTime Estimation comes with six standard preloaded: MTM-B, MTM-1, MTM-UAS, MODAPTS, BMOST, and STDS. These standards can be modified by editing the lookup files and adding or editing the individual template files.

12.1 Adding/Editing Codes

You can edit existing code template files through ProTime's Template Manager. If you want to edit an existing code file, go to Tools>Template Manager and select the file you'd like to edit. Right click and select Export. This will allow you to save the file and open in Microsoft Excel. *Note: When editing, it is important to follow the format of existing template files. All colors and styles should be replicated. In addition to loading the new code file, the existing "lookup" file needs to contain the new code.*

Continue through this section to learn how to add and edit code. Refer to Loading Templates to learn how to import the modified templates back into ProTime Estimation (this should not be done through the Template Manager).

The lookup spreadsheet file has a different format for each predetermined standard type. As a result, it is important to edit this existing file, instead of creating a new lookup file. A lookup file for MTM-UAS is shown below. In this example, the code lookup text string is in column A (typical for all standards), and the MU value is in column C. The value Add percentage is in column G, and the default code description is shown in column H. Note that it is important that all codes that appear in your template XLS code table files, also have a corresponding entry in the designated code Lookup file for that time standard.

MTM-UAS Lookup.xls [Compatibility Mode] - Microsoft Excel

	A	B	C	D	E	F	G	H
1	AA1	Process	200	EA	E	0	100	Get/Place, <=2lbs, Easy, Approximate, <8 inches
2	AA2	Process	350	EA	E	0	100	Get/Place, <=2lbs, Easy, Approximate, 8 to 20 inches
3	AA3	Process	500	EA	E	0	100	Get/Place, <=2lbs, Easy, Approximate, 20 to 32 inches
4	AB1	Process	300	EA	E	0	100	Get/Place, <=2lbs, Easy, loose, <8 inches
5	AB2	Process	450	EA	E	0	100	Get/Place, <=2lbs, Easy, loose, 8 to 20 inches
6	AB3	Process	600	EA	E	0	100	Get/Place, <=2lbs, Easy, loose, 20 to 32 inches
7	AC1	Process	400	EA	E	0	100	Get/Place, <=2lbs, Easy, Tight, <8 inches
8	AC2	Process	550	EA	E	0	100	Get/Place, <=2lbs, Easy, Tight, 8 to 20 inches
9	AC3	Process	700	EA	E	0	100	Get/Place, <=2lbs, Easy, Tight, 20 to 32 inches
10	AD1	Process	200	EA	E	0	100	Get/Place, <=2lbs, Difficult, Approximate, <8 inches
11	AD2	Process	450	EA	E	0	100	Get/Place, <=2lbs, Difficult, Approximate, 8 to 20 inches
12	AD3	Process	600	EA	E	0	100	Get/Place, <=2lbs, Difficult, Approximate, 20 to 32 inches
13	AE1	Process	300	EA	E	0	100	Get/Place, <=2lbs, Difficult, loose, <8 inches
14	AE2	Process	550	EA	E	0	100	Get/Place, <=2lbs, Difficult, loose, 8 to 20 inches
15	AE3	Process	700	EA	E	0	100	Get/Place, <=2lbs, Difficult, loose, 20 to 32 inches
16	AF1	Process	400	EA	E	0	100	Get/Place, <=2lbs, Difficult, Tight, <8 inches
17	AF2	Process	650	EA	E	0	100	Get/Place, <=2lbs, Difficult, Tight, 8 to 20 inches
18	AF3	Process	800	EA	E	0	100	Get/Place, <=2lbs, Difficult, Tight, 20 to 32 inches
19	AG1	Process	400	EA	E	0	100	Get/Place, <=2lbs, Handful, Approximate, <8 inches
20	AG2	Process	650	EA	E	0	100	Get/Place, <=2lbs, Handful, Approximate, 8 to 20 inches
21	AG3	Process	800	EA	E	0	100	Get/Place, <=2lbs, Handful, Approximate, 20 to 32 inches
22	AH1	Process	250	EA	E	0	100	Get/Place, 2 to 18lbs, Approximate, <8 inches
23	AH2	Process	450	EA	E	0	100	Get/Place, 2 to 18lbs, Approximate, 8 to 20 inches
24	AH3	Process	550	EA	E	0	100	Get/Place, 2 to 18lbs, Approximate, 20 to 32 inches
25	AJ1	Process	400	EA	E	0	100	Get/Place, 2 to 18lbs, loose, <8 inches
26	AJ2	Process	650	EA	E	0	100	Get/Place, 2 to 18lbs, loose, 8 to 20 inches
27	AJ3	Process	750	EA	E	0	100	Get/Place, 2 to 18lbs, loose, 20 to 32 inches
28	AK1	Process	500	EA	E	0	100	Get/Place, 2 to 18lbs, Tight, <8 inches
29	AK2	Process	750	EA	E	0	100	Get/Place, 2 to 18lbs, Tight, 8 to 20 inches

Lookup Spreadsheet File

We will walk through an example of adding a new MODAPTS code.

1. Open Pro Time Estimation and go to Tools>Template Manager.
2. Find the MODAPTS files - MODAPTS-Cognitive.xls, MODAPTS-MoveGet.xls, MODAPTS-MovePut.xls, MODAPTS-Use_Juggle_Press_Crank.xls, MODAPTS-Walk_Sit_Bend.xls and MODAPTSLookup.xls.
3. Select the MODAPTSLookup.xls, right click and click Export. This will allow you to save the file and open it in Microsoft Excel.

	A	B	C	D	E
1	Code	Freq	Desc	Time	VA
2	M1P0	1	Move Finger to Simple Put	1	100
3	M2P0	1	Move Hand to Simple Put	2	100
4	M3P0	1	Move Forearm to Simple Put	3	100
5	M4P0	1	Move Whole Arm to Simple Put	4	100
6	M5P0	1	Move Extended Arm Simple Put	5	100
7	M6P0	1	Move Trunk to Simple Put	6	100
8	M1P2	1	Move Finger to Feedback Put	3	100
9	M2P2	1	Move Hand to Feedback Put	4	100
10	M3P2	1	Move Forearm to Feedback Put	5	100
11	M4P2	1	Move Whole Arm to Feedback Put	6	100
12	M5P2	1	Move Extended Arm Feedback Put	7	100
13	M6P2	1	Move Trunk to Feedback Put	8	100
14	M1P5	1	Move Finger to Multi-Feedback Put	6	100
15	M2P5	1	Move Hand to Multi-Feedback Put	7	100

MS Excel File

4. In the file you will find the following columns-

- Code - Type in the new code to be added in this column. Say we add a new code **M2P3**
- Freq - Provide the frequency for this move. Our frequency is **1**.
- Desc - Provide a description for this code - Our description is - **Test Code**
- Time - Provide the time in MODS - Our time is - **5**
- VA - Provide the Value Added content of this code - Our value added content is - **90**

66	U3	1	Use, Move the WHOLE ARM back OR forth (freq = 2 for back+forth	3	0/100
67	M2P3	1	Test Code	5	90
68					

Code Value Added Content

5. If you add a "combined code" as we have in the example (M2+P3), make sure that the individual codes also exist in the lookup file. If M2 or P3 did not exist, we would add a line with each code's details.
6. Once you've finished editing, save the file as a .xls and close it.
7. Next we will add this code to the Move Put file. Open the MODAPTS-MovePut.xls file.
8. Go back to the ProTime Estimation Template Manager, select the file and Export. Once the file is open, create a column called test at the very end. **In order to put in the new code the user MUST copy an existing code into the desired cell and edit the same. Note that the look up capability will not work if an existing code is not copied and edited.** In our case we will copy any of the codes and paste it in the test column. Change the value to M2P3.

	A	B	C	D	E	F	G	H	I
1			(P0) Put Simple		(P2) Put Feedback		(P5) Put Feedbacks		Test
2	(M1) Finger		M1P0		M1P2		M1P5		
3	(M2) Hand		M2P0		M2P2		M2P5		M2P3
4	(M3) Forearm		M3P0		M3P2		M3P5		
5	(M4) Whole Arm		M4P0		M4P2		M4P5		
6	(M5) Extended Arm		M5P0		M5P2		M5P5		
7	(M6) Trunk		M6P0		M6P2		M6P5		
8									
9		P0	Put an object into a general location with low consciousness						
10		P2	Put an object into a DEFINED location requiring one feedback						
11		P5	Put an object into a DEFINED location requiring multi-feedback						

