ADINA System Newsletter

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ADINA System 7.4 Released

We are very pleased to announce that the ADINA System 7.4 has been released. This is a major new release with many new capabilities and enhancements, including the update of all the manuals which are now available as on-line documents.

With the release of ADINA 7.4, we also start a new volume for our quarterly newsletter. Some of the major new features in ADINA 7.4 have been presented in our previous newsletters (Volume 2, Issues 2 - 4). These newsletters also offer some useful hints in using ADINA 7.4. If you would like to refer to these previous issues, but do not have a copy, you can view or download them from the Support page of our web site.

Supported Platforms

We list below the supported hardware platforms and minimum level of the operating system (OS) for ADINA 7.4.

Platform	Minimum OS level
DEC	Digital Unix 4.0 D
HP	HP-UX 10.20
IBM	AIX 4.3
SGI	IRIX 6.5
SUN	Solaris 2.6
PC	Linux kernel 2.0.35
PC	Windows 95/98, NT 4.0, 2000

Note that the ADINA Modeler (ADINA-M) is not available on the Linux platform.

The 64-bit version of the ADINA System 7.4 is available for the SGI IRIX 6.5 and HP HP-UX 11 platforms.

We are testing the ADINA System 7.4 on Windows Me. Please check out the News page of our web site for the result of our testing.

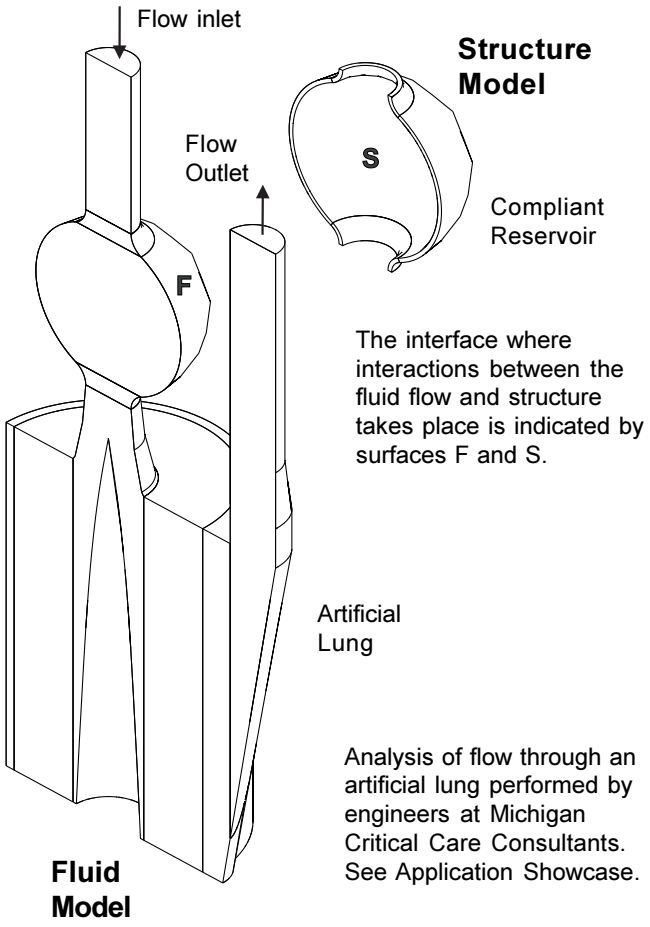

Figure 1: FSI Analysis of Artificial Lung

Training Classes

The next ADINA/AUI training course will be held at ADINA R & D on November 9-10, 2000.

Inside This Issue

ADINA System Programs

The ADINA System 7.4 consists of the following modules:

ADINA-AUI Complete pre- and post-processing capabilities for all the ADINA solution programs.

ADINA-M Add-on module to ADINA-AUI for solid modeling and integration with other Parasolid CAD programs.

ADINA The premium finite element program for linear and highly nonlinear analyses of solids and structures.

ADINA-F Analysis of compressible and incompressible flow with state-of-the-art capabilities for moving boundaries and automatic remeshing.

ADINA-T Heat transfer analysis of solids and structures.

ADINA-FSI The **leading** code for fully coupled analysis of fluid flow with structural interactions (multi-physics). Licenses for ADINA-F and ADINA required to run this program.

