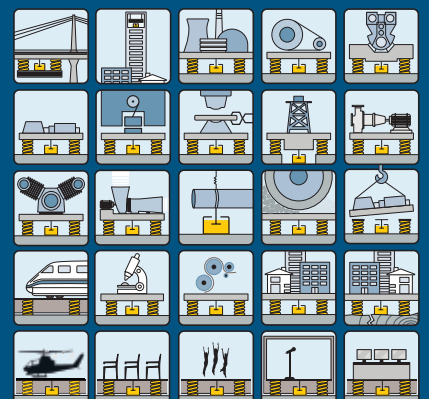




# Vibration Control Systems

## Application Areas





The history of GERB dates back to 1908. This was the year that its founder, William Gerb, became fascinated with the idea of using **steel springs** in order to protect work areas and surrounding neighborhoods from machinery vibrations. Subsequently, the invention of the **Viscodamper®** completed the most efficient vibration **control systems**.

Since then, the GERB Group of companies has continued to develop this idea and it has seen us solve dynamic problems across many new fields of application.

Today, both machinery and equipment in many **power generation** and **metal forming plants** are installed on **active vibration isolation systems**. The objective behind this is not only to reduce vibrations that are generated by the machines, but also to reduce the foundation size and cost.

**Sensitive production, measurement and test equipment, and even entire buildings require passive isolation systems** in order to protect against disturbing vibrations of nearby machines, traffic and seismic activities. Both active and passive isolation systems permit the straightforward realignment of the foundation in cases where poor soil conditions cause the foundation to settle.

**Tuned Mass Dampers (TMDs)** are a special type of vibration protection for taller structures. Specifically, they are used to stabilize and reduce vibrations of bridges, buildings, stadiums and other systems.

At GERB, we are fully conscious that innovation is the only way to secure the future.

**The vibration isolation of railway tracks and the seismic protection** of sensitive equipment and buildings are among just some of our exciting newer applications.

GERB's Research and Development Center, which is located in Berlin, Germany, regularly collaborates with highly regarded research institutions in Germany and abroad.

#### GERB Activities:

The development, manufacture and supply of **custom designed solutions for vibration control**.

If required:

- Measurement/identification of vibration and structure borne noise issues
- Static and dynamic structural analysis
- Installation and adjustment or supervision

#### Benefits offered by GERB solutions

- Unrivalled **vibration isolation** efficiency - up to 99%
- **Reduced foundation size**, which results in cost, time and space savings
- Designed to ensure **maintenance free, durable operation**
- **Reduced stress** in machines, which leads to an **increased operation life**
- **Easy levelling** of the machine whenever required, even after years of operation
- **No harm** to the workshop or building
- **Seismic protection** of machinery, buildings and other tall structures

GERB is certified according to:  
ISO 9001, ISO 14001, OHSAS 18001, DIN EN 1090-01,  
DIN EN 1090-02, ISO 3834 and other standards



# Metal Forming / Industrial Machinery

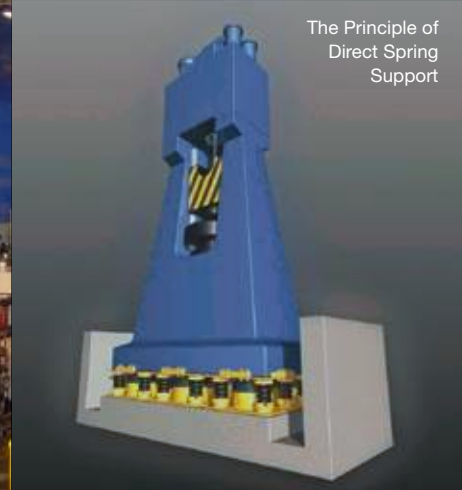
## FORGING HAMMERS

Forging hammers generate **extreme dynamic forces** which have a detrimental effect on nearby equipment, the operating personnel and even on nearby residences. In response to this issue, GERB's direct **spring support of forging hammers**:

- **Achieves a reduction in vibrations** of more than 85%
- **Ensures a reduction in construction time and the cost** of the foundation
- Enables hammers to operate **maintenance free** for longer periods of time
- **Eliminates** problems of foundation **settlement and tilting** of the hammer



A Spring Supported Lasco Forging Hammer, Germany



The Principle of Direct Spring Support

## PRESSES

All types of presses - whether they are mechanical, hydraulic or screw presses - will **create vibrations that will disturb the surrounding neighborhood**. The result can be damage to the building and other machines installed nearby.