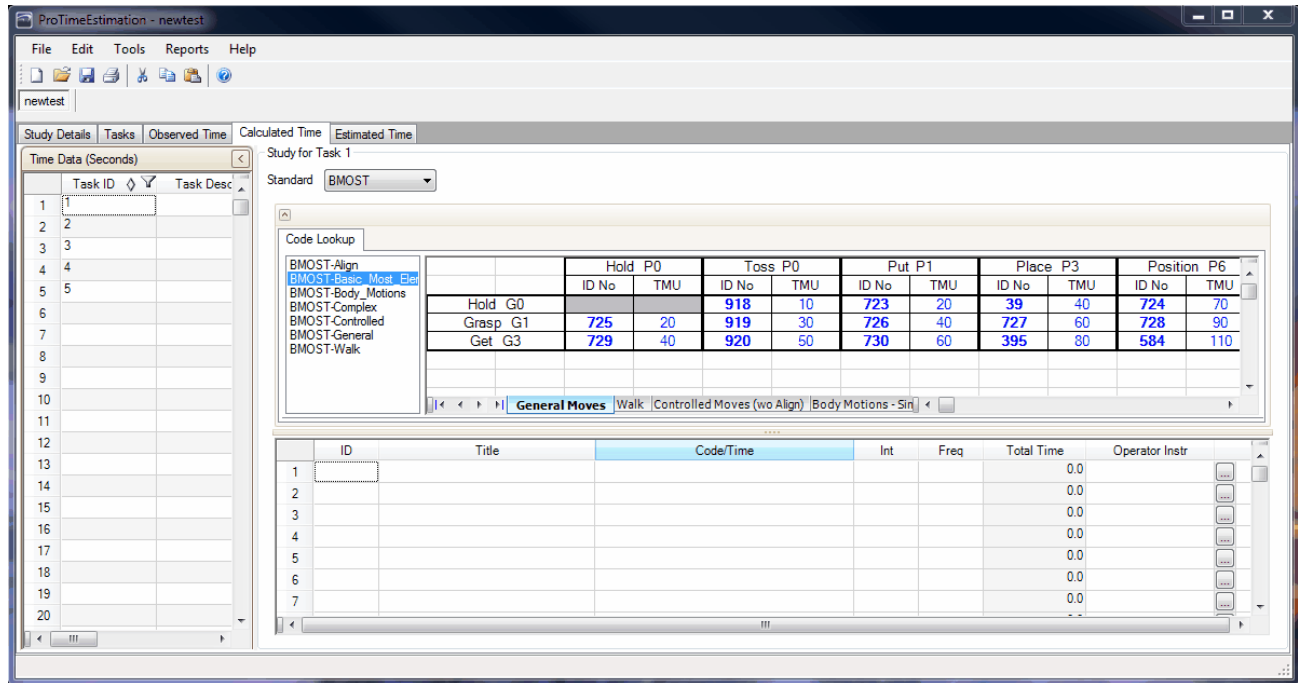
MS Excel New Code

9. Next save this file as an .xls and close it.
10. Continue to the next section to load the templates.

12.2 Loading Templates

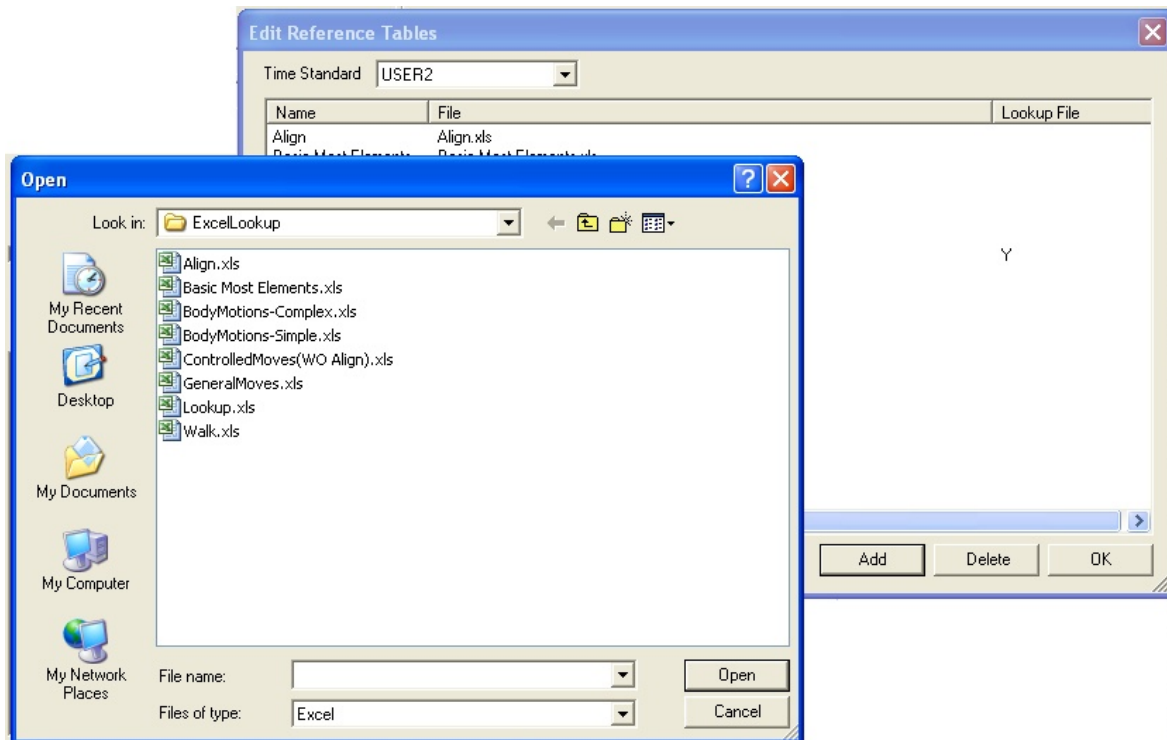
The code tables in ProTime are simple 2003 MS Excel files (XLS extension), that contain text in fields that are color-coded dark blue and are formatted as BOLD. When a user selects such a field, the application will take the value in that cell and reference it against a lookup table, which will then enter the code's TMU/MOD value, description and Value Add percentage in the element table below.

1. The Basic MOST time standard (called BMOST) is shown below, with a list of template files (XLS) shown on the left. In this example, a template file was selected that also contained multiple spreadsheet tabs which each contain code tables.



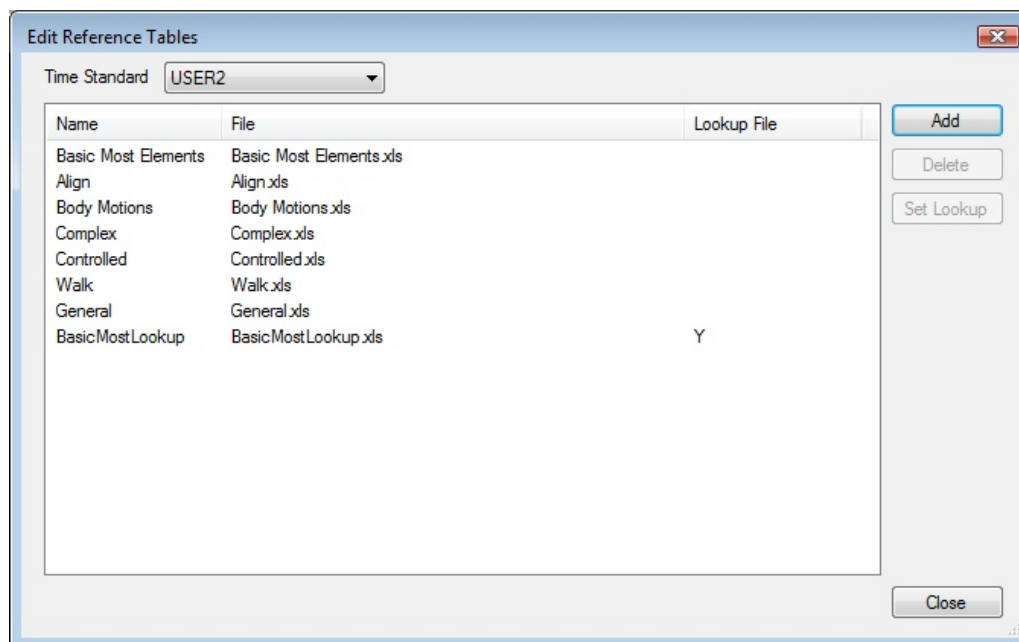
BMOST Template Files

2. If you right click in the list box of code template files, you can add, remove, or change the sequence of template files. It is important to note that the lookup file which is referenced by the templates must be loaded and must be tagged as the lookup file. See the next step for details.



Template Files

3. Once the template spreadsheets are uploaded, select the Lookup.xls sheet (called BasicMostLookup in this example) and select the 'Set Lookup' button.



Set Lookup File

4. Next close this window and restart the application for your changes to take effect. When you return to the standard you edited, you should see the new codes in the element tables.

13 Appendix: Predetermined Time Studies

Proplanner's ProTime Estimation module supports several different predetermined time formats, including the ability for users to create their own. While many of the fields of an elemental time study are unique for that time standard, the field format for specifying process time and LEAN percentages are common throughout the time standards, and thus are described in detail below.

Specifying Frequency

Element frequencies may be specified as Real Floating Point numbers (i.e. 6.5 or 0.2) or they can also be entered as fractions (i.e. 1/2, 1/10) as is shown in element 2 below. Note that the application will show the full time of the element in the Left Time column and then the Frequency Factored Time in the Total Time column. Fractional frequencies typically correspond to tasks which are not performed for every cycle of the overall Activity (i.e. replacing an empty tub of parts with a full one).

	Type	Freq	Left Desc	Left Time	Left Code	Total Time	Ri
1	M	1	Walk to button	5.0	W5	5.0	
2	M	1/2	Move Whole Arm to press button	4.0	M4G0	2.0	
3	L	1	This is a comment	2.0		2.0	
4	M	1	Read a word in a sentence to determine	2.0	R2	0.0	
5							
6							

Frequency

Specifying Process Time

Most all of the time study templates allow the user to specify a process time. Each standard has an Element Type code for specifying process times, so you should refer to the specific Time Standard documentation to determine what your standard uses. By default in all time standards, when the element type "Process" is specified, the user can simply enter a numeric value in the element code field which will represent a quantity of base units for that time standard (i.e. TMU's for MTM and MOST, or MOD's for MODAPTS). In addition, ProTime Estimation will also allow you to specify a Process time in several other units. This formatting is consistent for all time standards in Proplanner. To specify a process time in a unit that is not the base unit, you simply enter the numeric time value followed by a dash and the name of the time unit (i.e. 20-sec would be 20 seconds). Please reference the following table for valid time units.

