

PolyWave Post-Processing Software Suite

Advancing the analysis of vibration test data
Product brochure



PolyWave - The scalable software package for comprehensive analysis of vibration test data

The seamless post-processing with PolyWave makes your studies with Polytec laser Doppler vibrometers more efficient than ever.

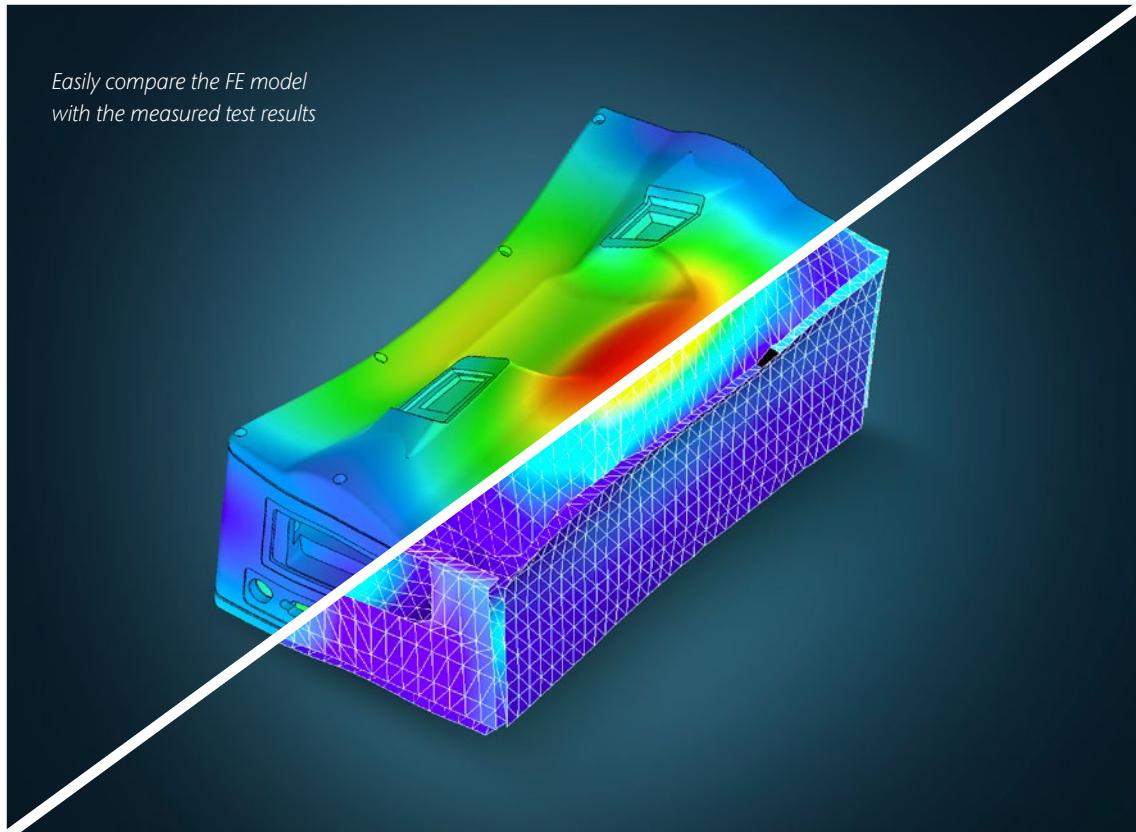


Concentrate on the essentials

PolyWave has only one focus: your data. Any data set content is already analyzed while loading and PolyWave offers just the matching post-processing modules. This feature alone helps give an inexperienced or first-time user the confidence of an expert and the skills to exclude poor data that can adversely affect subsequent work. It is reassuring that by immediately post-processing data, the user will know that all settings, including excitation values and run-up times, were chosen correctly the first time.

Tuned to maximum performance

PolyWave is optimized for processing the large data sets that make scanning laser vibrometers (PSV, MSA) the superior acquisition system for experimental modal analysis. The software is designed to allow thousands of transfer functions to be analyzed. In addition, PolyWave includes advanced algorithms that are not included in Polytec's basic measurement and analysis software. These powerful algorithms are automatically matched to the content of the test data file when a PolyWave module is started. However, for the expert, all parameters are still accessible for direct optimization.



