

Polytec

Education program

PolyLab

Tutorial on non-contact vibration measurements





Why PolyLab:

Our younger generations are our future. To help encourage them to grow, we offer an educational program designed to expose students to state-of-the-art tools for vibration measurement.

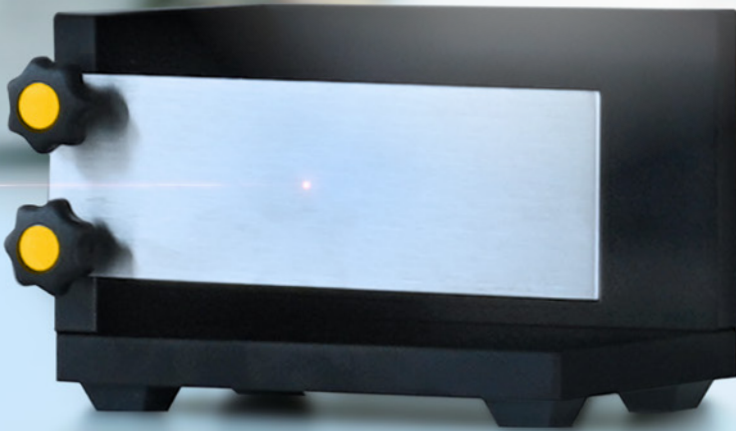
This program utilizes our PolyLab setup which was designed as a turnkey University lab covering experiments such as vibration testing and modal parameters (natural frequency, damping, and mode shapes). Students will enjoy working with the portable VibroGo® vibrometer as it is easy to use and offers the possibility for fully digital non-contact vibration measurements, as well as analog data acquisition for visualization of transfer functions and much more.



- The ability to enhance classes and labs by using the latest metrology techniques at no cost
- Complete package of free measurement technology, experiments and accessories
- Practical tutorial with worksheets
- Optional support from our experts

PolyLab

No cost educational program designed to expose students to state-of-the-art tools for vibration measurement.



The PolyLab is a free loaner program. It allows educators to use state-of-the art industrial technology in the classroom for a certain period to time.

Qualified schools will receive the portable laser Doppler vibrometer VibroGo® together with the PolyLab VibroGo® Education Kit, demonstrative experiments, and practical tests in a detailed script for teaching vibration tests

and its measuring parameters. Furthermore, PolyLab includes support from Polytec's experts that includes lectures showing the use of laser Doppler vibrometer technology to solve important engineering tasks. As well as, practical examples of how the technology is used for a variety of applications (aerospace, microstructures, electronics, biomedical, ultrasound, etc...).



Qualified schools receive the latest metrology tools at no cost.



Contact us:
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www.polytec.com/us/polylab

Use latest state-of-the-art technology

1 VibroGo® All-in-One Sensor

Whether for measurements in the field or experiments in the lab, the portable VibroGo® is enabling engineers and researchers to complete their tasks with ease. The VibroGo® features battery operation, wireless control and on-board data recording.