Times codes are NOT case sensitive.	
The following suffixes must be preceded by a real number time value, and separated by a dash (i.e. 18-sec or 1.5-days)	
min	Minutes
sec	Seconds
tmu	TMU's (0.036 seconds)
hours	Hours
days	Days
mu	MU's (0.0036 seconds)
mod	MOD's (0.129 seconds)

Specifying LEAN Value Added, Non-Value Added and Semi-Value Added percentages

Most all of the time study templates allow the user to specify a Value Added (VA), or Semi-Value Added (SVA) percentage value. The remaining percentage (i.e. 100-VA-SVA) will be used as the Non-Value Added amount. All templates include default Value Add percentages for each code. These percentages were set arbitrarily by the Proplanner Engineering staff, and thus can be modified easily by editing a particular code's lookup .XLS file.

The format for specifying Value Add percentages in either a code lookup file field, or in the actual template editor field, is as follows:

1. Percentages are specified in whole number integer values from 0 to 100.
2. A number in this field is considered the Value Add percentage.
3. A number in this field that is prefixed by a slash (/) is a Semi-Value Add percentage.

Examples

25	(this is 25% Value Added and 75% NonValue Added)
25/30	(this is 25% Value Added, 30% Semi-Value Added, and 45% Non Value Added)
0 or Blank	(this is 100% NonValue Added)
0/60	(this is 60% Semi-Value Added, and 40% Non Value Added)

13.1 MODAPTS Studies

MODAPTS is a language of work that was developed by Chris Heyde in the 1960's based upon his experience with the MTM-2 predetermined time system. MODAPTS is currently supported via the International MODAPTS Association (IMA) which is a non-profit organization headquartered within the United States (www.modapts.org).

MODAPTS codes consist of a letter followed by a number. The letter indicates the type of the activity being performed (typically a movement of a body appendage) and the number indicates the time associated to that movement as measured in a unit called a MOD (1 MOD = 0.129 seconds). A complete manual on the MODAPTS language for work, as well as a list of courses that are provided by certified instructors, can be located on, or purchased from, the IMA website.

The ProTime Estimation application includes a default set of MODAPTS templates (shown below), and an associated MS Excel lookup data file that can be easily modified by any user (see: [Editing Code Templates](#)).

MODAPTS Element Types

MODAPTS has two element types:

M - for code-based element strings

P - for user-specified process times. Simply enter a quantity of MOD's in the Left Code field, or enter a time value followed by a dash and the time unit. [See process time specification](#) for more details.

L - for literal means to ignore the line because it represents a comment

The MODAPTS parser supports basic one-handed motions (use the LEFT hand code column), or two-handed motions. In addition, the parser supports segmented code multiplication, or internal exclusion. Examples of these formatting options are shown below.

Multiplication of codes can be accomplished by using the Frequency column for applying the multiplication to the entire element line, or by simply prefixing a string of MODAPTS codes contained within parentheses by an integer factor. Similarly, codes can be ignored by the parser by enclosing them within angle brackets. In the following example, the first element line is repeated 3 times and code segment (M2P5 M1P0) is repeated 2 times within that. As such the total time for the element becomes 72 MODS. On the second element line of this example, you can see how the code W5 is ignored from the parser, which typically indicates that the operator is walking while performing the M3P5 task twice.

	Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc	SC	VA
1	M	3	Position tensioner and bolts	24.00	M3P5 2(M2P5 M1P0)	72		0.00			75
2	M	1	Position and Start	16.00	2(M3P5) <W10>	16		0.00			75/25
3											
4											

MODAPTS Example

Another way to address internal tasks (two tasks performed concurrently) is to specify the tasks in the right and left hand code fields. When using codes for both hands concurrently, the parser will assume that those tasks can actually be performed simultaneously and will simply use the time associated with the longer element hand. This is considered a High skilled task, which is the default for the application, although the user could specify an "H" in the special codes field to indicate this explicitly. Optionally, the user can specify an "L" in the special codes column to indicate that the task is performed by a Low skilled operator, and thus the times for each hand would be added together. The example below shows all 3 forms.

	Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc	SC	VA
1	M	1	move object1	4.00	M2P2	7	M2P5	7.00	move object 2		
2	M	1	move object1	4.00	M2P2	7	M2P5	7.00	move object 2	H	
3	M	1	move object1	4.00	M2P2	11	M2P5	7.00	move object 2	L	
4											

Task Skill Level

Default MODAPTS templates provided with ProTime

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0 NEC% 100 Calculate Rollup

Standard MODAPTS Total: 0 MOD Manual: 0 MOD Machine: 0 MOD Misc: 0 MOD

Code Lookup

MODAPTS_MoveGet	(G0) Get Contact	(G1) Get Grasp	(G3) Get Feedback
MODAPTS_MovePut	(M1) Finger	M1G0	M1G3
MODAPTS_Walk_Sit_Stand	(M2) Hand	M2G0	M2G3
MODAPTS_Cognitive	(M3) Forearm	M3G0	M3G3
MODAPTS_Use_Juggle	(M4) Whole Arm	M4G0	M4G3
	(M5) Extended Arm	M5G0	M5G3
	(M6) Trunk	M6G0	M6G3
	G0	Get/Contact/Touch an object from a general location	
	G1	Get/Grasp/Push an object from a general location	
	G3	Get/Grasp/Pick an object into a DEFINED location	

	Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc	SC
1										
2										
3										
4										
5										

☒ Is Practice:

Template 1

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0 NEC% 100 Calculate Rollup

Standard MODAPTS Total: 0 MOD Manual: 0 MOD Machine: 0 MOD Misc: 0 MOD

Code Lookup

	(P0) Put Simple	(P2) Put Feedback	(P5) Put Feedbacks
(M1) Finger	M1P0	M1P2	M1P5
(M2) Hand	M2P0	M2P2	M2P5
(M3) Forearm	M3P0	M3P2	M3P5
(M4) Whole Arm	M4P0	M4P2	M4P5
(M5) Extended Arm	M5P0	M5P2	M5P5
(M6) Trunk	M6P0	M6P2	M6P5
P0	Put an object into a general location with low consciousness		
P2	Put an object into a DEFINED location requiring one feedback		
P5	Put an object into a DEFINED location requiring multi-feedback		

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc	SC
1									
2									
3									
4									
5									

☒ Is Practice:

Template 2

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0 NEC% 100 Calculate Rollup

Standard MODAPTS Total: 0 MOD Manual: 0 MOD Machine: 0 MOD Misc: 0 MOD

Code Lookup

	CODE	Description
(W5) Walk Pace	W5	Walk a step (pace), approximately 2 feet or .65 Meters
(F3) Foot Action	F3	Depress pedal with foot
(B17) Bend & Arise	B17	Bend and Arise (both up and down together)
(S30) Sit & Stand	S30	Sit and Stand (both up and down together)

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc	SC
1									
2									
3									
4									
5									
6									
7									

☒ Is Practice:

Template 3

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0 NEC% 100 Calculate Rollup

Standard MODAPTS Total: 0 MOD Manual: 0 MOD Machine: 0 MOD Misc: 0 MOD

Code Lookup

	CODE	Description
(R2) Read Word	R2	Read a word in a sentence to determine overall meaning
(R3) Read Code	R3	Read each word with an independent meaning (i.e. codes)
(V3) Speak Word	V3	Vocalize a word or Listen to a word being spoken
(D3) Decide	D3	Binary Decision (yes/no, on/off, in/out, etc)
(N3) Count	N3	Count an item (mental retention of count)
(N6) Count	N6	Count a disarranged item (cognitive abilities required to identify)
(E2) Eye Travel	E2	Eye Travel, or Eye Fixation
(E4) Eye Focus	E4	Eye Focus at an object at a different distance
(H4) Write cursive	H4	Write one CURSIVE (continuous) letter or punctuation
(H5) Write block	H5	Write one BLOCK PRINT lower case letter, digit or symbol
(H6) Write CURSIVE	H6	Write one Upper Case CURSIVE (continuous) letter
(H7) Write BLOCK	H7	Write one Upper Case BLOCK PRINT letter
(H21) Write block	H21	Write one word in Cursive
(H26) Write CURSIVE	H26	Write one word in Block Print
(H35) Write BLOCK	H35	Write one word in all upper case

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc	SC
1									
2									

☒ Is Practice:

Template 4

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0 NEC% 100 Calculate Rollup

Standard MODAPTS Total: 0 MOD Manual: 0 MOD Machine: 0 MOD Misc: 0 MOD

Code Lookup

	CODE	Description
(J2) Juggle	J2	Change position of grasp, regrasp, roll item to fingers
(X4) Extra Force	X4	Apply Extra Force, Press, Connect, Tighten, Break Loose
(L1) Load (<13lbs)	L1	Load Factor to overcome inertia >2kg(4.4lbs) <6kg (13.3lbs)
(L2) Load (<18lbs)	L2	Load Factor to overcome inertia >6kg(13.3lbs) <8kg (17.6lbs)
(C4) Crank Forearm	C4	Crank with Forearm
(C3) Crank Wrist	C5	Crank with Wrist only
(U0.5) Finger	U0_5	Use, Move the FINGER back OR forth (freq = 2 for back+forth)
(U1) Hand	U1	Use, Move the HAND back OR forth (freq = 2 for back+forth)
(U2) Forearm	U2	Use, Move the FOREARM back OR forth (freq = 2 for back+forth)
(U3) Whole Arm	U3	Use, Move the WHOLE ARM back OR forth (freq = 2 for back+forth)

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc	SC	VA
1										
2										

☒ Is Practice:

Template 5

13.2 MOST Studies

MOST (Maynard Operation Sequence Technique, copyright HB Maynard Company) is a language that was developed by HB Maynard. It was designed to describe work based upon his experience with developing the MTM-1 predetermined time system.

