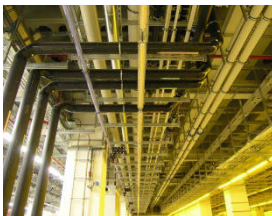


Structures for micro- and nanotechnology usage



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The Baudynamik Heiland & Mistler GmbH works for decades in the field of buildings for high vibration sensitive tools for micro- and nanotechnology usage. Worldwide acting companies with well known names like Infineon, Siemens, Bosch, AMD and many others trust in the dynamic calculations and dynamic design of our consulting office for their new buildings.

We use special high accuracy vibration sensors and for the purpose of semiconductor industry optimized analysis software. These instruments together with the international known Finite Elemente Software „Nastran“ allow us to make precise vibration predictions as well as optimized building design. We are used to operate all over the world.

As experts for structural dynamics we do not only perform data evaluation of measurements but we are proud to use the building structure as a vibration filter and optimize its dynamic behaviour in order to achieve best vibration reduction performance by the building itself.

Usually, we are asked by the client for a building concept, which will guarantee the high vibration sensitive usage of the building. The client will be sure to get a building with full serviceability.

The first step is the definition of a well-defined vibration limit for the building. Therefore, we already consult the client, since we know hundreds of tools from many clients and we are very familiar with its real sensitivity against structural vibrations.

The effect of self induced vibrations is very important. Persons inside the building, machines or HVAC will emit dynamic forces from inside the building, which must be taken into account.

In most cases we make our own vibration measurements at site to be sure of its high precision, which is required for this technology. The accuracy of our equipment is 10 nm/s between 1 and 315 Hz.

The calculations and the prognosis consider the following physical effects:

- the wave equation behaviour of the stiff building (high impedance of the structure compared to the elastic soil)
- the rigid body behaviour
- internal resonance of structure or components



If possible the parameters are measured and identified at site. Also the experience at comparable other projects are considered, so that the real behaviour can be approximated as good as possible.

Our engineering office is one of the leading consulting companies for structural dynamics, especially in the field of nanotechnology. Regularly, we publish recent project reports and research results. A short extract of the published literature is shown on our website:

www.baudynamik.de

Year **Reference Projects (Extract)**

2016 **Infineon, Kulim**

Acceptance measurements in the new Infineon FAB 2 in Malaysia, measurements of vibrations on the wafer in the production area, support and testing. Measurements of structural stiffness, optimisation of the measures that have influence on vibrations (piperack, vibration isolation, decoupling).

2016 **ELI Beamline, Prag**

Dynamic consulting and vibration measurements in the LASER building.

2016 **Infineon, Regensburg**

Dynamic concept and dimensioning of the new extension building H17.

2015 **Deutschlandradio, Köln**

Dynamic concept for the deconstruction of a former broadcasting building. Determination of vibration limit values for the IT equipment of the neighbouring broadcasting studios of Deutschlandradio in Cologne.

2015 **STRABAG Campus, Köln**

Investigation of Vibrations due to rail traffic concerning the data processing centre and the new office building.



- 2015 Preh GmbH**
Investigation of slab vibrations induced by SIPLACE Pick and Place devices. Development of improving measures.
- 2015 Boehringer Ingelheim MicroParts GmbH**
Monitoring of vibrations during the construction progress in the adjoining production area of new Modul 3.
- 2015 NTNU NanoLab Chemistry Building, Trondheim**
Dynamic design of a pedestal for an Elionix ELS-G100 Ebeam.
- 2015 OSRAM Opto Semiconductors GmbH, Regensburg**
Vibration measurements in the existing building and on the ground. Dynamic conception and FEM modelling for the new building 34.
- 2015 Novaled, Dresden, Germany**
Location evaluation for a new building with vibration sensitive equipment.
- 2014 Landeskriminalamt Sachsen, Dresden, Germany**
Investigation of ground vibrations for the installation of vibration sensitive tools in the planned LKA building. Consulting for the foundation design of the planned building.
- 2014 X-FAB in Dresden, Germany**
Vibration study for a planned relocation of CMP tools.
- 2014 Infineon, Villach, Austria**
Consulting for protection of an existing cleanroom building with running production against building site vibrations.
- 2014 AMS, Graz, Austria**
Vibration measurements on a waffle table. Pedestal design and QE measurements after installation.
- 2014 Infineon, Warstein, Germany**
Vibration Investigation for the placement of a vibration testing plant for reliability testing.



- 2014 IHP Frankfurt (Oder), Germany**
QE measurements on site for the installation of a KLA Tencor Archer 100.
- 2014 Infineon, Dresden, Germany**
Assessment of building site vibrations on the nearby located clean room building.
- 2013 Infineon, Dresden, Germany**
Location evaluation for a Hitachi SEM.
- 2013 IHP Frankfurt (Oder), Germany**
Preliminary investigation for the placement of a KLA Tencor Archer 100 tool.
- 2013 Technologie- und Gründerzentrum Freital GmbH, Germany**
Evaluation of a cleanroom area with vibration measurements.
- 2013 EADS New laboratory building**
Dynamical conception of a buildings structure including optimisation of the foundation for vibration sensitive laboratory usage.
- 2013 Vishay Siliconix Itzehoe GmbH, Germany**
Vibration study for the placement of vibration sensitive tools (ASML Stepper and Nikon Scanner) in the existing cleanroom.
- 2013 Vishay Siliconix Itzehoe GmbH, Germany**
Dynamic investigation and design for the placement of a heat pump on the buildings roof.
- 2013 WITec Ulm, Germany**
Vibration measurement as conservation of evidence in advance of constructions works near an existing building with vibration sensitive usage.
- 2012 LamResearch Villach, Austria**
Site evaluation for a KLA 2365 Wafer Inspection System and a Hitachi SEM.
- 2012 Texas Instruments, Freising, Germany**
Dynamic Investigation for Nikon scanners SNC01 and SNC02.



