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1998

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- [New Version of MSC/InCheck for SolidWorks Announced](#) (July 14, 1998)
- [MSC Names Dan Bryce Chief Information Officer to Head Information Systems Function](#) (July 9, 1998)
- [Fondmetal Minardi Ford and MSC Announce Expansion of Working Relationship](#) (July 8, 1998)

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WEB SITE: <http://www.macsch.com/support/support.html>

Where to Get Help

If you have a question about MSC/PATRAN, try finding the solution in our on-line help. It's easy to find with our **context-sensitive** and **topical help** system. Once in the help system, you can find any related topic using the hypertext (indicated by red-colored text); or you can access any document in the system using the **Navigational Menu**, which appears at the top of every page.

The on-line help system consists of a large group of view-only documents containing hypertext commands that link MSC/PATRAN to the help system, and link the documents to each other to display related information. These hypertext documents allow you to explore information nonsequentially, using the paths provided via hypertext. The hypertext is indicated with red-colored text. This system was designed to make it easy to obtain quick-access to the documentation while using MSC/PATRAN.

Accessing Help from any MSC/PATRAN Form (Context-Sensitive Help)

If you need help interpreting the buttons on a MSC/PATRAN form or figuring out which step to take first, move the cursor onto the form and press the F1 key. The help system will display the appropriate page of the on-line help, describing the form and indicating what you need to do to continue in MSC/PATRAN.

Transformation Options

30
Rotation increment (deg)

☒ Model Relative
☐ Screen Relative

.3
Pan factor

.5
Zoom factor

Reset

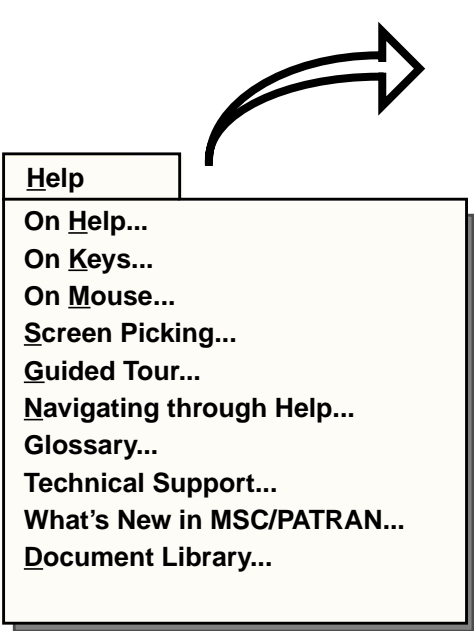
OK Cancel

Place your cursor anywhere
on the form...

Press the **F1** key for help.

Accessing Help from the Main Form (Topical Help)

From the MSC/PATRAN main form, the **Help** selection looks like this:

	On <u>H</u> elp	Describes how to use the help system.
	On <u>K</u> eys	Describes the function keys and other special characters.
	On <u>M</u> ouse	Explains how to use the mouse with forms, widgets, and in graphics windows.
	<u>S</u> creen Picking	Describes screen picking in MSC/PATRAN.
	<u>G</u> uided Tour	Accesses a tutorial to help you get started in MSC/PATRAN.
	<u>N</u> avigating through Help	Lets you explore the help system from this hypertext representation of the MSC/PATRAN main form. You may select and jump directly to the related sections of documentation.
	Glossary	Contains a list of terms relating to MSC/PATRAN.
	Technical Support	Explains how to contact the Technical Support Centers by phone, e-mail or the World Wide Web.
	<u>D</u> ocument Library	Provides easy access to every document in the Help system. The Library remains open after selections are made.

Navigation Menu

The Navigational menu is the bar running across every page of the on-line help system. On the left side is the page locator. The rest of the bar contains a strip of hypertext commands, denoted with the red. The Navigational menu is presented below.

Page locator. Identifies the name of the current document being viewed, as jumping from one document to another in the help system may get confusing. Page number will match that of the printed manuals.