MOST is currently supported via the Accenture company which owns the HB Maynard group (www.hbmaynard.com). MOST codes consist of a letter followed by a number. The letter indicates the type of the activity being performed (typically a movement of a body appendage) and the number indicates the time associated to that movement as measured in a unit called a TMU (1 TMU = 0.036 seconds). A complete manual on the MOST language for work can be purchased from, the HB Maynard website.

ProTime Estimation application includes a default set of Basic-MOST templates (shown below), and an associated MS Excel lookup data file that can be easily modified by any user. The MOST language can be selected in ProTime Estimation from the pull-down list as **BMOST**.

The MOST parser supports basic one-handed motions (use the LEFT hand code column), or two-handed motions. In addition, the parser supports segmented code multiplication, or internal exclusion. Examples of these formatting options are shown below.

The internal column displays the task number which is internal to the element where this value is entered. The time for the task in the internal column is compared to time of the given task and the task with the higher time determines the effective time.

	Row Number	Title	ABG Code	Int	Freq	Unit TMU	Total Time	Operator Instr	VA
1	742	ALIGN OBJECT - SIMPLE	A0 B0 G0 M0 X0 I3 A0	2	1	30	30		
2	744	ALIGN OBJECT - COMPLEX	A0 B0 G0 M0 X0 I6 A0	0	1			Enter the number in here	

MOST Studies - Internal Column

MOST Element Types

MOST has four element types:

DM - allows the user to type in an ABG code in the ABG code column. Click calculate and the code will get parsed and the time should show up in the Unit TMU and Total time column.

SO and PT - allows the user to directly edit a process time value. Simply enter a quantity of MOD's in the Left Code field, or enter a time value followed by a dash and the time unit. [See process time specification.](#)

***** - Putting a * or the asterisk symbol allows the user to type in text in both the Title and the ABG code columns. Essentially this makes the element into a comment, and thus anything in the code field will be ignored.

Multiplication of codes can be accomplished by using the Frequency column for applying the multiplication to the entire element line, or by simply prefixing a string of MOST codes contained within parenthesis by an integer factor. Similarly, codes can be ignored by the parser by enclosing them within angle brackets. In the following example, the second element line has a code segment (B0 P1 A0) that is repeated 3 times. As such the total time for the element becomes 50 TMU's. On the third element line of this example, you can see how the codes A1, G1A1 and P1A1 are ignored from the parser.

	ID	Title	ABG Code	Int	Freq	Unit TMU	Total Time
1	DM	Walk	A8	0	1	0.0	0.0
2	DM	1 MOVE HARNESS TO L-SIDE	A0 B0 G1 A1 3(B0 P1 A0)	0	1	50.0	50.0
3	DM	2 PULL HARNESS FOR BUNCHING	<A1>B10 <G1 A1 >B0 <P1 A1 >	0	1	100.0	100.0
4							0.0

MOST Example

Default MOST Templates provided with ProTime

Note that the first item on the list contains a spreadsheet with multiple tabs. These tabs include all of the tables that also appear further down on the list. This redundancy is provided as some users may prefer to select the tabs versus the list items.

ID No	TMU	Hold P0	Toss P0	Put P1	Place P3	Position P6
Hold G0						
Grasp G1	725	20	918	10	723	20
Get G3	729	40	920	50	730	60

ID	Title	ABG Code	Int	Freq	Unit TMU	Total Time	Operator Instr
1	DM				0	0	
2	DM				0	0	
3	DM				0	0	

Template 1

ID No	TMU	Hold P0	Toss P0	Put P1	Place P3	Position P6
(2) Points < 4"	13	743	30			
(2) Pts > 4"/Scale	16	744	60			

ID	Title	ABG Code	Int	Freq	Unit TMU	Total Time	Operator Instr
1	DM				0	0	
2	DM				0	0	
3	DM				0	0	

Template 2

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 5.4 sec Allowance % 0 VA% 41.67 NVA% 58.33 NEC% 0 Calculate Rollup

Standard USER2 Total: 250 TMU Manual: 250 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

Basic Most Elements
Align
Body Motions
Complex
Controlled
Walk
General

		ID No	TMU
Bend	Partial	20	30
	Full	21	60
Sit or Stand	Simple	712	30
	w/Adj	711	100
Climb	On/Off	745	160
Through Door		746	160

ID	Title	ABG Code	Int	Freq	Unit TMU	Total Time	Operator Instr
1	DM				0	0	
2	DM				0	0	

Template 3

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 5.4 sec Allowance % 0 VA% 41.67 NVA% 58.33 NEC% 0 Calculate Rollup

Standard USER2 Total: 250 TMU Manual: 250 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

Basic Most Elements
Align
Body Motions
Complex
Controlled
Walk
General

		ID No	TMU
Position/Use Creeper w/ Hands		185	440
Climb Step w/Light Load		700	600
Place Temp Step		948	280

ID	Title	ABG Code	Int	Freq	Unit TMU	Total Time	Operator Instr
1	DM				0	0	
2	DM				0	0	

Template 4

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 5.4 sec Allowance % 0 VA% 41.67 NVA% 58.33 NEC% 0 Calculate Rollup

Standard USER2 Total: 250 TMU Manual: 250 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

Basic Most Elements
Align
Body Motions
Complex
Controlled
Walk
General

		Push or Pull M1	Slide or Press M3	Manipulate M6	3 - 4 Stages M10			
	ID No	TMU	ID No	TMU	ID No	TMU		
Hold G0	731	10	732	30	733	60	734	100
Grasp G1	735	30	736	50	737	80	738	120
Get G3	739	50	740	70	741	100	742	140

ID	Title	ABG Code	Int	Freq	Unit TMU	Total Time	Operator Instr
1	DM				0	0	
2	DM				0	0	

Template 5

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time: 5.4 sec Allowance %: 0 VA%: 41.67 NVA%: 58.33 NEC%: 0 Calculate Rollup

Standard: USER2 Total: 250 TMU Manual: 250 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

	ID No	TMU
1 - 2 Steps	63	20
3 - 4 Steps	12	50
5 - 7 Steps	13	90
8 - 10 Steps	14	150
11 - 15 Steps	15	230
16 - 20 Steps	16	310
21 - 26 Steps	17	410
27 - 33 Steps	18	520

ID	Title	ABG Code	Int	Freq	Unit TMU	Total Time	Operator Instr
1	DM				0	0	
2	DM				0	0	

Template 6

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time: 5.4 sec Allowance %: 0 VA%: 41.67 NVA%: 58.33 NEC%: 0 Calculate Rollup

Standard: USER2 Total: 250 TMU Manual: 250 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

	Hold P0	Toss P0	Put P1	Place P3	Position P6	
	ID No	TMU	ID No	TMU	ID No	TMU
Hold G0	918	10	723	20	39	40
Grasp G1	725	20	919	30	726	40
Get G3	729	40	920	50	730	60

ID	Title	ABG Code	Int	Freq	Unit TMU	Total Time	Operator Instr
1	DM				0	0	
2	DM				0	0	

Template 7

13.3 MTM-1 Studies

MTM-1 is widely considered to be the original predetermined time standard, and it is the oldest standard currently in use. MTM-1 is a very detailed time standard that is most often used for processes that last less than 1 minute in length. It is highly recommended that you receive formal education on this time standard (courses and textbooks are available from the MTM organization at www.mtm.org).

MTM-1 Element Types

MTM-1 has two element types:

M - for code-based element strings

P - for user-specified process times. Simply enter a quantity of TMU's in the Left Code field, or enter a time value followed by a dash and the time unit. [See process time specification](#)

L - for literal means to ignore the line because it represents a comment

Manual codes, such as Reach, Move, etc, are case sensitive (especially with reference to Move and Reach In-motion). As such, the code letters should always be upper case, and the "m" In-Motion modifier (prefix and suffix) should always be lower case.

Special Codes

MTM-1 has several different element special codes

/, //, \ or ; will cause the entire element line to be ignored (i.e. a comment line)

V - indicates that this element is inside the field of vision for the user. Otherwise if this is not specified, or if an **O** (capital letter O for Outside) is specified, then the application assumes that the element task is Outside the field of vision for the user. The setting of this special code for an element is only relevant when that element has BOTH a Left hand code and a Right hand code, and the parser is trying to determine how to combine the two times into an overall concurrent task time. The (within/outside) normal vision special code is used by the parser when encountering Reach, Move and Grasp elements.

D - indicates that this element involves a part that is Difficult to handle. Otherwise if this is not specified, or if an **E** (for Easy) is specified, then the application assumes that the part being handled is Easy for the user. The setting of this special code for an element is only relevant when that element has BOTH a Left hand code and a Right hand code, and the parser is trying to determine how to combine the two times into an overall concurrent task time. The (easy/difficult) to handle special code is used by the parser when encountering Position and Disengage elements.

Weight with Move

When moving an object with a weight greater than 2 pounds, the time in MTM-1 is increased to allow for the additional effort. To specify the weight of an object with a move, simply append the weight in pounds after the code and use the comma as a separator. For example, to specify a 6 pound object that is moved 18 inches to a fixed location (i.e. code A), you would enter: **M18A,6**

Reach and Move Location Accuracy

The Reach and Move codes in MTM-1 are defined as being A, B or C codes, which represent the accuracy at which the Reach or Move is required.

A = Reach to an object at a fixed location

B = Reach to an object in a variable location

C = Reach to an object jumbled with others

Vision and Practice

Finally, the MTM-1 editor also has a checkbox in the lower left hand corner of the spreadsheet which indicates if the "User is Practiced." As with the Special Code for "V - Within Normal Vision", the value of this checkbox is used by the parser to determine the total time for an element line that contains BOTH a Right and Left hand code. By checking this box, the user is saying that the entire list of elements are performed by a user many times a day, and therefore it is to be assumed that the user has significant practice and skill in performing those tasks.

