

MSC/NASTRAN STATUS REPORT

(MARCH 1981)

- THE MOST RECENT NEW CAPABILITIES
- CURRENT PROJECTS
- LONGER RANGE PROJECTS
- SOME DETAILS OF NEW CAPABILITY

THE MOST RECENT NEW CAPABILITIES

(VERSION 61)

- NEW COMPUTERS

- CRAY

- MAJOR NEW FUNCTIONAL CAPABILITIES

- MATERIAL NONLINEARITY

- LAYERED COMPOSITES

- TRIA6 ELEMENT

- VIEW-FACTORS FOR THERMAL RADIATION

- ADDITIONAL METHOD OF COMPONENT MODE SYNTHESIS

- DOCUMENTATION

- HANDBOOK FOR LINEAR STATIC ANALYSIS

CLASSIFICATION OF VERSION 61 MODIFICATIONS

NEW MAJOR CAPABILITY	5
NEW MINOR CAPABILITY	24
USER CONVENIENCE	24
IMPROVED EFFICIENCY	15
IMPROVED ACCURACY OR RELIABILITY	12
BETTER USE OF STORAGE	8
REMOVAL OF OLD CAPABILITY	9
OTHER	<u>8</u>
TOTAL RECORDED MODIFICATIONS	105

SOME CURRENT PROJECTS

- NEW FUNCTIONAL CAPABILITY
 - MATERIAL NONLINEARITY
 - GRASP PRE/POSTPROCESSOR
 - STRESSES AT GRID POINTS
 - BETTER METHOD TO ENFORCE DISPLACEMENTS IN DYNAMICS
 - INERTIA RELIEF MODES
 - SUPERELEMENT TASKS

- DOCUMENTATION
 - HANDBOOK FOR DYNAMIC ANALYSIS
 - SUPERELEMENT HANDBOOK
 - NEW EDITION OF PROGRAMMER'S MANUAL

LONGER RANGE PROJECTS

- IMPROVED RESTART LOGIC
- STRUCTURAL OPTIMIZATION

FIRST STEP: DESIGN SENSITIVITY

- WORK STATION CONCEPT
- HANDBOOK FOR NONLINEAR ANALYSIS
- NEW THEORETICAL MANUAL (ELEMENTS AND ALGORITHMS)

THE DEVELOPMENT OF A MODERN
NONLINEAR CAPABILITY IN MSC/NASTRAN

- NECESSARY PRECURSORS:
 - MORE EFFICIENT AND MORE FLEXIBLE ELEMENT ASSEMBLY: EMG AND EMA (1973 - 1976)
 - A MODERN ELEMENT LIBRARY: QUAD4, TRIA3, HEXA, PENTA (1975 - 1977)
 - DATA BASE TECHNOLOGY (1974 TO PRESENT)

- LARGE DISPLACEMENT GEOMETRIC NONLINEAR ANALYSIS (RELEASED 1978)
 - UPDATED LAGRANGIAN FORMULATION
 - FOLLOWER FORCES
 - MODIFIED NEWTON-RAPHSON ALGORITHM

- COMBINED MATERIAL AND GEOMETRIC NONLINEAR ANALYSIS (RELEASED 1981)

NEW NONLINEAR CAPABILITY IN VERSION 61

- SØL 64 (OLD DMAP4) GEOMETRIC NONLINEARITY
 - SIMPLIFIED PROCEDURES; ERROR CORRECTIONS

- SØL 66 (NEW) COMBINED MATERIAL AND GEOMETRIC NONLINEARITY
 - TYPES OF MATERIAL NONLINEARITY
 - NONLINEAR ELASTICITY

 - PLASTICITY (WITH ELASTIC UNLOADING AND THE CHOICE OF SEVERAL THEORIES)

- NONLINEAR ELEMENTS
 - QUAD4, TRIA3 (MEMBRANE AND BENDING)

 - RØD, CØNRØD, TUBE

 - GAP (WITH SLIDING FRICTION)

 - BEAM (PLASTIC HINGES AT ENDS)