CAE requirements to define your test

If properly processed, the high spatial resolution possible with a scanning vibrometer leads to an accurate and confident validation of the associated FE models. Instead of validating just a few select degrees of freedom, a PSV Scanning Vibrometer can retrieve the measurement point definition directly from the CAE data. As a result, test data are generated at the nodal points and can result in ten thousand or more FRF's. PolyWave is uniquely designed to assure that this demanding post-processing task proceeds smoothly and quickly.

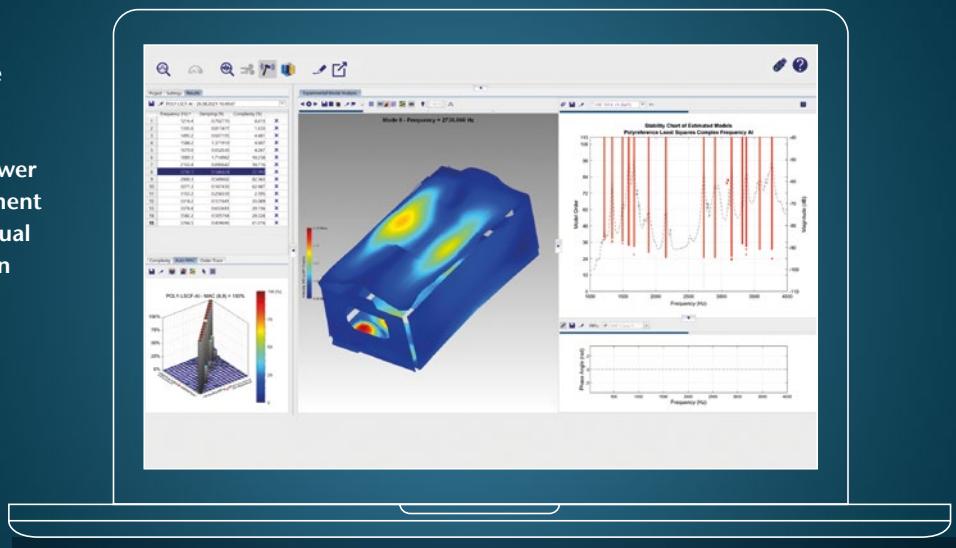
Module



EMA

EMA is an intelligent software that provides algorithms for SISO, SIMO, MISO and MIMO data. The included Result Viewer bridges the gap to Finite Element Analysis (FEA) by allowing visual and mathematical comparison with calculated modes.

EMA desktop



Highlights

- User support by data check during file import
- Flexibility by segmental analysis and manual frequency pre-selection at high mode densities
- Confidence in the results based on dedicated quality indicators
- Powerful with large test result files

Experimental modal analysis

EMA provides the tools necessary for extracting modal parameters from experimental modal tests. Interfaces and algorithms are optimized for the large data files inherent in using Scanning Vibrometers. Thousands of FRF's can be imported and analyzed without any stability issues.

Consequently, meaningful Eigenvectors, mode shapes and modal damping parameters can be extracted from the operational deflection shapes. Even at high modal density, these parameters can be ascertained by using segmental analysis. The use of multiple quality indicators provides assurance that the results are consistent.

- Auto-MAC
- Complexity plot
- Phase diagram
- Order trace
- Stability chart
- Synthesized FRF



Operational modal analysis

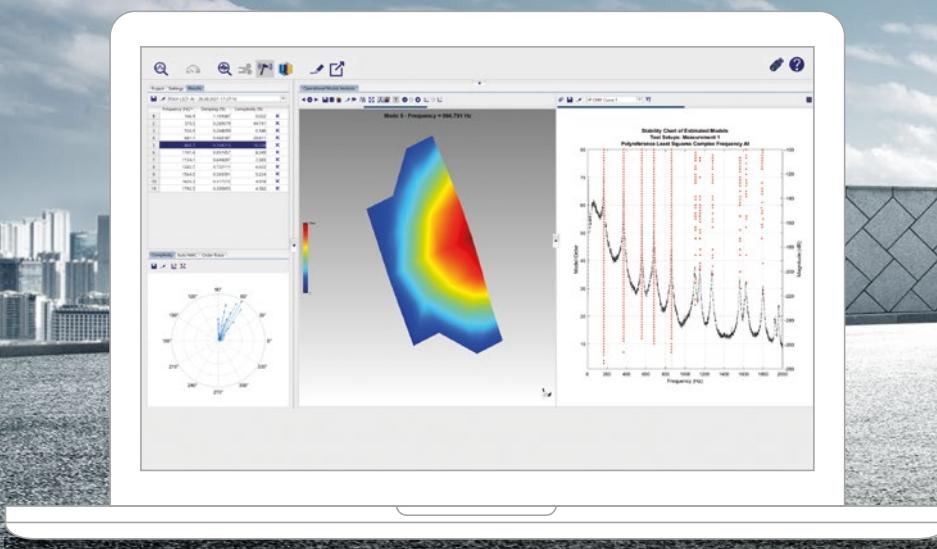
The OMA add-on module provides tools for the analysis of structures excited by ambient vibration where the input force is unknown, e.g. buildings, bridges or other structures under wind excitation, or engines and drives excited through normal operation. PolyWave automatically selects this analysis module when the imported file content is consistent with OMA acquisition. For modal parameter extraction, time based algorithms are integrated. For an always reliable mode identification the unique AI-supported algorithm Poly-LSCF-AI is available.