Simultaneous Motion

The Simultaneous Motions Table in MTM involves the technique for computing the total time of an element that involves movement of both hands concurrently. According to the MTM Association, when a MOVE-MOVE, MOVE-REACH, REACH-MOVE or REACH-REACH two-handed element is encountered, then the parser will take the largest of the two times (right and left hand) provided that the tasks can be performed simultaneously. Otherwise the parser will add 2 TMU's to the longest of the two times. If any other combination of element codes is encountered between the hands, then the application will EITHER take the LONGEST of the two times (provided that they can be performed concurrently) or ADD the two times (if they cannot be performed concurrently - regardless of the codes appearing in the left and right hand fields of the element). The user is encouraged to reference an MTM-1 Simultaneous Motions table for more information on this topic.

Example of an MTM-1 Study

The following example, shows a task description that includes both Left and Right hand tasks that are performed by a practiced worker in a situation where the tasks are within that worker's normal vision (i.e. special code in element #3). This task includes a process element (#6) that involves a 2.5 second wait time. It also includes a commented element (#7). Finally, this task is also provided with a 15% allowance factor (note: the MTM association states that their standard times include allowances for Fatigue and other factors. Please reference the MTM standard before applying allowances on MTM derived standard times).

The screenshot shows the ProTimeEstimation - Operation 1 software interface. The 'Select Time Type' section has 'Calculated Time' selected. The 'Total Time' is 4.87 sec, with an 'Allowance %' of 15.00. The 'Standard' is set to 'MTM1', showing a 'Total' of 117.60 TMU, 'Manual' of 48.60 TMU, 'Machine' of 69.00 TMU, and 'Misc' of 0.00 TMU. The 'Code Lookup' table shows the following components:

Full Cycle	Components
APA AF+DM+RLF	AF Apply Force
APR APA+G?	DM Dwell Minimum

The main data table lists the following elements:

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc	SC	VA
M	1	Step back to front of DIE, reaching	15.0	W1P	15.0		0.0			0/50
M	1	to run buttons	18.6	TBC1	18.6		0.0			100
M	1	Reach to left button	8.6	mR10B	8.6	mR10B	8.6	Reach to right button	V	100
M	1	Hold until dies close	0.0	G5	0.0	G5	0.0	Hold until dies close		100
M	1	Push Button	3.4	AF	3.4		0.0			100
P	1	Wait for Process (2.5 seconds)	69.0	2.5-sec	69.0		0.0			
M	1	Ignore Dwell (internal to element 6)	0.0	DM	0.0		0.0		\	100
M	1	Release force	3.0	RLF	3.0		0.0			100

The 'User is Practiced' checkbox is checked.

MTM-1 Study

Default MTM-1 Templates provided with ProTime

Note that the first item on the list contains a spreadsheet with multiple tabs. These tabs include all of the tables that also appear further down on the list. This redundancy is provided as some users may prefer to select the tabs versus the list items.

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type: ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time: 0 sec Allowance %: 0 VA%: 0 NVA%: 0 NEC%: 100 Calculate Rollup

Standard: MTM1 Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM1

Distance Moved (in)	Static at begin and end				
	A	B	C	D	E
<=3/4"	R1A	R1B	R1C	R1D	R1E
1	R2A	R2B	R2C	R2D	R2E
2	R3A	R3B	R3C	R3D	R3E
3	R4A	R4B	R4C	R4D	R4E
4	R5A	R5B	R5C	R5D	R5E
5	R6A	R6B	R6C	R6D	R6E
6	R7A	R7B	R7C	R7D	R7E
7	R8A	R8B	R8C	R8D	R8E
8	R9A	R9B	R9C	R9D	R9E

Reach Move Grasp Turn Apply Pressure, Release Position Disengage Walk Leg Foot Vert Motion

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc	SC	VA
1										
2										
3										

Is Practice: ☒

Template 1

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type: ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time: 0 sec Allowance %: 0 VA%: 0 NVA%: 0 NEC%: 100 Calculate Rollup

Standard: MTM1 Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM1

Distance Moved (in)	In motion at begin or end			
	mA	Am	mB	Bm
<=3/4"	mR1A	RfAm	mR1B	RfBm
1	mR2A	RfAm	mR2B	RfBm
2	mR3A	RfAm	mR3B	RfBm
3	mR4A	RfAm	mR4B	RfBm
4	mR5A	RfAm	mR5B	RfBm
5	mR6A	RfAm	mR6B	RfBm
6	mR7A	RfAm	mR7B	RfBm

Reach Move Grasp Turn Apply Pressure, Release Position Disengage Walk Leg Foot Vert Motion

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc	SC	VA
1										
2										
3										

Is Practice: ☒

Template 2

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0 NEC% 100 Calculate Rollup

Standard MTM1 Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM1

Distance Moved (in)	Static at begin and end				
	A	B	C	mB	Bm
<=3/4"	MfA	MfB	MfC	mMfD	MfBm
1	M1A	M1B	M1C	mM1D	M1Bm
2	M2A	M2B	M2C	mM2D	M2Bm
3	M3A	M3B	M3C	mM3D	M3Bm
4	M4A	M4B	M4C	mM4D	M4Bm
5	M5A	M5B	M5C	mM5D	M5Bm
6	M6A	M6B	M6C	mM6D	M6Bm
7	M7A	M7B	M7C	mM7D	M7Bm
8	M8A	M8B	M8C	mM8D	M8Bm
9	M9A	M9B	M9C	mM9D	M9Bm
10	M10A	M10B	M10C	mM10D	M10Bm

Reach Move Grasp Turn Apply Pressure, Release Position Disengage Walk Leg Foot Vert Motion

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc	SC	VA
1										
2										
3										

Is Practice: ☒

Template 3

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0 NEC% 100 Calculate Rollup

Standard MTM1 Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM1

Grasp	Case	Description
Pickup	G1A	Any size object by itself, easily grasped
	G1B	Object very small or lying on flat surface
	G1C1	Dia larger than 1/2"
	G1C2	Dia 1/4" to 1/2"
Regrasp	G2	Change grasp without relinquishing control
	G3	Control transferred from one hand to the other
Transfer	G4A	Larger than 1"x1"x1"
	G4B	1/4"x1/4"x1/8" to 1x1x1
Select	G4C	Smaller than 1/4"x1/4"x1/8"
	G4D	Object jumbled with other objects to that search and select occur.
Contact	G5	Contact, sliding or hook grasp

Reach Move Grasp Turn Apply Pressure, Release Position Disengage Walk Leg Foot Vert Motion

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc	SC	VA
1										
2										
3										

Is Practice: ☒

Template 4

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0 NEC% 100 Calculate Rollup

Standard MTM1 Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM1

Full Cycle		Components	
APA	AF+DM+RLF	AF	Apply Force
APB	APA+G2	DM	Dwell Minimum
		RLF	Release Force
Release			
RL1	Normal release performed by opening fingers as indepen		
RL2	Contact Release		

Reach Move Grasp Turn Apply Pressure, Release Position Disengage Walk

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc
1								
2								
3								

☒ Is Practice:

Template 5

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0 NEC% 100 Calculate Rollup

Standard MTM1 Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM1

Class of Fit	Symmetry	Easy to Handle	Diff. to Handle
Loose (no pressure)	Symmetrical	P1SE	P1SD
	Semi-Symm.	P1SSE	P1SSD
	Non-Symm	P1NSE	P1NSD
Close (light pressure)	Symmetrical	P2SE	P2SD
	Semi-Symm.	P2SSE	P2SSD
	Non-Symm	P2NSE	P2NSD
Exact (heavy pressure)	Symmetrical	P3SE	P3SD
	Semi-Symm.	P3SSE	P3SSD
	Non-Symm	P3NSE	P3NSD

Reach Move Grasp Turn Apply Pressure, Release Position Disengage Walk

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc
1								
2								
3								

☒ Is Practice:

Template 6

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0 NEC% 100 Calculate Rollup

Standard MTM1 Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM1

Disengage	Easy to Handle	Diff. to Handle
Loose	D1E	D1D
Close	D2E	D2D
Tight	D3E	D3D

Reach Move Grasp Turn Apply Pressure, Release Position Disengage Walk

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc
1								
2								
3								

☒ Is Practice:

Template 7

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0 NEC% 100 Calculate Rollup

Standard MTM1 Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM1

Unobstructed per Foot									
W1FT	W11FT	W21FT	W31FT	W41FT	W51FT	W61FT	W71FT	W81FT	W91FT
W2FT	W12FT	W22FT	W32FT	W42FT	W52FT	W62FT	W72FT	W82FT	W92FT
W3FT	W13FT	W23FT	W33FT	W43FT	W53FT	W63FT	W73FT	W83FT	W93FT
W4FT	W14FT	W24FT	W34FT	W44FT	W54FT	W64FT	W74FT	W84FT	W94FT
W5FT	W15FT	W25FT	W35FT	W45FT	W55FT	W65FT	W75FT	W85FT	W95FT
W6FT	W16FT	W26FT	W36FT	W46FT	W56FT	W66FT	W76FT	W86FT	W96FT
W7FT	W17FT	W27FT	W37FT	W47FT	W57FT	W67FT	W77FT	W87FT	W97FT
W8FT	W18FT	W28FT	W38FT	W48FT	W58FT	W68FT	W78FT	W88FT	W98FT
W9FT	W19FT	W29FT	W39FT	W49FT	W59FT	W69FT	W79FT	W89FT	W99FT
W10FT	W20FT	W30FT	W40FT	W50FT	W60FT	W70FT	W80FT	W90FT	W100FT