Throughout the world, GERB has succeeded in isolating the largest and most complicated presses in a very effective manner.



An Elastically Supported SMS EUMUCO HASENCLEVER Press, Austria

## CENTRIFUGES

**Dynamic forces** of vertical and horizontal centrifuges in chemical and other industries can **effectively be reduced by suitable isolation systems** that allow the installation of the machines on higher building levels.

Our 4 point isolation system has replaced the standard type 3 point supporting systems on a global level.



Vibration Isolation of Centrifuges, Germany

## GAS AND DIESEL GENSETS

Nowadays, the spring support of gas and diesel gensets is a standard foundation solution in many countries.

GERB elastic support systems provide an **efficiency of isolation that reaches up to 98%**. Consequently, this helps to avoid the **settlement of the substructure** as well as **damage to the machines in cases of earthquakes**. Our spring support systems are used for all types of gensets, including emergency gensets.



The Spring Supported CATERPILLAR Gensets, USA



# Power Plants / Damper Systems

## TURBINES AND CONDENSERS

Together with leading turbine manufacturers, GERB has developed the elastic support of turbines with capacities of up to 1700 MW. Our customers are benefitting from the many advantages offered by this innovation:

- **Achieves vibration isolation** of more than 98%
- **Straightforward adjustment and re-alignment**
- **Creates additional space** below the turbine
- **Integrates the turbine into the building structure**
- **Protects the turbine against earthquake damage**

Spring supported condensers enable thermal expansion without any restrictions.



The Spring Supported  
900 MW Siemens Turbine,  
Germany

## MILLS / CRUSHERS

Mills and crushers of all types, especially those in power plants and the cement industry, generate **heavy random type dynamic forces** that affect nearby boilers, control instruments and other equipment. Spring support not only reduces maintenance costs as a result of less wear and tear, but also allows for smaller foundations that eliminate layout constraint at the site.



The Spring Supported  
LOESCHE Coal Mill,  
Belgium

## FANS

Thanks to the GERB spring support of fans, **heavy block foundations are no longer required**. Instead of the need for a massive RC-block, the fan **foundation can either be eliminated or reduced to a small size slab**.

The **efficiency of vibration isolation of more than 95%** will not cause any disturbance to the surrounding area. Furthermore, the low total weight of the **spring supported fan protects from settlement of the sub-structure**.



Spring Supported Axial Fan,  
Howden, Germany



Spring Supported  
Axial Fan,  
TLT, Germany

## PIPEWORK DAMPERS

GERB pipework dampers are used in power plants, chemical plants, refineries and offshore applications across the globe for the protection of piping systems. GERB pipework dampers ensure:

- **Vibrations are reduced in all degrees of freedom**
- **The development of high damping forces in case of shock and operational loads**
- **Vibrations are reduced** without any delay
- **GERB Pipework Dampers are maintenance free**



Pipework Dampers for Earthquake Protection  
at a Power Plant,  
Hungary



# Building Isolation / Trackbeds

## BUILDINGS

Attractive building plots found in central and convenient locations of modern cities often come with one major disadvantage – vibrations and structure borne noise caused as a result of:

- Metro and railway lines,
- Heavy truck traffic,
- Machinery in neighboring industrial facilities

**Vibrations and ground-borne noise can be significantly reduced by elastic support systems for buildings.**

GERB spring elements are installed below buildings, in pockets arranged within basement walls, or on top of walls and columns above ground level.

A Spring Supported Residential Building, Berlin, Germany



A Spring Supported Office Building above Rail Tracks, Paris, France



GERB spring elements are designed to **take loads ranging from 10 to 300 metric tons** and even higher.

GERB provides elastic support systems not only **for entire buildings, but also for floating floors and room-within-a-room structures** using embedded “jack up” spring elements or supporting spring units.

The vibration and structure borne noise isolation of **concert halls, TV studios, nightclubs, IT rooms, swimming pools and even helipad platforms** are just a selection of examples of projects that GERB executes on a daily basis.

## TRACKBED ISOLATION

All trains produce noise and vibrations, disturbing people and sensitive industries in many cities. GERB offers a **variety of anti-vibration bearing systems, successfully reducing train induced vibrations and structure borne noise.**

Nowadays, GERB Floating Slab Systems represent **highly effective and long term reliable vibration mitigation systems** that are recognized by experts all over the world.