Highlights

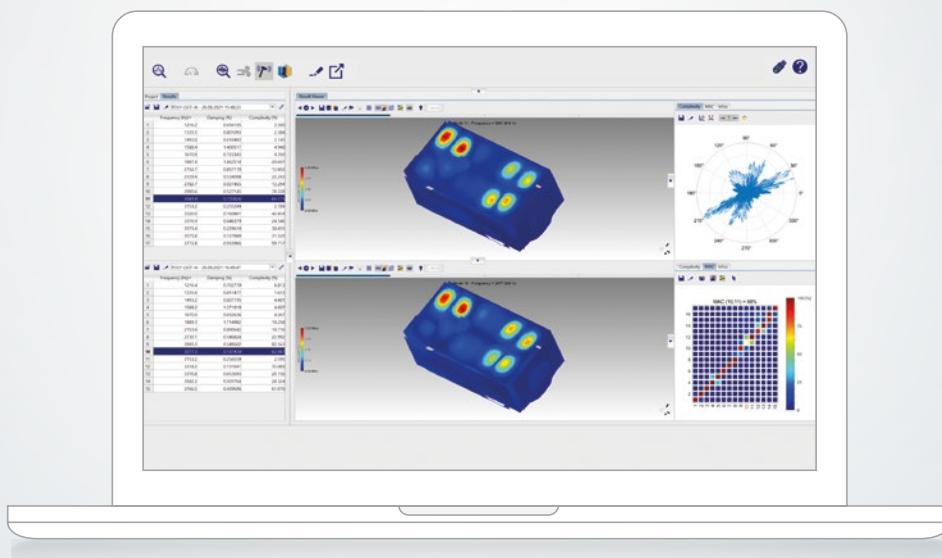
- User support by data check during file import
- Mode identification by Complex Mode Indicator Function (CMIF) at OMA module start
- Flexibility by segmental analysis and peak picking at high mode densities

OMA analysis of vortex induced membrane vibration





RESULT VIEWER for EMA and OMA



Comparing test
data and CAE
data

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Highlights

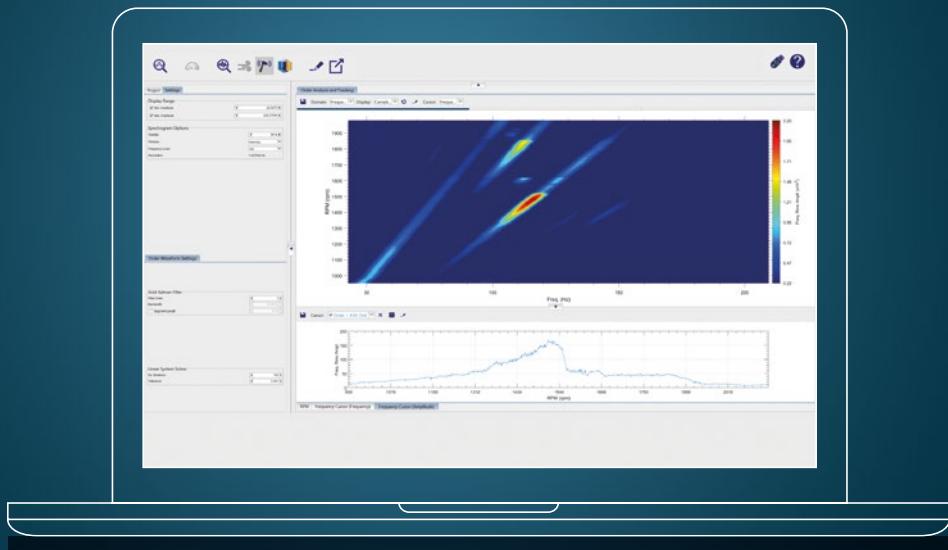
- MAC for EMA and FEA
- Side by side animation of mode shapes
- Comparison of data from various sources

