Working Model 3.0 Demonstration

INTRODUCTION & INSTALLATION

WORKING MODEL - FAST AND POWERFUL ENGINEERING ANALYSIS FOR DESKTOP PC'S

Working Model is a powerful tool for engineering analysis, animation, and prototyping. It saves time and money in the design process by allowing you create and analyze dynamic physical systems on the computer prior to building costly prototypes.

OPERATING CONCEPT

The operating concept of Working Model is straight-forward. First, define a set of rigid bodies and constraints (e.g., motors, springs, and joints) by drawing them with a mouse. Then set your system into motion by selecting "RUN" -- there is no pre-processing or post-processing. You immediately receive accurate results.

With Working Model, you create systems that are driven by physical laws. You can test, re-design, and re-test your mechanical system, speeding your time to market by seeing which designs work better before you build them. Working Model allows you to fine-tune simulation parameters. You can define controllers to adjust properties of objects. You can create meters to plot the data that is taken during a simulation. You can design a model in your CAD program and import the data into Working Model. You can even use another application such as Excel or MATLAB to control your simulations.

DESIGNED WITH EASE-OF-USE IN MIND

Working Model was designed to be an integral tool in the design and analysis process for engineers of all types. Its highly intuitive interface makes it useful for engineers of all levels. An engineer can quickly test the performance of a shock absorber with a simple model, or create a highly complex dynamic model of an automobile engine. With its high degree of accuracy, Working Model can simulate almost any mechanical system.

SYSTEM REQUIREMENTS

Working Model 3.0 is available for both Macintosh and Windows personal computers. The following system configurations are needed to run Working Model:

WINDOWS:

- 486/33-based PC or higher. 486/66, 486/100, or Pentium-based computers are strongly recommended.

- Windows 3.1 or higher.

- 16 MB of physical RAM is strongly recommended. 8 MB of RAM is required (virtual memory must be turned on for systems with 8 MB of RAM, which will slow down the simulations considerably).

- 12 MB of hard disk space.

MACINTOSH:

- Macintosh II or above. (Any Macintosh with a CPU of 68020 or higher i.e. Macintosh II, SE 30, LC, Quadras and PowerPC-based Macintoshes. Macintosh Classic and Macintosh SE are not supported.)

- 8 MB of free RAM to run in 256-color mode You can use virtual memory to increase the available memory size (at the expense of execution speed).

- Mac OS System 7.0 or higher.

- 10 MB of hard disk space.

INSTALLING and UNINSTALLING

The demo version of the program is completely self-contained within one directory structure - it does not have a special installation routine. Once you have unzipped or copied the structure, simply run WM.EXE by double clicking it in File Manager or Explorer. Usually this would be in c:\wm3demo.

To uninstall the demo, delete the directory structure.

ABOUT THE DEMONSTRATION VERSION

These demonstration disks include a limited version of Working Model along with numerous example files. You will be able to build models, simulate their behavior, make measurements and interact with systems using the revolutionary Smart Editor.

Several features, however, have been disabled in the demonstration version. In particular, file saving functionality has been removed (Save, Save As, Print, Export, Cut, Copy, Paste and Duplicate). This version also limits the number of measurements and bodies that can be created to one meter and five bodies per document.

THE DEMONSTRATION GUIDE & TUTORIAL

This guide will provide you with information you will need to evaluate Working Model. It covers the Working Model tool palette, its menus, and a short overview of its powerful function language.

Also included are two tutorials that will step you through how Working Model can be used to analyze real-world problems. The tutorials will show you how to build and analyze a mechanism and import geometries from a CAD file.

ORDERING INFORMATION

We hope you enjoy the demonstration version. To order your full
copy of Working Model, you can:

1. Call Interactive Learning Europe on +44 (0)1223 425558 x724, or fax us
   on +44 (0)1223 425349, or

2. E-mail to us (Internet) at ile@logo.com

3. Mail your request to Interactive Learning at:

>   Interactive Learning Europe
>   124 Cambridge Science Park
>   Milton Road
>   Cambridge CB4 4ZS
>   United Kingdom

NEW IN VERSION 3.0

IMPROVED INTEGRATOR FOR THE SIMULATION ENGINE

Working Model 3.0 features a faster and more accurate integration method,
the Kutta-Merson method (also known as the Runge-Kutta 5 method). The
integrator has an embedded error checking mechanism that automatically
reduces errors and adjusts time steps. Kutta-Merson is the default integrator
for the Accurate simulation mode. The method is generally faster and more
accurate than the Predictor-Corrector method used in the previous versions
of Working Model.

**POINT-BASED AND GEOMETRY-BASED PARAMETRICS AND EXTENDED FORMULA
LANGUAGE-** Working Model features point-and geometry-based parametric capabilities in
modeling. You can specify the positions of constraints based on the geometry of a body, so that
their
positions are updated automatically when the bodies are modified. For example,
you can position a pin joint at a vertex of a polygonal body. You can reshape or
resize the polygon, while the pin joint will remain at the vertex. This feature allows
you to quickly look at many design configurations with a click of mouse.

You can also specify the geometry of a body based on another. Using this
feature, for instance, you can design a four-bar linkage where the length of
the crank link is based on a dimension of the coupler link. Resizing the
coupler link will automatically resize the crank link based on your
specification.

VIDEO FOR WINDOWS EXPORT (Windows version only)
Working Model 3.0 can export the simulation history as a Microsoft Video
for Windows file. Video for Windows can playback the simulation result
more quickly and smoothly than Working Model. Video for Windows
movies can be distributed to show the animated result of your simulation to
those who do not own Working Model.

