About SAMTECH

Founded in 1986, SAMTECH is now the European leading provider of scientific analysis/optimization software, professional solutions and associated services. SAMTECH develops and commercializes:

“Generic purpose software tools”:
- the general implicit linear and non-linear Finite Element Analysis package SAMCEF,
- the general explicit and fast dynamics code EUROPUEXUS,
- the CAD/CAE modeling environment FIELD,
- the task management and optimization platform BOSS quattro,
- TEA Mecano and TEA Thermal CAA V5 Based (non linear thermomechanical solution embedded in CATIA V5)

“Professional solutions” answering to dedicated industrial needs:
- SAMCEF Rotor (Rotor Dynamical),
- SAMCEF Bolt (Composite assemblies analysis),
- SAMCEF HVS (Analysis of High Voltage Substations)

“Third party and customized solutions” like SAFE from Airbus (Fatigue analysis), where SAMTECH provides to clients with editor professional services for the reengineering, the development, the packaging and the deployment of proprietary professional solutions

“Customized multi-physics solutions” based on OOFELIE. OOFELIE is commercialized by Open Engineering, the SAMTECH subsidiary that allows SAMTECH to be present on the multi-physics design markets and to provide services for the development of original highly coupled analysis solutions covering specific needs.

Need some information about TEA Mecano?
Need some information about non-linear modeling and mechanical analysis with SAMCEF Mecano?
Need some information about SAMTECH expertise?

Contact our specialists !

SAMTECH Headquarters
Parc Scientifique du Sart-Tilman
Rue des Chasseurs Ardennais, 8
B-4031 Angleur-Liège, Belgium
Tel.: +32 4 361 69 69
Fax: +32 4 361 69 80
http://www.samtech.com

SAMTECH France
Paris
14, avenue du Québec
Bât. K 2.1, 928 518 Villiers-sur-Yvette
F-91454 Couteaux Cedex, France
Tel.: +33 1 69 59 22 80
Fax: +33 1 64 46 99 65

SAMTECH Germany GmbH
Oskar-Kalb-Platz 8
D-72764 Reutlingen, Germany
Tel.: +49 7121 92 20 0
Fax: +49 7121 92 20 90

SAMTECH Italia
Via Guido d’Arezzo, 4
I-20145 Milano, Italy
Tel.: +39 02 48 559 407
Fax: +39 02 46 94 998

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TEA Mecano
Mechanical Transparent Extended Analysis

SAMTECH, Integrating CAE towards Professional Solutions

TEA Mecano offers to CATIA V5 users numerous facilities for the modelling and the analysis of non-linear mechanical problems.

SAMTECH brings its specialized expertise to make SAMCEF Mecano available within CATIA V5 environment.
**SAOMTECH, Integrating CAE towards Professional Solutions**

**T**aking into account non-linear material behavior, TEA Mecano users can analyze the quasi-static behavior of 3D structures from CATIA V5 environment. They can easily obtain the Von Mises stresses, plastic strains, contact pressure and successive configurations. A variety of boundary conditions (clamps, surface slider, advanced restraint, iso-static restraint, enforced displacement, …) and mechanical loading (distributed force, moment, force density, …) is available.

**NON-LINEAR MECHANICAL ANALYSIS WITH CONTACT CONDITIONS**

TEA Mecano provides you with a comprehensive and very powerful software for non-linear mechanical analysis. It allows the use of 3D linear or quadratic volume and shell elements. The material behavior can be Elastic or Elasto-plastic. Rigid virtual parts can be defined between a point and a surface or an edge.

Flexible/Flexible contact conditions can be defined between 3D geometrical faces. It is also possible to recover GPS contacts definition.

**FOR DESIGNERS, MECHANICAL AND STRESS ENGINEERS**

SAMTECH enables CATIA V5 users to perform advanced non-linear mechanical simulations analysis, allowing Designers, Mechanical Engineers and Stress Engineers to predict the complete functional performances of their products, directly from within their familiar CATIA V5 environment.

The result is a new product named TEA Mecano.

**YOUR BENEFITS: AVOID EXPENSIVE RE-DESIGN, REDUCE DESIGN CYCLES**

CATIA V5 designers are able to quickly produce non-linear models by adding specific mechanical features to an existing linear model built within their environment.

TEA Mecano speeds up the design work thanks to the use of a single user interface for the geometry definition, the mechanical analysis data definition, the meshing, the launch of the solver and the postprocessing.

