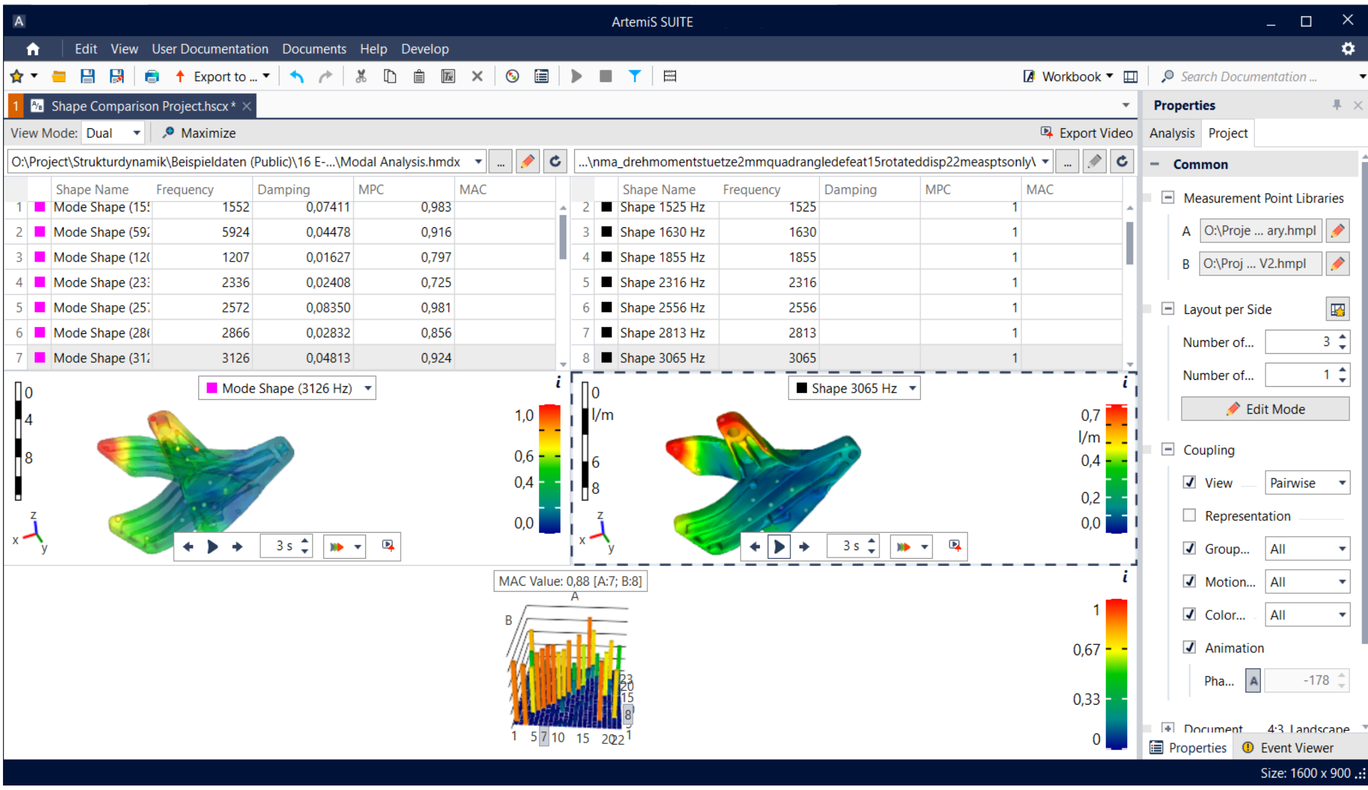
DATA SHEET



ArtemiS SUITE
PRoject

Code 50410

APR 410 Shape Comparison Project

The Shape Comparison Project of ArtemiS SUITE enables users to analyze and compare deflection shapes. With this project, users can observe individual shapes, compare simulations with real measurements, and evaluate component modifications.