Strip of hypertext commands. See description of each below.

Part 2: Basic Functions
Using On-Line Help Page 2-#

Options

Navigation icons

Done

Options	The key to accessing any document in the help system from any page.	Navigation icons	Retraces hypertext jumps. You may retrace all the way back to where the system was first entered.
Library	Contains hypertext links to all on-line documents.		
Contents	Displays the first page of the chapter you are displaying, which contains hypertext links to all major sections.	Navigation icons	Go one page backward.
Index	Includes hypertext links.	Navigation icons	Go one page forward.
Getting Started	Provides access to: <ul style="list-style-type: none">TutorialGlossarySelect MenusForm & Widget Terminology	Done	Exit the current help window.
Examples	Displays MSC/PATRAN example problems.		
Sales & Support	Includes information on where to get help, telephone numbers for technical support, and sales office locations.		
Help on Help	Provides access to: <ul style="list-style-type: none">Using HelpGlossarySelect MenusForm & Widget TerminologyReporting Documentation Errors		

Technical Support Centers

If your questions cannot be answered in the extensive on-line help system, please call the technical support center nearest you. We are ready to help you. To better answer your questions, we request that you provide us with the information outlined in **Preparing to Call the Hotline** (p. S-6).

Contact Support Services using any of the following options.

Telephone, Voice Message, and Fax	United States MSC/PATRAN Support Telephone: 1-800-732-7284 Fax: 714-979-2990 MSC/NASTRAN Support Telephone: 1-800-336-4858 Fax: 213-259-4999	Frimley, Camberley Surrey United Kingdom Telephone: 44-1276-671000 Fax: 44-1276-691111
	Munich, Germany Telephone: 49-89-43 19 87-0 Fax: 49-89-4 36 17 16	Paris, France Telephone: 33-1-69-36-69-36 Fax: 33-1-69-36-45-17
	Rome, Italy Telephone: 39-6-5-91-64-50 Fax: 39-6-5-91-25-05	Gouda, The Netherlands Telephone: 31-1 82-54 37 00 Fax: 31-1 82-54 37 07
	Moscow, Russia Telephone: 70-95-2 36 61 77 Fax: 70-95-4 34 72 30	Madrid, Spain Telephone: 34-1-556-0919 Fax: 34-1-556-7280
	Fribourg, Switzerland Telephone: 41-26-4 66 60 72 Fax: 41-26-4 66 61 13	Tokyo, Japan Telephone: 81-3-3505-0266 Fax: 81-3-3505-0914
	e-mail	
	You can e-mail a detailed description of the problem to one of the e-mail addresses below. You should receive an acknowledgment that your message was received, followed by an e-mail from one of our Technical Support Engineers.	
	msctraining.support@macsch.com mscpatran.support@macsch.com mscnastran.support@macsch.com mscabaqus.support@macsch.com mscaries.support@macsch.com mscedytran.support@macsch.com mscfatigue.support@macsch.com mscmvision.support@macsch.com mscnastran4windows.support@macsch.com	MSC Institute Course Information MSC/PATRAN Support MSC/NASTRAN Support MSC/ABAQUS Support MSC/ARIES Support MSC/DYTRAN Support MSC/FATIGUE Support MSC/MVISION Support MSC/NASTRAN for Windows Support
MSC WWW Customer Support Homepage http://www.macsch.com/support/support.html		

In addition to our technical support centers, MSC has developed a broad network of local offices, staffed by a knowledgeable team, who can provide product assistance of any kind. For the location of the office nearest you, call (800) 732-7284 or refer to **MSC Offices** (p. S-7).

Preparing to Call the Hotline

When you call the MSC/PATRAN Support Hotline (1-800-732-7284), the phone will be answered by an auto-attendant.

If you have previously called the MSC/PATRAN Support Hotline, you may have been assigned a PIN number. Please have it handy. If you have an open log with a support engineer, please have the Log ID number available also.