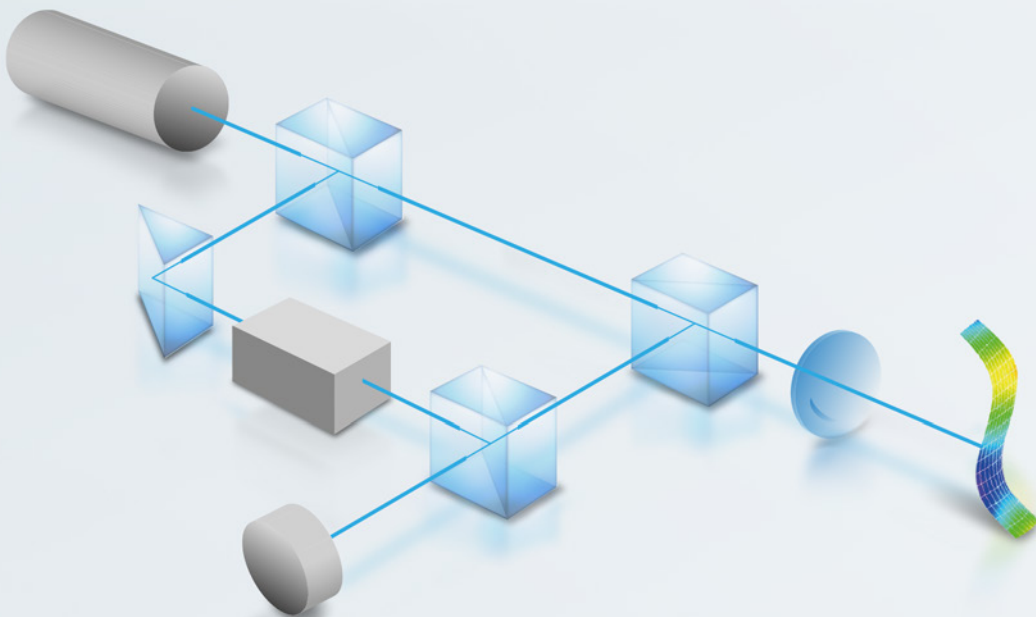
2 VibroGo® Education Kit

Explore the contents of the PolyLab Education Kit case

| | | | | | |
|---|--|----|--------------------------------|----|--|
| 1 | 1x Pair of loudspeakers | 6 | 1x Mounting wax | 11 | 1x USB Stick: Polytec Update (DeskSoft-Software Installation) 1x USB Stick: "Documents EduKit" |
| 2 | 1x BNC-T adapter | 7 | 1x Getting Started Guide | | |
| 3 | 6x Various plates | 8 | 1x Connection box w/ USB-cable | 12 | 1x Jack adapter |
| 4 | 1x Hardlock, 1x USB Stick: Polytec Update (VibSoft- Software Installation) | 9 | 1x Headphones (optional) | 13 | 5x BNC cables |
| 5 | 2x BNC jack adapter 1x BNC-I adapter | 10 | 5x Hexagon nuts (M6) | 14 | 1x Retro-reflective tape |
| | | | | 15 | 1x Cantilever beam test |

3 Tutorial with theory and hands-on guide to experiments

Polytec's application team composed a comprehensive lab tutorial. The theory section covers basics of vibrometry and dynamics of a mechanical structure in time and frequency domain. Various hands-on experiments are included.



Exciting experiments:

- Cantilever beams
- Time and frequency vibration analysis
- Visualization of deflection shapes
- Optical microphone



Theoretical background:

- Basics of laser Doppler vibrometry
- Time and frequency domain analysis
- Free damped vibrations
- Dynamics of bending beams
- Various techniques
- ...and a lot more!

9 Experiment: Deflection Shapes

A frequent task in vibration analysis is the identification of the resonance frequencies and their corresponding deflection shape. This experiment is dedicated to the visualization of vibration measurements.

The modes and resonant frequencies of an object can partly be compared to a human fingerprint. A response spectrum of an object is similarly unique and often used to update Finite-Element-Models (FEM) and material parameters. This type of examination is also called modal analysis.

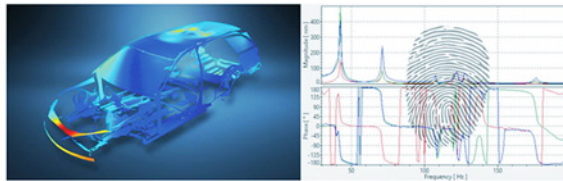


Figure 13: Vibration map of a car body

As described in the introduction, measurement results are not initially referred to as modes, but as operational deflection shapes. Usually several resonance frequencies are excited simultaneously and adjacent peaks influence each other. The further apart the individual peaks are the less impact they have on each other. For a clear and exact identification, however a special postprocessing is required, which extracts the individual modes from the spectrum with the help of mathematical algorithms. This analysis is not part of the script. We assume that the resonant frequencies we are looking for are not influenced by nearby peaks.

Preparation

For this experiment we use a structure-borne sound exciter as excitation source. The excitation signal is "white noise". In this case it is required to acquire two signals. In contrast to the previous experiments, here the measurement signal is not transmitted digitally via Wi-Fi, but is acquired in analog form via a two channel data acquisition box and then digitized.