ADINA-TMC Thermo-mechanical coupled analysis, including contact with heat transfer. Licenses for ADINA-T and ADINA required to run this program.

CAD Interfaces

We are always working to make the modeling task faster and easier to use. In addition to improving the ADINA-AUI, we partner with various CAD companies to provide an effective modeling environment for our users. We list here the CAD interfaces that we provide for ADINA 7.4.

All Parasolid-based CAD systems:
ADINA-M provides the natural interface to all Parasolid-based CAD systems, such as Unigraphics, SolidWorks, and SolidEdge. Both text and binary files created for Parasolid version 11.1 or below can be imported.

SDRC I-DEAS:
TRANSOR for I-DEAS is a tightly integrated interface that works within I-DEAS. It combines the modeling and post-processing capabilities of I-DEAS and the power of the ADINA solvers in an easy-to-use environment. I-DEAS Master Series 5, 6, 7, and 8 are supported.

MSC.Patran:
The ADINA Preference template allows users to create their finite element models in MSC.Patran for analyses using the ADINA solvers. The results are then post-processed in MSC.Patran. It supports MSC.Patran 8.5 and 9.0. The PC Windows version will be available soon. Check out our web site for announcement.

Pro/ENGINEER:
Two forms of interface to Pro/ENGINEER are available. The first form of interface converts Pro/ENGINEER geometry to ADINA-M geometry which is then imported into ADINA-AUI. In the second form (only on Unix), the Pro/ENGINEER geometry is accessed directly from within ADINA-AUI. The Pro/ENGINEER interface supports releases 20 and 2000i.

AutoCAD:
The AutoCAD interface supports Mechanical Desktop 3 and 4. It converts solid geometry from Mechanical Desktop to ADINA-M geometry.

IGES:
The IGES interface is commonly used for geometry from CAD systems where a direct interface is currently not available (e.g. CATIA). IGES files can be imported into ADINA-AUI as wireframe or solid geometry.

On-line Manuals

All the manuals have been updated for ADINA 7.4. They are available as on-line documents in pdf format, except for TRANSOR for I-DEAS Users Guide which is in HTML. You will need Acrobat Reader to view the pdf files. You can install Acrobat Reader from the ADINA CD-ROM if needed.

