

# ADINA System Newsletter

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As some of you may have already observed, we release a new version of the ADINA System about every 9 to 12 months. ADINA 7.4 was released in September 2000 and we are now working towards ADINA 7.5. We are excited about the many new features in ADINA 7.5 and are confident that they will make the use of ADINA much easier for you.

In this newsletter, we present some of the major interesting enhancements in ADINA 7.5. We thank many of our users for their feedback and continue to welcome all your suggestions for improvements.

## A Customized Environment

In ADINA 7.5, users can customize the way they want to work with the ADINA User Interface (AUI). The following customizations are available:

- You can design your own toolbars by dragging icons in or out of the toolbars. You are free to arrange the icons so that they are most comfortable to you.
- Macros allow users to run commands with a single mouse click. For example, you can use macros to run commands that set up your preferences, specify control parameters, define materials, or build a geometry model.
- Shortcut keys to the menu let you access the menu items quickly. For example, you can assign Ctrl + B (see Figure 1) to change the background color instead of using the menu Edit > Background Color.

On the Unix platform, only the macro definition customization is supported.

### New Icons

Some very useful features in the AUI require many mouse clicks to access them through the dialog boxes. In ADINA 7.5, new icons are designed to

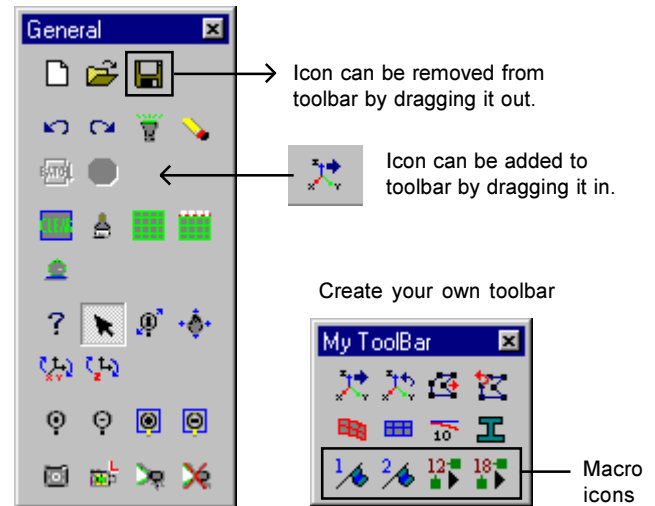
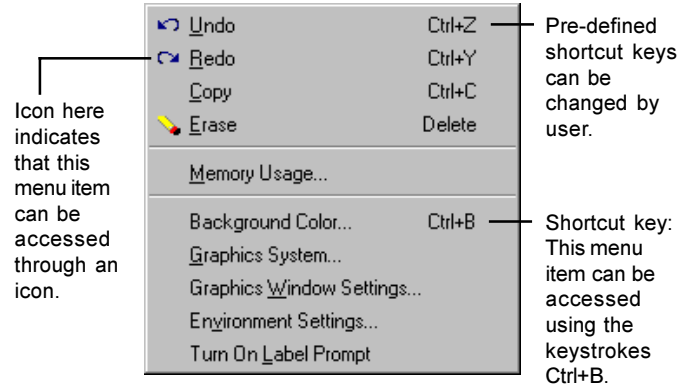


Figure 1: A Customized Environment

## Special Training Seminar

There will be an advanced training seminar on June 18-19, 2001. See behind for details.

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access these features easily. Some of the new icons are highlighted below.

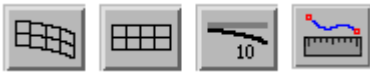
- To display all the mesh lines, only the outline, element group outline or no mesh lines.



- To display the results at the previous time step, next time step, first time step, or last time step.



- To toggle on/off the display of the deformed mesh and the original mesh; to scale the maximum displacement to 10 percent of the frame length; to measure distance between 2 points or length of a line.



- To save the current view as the default view or reset the default view to factory settings; to save the current display settings as the default or to reset the default display to factory settings.



Also, if a task that you need to perform repeatedly is not available as a standard icon, you can assign the actions to a macro icon. These tools will enable you to create an efficient environment to work in.

### Hexahedral Meshing

In ADINA 7.5, brick elements can be automatically generated on general solid bodies. In general there will be some tetrahedral elements generated also. In the example shown in Figure 2(a), the volume occupied by brick elements is about 95.6%.