Display and compare results

Comparing modal analysis data from simulation, test data and post-processed data is the core task in model validation. The RESULT VIEWER allows for a direct comparison of results from different sources regarding Eigen frequency, damping, complexity and mode shapes. In addition, it provides a side by side animation of mode shapes and the corresponding modal assurance criterion (MAC).



ORDER ANALYSIS



Order analysis

ORDER provides an analysis of structural resonances for tests taken during run-up or coast-down conditions. It offers all the necessary tools for a comprehensive analysis and visualization including: Campbell diagrams and waterfall diagrams, both in frequency domain and order domain, as well as cursor-specific functions that allow for a quick analysis by positioning the cursor on critical plot elements. Data sets from one or more response channels can be analyzed. TTL pulse signals are easily converted into RPM signals for a maximum flexibility regarding input signals.

Preprocessing of raw data

Before starting the ORDER module PREPROCESSING allows for preparing the raw data for fast and meaningful analysis. PREPROCESSING converts RPM signals from pulse (TTL) to linear speed values and adds smoothing for clear results. Data decimation saves memory and computation time for order calculations. Along with additional filters and conversion tools the PREPROCESSING module provides always the right input to order analysis.

Highlights

- Flexible with RPM Input: analog, TTL or synthesized by "RPM tracking" feature
- Comprehensive: order diagram, Campbell diagram and waterfall
- Quick identification of resonance frequencies by 3 cursor functions per domain
- Pinpoint noise sources by Order Waveform Tracking and audio playback
- Preprocessing featuring time cut, decimate, and smoothing

ORDER module showing Campbell diagram with order cursor



More modules

SIGNAL ANALYZER

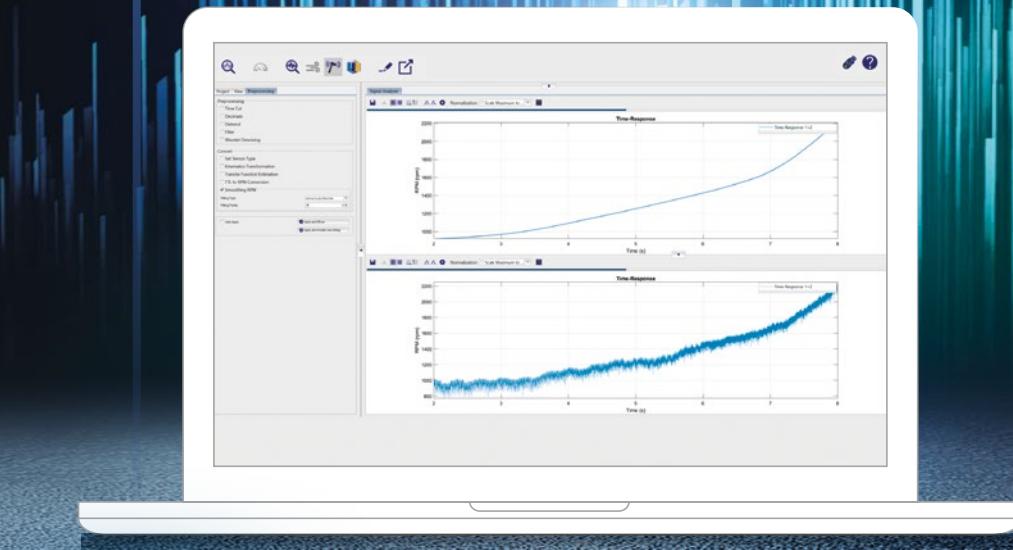
Visualization of raw data

The visualization of data from various sources is the dedicated task of the module SIGNAL ANALYZER. It allows for data quality check, channel overlays and audio playback of time data.