Unobstructed per Pace									
W1P	W11P	W21P	W31P	W41P	W51P	W61P	W71P	W81P	W91P
W2P	W12P	W22P	W32P	W42P	W52P	W62P	W72P	W82P	W92P
W3P	W13P	W23P	W33P	W43P	W53P	W63P	W73P	W83P	W93P
W4P	W14P	W24P	W34P	W44P	W54P	W64P	W74P	W84P	W94P
W5P	W15P	W25P	W35P	W45P	W55P	W65P	W75P	W85P	W95P
W6P	W16P	W26P	W36P	W46P	W56P	W66P	W76P	W86P	W96P
W7P	W17P	W27P	W37P	W47P	W57P	W67P	W77P	W87P	W97P
W8P	W18P	W28P	W38P	W48P	W58P	W68P	W78P	W88P	W98P
W9P	W19P	W29P	W39P	W49P	W59P	W69P	W79P	W89P	W99P
W10P	W20P	W30P	W40P	W50P	W60P	W70P	W80P	W90P	W100P

Reach Move Grasp Turn Apply Pressure, Release Position Disengage Walk Leg Foot Vert Motion

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc	SC	VA
1										

☒ Is Practice:

Template 8

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time: 0 sec Allowance %: 0 VA%: 0 NVA%: 0 NEC%: 100 Calculate

Standard: MTM1 Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

Motion	Code	Description
Leg or Foot Motion	FM	Hinged at angle up to 4"
	FMP	With heavy pressure up to 4"
	Hinged at Knee or Hip in any direction	
	LM1	LM11 LM21 LM31 LM41
	LM2	LM12 LM22 LM32 LM42
	LM3	LM13 LM23 LM33 LM43
	LM4	LM14 LM24 LM34 LM44
	LM5	LM15 LM25 LM35 LM45
	LM6	LM16 LM26 LM36 LM46
	LM7	LM17 LM27 LM37 LM47
	LM8	LM18 LM28 LM38 LM48
Vertical Motion	SIT	Sit from standing position
	STD	Stand from sitting position
	B	Bend
	S	Stoop
	KOK	Kneel on One Knee
	AB	Arise from Bend
	AS	Arise from Stoop
	AKOK	Arise from Kneel on One Knee
KBK	Kneel on Both Knees	
AKBK	Arise from Kneel on Both Knees	

Reach Move Grasp Turn Apply Pressure, Release Position Dis

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time

☒ Is Practice:

Template 9

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0 NEC% 100 Calculate

Standard MTM1 Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM1

Motion	Code	Description
Turn Body	TBC1	Complete when leading leg contacts floor
	TBC2	Lagging leg must contact floor before next
Side Step	Leading Leg	
		SS16C1 SS21C1 SS26C1
	SS12C1	SS17C1 SS22C1 SS27C1
	SS13C1	SS18C1 SS23C1 SS28C1
	SS14C1	SS19C1 SS24C1 SS29C1
	SS15C1	SS20C1 SS25C1 SS30C1
Side Step	Lagging Leg	
		SS16C2 SS21C2 SS26C2
	SS12C2	SS17C2 SS22C2 SS27C2
	SS13C2	SS18C2 SS23C2 SS28C2
	SS14C2	SS19C2 SS24C2 SS29C2
	SS15C2	SS20C2 SS25C2 SS30C2

Reach Move Grasp Turn Apply Pressure, Release Position Disengage

	Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right T
1								
2								
3								

☒ Is Practice:

Template 10

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0

Standard MTM1 Total: 0 TMU Manual: 0 TMU Machine: 0 TMU

Code Lookup

Crank Dia (in)	Code
1	C1
2	C2
3	C3
4	C4
5	C5
6	C6
7	C7
8	C8
9	C9
10	C10
11	C11
12	C12
14	C14
16	C16
18	C18
20	C20

Reach Move Grasp Turn Apply Pressu

	Type	Freq	Left Desc	Left Time	Left Code
1					
2					
3					

☒ Is Practice:

Template 11

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 0 NEC% 100 Calculate Rollup

Standard MTM1 Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM1

Position/Insertion	Symmetry	Align Only	Insertion Depth			
			<1/8"	<3/4"	<1.25"	<1.75"
0.150" - 0.350"	Symmetrical	P21SA	P21S0	P21S2	P21S4	P21S6
	Semi-Symm.	P21SSA	P21SS0	P21SS2	P21SS4	P21SS6
	Non-Symm.	P21NSA	P21NS0	P21NS2	P21NS4	P21NS6
0.025" - 0.149"	Symmetrical	P22SA	P22S0	P22S2	P22S4	P22S6
	Semi-Symm.	P22SSA	P22SS0	P22SS2	P22SS4	P22SS6
	Non-Symm.	P22NSA	P22NS0	P22NS2	P22NS4	P22NS6
0.005" - 0.024"	Symmetrical	P23SA	P23S0	P23S2	P23S4	P23S6
	Semi-Symm.	P23SSA	P23SS0	P23SS2	P23SS4	P23SS6
	Non-Symm.	P23NSA	P23NS0	P23NS2	P23NS4	P23NS6

Secondary Engage

Position/Insertion	Insertion Depth		
	<3/4"	<1.25"	<1.75"
0.150" - 0.350"	E2212	E2214	E2216
0.025" - 0.149"	E2222	E2224	E2226
0.005" - 0.024"	E2232	E2234	E2236

Reach Move Grasp Turn Apply Pressure, Release Position Disengage Walk Leg Foot Vert Mo

Type	Freq	Left Desc	Left Time	Left Code	Total Time	Right Code	Right Time	Right Desc
1								
2								

Is Practice: ☒

Template 12

13.4 MTM-UAS Studies

MTM-UAS is a time standard from the MTM organization that is used extensively in Europe. It is considered a mid-level detail standard that is most applicable for processes that last from 1 to 5 minutes in duration. In Sweden the MTM-UAS standard is referred to as MTM-SAM.

It highly recommended that you receive formal education on this time standard (courses and textbooks are available from the MTM organization at www.mtm.org).

MTM-UAS has a basic set of codes and a more advanced set that is referred to as the Standard Data Additions. By default, ProTime Estimation includes the basic MTM-UAS codes.

MTM-UAS Element Types

MTM-UAS has four element types

P - (Process Time) Simply enter a quantity of TMU's in the Left Code field, or enter a time value followed by a dash and the time unit. [See process time specification.](#)

R - (Retrieval) This is what you will use for all standard UAS Codes

L - (Literal) – This means to ignore the line because it represents a comment

U - (user defined time that is typed in (Not currently Implemented))

	Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1	R	KA	Walk to table		8	0.0000	2000.0000	
2	R	KB	Bend down to pick up part (includes arise)		1	0.0000	600.0000	
3	L	AA2	Pickup Light prt (this is a comment to ignore)		1	0.0000	0.0000	
4	P	1000	Process for 1000 TMUs		1	0.0000	1000.0000	
5								

MTM-UAS Element Types

The Internal field for an element allows you to specify another element that this particular element is performed concurrently with. In this version, the Internal field is not implemented for MTM-UAS.

The Allowance% field allows the user to specify an allowance for this specific element line.

Default MTM-UAS Templates provided with ProTime

Note that the first item on the list contains a spreadsheet with multiple tabs. These tabs include all of the tables that also appear further down on the list. This redundancy is provided as some users may prefer to select the tabs versus the list items.

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 100 NEC% 0 Calculate Rollup

Standard MTMUAS Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM-UAS

ID No	TMU
KA	25
KB	60
KC	110
VA	15

Body Motions & Visual Control Get & Place Place

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							
3							
4							
5							

F5 : Code Lookup

Template 1

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 100 NEC% 0 Calculate Rollup

Standard MTMUAS Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM-UAS

			Distance <=8"		Distance 8"<=20"		Distance 20"<=32"	
			ID No	TMU	ID No	TMU	ID No	TMU
<=2lbs	Easy	Approximate	AA1	20	AA2	35	AA3	50
		Loose	AB1	30	AB2	45	AB3	60
		Tight	AC1	40	AC2	55	AC3	70
	Difficult	Approximate	AD1	20	AD2	45	AD3	60
		Loose	AE1	30	AE2	55	AE3	70
		Tight	AF1	40	AF2	65	AF3	80
	Handful	Approximate	AG1	40	AG2	65	AG3	80
		Loose	AH1	25	AD2	45	AD3	55
		Tight	AJ1	40	AE2	55	AE3	75
>2lbs - <=18lbs	Approximate	AK1	50	AF2	65	AF3	85	
	Loose	AL1	80	AL2	105	AL3	115	
	Tight	AM1	95	AM2	120	AM3	130	
>18lbs - <48lbs	Approximate	AN1	120	AN2	145	AN3	160	
	Loose							
	Tight							

Body Motions & Visual Control Get & Place Place Oper

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							

F5 : Code Lookup

Template 2

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 100 NEC% 0 Calculate Rollup

Standard MTMUAS Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM-UAS

		Distance <=8"		Distance 8"<=20"		Distance 20"<=32"	
		ID No	TMU	ID No	TMU	ID No	TMU
Approximate	PA1	10	PA2	20	PA3	25	
Loose	PB1	20	PB2	30	PB3	35	
Tight	PC1	30	PC2	40	PC3	45	

Body Motions & Visual Control Get & Place Place Oper

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							

F5 : Code Lookup

Template 3

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 100 NEC% 0 Calculate Rollup

Standard MTMUAS Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM-UAS

		Distance <=8"	Distance 8"<=20"	Distance 20"<=32"
	ID No	TMU	ID No	TMU
One Single Operation	BA1	10	BA2	25
Compound Operation	BB1	30	BB2	45
			BB3	60

Body Motions & Visual Control | Get & Place | Place | Operat

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							

F5 : Code Lookup

Template 4

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 100 NEC% 0 Calculate Rollup