WORKING MODEL AS APPLE EVENTS/DDE SERVER
Other advanced applications can send scripting commands (using Working

Model Basic) to Working Model. As long as the external application
supports a few key features of DDE and/or Apple events, it can send to or
invoke an entire WM Basic program in Working Model. The Macintosh
version of Working Model supports Apple events, while the Windows
version supports DDE.

OBJECT SNAP - An automatic "snap" feature often seen in CAD applications.
As you create constraints and bodies, your mouse pointer can snap to
predefined points on the body geometry, allowing you to position constraints
and bodies precisely, right from the start.

REDESIGNED DIALOGS AND WINDOWS - Dialogs and all utility windows
are redesigned to improve refresh speed and their appearance. In addition, the
utility windows are sized smaller so you can view more of your design work.

CLEAR INDICATION OF COLLIDING BODIES - When a pair of bodies
are selected, the Object menu clearly shows whether the two objects are set to
Collide or Do Not Collide.

MULTI-PURPOSE COORDINATES BAR - The Coordinates bar now has a
versatile functionality to speed up your design work. You can quickly modify
the geometry and position of objects by typing the desired properties directly
on the screen.

REDESIGNED MENUS - Working Model's main menu is re-organized to
enhance consistency with other Macintosh- or Windows-based applications.

LIST OF FILES RECENTLY OPENED - Working Model stores a list of the
four most recently opened files. Without searching through the file hierarchy of
your hard disk, you can quickly resume your work by choosing items from this menu.

IMPROVED PROPERTIES WINDOW - The selection pop-up in the Properties
window now shows the name of each object in addition to its ID. Once you
customize object names, you will be able to find objects very quickly.

IMPROVED CENTER OF MASS ICON - For clarity, the center of mass for
each body appears as a symbol used in standard mechanics diagrams and schematics.

ENHANCED SMART EDITOR - Working Model features the unique Smart Editor.
The Smart Editor of Working Model 3.0 is enhanced to reduce your design effort. For example,
when you enter numerical values into dynamic constraints such as a length
actuator and a rotational motor, the modification takes effect immediately. You can
reshape and resize bodies without detaching from any constraints.
For example, when a length of a crank link in a four-bar linkage is modified,
the Smart Editor will automatically adjust the location of constraints and
modify the rest of the linkage mechanism.

EMBEDDED SCRIPTING WITH WORKING MODEL BASIC - Working
Model has an embedded scripting system called Working Model Basic.
The language closely resembles Microsoft Visual Basic and gives
full access to the complete Working Model database and features.

In the full version of Working Model, (the editor has been disabled in the
demonstration version) you can write programs to create, modify, and join
bodies and constraints. You can run iterative simulations overnight and

export the data files for future review. You can design custom dialog boxes
to create a new simulation environment. In addition, you can share scripts
provided by third-party vendors and add them to Working Model's menu bar.

IMPORT / EXPORT - Working Model includes import/export options.
With Working Model, users can import CAD drawings in DXF format
from popular applications such as AutoCAD R13, CADKEY and Vellum
and use them immediately in simulations.

INTER-APPLICATION COMMUNICATION - Working Model uses
Dynamic Data Exchange (DDE) on Windows and Apple Events on
Macintosh to communicate with other applications during a simulation.
With this feature, users can specify physical models of real-life mechanical
designs and then control them externally through other programs.   For
example, Microsoft Excel can be used to calculate control signals.   Data
from Working Model is sent to the spreadsheet which calculates the control
signals based on the current state of the system. New control information is
then received by Working Model and used to calculate the next simulation
frame. Programs supported in addition to Excel include MATLAB, Mathcad,
and Lotus 1-2-3.

FILE COMPATIBILITY WITH PREVIOUS VERSIONS - Working Model 3.0
can read any file made by previous versions of Working Model, including the
Working Model Student Edition. Working Model 3.0 can also save files so that
they are compatible with Working Model 2.0 and Working Model Student Edition.

NOTE: ON INCOMPATIBLE BWCC.DLL PROBLEM

If you encountered the following warning message when you tried to launch Working Model:

"An old version of BWCC.DLL is loaded in memory. Working Model cannot run with this version
of BWCC.DLL."

you have another application running on Windows using an older version of BWCC.DLL, a shared
library module. To correct this incompatibility problem, you need to either quit such
application before you launch Working Model, or replace the older BWCC.DLL with the newer
version (provided in the Working Model 3.0 directory). The new version of BWCC.DLL is
compatible with applications that use the older versions.

To proceed with the replacement:

1. Find the existing instances of the file BWCC.DLL in your system, other than the one provided in
the Working Model 3.0 directory.

You can use File->Search menu in the Windows file manager to find out the existing BWCC.DLL.

2. Rename the older BWCC.DLL as BWCC3.DLL. (Keep a backup in this fashion, just in case).

If the Windows generates an error message while you are trying to rename the file (e.g., "this file
may be in use"), BWCC.DLL is already loaded in memory and you cannot rename it until
you exit Windows. In this case, exit Windows, rename the file,and complete the step 3 below
before restarting Windows. If you restart Windows prematurely, the startup applications that
require BWCC.DLL may fail, yielding unpredicable results.

3. Copy the file BWCC.DLL located in the Working Model 3.0 directory to wherever you found the
older version of BWCC.DLL.

4. If you had to exit Windows in step 2 above, restart Windows now.

5. Launch Working Model and enjoy!

If you require further assistance, please contact your authorized Working Model dealer - Interactive Learning.