Highlights

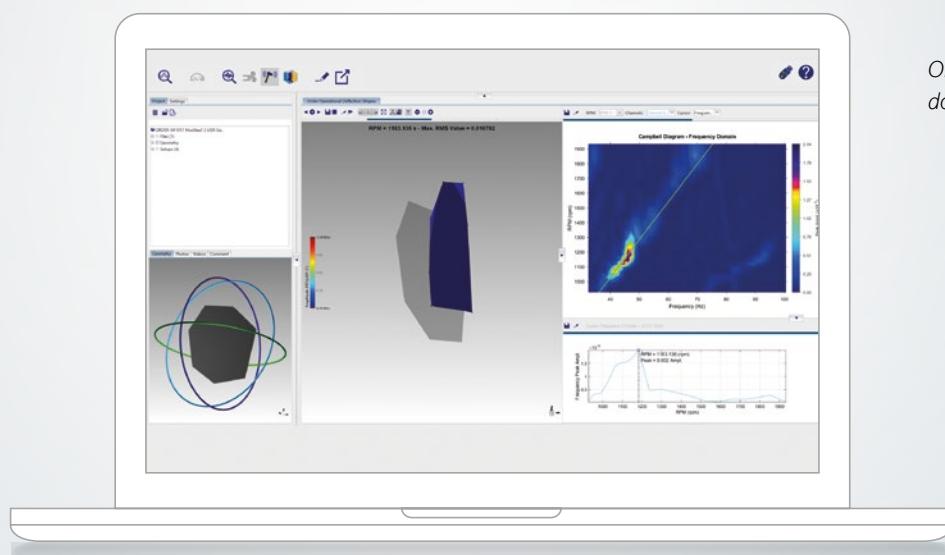
- Raw data visualization
- For spectra and time data
- Overlay of channels
- Audio playback of time data



*RPM smoothing in the
PRE-PROCESSING MODULE*



ORDER ODS - Operational deflection shapes for time variant data



ODS in time domain

ODS - Operational deflection shapes

This optional module is not only replicating functionality of the Polytec PSV and MPV acquisition software. It adds time ODS display capabilities including a spectrogram view for a selected channel.

ORDER ODS - Operational deflection shapes for time variant data This module is intended for the analysis of full-field data measured during run-up measurements. It is providing a Campbell diagram and basic order analysis functionality per measurement channel to assess the critical structural resonances in presence of an RPM channel.



Highlights

- Visualization of raw data prior to EMA and OMA post-processing
- Basic order analysis
- Time domain animations and spectrogram



Highlights

- Meaningful reports in an instant
- Incorporate custom templates and company logo
- Easily define what's relevant for the audience
- Output in Microsoft® Word®, Microsoft® PowerPoint® (including animated GIF) or PDF



REPORT

Automated report generation

REPORT is designed to quickly and automatically generate meaningful reports from post-processed test data. Present your post-processing results and convince with animations of the relevant mode shapes in Microsoft® PowerPoint®, Word® and PDF. The reporting option is available for the modules EMA, OMA and ORDER ANALYSIS.

Module	Signal Analyzer	EMA	OMA	Result Viewer	Preprocessing	Order Analysis	Order ODS	ODS	Report
Available packages									
PolyWave Modal Standard	S	S		S				O	O
PolyWave Modal Plus	S	S	S	S				O	O
PolyWave Rotating Machinery Expert	S	S		S	S	S	S	O	O
PolyWave Rotating Machinery Studio	S	S	S	S	S	S	S	O	O
PolyWave Rotating Machinery	S				S	S			O
PolyWave Rotating Machinery Plus	S				S	S	S		O

S: Standard feature O: optional feature

System requirements

PolyWave packages

Developed by professionals for professionals PolyWave modules are available as well-balanced packages covering the post-processing requirements for structural dynamics and/or order analysis. For each package, the REPORT module for professionally presenting and documenting the results is optionally available. Refer to MODULES table on the left page.

Software maintenance

PolyWave is continuously improved for a faster and more convenient data analysis and post-processing. A software maintenance contract entitles for a feature releases every year. One year is already included in the package.

CPU	Intel® Core™ i7, min. 2.0 GHz min. quad core
RAM	8 GB, 16 GB recommended
HDD	min. 4 GB
Graphics board	minimum OpenGL 2.1 capable GPU (1024 MB DDR3) recommended is NVIDIA card. Onboard graphic chips are not recommended.
Display	1920x1080 (HD) recommended
USB 2.0	at least one port (dongle)
Operating System	Windows® 10,11, 64 bit
File interface for SVD and PVD files	Polytec File Access interface. Free download on the Polytec website
Using REPORT PRO	Installed Microsoft® Office Package or matching Viewer software (from 2003 version onwards)

PolyWave is designed to provide high performance post-processing also for large test files as generated by Scanning Laser Doppler Vibrometers. A large number of degrees of freedom at high frequency resolutions results in GB of data. Like other numeric CAE tools PolyWave may require a larger RAM in case of large projects.

