

ADINA System Newsletter

Volume 3, Issue 2

www.adina.com

December 2000

As we approach the end of another year, all of us at ADINA R & D would like to wish you a Happy Holiday Season and a good start to the New Year.

This has been a very good year for ADINA R & D, both in terms of the achievements in our program development and the increase in the number of ADINA installations, including several Fortune 500 companies in the U.S.

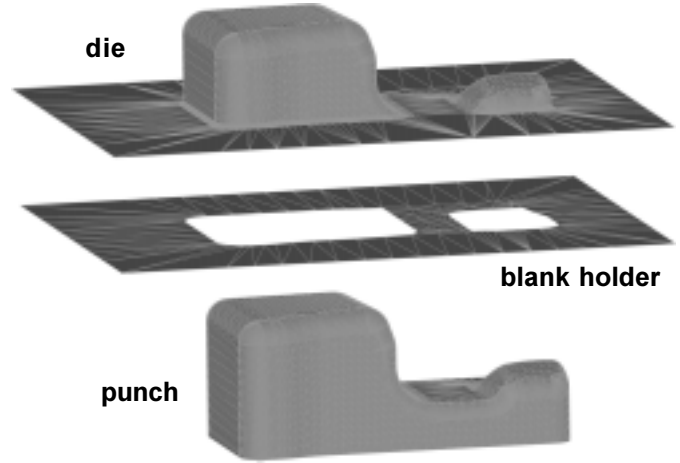
Many unique and challenging problems were successfully solved using ADINA. Some of these success stories were highlighted in previous issues of the newsletter. For certain other problems, we are unable to present them due to the confidentiality agreements with our users.

In September this year, we released the ADINA System 7.4 with many major enhancements. We are now working towards new improvements for version 7.5. We highlight some of our development plans in this newsletter.

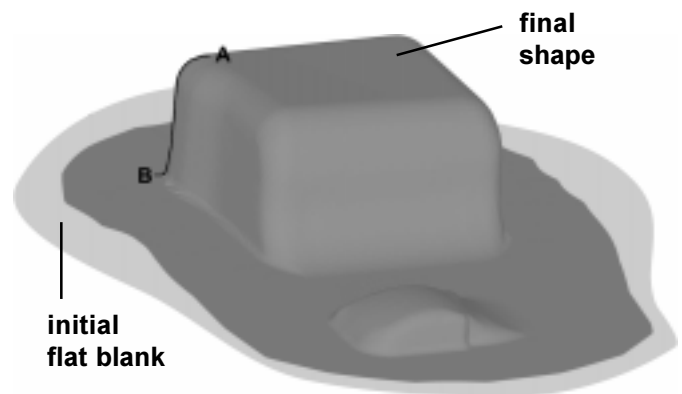
Improved ADINA Web Site

One of the ways we are working to make ADINA a more effective tool for our users is through our web site. Recently, we did a major update on our web site with significant enhancements such as:

- More comprehensive information about the ADINA System is provided.
- Better support for our users, including frequently asked questions (FAQs), examples, and download of program updates.
- Easier and more systematic navigation of the web site.
- New Application Showcase section featuring the use of ADINA for analyses such as artificial lung, shock absorber, car headlamp, etc.



a) Tool Geometry



b) Simulation Results

Figure 1: Deep Drawing of an Oil Pan

Training Classes

The next ADINA/AUI training course will be held at ADINA R & D on January 25-26, 2001.

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In the download page, you can view the list of known errors that have been fixed for ADINA 7.4. As the download page is meant only for current users of ADINA, a password is required to access the page. Current users can send an email to support@adina.com to request the password.

Other new pages on our web site include:

- Product pages describing each module of the ADINA System, including all our CAD interface programs.
- Systems page listing the platforms and operating systems that are supported.
- Educational page highlighting the attractive options offered for the use of ADINA as a teaching and research tool.

Please visit our new web site to check out the enhancements.

Development Plans

The mission of ADINA R & D is to provide one finite element program system — the ADINA System — that can be used to perform comprehensive finite element analyses of structures, fluids, and fluid-structure interactions.

In our development efforts, we continue to focus on the following two important aspects:

- Enhancements in state-of-the-art capabilities in the ADINA solution programs.
- Improvements to the ease-of-use of the overall system.

Some of the major developments currently pursued are:

- An interactive online help system based on HTML. New users will learn to use the ADINA System faster with help on "Getting Started". Hints and recommendations will be provided for inputs and selections in dialog boxes.

- Customizable toolbars where users can create their own toolbars from a list of provided icons. Icons for macros are also provided for users to associate their own commands with the macros.
- Easier selection of nodes and element faces for application of loads and boundary conditions interactively.
- Selection of entities with Marquee box on PC Windows version.
- Significant improvement in graphics speed, particularly in the initial display of the mesh.
- Unit selection for importing Parasolid files with the ADINA Modeler (ADINA-M).
- Generation of brick elements for general solid bodies.
- Strengthening of metal forming capabilities, consideration of shell thickness in contact, and more efficient handling of rigid targets.
- Coulomb friction that is dependent on normal contact pressure.
- New creep law for all the creep material models.
- Improvements for large strain shell analysis with bilinear plastic, multilinear plastic, and orthotropic plastic material models.
- Strengthening of adaptive meshing for problems in fluid flows with structural interactions (FSI).
- Use of porous media material model with FSI problems.
- Parallel processing capabilities for PC Windows version.
- 64-bit solution programs to work with 32-bit ADINA User Interface and TRANSOR interface to I-DEAS and MSC.Patran.