If this is your first time contacting MSC/PATRAN Support, you will be assigned a PIN number. Please be prepared to provide the following information:

- | | |
|---|--|
| • Name | • Category of call |
| • Phone number | • System information |
| • Fax number | Manufacturer (Sun, SGI, IBM, Digital UNIX, HP) |
| • E-mail address | Model or chip (e.g., r10000 for SGI) |
| • Company name and address | OS Version (Solaris 2.5, IRIX 6.2, AIX...) |
| • Name of product you are using
(MSC/PATRAN, MSC/MVISION,
etc.) | Graphics board (for graphics problems) |
| • Version number of the product
(V6.2, V7, V7.5...) | RAM (for hardware problems) |
| | Available disk space (for hardware problems) |
| | • Description of the problem |

If all engineers are busy, you will have the option of waiting on hold for the next available engineer, or you may leave a message for a callback from an engineer. We recommend that you wait on hold whenever possible.

MSC Offices

The MacNeal-Schwendler Corporation is the industry leader for engineering analysis solutions. For more detailed information on any of our advanced analysis programs, contact your local MSC representative.

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MSC Corporate Profile

The MacNeal-Schwendler Corporation is the largest single provider of finite element modeling and analysis (FEA) solutions to the computer-aided engineering (CAE) market. The company also is a leading provider of other products for the CAE market. The predictive engineering approach—simulating the performance characteristics of a design before it is built or before a physical prototype is developed—has saved companies hundreds of millions of dollars in research, design, engineering and manufacturing.

MSC solutions help designers and analysts create a computer model of a given design, specify the materials from which it is to be made, and simulate the environment that will act upon it. MSC software analyzes the model to determine how well the structure will withstand conditions in the real world.

Besides MSC/PATRAN, the company's major product lines are MSC/NASTRAN, MSC/MVISION, and MSC/DYTRAN, which are used by engineers and designers to model structures and assemblies and then analyze their strength, dynamic response, and heat transfer characteristics prior to manufacturing. MSC's products are marketed worldwide through offices in the United States, Europe, and Asia Pacific.

Investment in the Future

MSC products lead the industry because of our substantial investment in research and development. This investment means that MSC products will continue to incorporate the latest capabilities and algorithms, ensuring that, as your needs grow, MSC software will grow right along with you.

The product descriptions that follow represent a wide spectrum of software tools for virtually any structural design or engineering analysis application. These software packages are available for use on systems ranging from PCs to workstations and supercomputers.

MSC/PATRAN Products

The MSC/PATRAN analysis software system is an open, integrated system that enables manufacturers to simulate product performance on the computer early in the design-for-manufacture process. MSC/PATRAN meets manufacturers' requirements for new levels of integration of analysis with design and test, and the early simulation of product performance and the manufacturing process.

Because of its broad range of analysis capabilities, MSC/PATRAN is used in the product development process of companies around the world. Aerospace and automotive are MSC/PATRAN's largest markets, but the software is also used by government agencies, utilities, petroleum producers, manufacturers of electronics, industrial equipment and consumer goods.

Originally developed by PDA Engineering to facilitate pre- and postprocessing for NASA's computerized engineering analysis needs, MSC/PATRAN was first marketed in 1979. The introduction of the all-new MSC/PATRAN system marked the beginning of a new generation in analysis software. No other analysis software system in the industry has been completely rewritten, making MSC/PATRAN the only analysis system to take advantage of the very latest developments in hardware and software architecture and language.

MSC/PATRAN Product Line

MSC/PATRAN: MSC/PATRAN is the pre- and postprocessing core of the product line. It provides "next-generation" modeling and integration capabilities required for concurrent engineering. With an all-new graphical user interface and on-line help, MSC/PATRAN is easy to use. Providing a true open system environment, MSC/PATRAN integrates computer-aided design (CAD) and analysis software packages. What's more, all of these functions can be customized to your specific requirements using MSC/PATRAN's powerful programming language, the PATRAN Command Language (PCL).