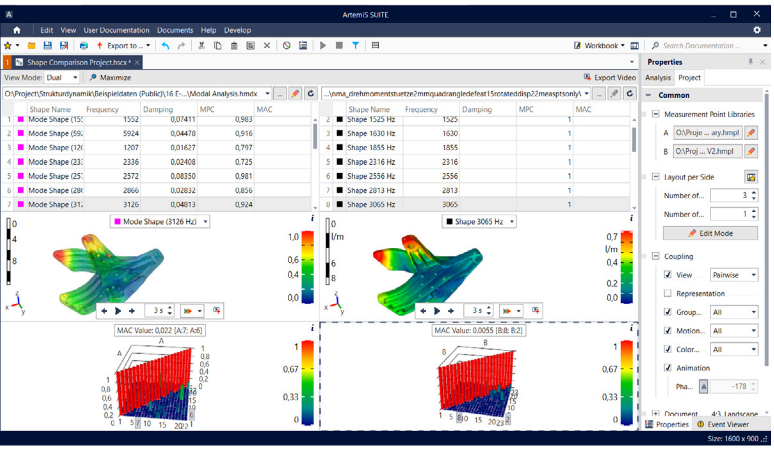
OVERVIEW

APR 410 Shape Comparison Project

Code 50410

The Shape Comparison Project is a part of the ArtemiS SUITE Structural Analysis Package and determines automatically the (Auto)MAC value (Modal Assurance Criterion) which enables users to receive information about the similarity of deflection shapes immediately. This information can be used, for example, to assess the quality of a simulation.

With a direct comparison between two shapes, for example, users can quickly find similar or identical shapes, as well as dependencies between them. In addition, the animations allow users to observe selected shapes. While comparing two shapes, both animations can be coupled enabling users to compensate different phases automatically or manually.



KEY FEATURES

Clearly arranged user interface for intuitive operation

Detection of matching shapes

- The Shape Table facilitates the selection of a shape to serve as a reference for the automatic computation of a relative MAC index and for the automatic identification of all corresponding shapes that are either similar or identical
- Grouped Shape Table to detect similar or identical shapes
- Adjustable individual group threshold for enhanced customization and accuracy

Visual comparison of deflection shapes (MAC matrix)

- Displaying the MAC values of modal Shape Tables in a 3D bar diagram or 2D display
- Analysis of MAC Matrix between model A and B or AutoMAC Matrix between model A to A (to itself)
- Import of 3rd party results
- Results from numerical simulations (ANSYS, NASTRAN, Abaqus, etc.) can be directly imported
- Selection of resulting 3-dimensional deformations: axes-wise or (XY, XZ, YZ) deformation

Interactive 3D or 2D animation with setting options

- Animation of the shapes in the model
- Animation coupling (synchronous oscillation/ view or individual setting)
- Zooming, turning, and tilting a model during animation as well as individual control of playback speed and the scaling of the deflection
- Export as AVI, PPT, PDF, and image

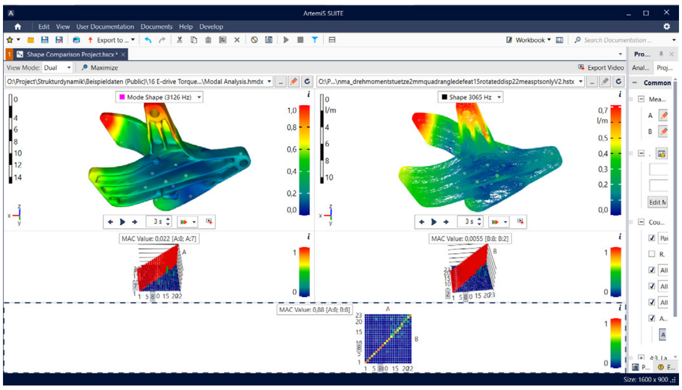
APPLICATIONS

Analyzing and comparing of measured (and numerically simulated) shapes

Shape Comparison Project

For optimization of components or examination of simulations in comparison to real measurements, shapes have to be analyzed.

For this, the MAC value can be used. The MAC value provides information about differences and similarities in conjunction with the animation of the shapes. To analyze only certain deformation, users are able to select only certain coordinate directions to be animated.