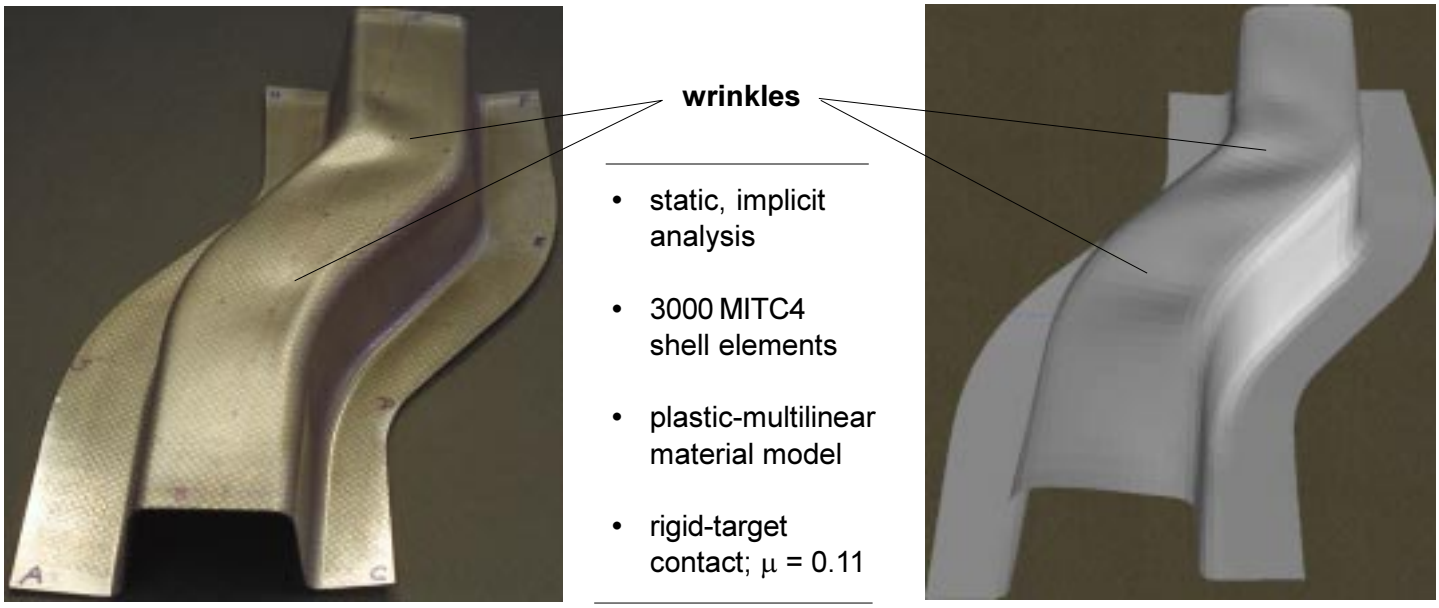

Figure 2: Comparison of simulation result with experiment for S-rail benchmark. Figures show final shape after springback.

The on-line manuals can be accessed through the Help menu in ADINA-AUI. On PC Windows, you can choose to install the on-line manuals onto your hard disk or you can access them from the ADINA CD-ROM.

Metal Forming Simulation

We are making very good progress in our developments for metal forming simulation.This new capability is developed based on strong technologies in ADINA such as:

- high performance elements
- implicit static and dynamic time integration
- accurate contact algorithm

ADINA 7.4 already offers some good capabilities in metal forming simulation. These capabilities are being strengthened much further in our current development efforts.

In Figure 2, we show the result of our simulation for an S-rail benchmark problem and the comparison with experimental results. Very good similarity is observed in the wrinkling pattern.

Application Showcase

ADINA-FSI offers the state-of-the-art tool for **fully** coupled analysis of fluid flow with structural interactions. An important enhancement in ADINA 7.4 is the option to use direct coupling or iterative coupling for solving the governing equations. In each case, the full coupling is solved.

The use of ADINA-FSI for industry problems continues to expand. In this issue, we highlight an application in the medical field where engineers at Michigan Critical Care Consultants (MC3) used ADINA-FSI to successfully analyze blood flow through an artificial lung. The objective of the analysis was to optimize the design of the artificial lung. Figure 1 shows the model that was used.

The heart pumps fluid into the compliant reservoir where interactions between the fluid flow and structure take place. The reservoir (structure) expands to accept the fluid and then passes it into the lung. The core of the lung is a fiber bundle which is modeled as a porous medium. The porosity was calculated from the fiber geometry and spacing, and the permeability was measured experimentally.

The excellent results obtained in this FSI analysis were presented by MC3 at the annual conference of the American Society for Artificial Internal Organs (ASAIO).

You can see the picture of the artificial lung developed by MC3 and read more information about it at http://www.mc3corp.com/lung.html.

ADINA in Universities

Besides being used widely in industries, the ADINA System is also used effectively for research and teaching in the universities.

Research:

- Users can program their own types of loads, elements, and material models.

Teaching:

- Special educational license allows unlimited usage of ADINA throughout the university.
- Capability of analyzing fluids and structures in one program system.
- 900 nodes version that can be freely distributed to students.

Please contact us for more information on the special package that we offer for educational users.

Special 900 Nodes Version

We are pleased with the excellent response we continue to receive for our offer of the special 900 nodes version. This special version is available for as little as US$120. It does not require any password and you can install it on as many PCs as you like. Please check out our web site for ordering details.

Our current offer entitles the owner of the 900 nodes version to receive new releases for free. If you have purchased the 900 nodes version, you may contact us to send you the free upgrade to the 900 nodes version for ADINA 7.4.

Note also, that you can still request for a free animation CD which features several interesting applications using the ADINA System. The animations are also included in the PC Windows full version CD and the 900 nodes version CD.

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."

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

You can find more information on the Conference at http://www.firstmitconference.org.

ADINA R & D, Inc.
71 Elton Avenue
Watertown, MA 02472
Telephone: (617)-926-5199
Fax: (617)-926-0238
Email: support@adina.com

For additional information about ADINA please visit us at **www.adina.com**

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