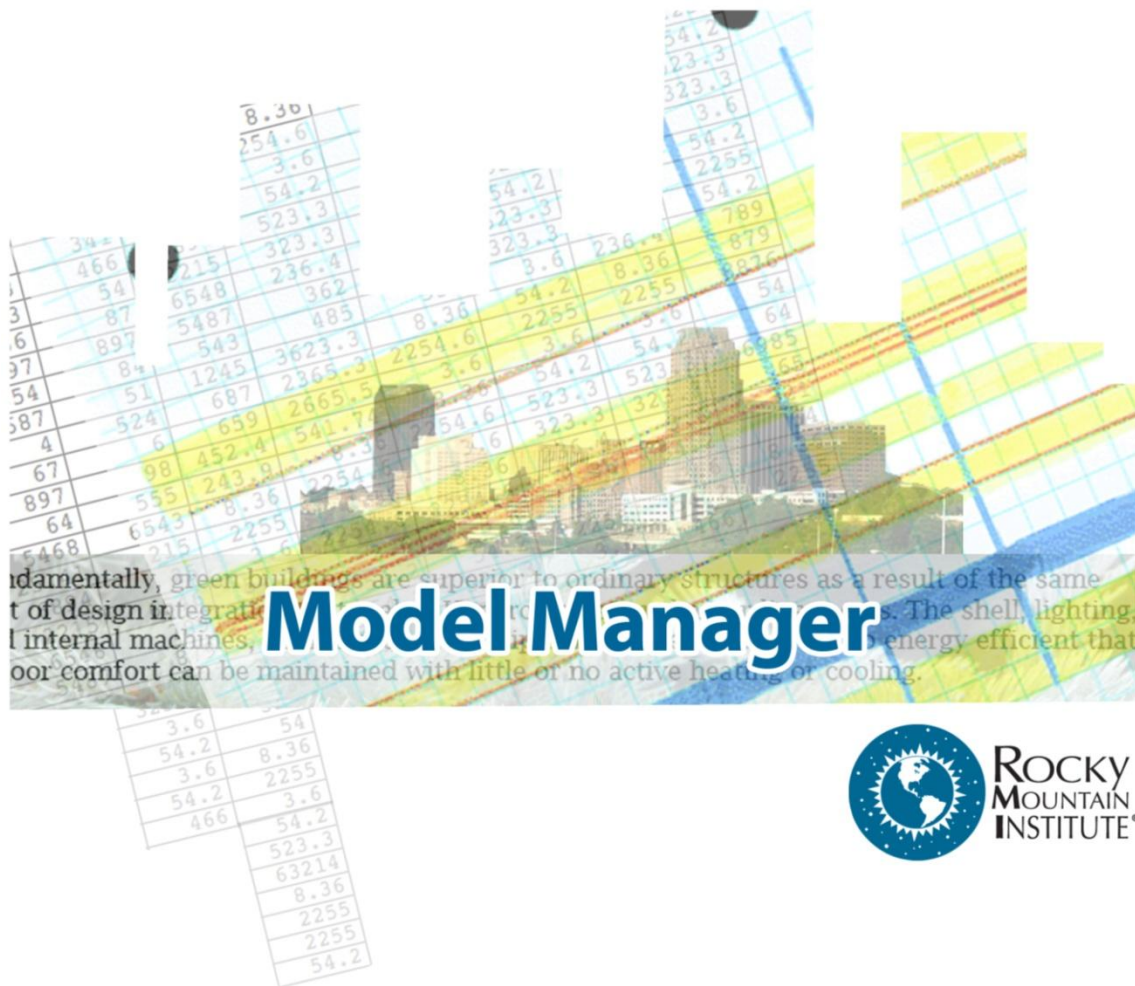


Model Manager

BETA TEST Version 3.0

Set Up and User's Guide



fundamentally, green buildings are superior to ordinary structures as a result of the same set of design integrally. The shell, lighting, internal machines, energy efficient that floor comfort can be maintained with little or no active heating or cooling.



