About SAMTECH

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

"**General-purpose software tools**": this SAMTECH offer includes the general linear and implicit non-linear Finite Element Analysis package SAMCEF with the CAD/CAE modeling environment FIELD, the general explicit and fast dynamics code EUROPLEXUS; the task management and optimization platform BOSS quattro; TEA Mecano and TEA Thermal CAA V5 Based as non-linear thermo-mechanical solution embedded in CATIA V5 and SAMCEF Gateway CAA V5 Based, the SAMCEF integrated interface within CATIA V5.

"**Professional solutions**": this SAMTECH offer is based on its general-purpose software tools and is dedicated to specific domains of application like rotor dynamics, modeling of composite structures, mechatronic modeling of machine-tools, modeling of large deployable or inflatable structures, modeling of high voltage substations, modeling of pipes for automotive industry…
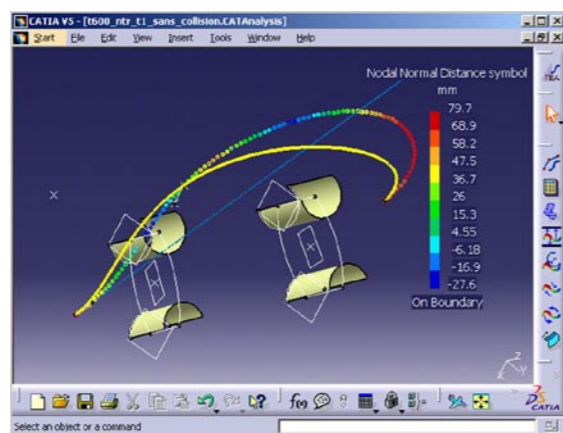
"**Third party and customized solutions**" like the SAFE tool (fatigue analysis of aeronautic structures) and the Application COMPOSITES (analysis of aeronautical structures made of composite materials) from AIRBUS, where SAMTECH provides its clients with services such as development, reengineering, packaging and deployment of proprietary professional solutions on the customer site.

"**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.

Visit **www.samcef.com** for further details on SAMTECH Product/Service offer!

- Need some information about TEA Pipe ?
- Need some information about non-linear modeling and pipe analysis with TEA Pipe ?
- Need some information about SAMTECH expertise ?

Contact our specialists !

TEA Pipe

Transparent Extended Analysis for Brake Pipe Analysis

TEA Pipe users can analyze the behavior of brake pipes from CATIA V5 environment.

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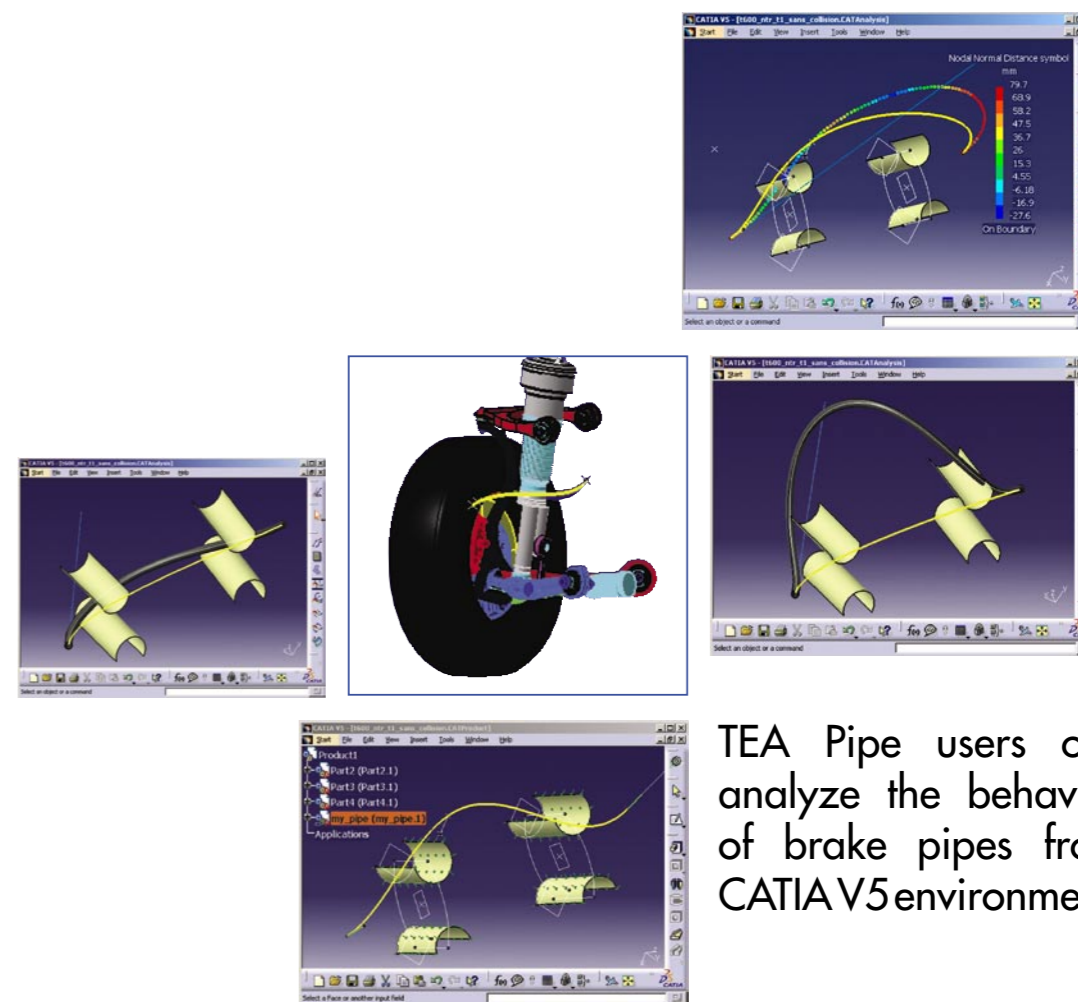Fax : +39 02 46 94 998