- NUMERICAL INTEGRATION
 - ISOLATION OF LINEAR AND NONLINEAR REGIONS

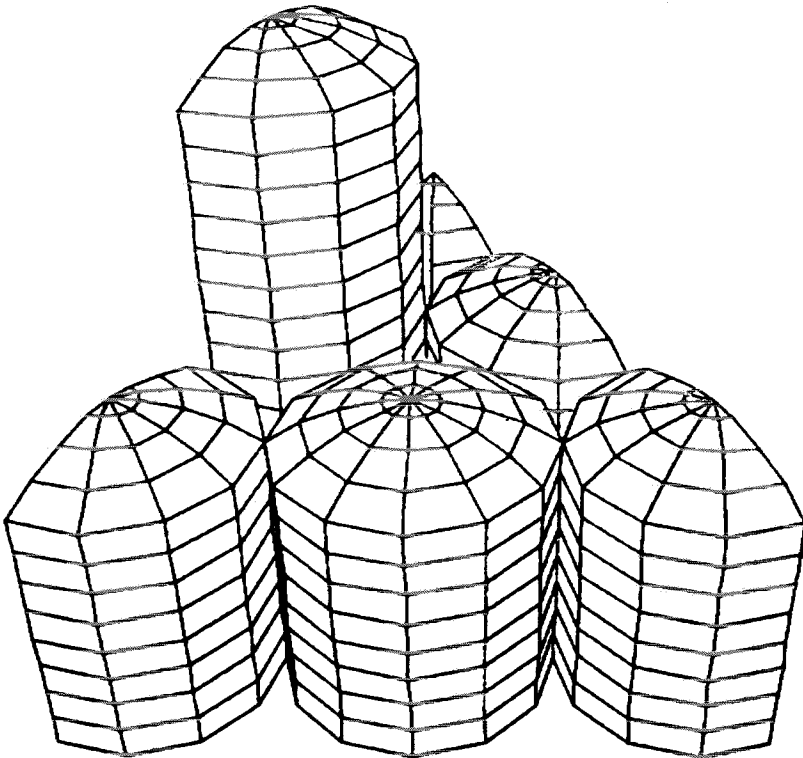
 - FULLY AUTOMATED MODIFIED NEWTON-RAPHSON METHOD

 - AUTOMATIC CONVERGENCE CRITERIA

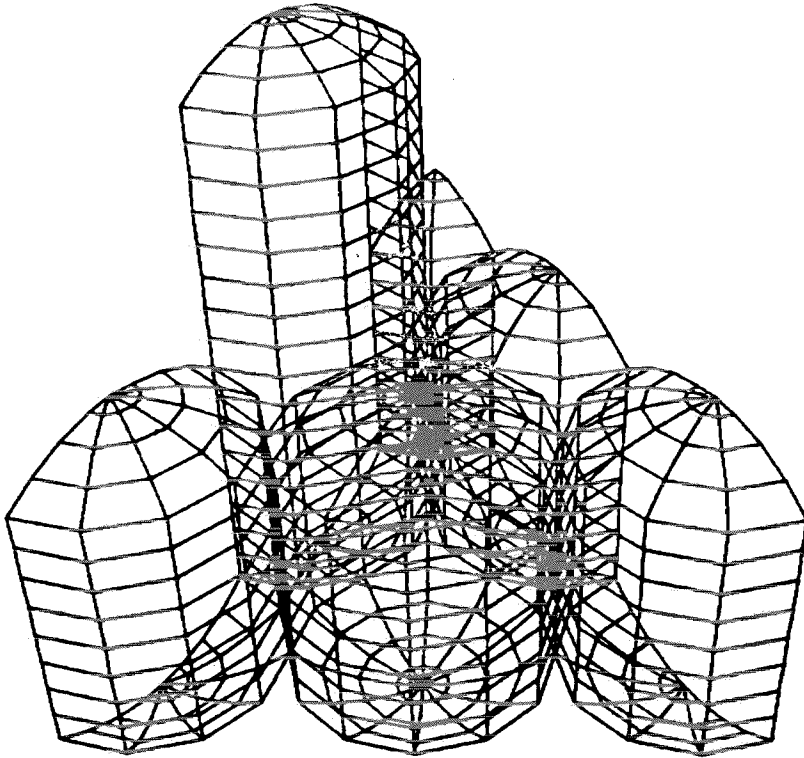
NONLINEAR CAPABILITIES SCHEDULED FOR VERSION 62

- SOLID ELEMENTS
- TRANSIENT RESPONSE
- CREEP
- QUASI-NEWTON ITERATION
- PLANE STRAIN MATERIAL

HIDDEN SURFACES REMOVED



TANK CLUSTER - NORMAL VIEW



MSC/GRASP

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