Standard MTMUAS Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM-UAS

		Distance <=8"	Distance 8"<=20"	Distance 20"<=32"
	ID No	TMU	ID No	TMU
One Motion	ZA1	5	ZA2	15
Motion Sequence	ZB1	10	ZB2	30
Simultaneous Motion	ZC1	30	ZC2	45
Fasten or Loosen	ZD			20

Body Motions & Visual Control | Get & Place | Place | Operate | Motion Cycles | Walk | Handle Tool

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							
3							

F5 : Code Lookup

Template 5

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 100 NEC% 0 Calculate Rollup

Standard MTMUAS Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM-UAS

	ID No	TMU
1-2 Steps	KA	25
3-4 Steps	KA4	50
5-7 Steps	KA7	90
8-10 Steps	KA10	150
11-15 Steps	KA15	230
16-20 Steps	KA20	310
21-26 Steps	KA26	410
27-33 Steps	KA33	530
34-40 Steps	KA40	660

Body Motions & Visual Control | Get & Place | Place | Operate | Motion Cycles | **walk** | Handle Tool

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							

F5 : Code Lookup

Template 6

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 0 sec Allowance % 0 VA% 0 NVA% 100 NEC% 0 Calculate Rollup

Standard MTMUAS Total: 0 TMU Manual: 0 TMU Machine: 0 TMU Misc: 0 TMU

Code Lookup

MTM-UAS

	Distance <=8"		Distance 8"<=20"		Distance 20"<=32"	
	ID No	TMU	ID No	TMU	ID No	TMU
Approximate	HA1	25	HA2	45	HA3	65
Loose	HB1	40	HB2	60	HB3	75
Tight	HC1	50	HC2	70	HC3	85

Body Motions & Visual Control | Get & Place | Place | Operate | Motion Cycles | Walk | **Handle Tool**

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							

F5 : Code Lookup

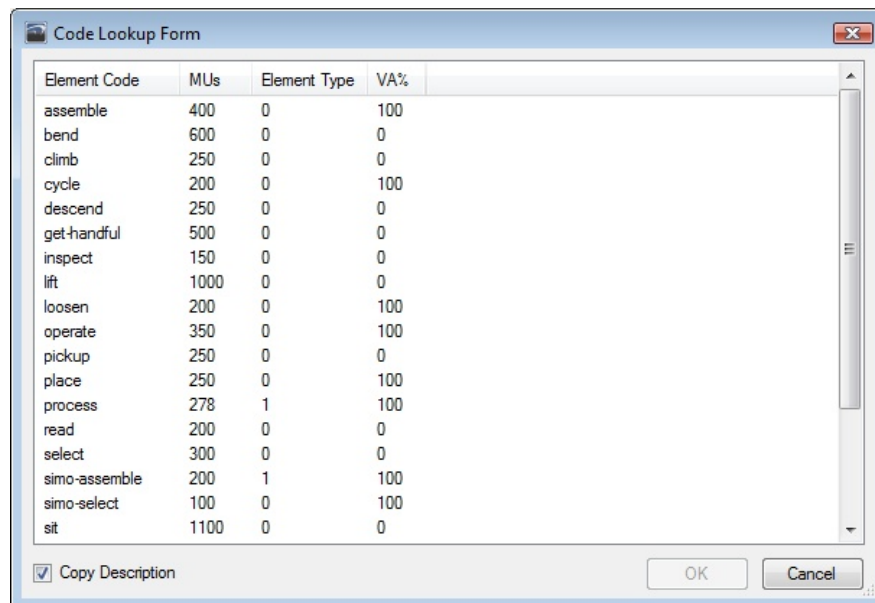
Template 7

13.5 MTM-B Studies

MTM-B is one of the newer time standards from the MTM organization. It is targeted for long cycle time processes and for task descriptions for which a LEAN Benchmark is desired (i.e. Comparison of Current State versus Future State). MTM-B is a very simple parenthetical key-word based language of work.

Please note that while other MTM-based time standards have their base units in TMU's, the MTM-B standard will report MU's by default.

It highly recommended that you receive formal education on this time standard (courses and textbooks are available from the MTM organization at www.mtm.org). A list of keywords can be obtained inside of the Predetermined Time editor by pressing F5 (function 5) key. Once the list appears, you may also select the keywords with your mouse.



Element Code	MUs	Element Type	VA%
assemble	400	0	100
bend	600	0	0
climb	250	0	0
cycle	200	0	100
descend	250	0	0
get-handful	500	0	0
inspect	150	0	0
lift	1000	0	0
loosen	200	0	100
operate	350	0	100
pickup	250	0	0
place	250	0	100
process	278	1	100
read	200	0	0
select	300	0	0
simo-assemble	200	1	100
simo-select	100	0	100
sit	1100	0	0

☒ Copy Description OK Cancel

Keyword List

As your process is described, the editor will automatically color-code the keywords and keyword modifiers (quantities of distance or time) so that it is easy to determine if the keyword-code has been recognized. In addition, your process time and corresponding value-add analysis will be computed by the application. Of course, the list of keywords and their associated value-add percentages can be modified by the user.

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

Operation 1

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 17.57 sec Allowance % 0 VA% 70 NVA% 30 NEC% 0 Calculate Rollup

Standard MTMB Total: 4880 MU Manual: 900 MU Machine: 2780 MU Walk: 1200 MU

Walk 10 feet to the table and pickup the power drill. Then process 10 seconds and place the tool back on the table. Now walk 5 feet to the vehicle and assemble the part.

Described Process

Example of an MTM-B Study

MTM-B Example Standard with a 15 percent allowance factor. Note that the MTM standards are defined to include some normal allowances, such as fatigue. Please reference the MTM association documents before applying allowances.

ProTimeEstimation - Operation 1

File Edit Tools Reports Help

MTM-B Example

Select Time Type ☒ Calculated Time ☐ Estimated Time ☐ Observed Time

Total Time 6.27 sec Allowance % 15.00 VA% 78.00 NVA% 22.00 NEC% 0.00 Calculate F

Standard MTMB Total: 1514.00 MU Manual: 600.00 MU Machine: 834.00 MU Walk: 80.00 MU

Walk 1 foot to front of die turn body and operate button. Process 3 seconds, including time for dies to close.

MTM-B Study Example

13.6 Additional Predetermined Time Systems

ProTime currently has the capability to support more predetermined time systems than are included in the basic version of the software. Some of these systems are proprietary, and all of them require you to contact Proplanner for more information. In this category, you will find:

- MMMM (4M)
- MTM-MEK
- STDS

13.6.1 MTM-MEK Studies

MTM-MEK is a time standard from the MTM organization that is used principally in Europe. It is considered a mid-level detail standard; it is most applicable for processes that last from 1 to 5 minutes in duration. MTM-MEK is not shipped by default in the ProTime Estimation system. It can be acquired from the MTM Association (www.mtm.org).

It is highly recommended that you receive formal education on this time standard (courses and textbooks are available from the MTM organization at www.mtm.org).

MTM-MEK Element Types

P - (Process Time) Simply enter a quantity of TMU's in the Left Code field, or enter a time value followed by a dash and the time unit. [See process time specification](#)

R - (Retrieval) This is what you will use for all standard UAS Codes

L - (Literal – this means to ignore the line because it represents a comment)

U - (user defined time that is not implemented until the user types it in)

The Allowance % field allows the user to specify an allowance for this specific element line. MTM standards already include certain allowances, such as fatigue. Please reference the MTM Association for specific rules regarding the addition of allowances with MEK.

Default MTM-MEK Templates provided with ProTime

Note that the first item on the list contains a spreadsheet with multiple tabs. These tabs include all of the tables that also appear further down on the list. This redundancy is provided as some users may prefer to select the tabs versus the list items.

Code Lookup
MTM-MEK

	Approximate Place				Exact Place			
	Range 1	Range 3	Range 4	Range 5	Range 1	Range 3	Range 4	Range 5
<12/32 in, < 18lbs	KAA1	KAA3	KAA4	KAA5	KAB1	KAB3	KAB4	KAB5
>12/32 in, >18-48lbs		KAC3	KAC4	KAC5		KAD3	KAD4	KAD5
		Range 4	Range 5					
Additional Get Part	KET4	KET5						

Lookup Get & Place Handle Tool Place Operate Motion Cycles Body Motions Visual Contr

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							

Template 1

Code Lookup
MTM-MEK

	Approximate Place			Exact Place		
	Range 3	Range 4	Range 5	Range 3	Range 4	Range 5
Handle Tool	KHA3	KHA4	KHA5	KHB3	KHB4	KHB5
	Range 3	Range 4	Range 5			
Additional	KEH3	KEH4	KEH5			

Lookup Get & Place Handle Tool Place Operate Motion Cycles Body Motions Visual Contr

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							

Template 2

Code Lookup
MTM-MEK

	Range 1	Range 3	Range 4	Range 5
Approximate	KPA1	KPA3	KPA4	KPA5
Exact	KPB1	KPB3	KPB4	KPB5

Lookup Get & Place Handle Tool Place Operate Motion Cycles Body Motions Visual Contr

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							
3							
4							

Template 3

Code Lookup

MTM-MEK

	Range 1	Range 3	Range 4	Range 5
Simple Operation	KBA1	KBA3	KBA4	KBA5
Compound Operation	KBB1	KBB3	KBB4	KBB5

|< < > >| Lookup Get & Place Handle Tool Place Operate Motion Cycles Body Motions Visual Contr |

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							
3							

Template 4

[illegible]

Template 5

Code Lookup

MTM-MEK

Walk 40 inches	KKA
Bend/Stoop, KOK, Arise	KKB
Sit and Stand	KKC

Navigation: [Back] [Forward] [Home] [End] | LookUp Get & Place Handle Tool Place Operate Motion Cycles **Body Motions** Visual Cont.