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May 18, 2011

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Overview

Model Manager was developed by Rocky Mountain Institute (RMI) to support internal procedures for best-practices energy modeling. RMI is sharing a Beta Test 3.0 version of the tool with the modeling community so others may also incorporate these practices.

Model Manager is a pre- and post-processor to the eQUEST/DOE-2.2 computer simulation program. However, the concepts employed in its development might be applied in other support tools designed to work with other popular simulation programs.

Please note: Model Manager does not work with 64-bit Windows at this time due to issues with results extraction. We are working on the problem and will notify those who have downloaded the tool when the issue is resolved.

Model Manager works with a base project input file that has been created through the eQUEST interface. The tool permits the user to specify run parameter values through a spreadsheet, which allows multiple runs to be simulated from a single input file much like the parametric feature within eQUEST. However, the tool allows side-by-side comparison of parameter values for each simulation run. In addition, DOE-2 “include” files and “macro” commands can be incorporated, which provides more flexibility and allows more complexity when using one input file for modeling multiple building designs options.

After the batch runs have been simulated, the post-processing component of the tool extracts key results from the simulation output file. The data are categorized as: performance, metrics, building, plant, and systems. Values for each category are presented under a separate tab in an output spreadsheet. Results for each run are presented side-by-side to facilitate making result comparisons, identifying modeling errors, and understanding the impacts of individual design changes.

The currently available version is BETA TEST 3.0. To receive notification of updated versions, please fill out the survey for the tool, which is located at the bottom of the web page

<http://www.rmi.org/rmi/modelingtools> .

Please send bug reports to: toolkit@rmi.org.

Setting Up Batch Processing Capabilities

In order for the tool to be functional, the user must enable eQUEST's batch processing capabilities. This is done as follows.

1. Install eQUEST 3.64 on your computer. These files can be downloaded at no cost from:
<http://doe2.com/equest/>

Note 1: These directions are based on a Shared User Installation, which places program files in the C:\Documents and Settings\All Users\Documents\eQUEST 3-64 Data directory. If you selected the single user installation option, your program files will be located in C:\Program Files\eQUEST 3-64. If this is the case, substitute the latter path for the former in the set up instructions outlined below.

Note 2: One can run Model Manager from eQUEST 3.63 following the same steps outlined below but the automatic exit and re-entry to eQUEST from Model Manager will not work. You'll need to open eQUEST manually and select Tools-Batch Processing to initiate the runs. Follow the same steps below but place files in the eQUEST 3-63 directories.

2. Open with a text editor the eQUEST initialization file (EQUEST.INI) located in:
C:\Documents and Settings\All Users\Documents\eQUEST 3-64 Data\.

Note: As noted above, if you selected the single user installation option, the initialization file may be found in: C:\Program Files\eQUEST 3-64.

3. Add the lines listed in red below to the initialization file (example partial file listed below)

```
[preferences]
StoreResults_HVAC_Summary=1
;BDLErrorAction options: 1=> Continue w/Out Prompt
;           2=> Prompt w/ Continue as default
;           3=> Prompt w/ Exit as default
;           4=> Exit without prompt
BDLErrorAction=2
ShowBDLComKeyInToolTip=0
DisplayRangeCautions=1
ConfirmBDLMods=0
;3DRenderMethod options: 0=> Cell per component
;           1=> Multiple cells per component
3DRenderMethod=0
;3DManipulationMethod - used for what is displayed while rotating/zooming building
; options: 0 => Base Wire Frame (Exterior Walls and Roofs only)
;           1 => Wire Frame (all displayed components are reduced to wire frame)
;           2 => Surface or current view (no special action performed before manipulation)
3DManipulationMethod=0
```

EnableBatchProcessing=1 ; enables eQUEST batch processing

ShowBDLComKeyInToolTip=1 ; enables display of Command:keywords at input cells within eQUEST

ShowWizCompPropInToolTip=1 ; enables display of CompProp(?) at input cells within eQUEST

4. The user may also choose to add the line listed in blue. This will generate an individual output spreadsheet that includes system performance data for each run, which supplements the summary output data extracted by Model Manager.

