

Trombik Engineers Ltd.

Trombik Engineers Ltd. is an independent engineering office, located in Zurich, Switzerland, proudly representing over 40 years of successful firm history.

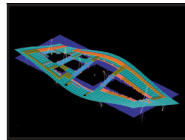
The record of achievement includes nearly all fields in civil and structural engineering. Thanks to the emphasis on structural dynamics, especially machine foundations, promoted since the formation of the company in the year 1959, Trombik Engineers Ltd. reached international recognition.

In keeping with world's recent industrial developments, Trombik Engineers Ltd. is able to offer the full range of services with regards to static and dynamic analysis, layout and design of concrete, steel and associated structures. In addition, we offer specialised services in the field of noise and vibration control, structural acoustics and structural physics. Since 1998, all our services and processes are in accordance with the requirements of international standard ISO 9001 (Quality Control System).



Civil Engineering

Civil engineering regarding domestic buildings, commercial properties and industrial constructions. Consulting, planning, design, project and execution drawings as well as construction supervisions for new constructions, extensions and renovations.



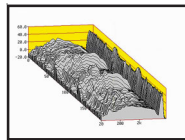
Structural Dynamics

Dynamic design for civil engineering works regarding natural, human, wind or machine induced vibrations. Case studies, numerical analysis and sourcing for all kind of structural dynamic problems and vibration phenomenon, including earthquakes, impacts, blasts and fatigue effects.



Sound, Vibrations and Structure-Borne Sound

Recording, measuring and studies of sound, vibration and structure-borne sound at their source and their transfer. Analysis, assessment, prognoses, preventive measures.



Structural Acoustics, Structural Physics

Planning and projecting of sound and vibration measures. Calculations, analysis, prognoses, case studies, verifications according to current codes. Steady state and transient thermal transfer and vapour diffusion calculations. Thermal and humidity protection, overall energy considerations regarding thermal insulation.



Measurements

Vibrations, sound and structural-borne sound measurements using firm-owned instruments of highest measurement precision class. Structural dynamics measurement campaigns: vibration and natural frequency recordings. Airborne sound and subsonic noise isolation measurements according current codes.



Machine Foundations, Elastic Supports

Consulting, design and construction supervision for all sorts of elastic support applications as well as for all conventional and spring supported machine foundations; starting from small applications (i.e. PC) to large-scale machines (i.e. turbo generators).



Spring Elements

Complete range of high accuracy spring supports for high and highest loads is available. These height-adjustable TROMBIK Spring-elements have been enhanced and optimised based on long experience and can be applied to all load areas and purposes.

TROMBIK Spring Elements High Accuracy Spring Supports

Spring Elements for High and Highest Loads

Elastic Supports for Machines, Buildings and Railroads

Civil Engineering
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Spring Elements



- 1) Integral
- 2) Core
- 3) Vacuum
- 4) 4B
- 5) Primo

TROMBIK Spring Elements for High and Highest Loads

TROMBIK Spring Elements are applied as vibration isolation devices / spring suspension for machines, equipments, buildings and railroads by a system of springs. Two different categories have to be separated: source isolation of machines and installations (e.g. elastic support of turbines, condensers, feed pumps, sledge hammer and presses) and receiver isolation as protection for delicate machines and installations, against all kind of vibrations including earthquakes.



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High Accuracy Spring Elements

Trombik Engineers Ltd. produces a complete range of high accuracy spring supports for high and highest loads. These height-adjustable TROMBIK Spring-elements have been enhanced and optimised based on long lasting experience and can be applied to all load areas and purposes. For the main part, built up of disc springs, as well as for the casing parts, materials of the highest quality class are used. Special designs for clients and/or for objects, e.g. helical spring layouts or adapted load areas are possible as well.



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Spring Characteristics

Type	Loading Range [kN]	Spring Stiffness ^(**) [MN/m]
INTEGRAL	750 - 4'000	30 - 350
CORE	750 - 4'000	30 - 350
PRIMO	750 - 1'000	30 - 200
VACUUM ^(*)	750 - 1'000	30 - 200
4B	250 - 500	5 - 60

(*) prestressed springs (**) tuning depending on application

Futher technical details available on demand.



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System SPRINGLIFT

The system SPRINGLIFT is an effective, modern and versatile applicable area-supporting-system, mainly for machine types of middle weights and railroads / trams. It is based on multiple spring elements cast into secondary slab. By this, large areas can be decoupled (typical application: high sensitive installations or workshop having several / changeable machines). The advantages are: easy to build, ideal vibration isolation, accessibility / adjustability of the spring elements (control / replacement), long term resistance.

Since the company Trombik Engineers Ltd. was founded, the domain structural dynamics has been attended to carefully. Due to international activity in buildings of major infrastructure and power generation plants, a wealth of experience over many years, regarding machine foundations and elastic supports, has been gathered. All staff members are aware of corresponding problem formulations. Trombik Engineers Ltd. is a member of the Swiss Society for Earthquake Engineering and Structural Dynamics (SGEB).



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Engineering

Trombik Engineers Ltd. are proud to offer the whole spectrum of engineering services for vibration isolations (machine foundations / elastic supports): consulting, planning, static and dynamic analysis, project and execution drawings, detailed construction manuals, construction supervision and measurements; these apply not only to new constructions but also to extensions, reconstructions, and corrective maintenance, and they are offered in the corresponding country-specific requirements / provisions (language, codes).



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Revision and Maintenance Work

TROMBIK Spring Elements are high quality products and are insensitive against external influences. They are often used in accordance with long term operation machine units, so periodical revision and maintenance work on the Spring Elements have to be carried out. By checking and overhauling the functionality, the vibration-isolation between the machine foundation and the substructure can be granted. At the same time the spring load distribution will be equalised and if necessary deformations of the foundation table can be readjusted.

- 1 TROMBIK Spring Elements for high and highest loads
Overview Spring Types
- 2 Spring type INTEGRAL, typical application machine foundation 'table installation'
Turbo Generator Battle River 400 MW, Canada
- 3 Spring type PRIMO, installed spring elements (detail 'column top')
Turbo Generator Patnov 460 MW, Poland
- 4 System SPRINGLIFT, loading procedure
Test plate and detail of the helical compression spring
- 5 Vibration isolation: Residential building on springs; spring element loading sequence
Horburg Tunnel, Motorway A2 Basel, Switzerland
- 6 Spring type INTEGRAL, maintenance work
Turbo generator Tihange III 1064 MW, Belgium