- 2012 IHP Frankfurt (Oder), Germany**
Site evaluation and foundation design for a Nikon Stepper.
- 2011-2012 Zeiss SMT Oberkochen, Germany**
Consulting services to Zeiss SMT concerning the structural dynamics of the planned annexe buildings.
- 2011 Elmos Semiconductor AG, Dortmund, Germany**
Dynamic Evaluation of a new laboratory area for a SEM concerning vibration and EMI immissions including a reference measurement in an existing SEM Laboratory.
- 2011 Hitachi High-Technologies Europe GmbH, Dresden, Germany**
Site evaluation of an existing clean room including measurements of vibrations, sound, EMI and temperature.
- 2011 AEMtec GmbH Berlin, Germany**
Site evaluation and concept of structural dynamics for the new production building at the location in Berlin.
- 2011 LEICA Portugal**
Dynamic evaluation of production area for LEICA cameras in Portugal.
- 2011 First Sensor, Berlin, Germany**
Vibration measurement and evaluation of an installation area for a Nikon Stepper.
- 2011 FAB –Gebäude, Global Foundries Abu Dhabi**
Conceptual design of the new semiconductor fab.
- 2011 Infineon Villach, Austria**
Design of new wafer Fab production Building for Infineon Villach.
- 2011 FAB –Gebäude, Plastic Logic Moskau, Russia**
Dynamic design of the new cleanroom.
- 2011 FAB –Gebäude, Plastic Logic Dresden, Germany**
Conceptual design of the new cleanroom for the defined vibration level.



- 2010 New FAB, Global Foundries Dresden, Germany**
Dynamic concept and structural dynamic design for the new Modul 3, Structure size 45nm.
- 2010 Dr. Johannes Heidenhain GmbH**
Consulting for new vibration free pedestals for metrology tools.
- 2010 Schneider GmbH & Co. KG, Präzisionsschleiferei**
Structural dynamic design for a ultra precision (UP) manufacturing area.
- 2009 IBS Precision Engineering, Eindhoven, Netherlands**
Vibration measurements and consulting for new factory building.
- 2008 Plastic Logic, Dresden, Germany**
Retrofit and vibration survey of E-book fab.
- 2008 Solar FAB Cadiz, Spain**
Consulting and dynamic concept of a solar fab.
- 2007 Siltronic AG Freiberg, Germany**
Consulting services concerning the structural dynamics of the new FAB 300CZ in Freiberg.
- 2007 Qimonda, Asia**
Dynamic concept and structural dynamic design of semiconductor fab with 45nm structure size.
- 2007 Semiconductor FAB, New York, USA**
Consulting and dynamic concept of semiconductor fab, structure size 45nm.
- 2007 Blaupunkt, Portugal**
Vibration survey and specification of production area.
- 2006 Mikron Zelenograd, Moscow, Russia**
Retrofit and vibration survey of an existing semiconductor factory in Moscow.



- 2006 Boehringer Ingelheim Microparts, Dortmund, Germany**
Vibration measurements and analysis of requirements for new medicine factory with micro scaled parts.
- 2005 Carl Zeiss, Oberkochen, Germany**
Extensive site research of vibration requirements and building performance of the Carl Zeiss nanotechnology factory.
- 2004 NIBSC, London, UK**
Extensive Vibration, sound and EMI measurements for new building layout.
- 2004 Elmos Semiconductor AG, Dortmund, Germany**
Dynamic concept and structural dynamic design for the new Semiconductor Fabrication, Fab4 of Elmos AG.
- 2004 Infineon, Kulim, Malaysia**
Dynamic concept and structural dynamic design of semiconductor fab with 45nm structure size, Infineon „Power Fab“.
- 2003 Mikron Avenzzano, Italy**
Vibration measurements and consulting for new waferfab for Mikron.
- 2003 AMD, Dresden, Germany**
Dynamic concept and structural dynamic design for the new AMD Fab 36, Structure size 45nm.
- 2001 Osram Opto, Regensburg, Germany**
Dynamic concept and structural dynamic design for the new factory.
- 2001 AMD, Dresden, Germany**
Dynamic concept and structural dynamic design for the new AMD Fab extension “ATPC”, Structure size 90nm.
- 2001 AMTC Dresden, Germany**
Site evaluation and dynamic building concept for Maskhouse Dresden, Cooperation of AMD, Infineon and DuPont (AMTC).



- 2000 Austria Micro Systems, AMS, Graz, Austria**
 Dynamic design of Waferfab for 0,25 μm structure size on vibration critical location 50m beside highway. Development of special building concept.
- 1998 Porto, Portugal**
 Retrofit of not appropriate building for high precision manufacturing.
- 1998 Siemens, Module 2, Dresden, Germany**
 Dynamic concept and structural dynamic design for the new semiconductor factory of Siemens, Module 2.
- 1997 Micronas, Freiburg, Germany**
 Dynamic concept and structural dynamic design for the new semiconductor factory.
- 1997 High-speed-train authority Taiwan**
 Consulting for the High-speed-train authority in Tainan and presentation of influence of high-speed train on semiconductor fabs.
- 1996 Siemens Villach, Austria**
 Dynamic concept and structural dynamic design for the new semiconductor fab of Siemens in Villach, factory 161.
- 1995 Siemens, Newcastle, UK**
 Dynamic concept and structural dynamic design for the new semiconductor factory.