An alternative way to create a hexahedral mesh on the part as shown in Figure 2(b) is to generate a quad mesh on the top face and then create the

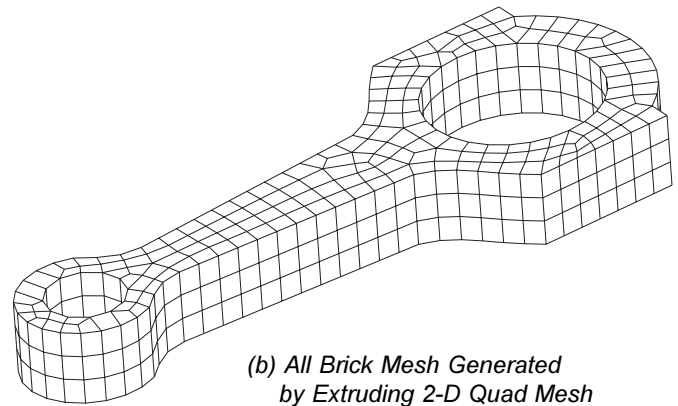
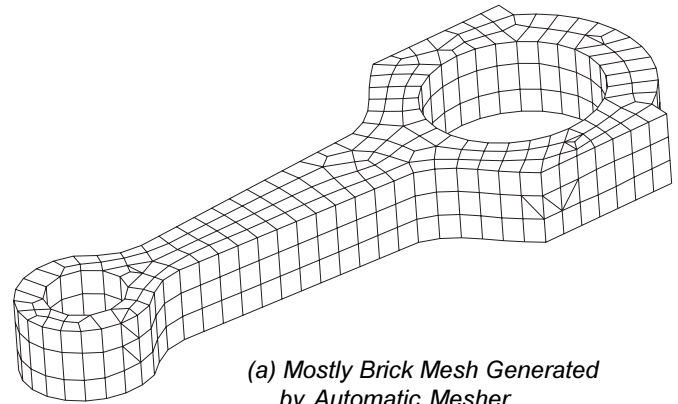


Figure 2: Hexahedral Meshing

brick mesh from the 2-D quad mesh. This method can only be used for parts that can be represented by extruding or revolving a 2-D quad mesh.

When creating brick elements from 2-D quad elements, the following options are available:

- Pressure on 3-D element faces can be generated from pressure on 2-D element edges.
- Fixed boundary conditions can be assigned to generated nodes on the 3-D mesh corresponding to fixed boundary conditions on nodes of the 2-D mesh. **(new)**
- 3-D contact surfaces can be generated from 2-D contact surfaces. **(new)**
- Material and initial strain axes can be generated on the brick elements based on the axes on the 2-D elements.

## Large Strain Shell Analysis

A very important capability in ADINA 7.5 is the ability to effectively model metal forming problems. We have reported on this new feature earlier but would like to emphasize it again.

In metal forming, the large strain shell element with bilinear plastic, multilinear plastic, and orthotropic plastic material models can be used with an efficient contact algorithm. Significant improvements in the contact algorithm available in ADINA 7.5 for metal forming problems make the analyses very effective. Accurate results are achieved for many kinds of metal forming analyses.

As an example, we show the results obtained for the deep drawing of a cylindrical cup with orthotropic material properties (see Figure 3). The results obtained in our simulation are compared against experimental results (see Figure 4).

Some key points about this analysis:

- 867 MITC 4 large strain shell elements
- Orthotropic plastic material model
- Rigid target contact
- Frictional contact with friction coefficient of 0.04