Analysis Solvers: The MSC/PATRAN system includes several analysis solvers and application modules that enable you to perform different types of engineering analyses in order to predict a product's performance under various conditions. All of these solvers use the same MSC/PATRAN core software and interfaces for model creation, job submission, and results evaluation. There are MSC/PATRAN analysis solvers for stress, thermal, and fatigue analysis, plus special modules for composite laminate modeling and analysis job submittal/management.

Integration with CAD: Through a direct geometry access method, MSC/PATRAN provides users with robust access to the CAD geometry of Computervision's CADD5, Dassault Systemes' CATIA, EDS' Unigraphics, Matra Datavision's EUCLID 3, and Parametric Technology's Pro/ENGINEER. Interfaces to geometry standards IGES and ACIS are also available.

Integration with Materials: The MSC/PATRAN MATERIALS product provides fast, direct access to any MSC/MVISION materials databank from within MSC/PATRAN. Its Motif-based forms offer engineers automated search and query, materials selection, and integration of the data into the MSC/PATRAN system for analysis.

MSC/NASTRAN Product

MSC's principal product, MSC/NASTRAN, is the industry's leading FEA program. In an area where unreliable results may cost millions of development dollars, MSC/NASTRAN has proven its accuracy and effectiveness for almost 30 years. It has remained the leading FEA program by constantly evolving to take advantage of the newest analytical capabilities and algorithms.

Superior element technology and robust numerical methods are the foundation of MSC/NASTRAN. The program includes h- and p-elements, and both can be mixed in the same model for increased modeling accuracy with minimal computer resources. The p-elements conform closely to a structure's curved geometry and can therefore be highly accurate for detailed stress analysis. These elements automatically adapt to the desired accuracy level.

Sparse matrix numerical methods, incorporated in every analysis type, greatly increase the solution speed and reduce the amount of disk space, making the numerical processing fast and efficient.

MSC/NASTRAN offers a wide variety of analysis types, including linear statics, normal modes, buckling, heat transfer, frequency response, transient response, random response, response spectrum analysis, and aeroelasticity. Virtually any material type can be modeled, including composites and hyperelastic materials. Advanced features include superelements (substructuring), component mode synthesis, and DMAP (a macro language for creating custom applications).

In addition to analyzing structures, you can use MSC/NASTRAN to optimize designs automatically. You can perform optimization for statics, normal modes, buckling, transient response, frequency response, acoustics, and aeroelasticity—all simultaneously, with both shape and sizing design variables. Because of their efficiency, the optimization algorithms can easily handle several hundred design parameters and a like number of constraints. You can use weight, stress, displacement, natural frequency, and many other responses as either the design objective (which can be minimized or maximized) or as design constraints. In addition, MSC/NASTRAN can synthesize the design objective and constraints via user-written equations, making possible capabilities such as updating a model to match test data. MSC/NASTRAN is the only FEA program that can do this automatically.

MSC/NASTRAN is closely linked with the pre- and postprocessing of MSC/ARIES and MSC/PATRAN, offering a completely integrated environment for modeling and analysis. Because MSC/NASTRAN is the undisputed market leader, a wide range of third-party pre- and postprocessors, solid modelers, and CAD programs also offer direct interfaces. The result is unmatched flexibility integrating MSC/NASTRAN into an existing design environment.

MSC/NASTRAN runs on PCs, workstations, and supercomputers, and is tuned to take advantage of vector and parallel processing on many machines that support these capabilities.

MSC/DYTRAN Product

MSC/DYTRAN is a general purpose, three-dimensional computer program for large deformation structural analysis. You can also use MSC/DYTRAN to simulate coupled fluid-structure interaction. The program provides a unique combination of finite element and fluid mechanics technology for ease of modeling, and uses explicit time integration to provide efficient solutions.