Type	Element/Time	Description	Interval	Frequency	Allowance (%)	Total Time	VA
1	[Dropdown]						
2							
3							

Template 6

Code Lookup
MTM-MEK

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							
3							

Visual KVA

Lookup Get & Place Handle Tool Place Operate Motion Cycles Body Motions Visual Cont

Template 7

Code Lookup
MTM-MEK

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							
3							

CLEAN W/COMPRESSED AIR, BRUSH, BROOM, RAG, CLOTH, 8"X8" KA-BAB
 ASB STD PARTS W/1 TOOL, SPRING PIN, NAIL, COTTER, CLIP, ETC KA-NAA
 ASB STD PARTS W/2 TOOLS, COTTER, PIN, RIVET, DOUBLE COTTER KA-NBA
 ASB STD PARTS W/SPECIAL TOOL, E-RING, SNAP RING, POP RIVET KA-NCA
 ASB STD PARTS, ADDITION FOR USE ADDITIONAL TOOL; SNAP TOOL KA-NZA
 ASB STD PARTS, ADDITION FOR DIFFICULT OR CAREFUL HANDLING KA-NZB

Clean & Assemble Clamp & Unclamp Mark Inspect Fasten Transport

Template 8

Code Lookup
MTM-MEK

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							
2							

PORTABLE C-CLAMP KA-FDA
 PORTABLE PARALLEL SCREW CLAMP KA-FEA
 FIXED CLAW (T-CLAMP) KA-FLA
 FIXED GRIPPING LEVER CLAMP (MANUAL) KA-FMA
 FIXED GRIPPING LEVER CLAMP (PNEUMATIC) KA-FNA
 FIXED VISE (APPROXIMATE) KA-FPA
 FIXED VISE (EXACT) KA-FQA
 FIXED JAW CHUCK KA-FRA
 FIXED MAGNETIC PLATE KA-FSA
 ADDITION FOR ADDITIONAL TOOL KA-FZA

Clean & Assemble Clamp & Unclamp Mark Inspect Fasten Transport

Template 9

[illegible]

Template 10

Code Lookup			Small	Medium	Large		
MTM-MEK		Inspect or Measure	<6"	6"<20"	20"<80"		
		Dimension or Shap with Go-No-Go Gauges	KA-PAA	KA-PAB	KA-PAC		
		Thread with Go-No-Go Gauges	KA-PBA	KA-PBB			
		Dimension with Dial Type Measuring Instrument	KA-PCA	KA-PCB			
		Determine Dimension with Dial Type Measuring Instrument	KA-PDA	KA-PDB			
		Dimension with Direct Read Measuring Instrument without moving parts	KA-PEA	KA-PEB	KA-PEC		
		Dimension with Direct Read Measuring Instrument with moving parts	KA-PFA	KA-PFB			
		Adjust area or set to zero	KA-PZF	KA-PZG			
		INSP/MEAS,ADD'N DRAW IN/O ROLL TAPE <66 FT	KA-PGA				
		INSP/MEAS,ADD'N FOR DRAW IN/O ROLL TAPE <80 IN	KA-PGB				
		INSP/MEAS W/PLUMB BOB <8 FT (FREQ. OF 2 FOR 2 WORKERS)	KA-PHA				
		INSP/MEAS W/VISUAL MEAS INSTR, PROJECTORS(MAGNIFIERS)	KA-PIA				
		INSP/MEAS, FEEL OR NOISE INSPECTION	KA-PAK				
		INS/MEAS, ADD'N FOR PREP, STD END MEAS <3 BLOCKS	KA-PZA				
		INS/MEAS, ADD'N FOR PREP, PROTRACTOR	KA-PZB				
		INS/MEAS, ADD'N FOR PREP, DIAL TYPE MEAS INSTR	KA-PZC				
		INS/MEAS, ADD'N FOR PREP, MICROMETERS	KA-PZD				
		INS/MEAS, ADD'N FOR PREP, VISUAL MEAS INSTR	KA-PZE				
		⏪ ⏩ Body Motions Visual Control Clean & Assemble Clamp & Unclamp Mark Inspect Fasten ⏴ ⏵					

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							

F5 : Code Lookup

Template 11

Code Lookup
MTM-MEX

		<3/8"	3/8"~3/4"	3/4"~1-3/8"	1-3/8"~2"	2"~2-3/8"	
Easy Access	W/O Tool (Wing nut/Knurled Head Bolt)	KA-SAA	KA-SBA				
	W/Screwdriver/Ratchet	KA-SAB	KA-SBB	KA-SCB	KA-SDB	KA-SEB	
	W/Open, Box, Allen Wrench	KA-SAC	KA-SBC	KA-SCC	KA-SDC	KA-SEC	
	W/Pneumatic Screwdriver	KA-SAD	KA-SBD	KA-SCD	KA-SDD	KA-SED	
Hard Access	W/Screwdriver/Ratchet	KA-SAE	KA-SBE	KA-SCE	KA-SDE	KA-SEE	
	W/Open, Box, Allen Wrench	KA-SAF	KA-SBF	KA-SCF	KA-SDF	KA-SEF	
	W/Pneumatic Screwdriver	KA-SAG	KA-SBG	KA-SCG	KA-SDG	KA-SEG	
	Addition for additional tighten	KA-SAH	KA-SBH	KA-SCH	KA-SDH	KA-SEH	
	Addition for damaged or dirty threads	KA-SAI	KA-SBI	KA-SCI	KA-SDI	KA-SEI	
	Addition for 2nd screw part (bolt or nut) w/add'l tool	KA-SGA	KA-SGA	KA-SGA	KA-SGA	KA-SGA	
	Addition for stud setter w/open, box, allen wrench	KA-SHA	KA-SHA	KA-SHA	KA-SHA	KA-SHA	
		Wooden or Self Tapping		Wooden with Piercing			
		<1"	1"~2"	>2"	<1"	1"~2"	>2"
	W/Screwdriver/Ratchet	KA-SNE	KA-SPE	KA-SQE	KA-SRE	KA-SSE	KA-STE
	W/Open, Box, Allen Wrench	KA-SNF	KA-SPF	KA-SQF	KA-SRF	KA-SSF	KA-STF
	W/Pneumatic Screwdriver	KA-SNG	KA-SPG	KA-SQG	KA-SRG	KA-SSG	KA-STG
	FINAL FASTEN OR INITIAL LOOSEN	KZZ					

Body Motions Visual Control Clean & Assemble Clamp & Undamp Mark Inspect **Fasten** Transport

Type	Element/Time	Description	Internal	Frequency	Allowance (%)	Total Time	VA
1							

F5 : Code Lookup

Template 12

Code Lookup
MTM-MEX

		Prepare	<7'	7'~33'	33'~165'
Without means of transport	Shift		KA-TAAB	KA-TAAC	KA-TAAD
	Exchange		KA-TABB	KA-TABC	KA-TABD
With Hand Truck without Load and Unload			KA-TBAC	KA-TBAD	
	FL-FL		KA-TBBC	KA-TBBB	
	FL-TBL		KA-TBCC	KA-TBCD	
With Manual Hand Truck, with Load and Unload	TBL-TBL		KA-TBDC	KA-TBDD	
	FL-FL		KA-TBEC	KA-TBED	
	FL-TBL		KA-TBFC	KA-TBFD	
With Motorized Hand Truck, with Load and Unload	TBL-TBL		KA-TBGC	KA-TBGD	
	Hook		KA-TCAB	KA-TCAC	KA-TCAD
	Sling		KA-TCBB	KA-TCBC	KA-TCBD
With Lift Device and Equal Work Height	Hook		KA-TCCB	KA-TCCC	KA-TCCD
	Sling		KA-TCDB	KA-TCDC	KA-T added
	Hook		KA-TDAA	KA-TDAB	KA-TDAC
With Traveling Crane <80Ton and Approximate Location	Sling		KA-TDBA	KA-TDBB	KA-TDBC
	Hook		KA-TDCA	KA-TDCB	KA-TDCC
	Sling		KA-TDDA	KA-Tddb	KA-T added
With Traveling Crane <80Ton and Exact Location	Hook		KA-TEAA	KA-TEAB	KA-TEAC
	Sling		KA-TEBA	KA-TEBB	KA-TEBC
	Hook		KA-TECA	KA-TECB	KA-TECC
With Portable Crane <16Ton and Approximate Location	Sling		KA-TEDA	KA-TEDB	KA-TEDC
	Hook		KA-TFAA	KA-TFAB	
	1.5T ~6Ton		KA-TGAA	KA-TGAB	KA-TGAC
With With Leverjack Lifting Gear	1.5T ~6Ton		KA-TGBA	KA-TGBB	KA-TGBC
	1.5T ~3Ton		KA-THAA	KA-THAB	KA-THAC
	With Cable Line Gripping Gear		KA-THBA	KA-THBB	KA-THBC
With Pulley Chain Hoist	<2Ton				
	<0.5Ton				
With Roller Pulley					

Body Motions Visual Control Clean & Assemble Clamp & Undamp Mark Inspect Fasten **Transport**

F5 : Code Lookup

Template 13

13.6.2 STDS

STDS is a variant of the MTM-1 system that was developed by General Motors North America. This application provides a workspace for storing STDS studies, but it does not currently parse those codes (except to add up the process times that were previously parsed by GM's STDS application).

13.6.3 4M Studies

The MMMM (4M) standard is very similar to the MTM-1 standard. However, it will sometimes yield slightly different times due to differences in the calculation formulas). Furthermore, 4M accepts additional codes with a different format. The 4M system is only available directly from the MTM Association (www.mtm.org).