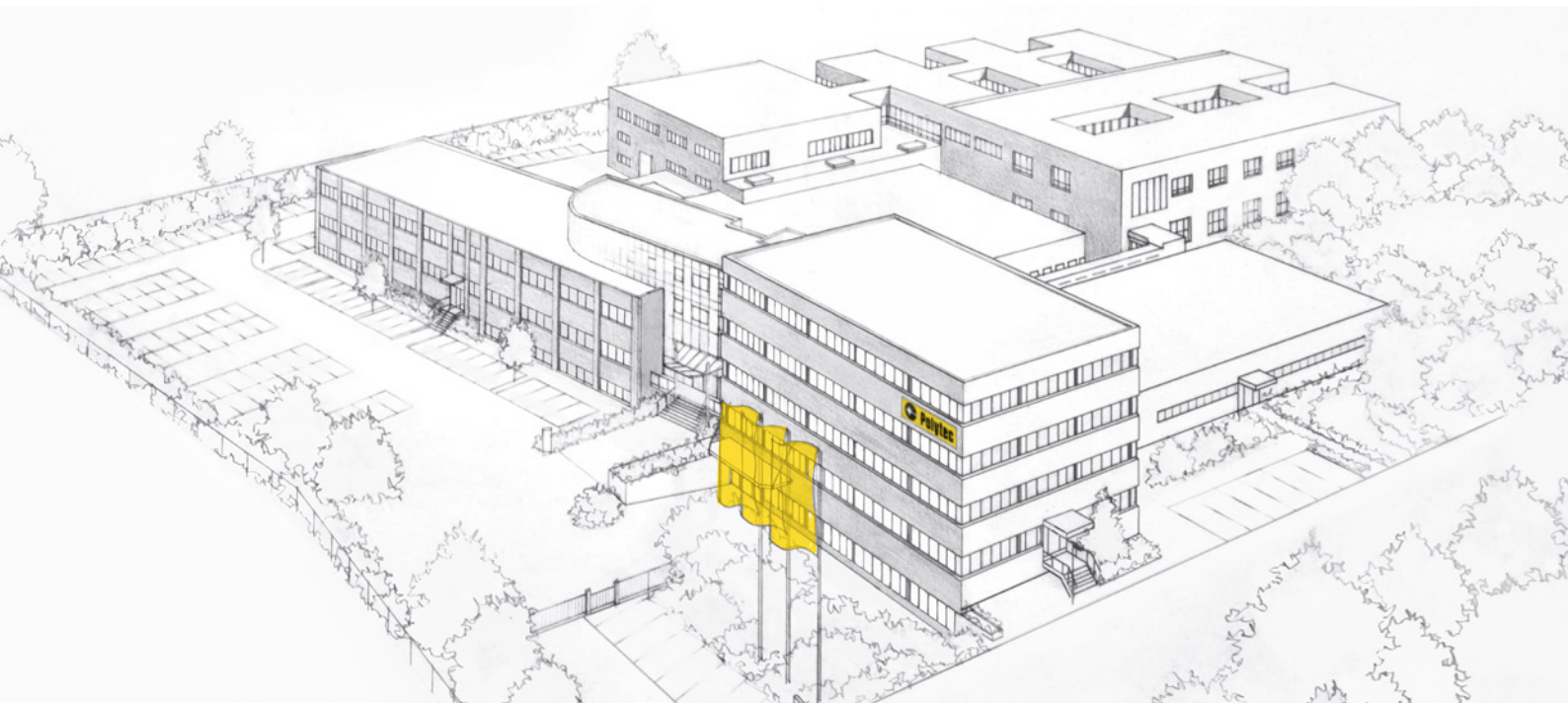
1. Connect the junction box with the USB cable to the computer
2. Plug in the licence dongle
3. Connect the BNC output of VibroGo to the Vib BNC input on the junction box
4. Connect the audio output of the computer to the Ref channel of the junction box and the BNC input of the structure-borne sound exciter. Use the corresponding adapters.
5. Start VibSoft 20 data acquisition
6. Save the measurement files with the corresponding index (1.pvd, 2.pvd, ...)
7. Open the VibSoft desktop version to evaluate the data



Interested? Talk to one of our experts about your specific needs. We are looking forward to supporting you in educating the engineers and scientists of tomorrow.



Contact us:
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