TEA Mecano provides users with extended non-linear mechanical solving capabilities, in a fully associative environment.

With TEA Mecano, SAMTECH answers customer needs from medium and large industries by proposing the transparent use of extended FE mechanical techniques very early in the design process, to eliminate the expensive iterations during design process.

**BETTER COMPATIBILITY WITH DETAILED ENGINEERING**

Users benefit from SAMTECH recognized expertise in detailed engineering and software quality, most of as with TEA Mecano, users can perform sophisticated mechanical simulation within a complete and integrated CAE software for mechanical design.

**WHATEVER YOUR INDUSTRIAL SECTOR**

With TEA Mecano, SAMTECH’s aim is to target design activities of customers from the whole mechanical industry (Aeronautical, Space, Defense, Ship Building, Energy, Car, Trucks, Railway, Sport industry, …).

**ADVANCED FEA/CAE CAPABILITIES**

The domains addressed by SAMTECH are the following :

- Non-linear Mechanical Finite Element Analysis
- Non-linear structures and flexible/flexible contact
- large deformations
- Mixed kinematical joints and non-linear structures

**SOLUTION ALGORITHMS**

For the quasistatic analysis of TEA Mecano, a Newton Raphson procedure is used to solve the mechanical equilibrium equations with the multifrontal solver of SAMCEF Mecano.

The solver strategy selection is automatically performed. TEA Mecano uses the very robust contact algorithms of SAMCEF Mecano allowing large relative displacements and rotations.

**BOUNDARY CONDITIONS**

- **Restraints**
  Different restraints can be imposed to fix all the degrees of freedom on a geometry selection (clamps), to fix some degrees of freedom along the normal of a surface (surface slider), to fix any combination of degrees of freedom (advanced restraint) or to generate statically indeterminate supports on a part (isostatic restraint).
- **Enforced displacement**
  Transitional and rotational displacements can be prescribed by the user.

**MECHANICAL LOADS**

- **Distributed Force or Moment**
  The definition of a distributed force system equivalent to a pure force at a point or at a local moment is allowed.
- **Force Density**
  It is possible to generate a line force field of given uniform intensity on a part edge (Line Force Density), a surface traction field on a part face (Surface Force Density) or a volume body force field on a part (Body Force).

**MODELLING ENVIRONMENT**

TEA Mecano is perfectly embedded in CATIA V5 for the modeling, the non-linear mechanical analysis and the post-processing of structures.

Results are postprocessed graphically in the form of isolines or as animations.

The non-linear mechanical analysis of complex structures entails the pre and post-processing of a huge amount of data. TEA Mecano benefits of advanced visualization tools of CATIA V5, allowing very efficient and straightforward pre- and post-processing of non-linear mechanical analyses.

The results that can be postprocessed includes Von Mises stresses, plastic strains, contact pressure and successive configurations.

**DOCUMENTATION**

For direct access to information, the Users Guide and Help manual are available via your favorite navigator (HTML).

**Technical Characteristics :**

- TEA Mecano offers non-linear mechanical analysis directly accessible from CATIA V5 environment. The users benefit from features of SAMCEF Mecano (non-linear material laws, large deformations, powerful contact algorithms).
- General capabilities:
  - Solution based on CATIA V5 GPS, C[Genitive Part Structural Analysis]
  - Control of mesh refinement
  - Finite Elements
  - Transient Non-Linear Analysis
  - Minimum data definition for:
    - static analysis
    - Automatic choice of solver strategy
    - Very robust contact algorithms
    - Automatic storage of intermediate configurations
  - Element library:
    - 3D volume
    - Linear or quadratic material laws
    - Elastic and elasto-plastic material laws
  - Restraints:
    - Clamps
    - Advanced restraints
    - Surface Slider
  - Rigid virtual part:
    - Rigid elements between a point node and a surface or an edge
  - Loads and boundary conditions:
    - Enforced displacement (translation/rotation)
    - Distributed Force or Moment
    - Linear Force Density
    - Surface Force Density
    - Body force
    - Pressure Field
  - Contact conditions:
    - Flexible/flexible contact defined between geometrical faces
  - Available results:
    - Von Mises stresses
    - Plastic strains
    - Contact pressure
    - Successive configurations

**Available results:**

- Von Mises stresses
- Plastic strains
- Contact pressure
- Successive configurations

**Platforms**

TEA Mecano is available on Windows NT and 2000.

**Prerequisites :**

- GPS
- CATIA release : CATIA V5R10
- Service Pack 3