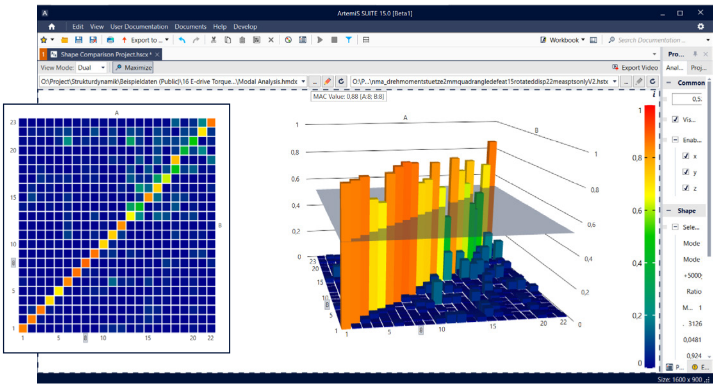


Two result sets can be compared using the MAC matrix. High MAC values (close to 1) show a high deformation correlation between two shapes and are therefore a great tool for model updating, for example.

Shape Table and MAC index

Using the Shape Table, users receive the frequency, the MPC value (Modal Phase Collinearity), the damping, and the MAC value that have a value above the set group threshold in relation to the reference shape.

A value between 0 and 1 is calculated, with a MAC value of 1 being very similar and 0 being very dissimilar. All shapes are compared to the selected reference, and all MAC values above the threshold will be shown in the shape table, as a value and its corresponding mapped color.



In the properties tool window, users can display the threshold value. As a result, the group threshold value is superimposed as a partially transparent layer, which enables relevant MAC values to be grouped optically. The view can also be changed to 2D, using the option available in the context menu.

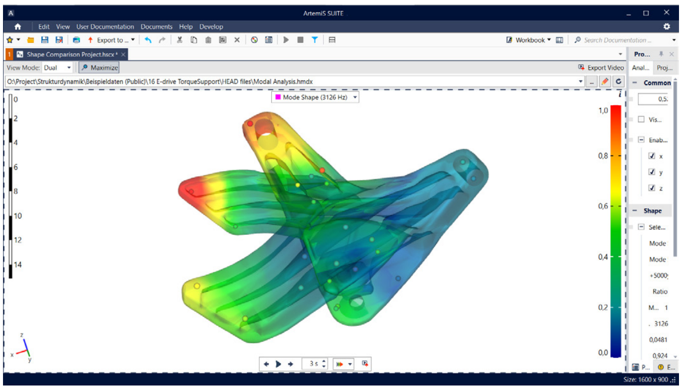
MAC Matrix (3D bar diagram)

By default, the bar diagram shows the MAC values of all possible comparisons between the shapes. The MAC values are represented by the height of the bars and their color. The MAC Matrix Diagram is an interactive tool, where the user can click on single elements, and the coupled shapes will be selected and animated. This leads to an easy and fast analysis workflow.

3D animation representation

The animation shows dynamic deformation patterns of the object and enables a more detailed examination. While comparing shapes, both animations can be coupled allowing users to compensate different phases automatically or manually.

Animation speed and the scaling of the deflection can individually be adjusted. To document, you can save the animated shapes as AVI files. You can choose to export them as single or paired animation videos.



Using the 3D animation display, users can select in which way the data is visualized. In addition, the course of the movement of each measurement point can be visualized in the form of a fading trace.

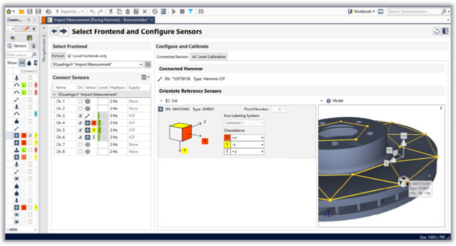
STRUCTURAL ANALYSIS

The Shape Comparison Project is a part of a powerful and perfectly matched ArtemiS SUITE Structural Analysis Package that enables users to intuitively examine and understand the complex relationship between stimulus and structure.