More details of the development items will be provided in the upcoming issues of the newsletter. However, you are most welcome to contact us if you urgently need more information on any of the above items.

Application Showcase

The analysis of sheet metal forming processes requires effective finite element procedures to handle the high nonlinearities encountered such as large strains, contact, and material nonlinearities. The procedures must also effectively handle the other difficulties involved with the analysis of shells.

In general, codes based on explicit dynamic analysis procedures have been used for the analysis of sheet metal forming. Such analyses can be computationally expensive, require tuning of the model, and do not accurately represent the actual physics of the process.

It is thus widely recognized that an **implicit** dynamic solution without tuning of the model would be preferred as it accurately represents the actual physical process; provided the solution is also computationally effective.

We present in this newsletter the effective solution of the deep drawing of an oil pan (see Figure 1) using ADINA. Such analysis is often encountered in the automotive industry.

The **implicit** dynamic solution was obtained using the new rigid target contact option in ADINA. The key points in this analysis are:

- sheet metal modeled with 16,922 MITC4 shell elements
- tool geometry defined with 16,500 rigid elements
- effects of spring back are included
- simulation results compare very well with experimental measurements (see Figure 2)
- solution time is close to that required for explicit dynamic analysis

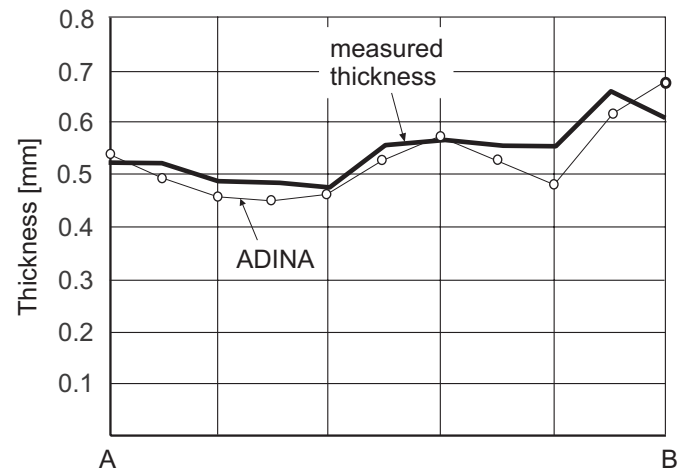


Figure 2: Comparison of thickness along line A-B; Location of line A-B shown in Figure 1

ADINA News Group

We would like to keep you informed about the latest developments in the ADINA System. In order to keep you regularly updated, we are forming an ADINA News Group where members will receive news on the ADINA System through email.

For example, members may receive news on the release of a new program version, postings of new FAQs on the web, availability of new downloads of ADINA program updates, or schedule of upcoming training courses.

If you are interested (even if you are not a user) to join the ADINA News Group, please send an email to:

newsgroup-request@adina.com

with **SUBSCRIBE** as the first and only line in the message body.

Many of you who had responded to our request for your email addresses have already been included in the news group. If so, you will receive an email to let you know that you are already subscribed.

Note that you can unsubscribe to the ADINA News Group at any time.

User Hints

When modeling fluid flow, the following general guidelines are useful.

For Air:

- If Mach Number > 0.3, use high-speed compressible flow.
- If Mach Number < 0.3: use incompressible flow; except for confined flow with moving boundaries, use low-speed compressible flow.

For Liquid:

Incompressible flow should always be used except for the following 2 cases, where slightly compressible flow is used.

- Confined flow with moving boundaries.
- When wave propagation effects are present.

Various News Items

- We are glad to report that our tests show that the ADINA System installs and works without problems with respect to Windows Me.
- TRANSOR for MSC.Patran 9.0 is now available on Windows NT/2000.
- We will soon complete the newly revised ADINA-F Theory and Modeling Guide. We will let you know through our web site when it is released and let you know how you can download it. If you are in the ADINA News Group (see above), we will also inform you by email.

Upcoming ADINA Trade Shows and Seminars

ADINA Seminars on Metal Forming and FSI

February 8-15, 2001

M. Kawka, Z. Hou

Tokyo/Osaka, Japan

ADINA Seminar

March 6-7, 2001

K. J. Bathe, L. Tan

München, Germany

National Design Engineering Show (with SolidWorks)

March 5-8, 2001

Chicago, Illinois

CeBIT

March 22-28, 2001

S. Mohasseb, J. Dong

Hannover, Germany

Please contact us if you would like more information about the above events.

**First M.I.T. Conference on Computational
Fluid and Solid Mechanics, June 12-14, 2001**

Please mark your calendars for the above Conference which will be held on the M.I.T. campus.

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

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

You can still submit an abstract for the Conference. 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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