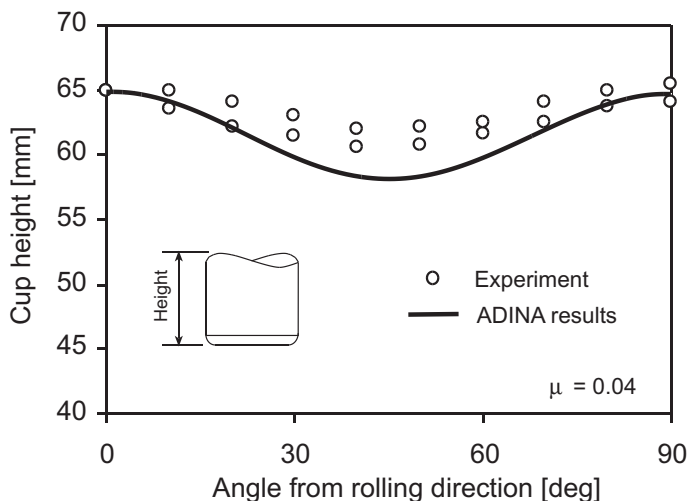


Figure 4: Comparison of Cup Height

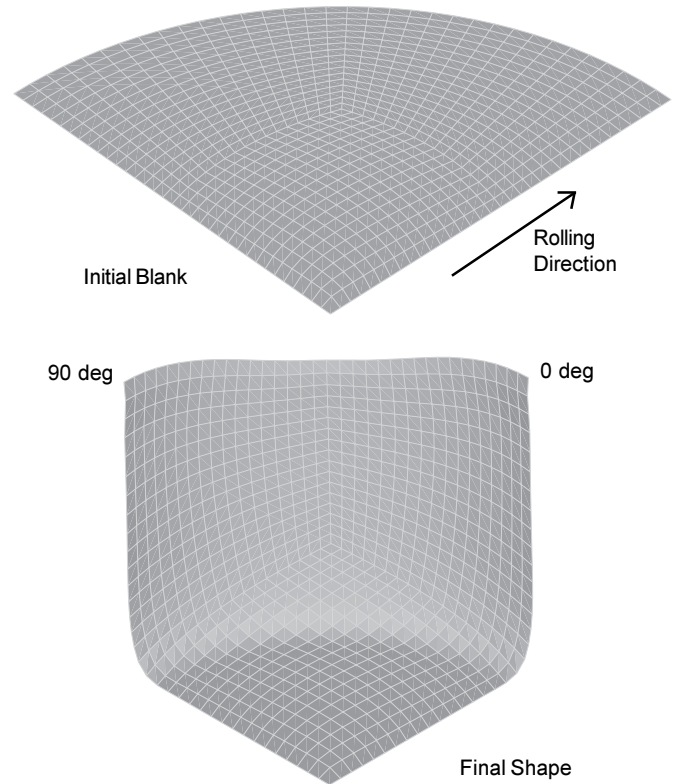


Figure 3: Quarter Model used for the Simulation of Drawing of Cylindrical Cup

## Online Help

We recognize that a good and comprehensive help system is essential in making the ADINA System easy to use. For ADINA 7.5, our documentation will include a HTML-based help system. This interactive help system will provide guidance to new users as well as offer more advanced information for experienced users.

To offer a comprehensive help system requires much effort and time. In ADINA 7.5, the complete help system will not yet be in place. We begin by offering help on "Getting Started" which will cover the basic topics in finite element modeling, such as defining geometry, applying loads and boundary conditions, etc. Detailed help on some advanced topics (e.g. contact analysis) will also be ready.

This help system will be continuously strengthened in future releases to cover the use of the complete ADINA System.

## Supported Platforms for ADINA 7.5

The planned minimum operating systems (OS) to be supported for ADINA 7.5 are listed below.

Platform	Minimum OS level
Compaq	Tru64 UNIX 5.0
HP	HP-UX 10.20
IBM	AIX 4.3.3
SGI	IRIX 6.5
Sun	Solaris 7
PC	Linux kernel 2.4 <sup>1,2</sup>
PC	Windows 98/Me, NT 4.0, 2000

<sup>1</sup> If there is delay in the release of Linux kernel 2.4 by major vendors, we will support Linux kernel 2.2 instead.

<sup>2</sup> We plan to support ADINA-M on Linux also.

The parallel version will also be available on the Windows NT/2000 platform in addition to the Compaq, HP, SGI, and Sun platforms.

## Special Training Seminar

In view of the upcoming M.I.T. Conference, we will conduct an advanced training seminar on the state-of-the-art analysis of fluid flows with structural interactions (FSI) instead of our regular training course. This seminar will be held on June 18-19, 2001 (just after the M.I.T. Conference).

Both the theory and modeling aspects of FSI analysis will be covered in the seminar. Please see our web site for details on this seminar.

## MIT Video Course

As some of you are aware, there is available an MIT video course on Finite Element Procedures presented by Dr. K. J. Bathe. The video course comes in 2 sets of videotapes — a 12 videotape set on linear analysis and a 28 videotape set on nonlinear analysis. This video course is now available through the DOES Institute.

For details about this video course, including how to order, please visit the Educational page of our web site which will have a link to the appropriate DOES web page.

### First M.I.T. Conference on Computational Fluid and Solid Mechanics, June 12-15, 2001

Please mark your calendars for the above Conference which will be held on the M.I.T. campus. Note the additional day, June 15, added to the Conference due to the tremendous response received.

#### The mission of the M.I.T. Conference:

“To bring together Industry and Academia, and to nurture the next generation in computational mechanics.”

We hope to see many of you at the Conference, which promises to be a very exciting and valuable event.

For more information on the Conference, see <http://www.firstmitconference.org>.



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