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SAMTECH, Integrating CAE towards Professional Solutions

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Taking into account non-linear geometrical behavior, TEA Pipe users can analyze the behavior of brake pipes from CATIA V5 environment. They can easily obtain the deformed shape, curvatures, stresses, collisions information for successive configurations. A variety of pipe details (Supports, Reinforcements, Spirals…) and kinematical description (Simple or Imported from DMU Kinematic) is available.

NON-LINEAR MECHANICAL ANALYSIS WITH COLLISIONS DETECTION

TEA Pipe provides you with a comprehensive and very powerful software for brake pipes analysis. It allows the use of a Pipe Manufacturer Database. The material behavior can also be defined in a Database. The brake pipe connectors, supports… can be defined on points and geometries from your current CATIA V5 models.

Distance measurement between the deformed shape and the surrounding surfaces allows the user to detect possible collisions.

A new pipe shape can be created from the analysis result.

With a simple kinematical definition, the wheel rotation and translation can be taken into account. With the advanced kinematical definition, complex movements can be imported from DMU Kinematics.

With TEA Pipe, the best length, the best connectors positions… can be found, while checking collisions or curvatures.

FOR DESIGNERS AND MECHANICAL ENGINEERS

SAMTECH enables CATIA V5 users to perform advanced non-linear mechanical simulations analyses, 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 for brake pipe analysis named TEA Pipe.

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

CATIA V5 designers are able to quickly produce brake pipe models by adding specific brake pipe features to an existing model built within their environment.

TEA Pipe 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 post-processing.

TEA Pipe provides users with extended non-linear mechanical solving capabilities, in a fully associative environment.
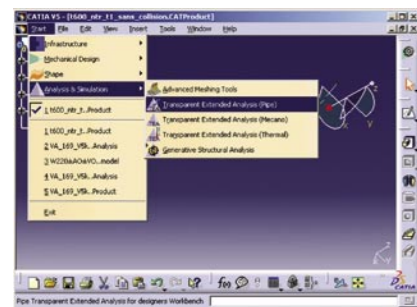
With TEA Pipe, SAMTECH answers customer needs from medium and large industries by proposing the transparent use of extended FE mechanical techniques very early in the design process of the brake pipes, to eliminate the expensive iterations during design process.
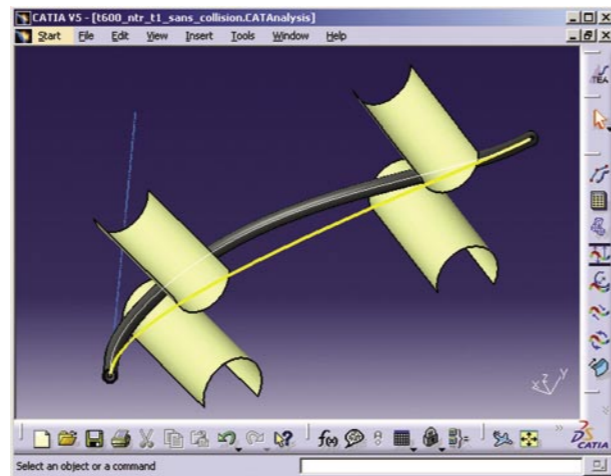
BETTER COMPATIBILITY WITH DETAILED ENGINEERING

Users benefits from SAMTECH recognized expertise in detailed engineering and software quality, insofar as with TEA Pipe, users can perform sophisticated mechanical simulation within a complete and integrated CAE software for mechanical design.
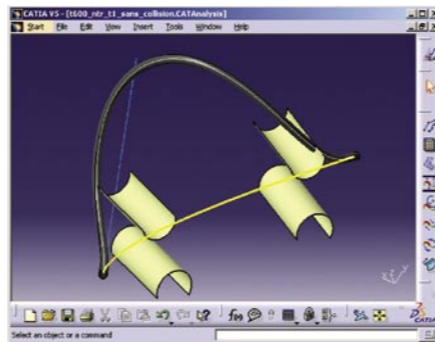
AUTOMOTIVE AND TRANSPORT SECTOR

With TEA Pipe, SAMTECH aim is to target design activities of customers from the automotive and more generally, the transport industry (Trucks…).