Supported data file formats

Import:

SVD (Polytec Scanning Vibrometer)

PDV (Polytec Single Point Vibrometer / VibSoft)

UNV (Universal File Format); Data sets 15, 55, 58, 58b, 82, 2411, 2412

VIB (PolyWave Exchange Format)

WAV (Wave Audio File)

RST (Ansys result files)

Export:

UNV (Universal File Format); Data sets 55, 58, 58b, 82, 2411, 2412

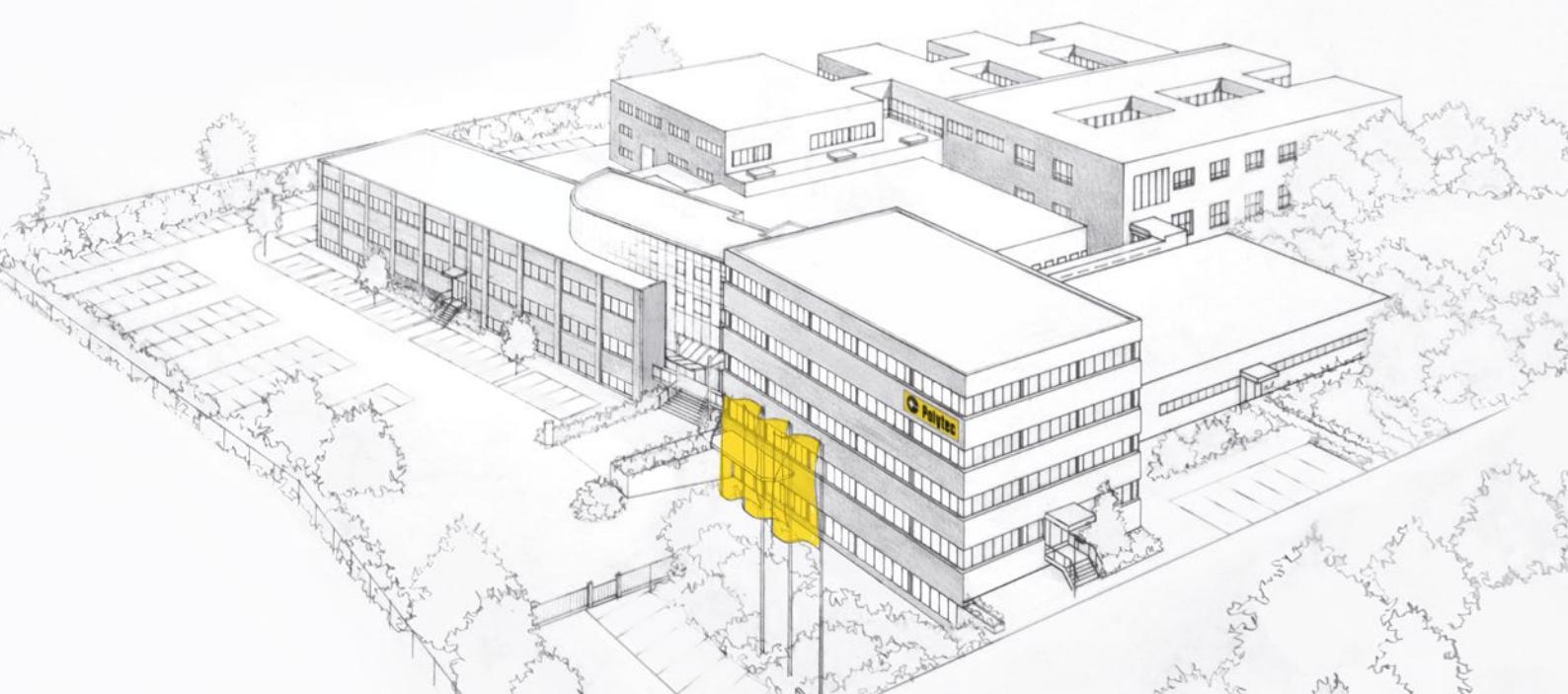
VIB (PolyWave Exchange Format)

CSV (Text file for modal analysis results)

AVI movies, animated GIF

STL (Geometry)

WAV (Wave Audio File)



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