The Trackbed Isolation of a High Speed Line, Cheonan, Korea



Systems with vertical natural frequencies as low as 3 to 8 Hertz provide excellent attenuation levels. They are successfully installed in tunnels, above ground and on elevated rail tracks worldwide. In particular, they are available for

- Trams
- Urban mass transit systems
- Freight trains
- High speed passenger trains

For more details please do not hesitate to contact us.

A Commuter Train on a Floating Slab Track System, Los Angeles, USA





# Seismic Protection / Tuned Mass Dampers

## EARTHQUAKE PROTECTION OF MACHINERY, BUILDINGS AND OTHER STRUCTURES

Many countries have to live with the constant threat of earthquakes. In response to this, GERB is offering **visco-elastic devices to ensure the earthquake protection of heavy machinery and structures.** Machines, equipment and buildings with such devices have been able to survive powerful earthquakes over the last years in many seismically prone areas of the world.

With so-called **Tuned Mass Control Systems**, GERB has been able to effectively protect large bridges, new and existing sensitive buildings such as hospitals and office buildings.

For further information please do not hesitate to contact us.

The Retrofit of a Hospital Building by a Tuned Mass Control System, Slobozia, Romania



## TUNED MASS DAMPERS (TMDs)

Wide span structures like bridges, stairs and roofs, **as well as tall, narrow structures** such as chimneys, antennas, masts and skyscrapers, can be excited to vibrate by wind forces, pedestrians, **car or railway traffic and earthquakes.**

GERB's TMDs are specially designed to reduce these vibrations of heavy structures and for the required application.



The Millennium Bridge with TMD-Retrofit, London, UK



A High Roller with TMDs for Protection from Wind Forced Vibrations, Las Vegas, USA



Consisting of spring or pendulum systems, oscillating masses and Viscodampers®, they are **passive type dampers** that feature the following advantages:

- Do not require an energy source
- Simple in design and maintenance free
- Highly effective and provide maximum reduction of vibrations
- Tunable on-site, even after years of operation

The protection of a Skyscraper from Wind Forced Vibrations, Doha, Qatar"

# Special Applications

## SHIPBUILDING AND OFFSHORE FACILITIES

Unquestionably, noise and vibration control plays a significant role in ensuring safety and comfort on ships and offshore facilities.

Special spring elements and TMDs have been developed by GERB for elastic support and vibration reduction of engines, power generators, compressors and other aggregates on ships and offshore structures.

GERB products for ship and offshore applications feature many benefits, including:

- Resistant to high and low ambient temperatures
- Resistant to fire and corrosion
- Non-aging and maintenance free
- Easy to install



An Offshore Tower with TMD, North Sea

## MICROSEISMIC

Impressively, it is not only disastrous vibrations by earthquakes, traffic and industrial operation that can be reduced.

GERB also provides **vibration control systems for buildings, machinery and equipment in the micro and nano process industries.**

**Extremely sensible machinery and equipment** such as 3D-measurement machines, optic and electronic microscopes, and IT equipment **can now be protected from vibrations thanks to special spring elements and dampers.**

GERB provides design, civil engineering, products for isolation, installation and inspection services that can be tailor-made for your specific requirements.



The protection of a Research Center from Microseismic Vibrations, Bucharest, Romania



Retrofit of a Turbine Foundation System at a Power Plant, Germany

## RESTORING AND UPDATING OF FOUNDATION SYSTEMS

**More than one-third of all power plants throughout the world are aged over 30 years.** Many of them operate **machinery and equipment that needs to be updated** with newer, higher capacity turbo generators, coal mills, boiler feed pumps and fans.

Large machine foundations in other areas like the automobile, paper printing, or chemical industries have also found a need for restoration and retrofit.

For over 50 years, GERB has updated machine foundations for many leading groups in power generating and other industries.

### GERB's full service offer includes:

- Soil and foundation assessment
- Proposals for new machine foundation systems with full documentation (i.e. static and dynamic analysis, general arrangement and reinforcement drawings, re-bar lists)
- Supply of elastic foundation systems (if required)
- Construction supervision and startup assistance

For your special requirements, please do not hesitate to contact us.



# GERB

worldwide



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