Setting Up Data Extraction Capabilities with NHK Output Files

Model Manager makes use of eQUEST/DOE-2.2 DLL functions for reading results from simulation output files (*.nhk) and writing output values to a spreadsheet file. To enable Model Manager extraction capabilities, you'll need to register the D2Result.dll file.

1. **Copy** the D2Result.dll file from the eQUEST directory - C:\Program Files\eQUEST 3-64 – to your Windows directory - C:\WINDOWS\system32.
2. Register the file with windows by performing the following:
 - a. From the Windows Toolbar on your desktop select Start > Run >
 - b. Type the following into the Open: box: "regsvr32 D2Result.dll"
 - c. Click OK.
3. Enter the appropriate eQUEST Data path on the "Manage" tab, cell C3. This eQUEST 3-64 Data folder, which if you have installed as a single user should be something like: C:\Documents and Settings\username\My Documents\eQUEST 3-64 Data. If installed for all users, it might be: C:\Documents and Settings\All Users\Documents\eQUEST 3-64 Data. If you have installed a version other than 3-64, the version number should be different.

As noted above, Model Manager does not work with 64-bit Windows at this time due to issues with results extraction. We are working on the problem and will notify those who have downloaded the tool when the issue is resolved.

Setting Up the Base Project

Follow the directions below to set up the Base Project.

1. Create the Base Project Folder in the eQUEST project directory. For eQUEST 3.64 users, the project directory is located in: *C:\Documents and Settings\All Users\Documents\eQUEST 3-64 Projects*.
2. Download the example model manager and large office example eQUEST files available from <http://www.rmi.org/rmi/ModelingTools> and copy to *C:\Documents and Settings\All Users\Documents\eQUEST 3-64 Project\ Model Manager BETA TEST 3.0*. Skip to the next section of these instructions to run the large office example project. Once you have tried out the tool, you can create your own project eQUEST files to use with Model Manager. Create the new *.inp and *.pd2 files using the eQUEST wizards as usual and save them to a project folder in the *C:\Documents and Settings\All Users\Documents\eQUEST 3-64 Projects* directory. Follow the directions below to define your own parameters
3. Define Global Parameters within the project that will enable you to utilize user defined expressions for making substitutions to run input variables for the batch processing.
4. Through the eQUEST interface, create User Defined Expressions that incorporate the Global Parameters. These can be edited by right-clicking on the input value and selecting *Edit/View User Expression*. Details on how to write user expressions can be found in: DOE22Vol3-Topics.pdf, BDL Functions, starting on page 66.
5. More advanced users may choose to create user expressions by editing the input file directly using a text editor. You may also consider incorporating old-style DOE-2 macro commands in your input file for greater flexibility when working with a single base input file. To set macro variable values, use a parameter statement. If you use macros, be sure to safeguard your input file by naming it as [*].in]. It is the [*].in] file that Model Manager uses. This convention is followed as a precaution. If an input file [*].inp] with embedded macro statements is read into eQUEST, the macros statements are overwritten with their static value and they are lost.
6. Make sure the weather files that you plan to use in your batch runs are located in the eQUEST weather subfolder that indicates its file type (*TMY, TMY2, TMY3*). The weather subfolders are located in: *C:\Documents and Settings\All Users\Documents\eQUEST 3-64 Data\Weather*. If the file is not available, download it from links available on the the eQUEST website (http://doe2.com/index_Wth.html).
7. Simulate the Base Project through eQUEST before trying it with Model Manager to make sure it runs without error. If you are using DOE-2 macro commands, copy your file from [*].in] to [*].inp] to test.

Setting Up Model Manager

Download the most up-to-date version of the RMI Model Manager from the RMI Tools website (<http://www.rmi.org/rmi/ModelingTools>). The download files include an example large office simulation file set. You can skip to the next section – Running in Batch Mode – if you want to try the tool with the example files. Otherwise, follow the steps below to get your own eQUEST project to run with Model Manager.