Using MSC/DYTRAN, you can solve a wide variety of practical problems in such diverse industries as automotive, aerospace, manufacturing, and defense. Typical application areas include:

- Airbags/occupant safety analysis
- Structural crashworthiness
- Component drop test simulation
- Sheet metal stamping
- Metal forging
- Blade/rotor containment analysis
- Bird strike on aircraft
- Explosive containment within aircraft structures
- Structural response to underwater shock
- Ship collision and grounding
- Projectile impact and penetration

MSC/DYTRAN has two separate processors: Finite Element and Eulerian. The Finite Element processor uses conventional finite element technology in which the mesh distorts and material follows the motion of the mesh. This classic finite element approach is most suited for modeling the deformation of structures and structural components subjected to applied loads.

The Eulerian processor uses an explicit finite volume formulation in which the mesh is fixed in space and time and material flows from one element to the next. MSC/DYTRAN accepts elements of arbitrary shape and general connectivity. The Eulerian approach is particularly suitable for modeling fluid and material flow problems. This includes not only the flow of classic hydrodynamic materials such as liquids and gases, but also the flow of structural materials like steel, providing a unique capability for the simulation of metal flow in forging applications.

A wide range of constitutive models are available to simulate the nonlinear behavior of materials such as metals, plastics, foams, composites, liquids, gases, and high explosives. The effects of strain rate, material anisotropy, temperature, and material failure can also be taken into account.

Three dimensional contact surfaces allow parts of finite element meshes to interact with each other or with rigid bodies. For the interaction of fluids and structures, a general coupling algorithm and an ALE algorithm automatically couple the response of the finite element and Eulerian meshes.

For occupant safety analysis, the vehicle occupant model program ATB has been fully integrated into MSC/DYTRAN, enabling the simulation of an occupant interacting with the interior structural components of a vehicle.

The technology in MSC/DYTRAN is an extension of the proven numerical methods used for many years in MSC/DYNA and MSC/PISCES. MSC/DYTRAN uses explicit time integration, which does not involve the expensive decomposition of global matrices. The program is vectorized and takes advantage of parallel processing hardware. The program also uses subcycling techniques to provide a high level of efficiency of modern computer architectures.

MSC/DYTRAN is also compatible with current CAE environments. Its input is compatible with that of MSC/NASTRAN, allowing the use of most commercially available finite element processors for the preparation of MSC/DYTRAN input data. Pre- and postprocessing can be accomplished with the MSC/DYTRAN analysis preference in MSC/PATRAN.

MSC/MVISION Materials Software System

The MSC/MVISION materials software system is a first-of-its-kind system dedicated to integrating materials information in the manufacturing process.

Materials selection is a fundamental decision in the design-for-manufacture process that can have an enormous impact on product competitiveness. Throughout the design process, you typically do not have a central on-line source of comprehensive materials information. MSC/MVISION meets manufacturers' critical need to capture, store, and integrate materials data. Today's materials technology is advancing so rapidly that manufacturers, in choosing and using new materials, need a system that will enable them to view, understand, and utilize the latest materials information in test, design and analysis.

This easy-to-use software system provides for the visualization, selection and integration of materials data. MSC/MVISION allows you to utilize materials information from your own perspective and need. With MSC/MVISION, you can now exploit materials as a design variable.

The MSC/MVISION family of products includes:

Materials System Builder: The most comprehensive product of the MSC/MVISION family, Materials System Builder is a unique and powerful tool to help manufacturers build their own corporate, proprietary materials . From reducing raw test data to disseminating approved materials data throughout the organization, Materials System Builder is a comprehensive materials system. Designed specifically for materials data, Materials System Builder requires no database programming.

Materials Evaluator: Materials Evaluator is a cost-effective materials selection tool, providing enterprise-wide access to any MSC/MVISION materials databank. Incorporating all the graphic, image, and data manipulation features of System Builder, Materials Evaluator helps manufacturers choose and use new materials.