Pipe Definition

- Pipe length;
- Pipe diameter;
- Pipe connectors (length, position, directions…);
- Pipe material and Pipe Manufacturer Database;
- Pipe auxiliaries
  - Supports
  - Reinforcements
  - Spirals

Simple Kinematical Definition

The user must define a Wheel Master Point, able to rotate (steering) and to translate (suspension). The surrounding surfaces and geometries are either fixed or linked to the wheel. Nine standard positions (three Steering positions and three Suspension positions) are defined for the wheel.

The user can also introduce some user cases (defined by a steering and a suspension value).

Advanced Kinematical Definition

The surrounding surfaces and geometries movements are defined in DMU Kinematics.

"Measure" points are recorded in DMU Kinematics.

Each TEA Pipe moving object is linked to a DMU Kinematic Measure Point.

Pipe Optimization

The user must define an objective (for example: minimize Pipe length) and define some constraints (for example: keep the curvature under a given value).

MODELING ENVIRONMENT

TEA Pipe is perfectly embedded in CATIA V5 for the modeling, the non-linear mechanical analysis and the post-processing pipes. Results are post-processed graphically in the form of isovalues or as animations. TEA Pipe 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 post-processed includes deformed mesh, nodal normal distance, curvature, force, moment and successive configurations.
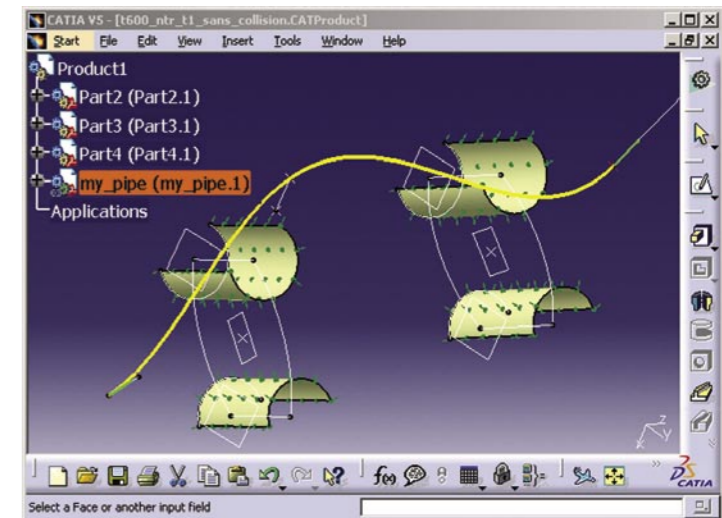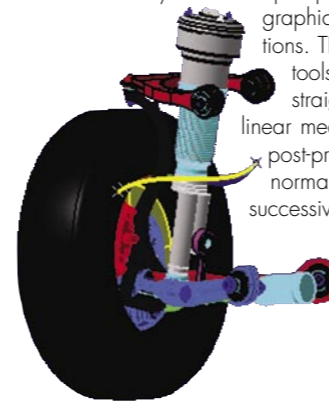
DOCUMENTATION

For direct access to information, the Users Guide and Help manual are available on the CD-Rom (PDF file).

PLATFORMS

TEA Pipe is available on Window 2000/XP, UNIX AIX.

Prerequisites :

- GPS, Assembly Design, Tubing, Dmu Kinematics;
- From CATIA V5 R12.

Technical Characteristics:

TEA pipe offers non-linear brake pipe analysis directly accessible from CATIA V5 environment. The users benefit from features of SAMCEF Mecano (large deformations, powerful contact algorithms…) and BOSS (optimization).

General capabilities
- Solution based on CATIA V5

Formulation
- Non-linear Finite Elements

Transparent Non-Linear Analysis
- Minimum data definition for non-linear pipe analysis
- Automatic choice of solver strategy

- Very robust collision detection algorithms
- Successive configurations

Pipe Definition
- Pipe length
- Pipe Diameter
- Pipe Connectors (Length, Position, Directions, …)
- Pipe Material and Pipe Manufacturer Database
- Pipe Auxiliaries
  - Supports
  - Reinforcements
  - Spirals

Movement Definition
- Simple Kinematical Definition
- One Wheel Master Point, able to rotate (steering) and to translate (suspension)
- Advanced Kinematical Definition
  - Imported from DMU Kinematic

Pipe Optimization
- Parameters : Length, Connectors Positions…
- Constraints : Parameters limits, Curvature, Collisions…
- Objectives : Pipe Length, Minimize bending…

Available results
- Deformed Pipe Shape
- Corresponding CATIA V5 pipe shape
- Distance from surrounding surfaces
- Curvature
- Torsion
- Bending