The MacNeal Group

NASTRAN-*xMG*

At the heart of Virtual Product Simulation

NASTRAN-*xMG* is the next generation of NASTRAN software - Developed by the team that created the standard, NASTRAN-*xMG* is based on the original NASTRAN code and has been updated with the latest technologies. NASTRAN-*xMG* integrates into your existing simulation processes, provides more accurate solutions, includes advanced features to meet your growing simulation and process needs, and has the performance necessary to solve the large system simulations required in today's virtual product design and simulation environment.

Industrial Strength Solution Capabilities

Built from the same base code as the original NASTRAN software created by NASA that includes the original NASTRAN architecture and DMAP language, NASTRAN-*xMG* provides unlimited problem size, high-speed solver technology, and substructuring analysis options, which allow engineers to solve extremely large and complex problems. This gives NASTRAN-*xMG* the power to perform such intricate analysis as airfram loads, turbine design, coupled loads, vehicle dynamics, noise/vibration/harshness (NVH), and durability problems. NASTRAN-*xMG*'s unique substructuring analysis option facilitates collaboration between organizations working together on a project.

Improved Element Technology

NASTRAN-*xMG* not only includes the most popular NASTRAN element formulations, but also includes a new set of solid elements. These new elements are first in a series that implements the latest theory as developed by Dr. R. H. MacNeal, one of tMG's founders and the creator of the current standard of NASTRAN element technology. The new theory corrects long term and well known problems with the solid and shell elements including those in NASTRAN.

No Legacy Data Conversion

NASTRAN-*xMG* is fully compatable with existing input and output files so that current users of pre- and post-processors that interface with conventional NASTRAN formats can use NASTRAN-*xMG* without incurring the high cost of legacy data conversion. NASTRAN-*xMG* supports common pre- and post-processors including: MSC.Patran, Femap, I-deas and HyperMesh.

About The MacNeal Group

The MacNeal Group is committed to providing engineers worldwide with the software and services necessary to meet their performance, accuracy, and process integration needs, enabling manufacturers worldwide to overcome their product design challenges and suceed in today's competative global marketplace.

Founded by the pioneers of NASTRAN, including Dr. R.H. MacNeal and Dr. H.G. Schaeffer, tMG is uniquely positioned to to serve the simulation needs of the world's largest manufacturing companies. Our management team is experienced and respected in the industry and is fully committed to the long term success of the company.

"Our mission is to define the next generation NASTRAN standard and to deliver to our customers the ability to meet their process and cost requirements."

-Dr. Richard H. MacNeal, Founder

Contact Information

tMG Worldwide Headquarters
2400 N. Lincoln Avenue
Altadena, CA 91001

Phone: (626) 296-6220
Fax: (626) 296-6221
Web: www.macnealgroup.com

NASTRAN-xMG version 2.0 Features

Legacy NASTRAN Characteristics

- Wide ranging analysis types
- General purpose equation solvers
- Robust element library
- NASTRAN structured data formats
- Modular program architecture
- DMAP - Direct Matrix Abstraction Program

Analysis Types

Linear Static Analysis

- Linear stress, strain, and deflection
- Inertia relief
- Thermal stress and deflection
- Differential stiffness
- Piecewise linear
- Cyclic symmetry

Normal Modes

- Natural frequencies and mode shapes
- Flexible and rigid body motion
- Differential stiffness
- Model participation factors, effective mass/weight, and reaction forces
- Cyclic symmetry

Dynamic Response

- Direct frequency
- Direct transient
- Model frequency
- Model transient
- Complex Eigensolution
- Random response

Buckling Analysis

- Critical loads and mode shapes
- Initial linear stress

Substructuring Analysis

- Component modes synthesis

Boundary Condition Types

Single-point Constraint

- SPC, SPC1, SPCADD, SPCAX

Enforced Displacement

- SPCD

Multi-point Constraint

- MPC, MPCADD, MPCAX

Enforced Motion

- Large mass approach
- Lagrange multiplier approach

Material Types

Isotropic

- MAT1, MATT1, MAT4, MATT4

Orthotropic

- MAT8

Anisotropic

- MAT2, MATT2, MAT5, MATT5, MAT9, MATT9

Element Types

1-D

- BAR, ROD, TUBE, BEND, BEAM

2-D

- QUAD4, TRIA3, SHEAR

3-D

- HEXA, HEXA8, PENTA, TETRA

Spring

- ELAS1, ELAS2, ELAS3, ELAS4

Rigid

- RBAR, RBE1, RBE2, RBE3, RROD, RTRPLT

Special

- CMASSi, CONM1, CONM2, GENEL, DUM, VISC, DMI, DMIG, DAMP, FLUID

Loads

Point Loads

- FORCE1, FORCE2, MOMENT, MOMENT1, MOMENT2, MOMAX, SLOAD, RFORCE, FORCEAX

Pressure Loads

- PLOAD, PLOAD1, PLOAD2, PLOAD4, PRESAX

Gravity Loads

- GRAV

Temperature Loads

- TEMP, TEMPD, TEMPAX, TEMPP1, TEMPP3, TEMPRB

Enforced Deformation Loads

- DEFORM

Frequency Loads

- FREQ, FREQ1, FREQ2, RLOAD1, RLOAD2, RANDPS, RANDT1

Transient Loads

- TLOAD1, TLOAD2, TIC, TSTEP

Load Application Control

- DAREA, DELAY, DLOAD

Heat Loads

- QBDY1, QBDY2, QHBDY, QVECT, QVOL

Radiation Loads

- RADLST, RADMTX

Solvers

Boeing Computer Services (BCS) Libraries

- Sparse Symmetric Solver
- Unsymmetric Solver
- Lanczos (Real)

Standard NASTRAN Solvers

- Symmetric DECOMP
- Inverse Powers with Shifts
- Givens
- Modified Givens
- Householder
- FEER
- Complex Eigenvalue Solvers
- Hessenberg
- Lanczos