Materials Databanks: The MSC/MVISION system offers three on-line materials databanks that may be incorporated as part of the MSC/MVISION system. These databanks are the highest quality available, and have been extensively reviewed by such organizations as Battelle Memorial Institute and the University of Dayton Research Institute. MSC/MVISION can also integrate customers' proprietary databases. Currently, MSC offers the following materials databanks:

- MIL-HDBK-5–metals (the only complete, on-line source of this handbook).
- MIL-HDBK-17–fiberglass.
- PMC-90–advanced structural composites.
- Producer-supplied databanks for metals, plastics, ceramics, and composites.
- 13 ASM Mat.DB databanks in MSC/MVISION format.

Leadership through Partnering

To expand our variety of engineering analysis products, MSC engages in a program of partnering with other internationally respected technology organizations. MSC's partnering strategy allows us to better meet market demands for technology, enabling you to meet the demands of growing worldwide competition.

Through partnering, MSC has created several analysis products for the MSC/PATRAN system, expanding the use of analysis industry-wide by bringing easy-to-use analysis functionality to a wider range of engineers. These products include:

MSC/InCheck: Now available for Mechanical Desktop! Autodesk Mechanical Desktop and AutoCAD users can now validate the performance of their designs using MSC mechanical simulation technology.

MSC/FEA: Combining the power and ease-of-use of MSC/NASTRAN and MSC/PATRAN into a cost-effective integrated solution

MSC/SuperModel: Solutions for CAE process management and advanced aerospace modeling.

MSC/NASTRAN for Windows: MSC/NASTRAN, the world's most popular and powerful structural analysis program for analyzing stress, vibration, dynamic, nonlinear, and heat transfer characteristics of structures and mechanical components on the world's most popular computing environment

MSC/FATIGUE: An advanced fatigue life estimation software package for use with finite element analysis results. It provides state-of-the-art fatigue design tools, which can be used to optimize the life of a product early in the design process

MSC/ABAQUS: Advanced structural and heat transfer analysis software

MSC/NVH_Manager: Simplifying Evaluation of Design Alternatives for Noise, Vibration, and Harshness characteristics.

MSC has formed relationships with the world's leading CAD companies: Computervision, EDS/Unigraphics, Dassault Systemes, Matra Datavision, and Parametric Technology. For best-of-class analysis technology, MSC has partnered with Hibbitt, Karlsson & Sorensen (advanced finite element analysis), nCode International (fatigue analysis), and LMS International (integrated analysis and test).

Hardware Partners

Relationships with major computer manufacturers exist through MSC's Hardware Partner Product Optimization Program. Through this program, MSC combines its software development expertise with its hardware partners' to optimize the performance of MSC's software on the latest computers and graphics devices.

MSC supports leading computer hardware such as Dell, Compaq/Digital, Hewlett-Packard, IBM, Intel, Silicon Graphics, Cray Research, Sun, Intergraph, Accel Graphics, Adaptec, and Dynamic Pictures.

MSC Institute of Technology

To complement the development and sales of its software products, MSC provides engineering software and technology training. Through the MSC Institute of Technology, the company offers a broad selection of comprehensive courses to train engineers in the use of MSC software as well as other general analysis subjects such as thermal analysis, finite element modeling, and fatigue-life prediction. In addition, video courses and a specialized instructor's program are available. More than 50 different courses are offered at our domestic and international training centers, as well as at customer locations. More than 4,500 engineers attend the MSC Institute annually. To register, call 1-800-732-7211.

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- No copies of this manual, or excerpts thereof, will be given to anyone who is not an employee of the company.
- There will be no charges made for these copies (although the costs of copying may be allocated internally).

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815 Colorado Boulevard
Los Angeles, CA 90041-1777

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Address: _____

Telephone: _____ e-mail: _____

Signature: _____ Date: _____

Please do not write below this line.

APPROVED: THE MACNEAL-SCHWENDLER CORPORATION

Name: _____

Title: _____

Signature: _____ Date: _____