Copy all of the Model Manager BETA TEST 3.0 files into your Base Project folder.

Set up the files for batch processing as follows.

1. Open “Model Manager 3.0.xlsm”. Under the “Manage” tab, update the file paths in cells C2 through C6. Include full path for cells C2 to C5.
2. Modify “Parms LU” tab for your project. Open Base Project in eQUEST. Under “Project & Site”, double click on Global Parameters within the component tree to see the parameter names and values in spreadsheet format. Copy all three spreadsheet columns of data to the “Parms LU”. Paste the fields over the existing data fields in the sheet.
3. In “Parms LU”, add a new column before the parameter values column. This must be named “Variable Type” in cell C4 (follow the existing format in the Model Manager spreadsheet). It describes the type of variable as either a float, integer, string or symbol. In general, number parameter values are “float” and character parameter values are “string”.
4. Add additional values columns. This is a good place to add comments to document the source of the values that you plan to use in the batch runs.
5. In “Batch Runs”, list the parameter names from the defined global parameters that you want to use in your batch runs.
6. Each run is defined as a column in the “Batch Runs” tab. You’ll need to enter the Base Project input file name (the file that all parametric runs stem from). To safeguard for use with macro commands, model manager uses the base input file with a [* .in] extension. If you didn’t use macros, just copy the base [* .inp] file you created through eQUEST to [* .in]. Enter text in the “Batch Run label” row to name the run. This label is added to the Base Project name to make the run unique. Under the “Parameters Substitutions” part of the spreadsheet, write the parameter values for the run.
7. The “Location” value in the “Batch Runs” tab sets the run weather file through a look up linked to the “Weather LU” tab. For each location you plan to model, you must complete the lookup table to include the weather subfolder and the weather filename. The weather files need to be stored in the folders as specified in order for the batch processor to find and access them.
8. The “Batch Runs” tab makes use of cell conditional formatting feature to more easily make a distinction between values that change from the 1st run column in other runs.
9. A binary flag in row 2 of the “Batch Runs” tab causes runs listed to be run or skipped. A value of “yes” in row 2 will cause the case to be run. A value of “yes” in row 7 will cause parameter substitutions to be made. A value of “no” in row 7 will result in the parameter values listed in the Base Project file being used.

Running in Batch

By pressing the “Create eQUEST Batch Files” button in the “Manager” tab, the tool creates 3 comma separated variable (CSV) files that are read by the eQUEST source-code batch-processing functions. By pressing “Exit to eQUEST”, the tool opens up eQUEST and selects Tools > Batch Processing automatically. Check the files listed on the batch screen to make sure they are the ones you intend to run. Press “Run” to complete the runs. Once they are finished, you will be returned to Model Manager.

Note: if you are running Model Manager with eQUEST 3.63 files, the “Exit to eQUEST” macro will not work. To manually run the files in batch through eQUEST 3.63, perform the following.

1. Exit the Model Manager by clicking on the “Exit to eQUEST” button under the “Manage” tab.
2. Open up eQUEST (it is okay to load any project to get it opened).
3. Under the “Tools” menu in eQUEST, select the “Batch Processing ...” menu item. Check to make sure the path/file loaded for the Batch Directives (.csv) file is the one located in your project folder. If not, browse to find “BatchData.csv” file in your Base Project folder.
4. Commence the batch processing by clicking the “RUN” button.
5. Note error messages if listed. Further details on run problems can be found in the BatchData log file.
6. Exit eQUEST once runs are complete and return to Model Manager to extract results.

Extracting Run Results

Once you have run your files in batch, you can extract key results from the simulation output files run. By pressing the “Extract Results Batch Files”, Model Manager will extract results for the “yes” Runs listed under the Batch Runs tab. The current version of Model Manager extracts key performance values related to overall performance, building, plant, system and metrics. RMI is working on refining these extraction capabilities. In the future, documentation will be provided that describes how users can modify Model Manager to customize the output data that are extracted.