MEASURING / PREPARING

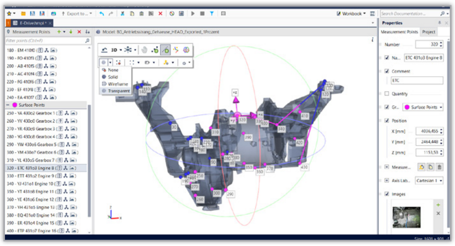
IMPACT MEASUREMENT (APR 430)

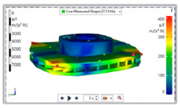
Impact Measurement enables structural analysis measurements using the methods Roving Hammer and Roving Accelerometer.



MEASUREMENT POINT LIBRARY (APR 000)

The Measurement Point Library can be used to create a 3D grid model and to import a corresponding CAD model very easy.

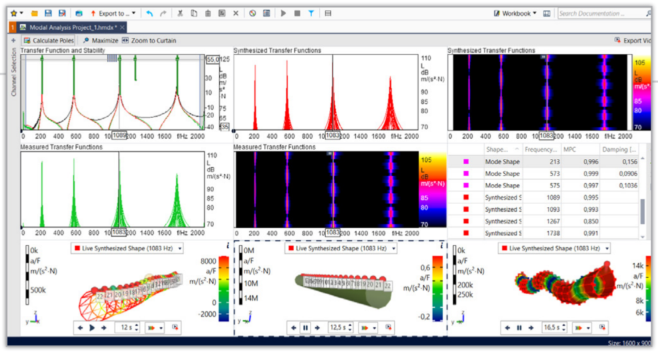




LIVE COUPLING (APR 430 & APR 420)

During the measurement, the analysis of the recorded data can be performed by means of live coupling in the Modal Analysis Project.

ANALYZING

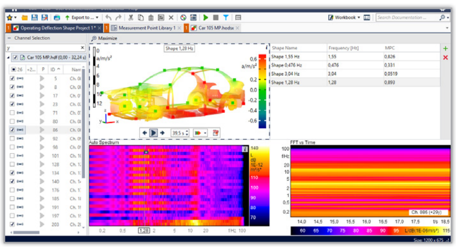


MODAL ANALYSIS PROJECT (APR 420)

The easy-to-use Modal Analysis Project enables easy recognition of interesting frequency ranges as well as the comparison, for example, with reference measurements. Alternatively, users can also validate simulation results in this way.

ODS PROJECT (APR 400)

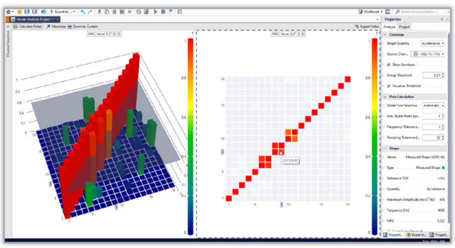
The ODS Project (Operating Deflection Shape) includes the Time Domain Animation Project (TDA) and can be used to animate and analyze structures in a defined stationary operating status as well as time-variant motions.



SHAPE COMPARISON PROJECT (APR 410)

The Shape Comparison Project is used for analyzing and comparing deflection shapes.

LIVE COUPLING A MAC MATRIX (APR 410 with APR 420 & APR 400)



REQUIREMENTS

- Shape Table (*.hstx)
- ODS Project (*.hodsx)
- Measurement file (*.hdf)
- Modal Analysis Project (*.hmdx)
    - For working with HSTX, HODSX, and HMDX files, users have to consider that the Measurement Point Library referenced in each case has to exist at the original location. It is required as it contains the coordinates of the point numbers for the representation and animation as corresponding three-dimensional model.
- Punch file (*.pch)
- ANSYS file (*.out)
- Abaqus file (*.dat)
    - For the creation of a compatible DAT file, the line *NODE PRINT, NSET=<Set Name> COORD, U has to be contained in the INP input file
- PERMAS file (*.dato.gz)
- UFF file (*.uff, *.unv)
- ME'scope project (*.vtprjj, *.vtmax)

RECOMMENDED

- Modal Analysis Project (APR 420 is required)
- Impact Measurement (APR 430 is required)
- ODS Project (APR 400 is required)

Required: APR 000 Framework (Code 50000)

HEAD acoustics

Contact Information

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