

Case Study

Elastic Foundation Bearing for Steigs Power Plant, Mels (CH)



» Vibration isolation protects the hydroelectric power plant and nearby residential buildings from vibrations

» Residents no longer feel vibrations or noise

» Remeasurements confirm the excellent impact of the Sylomer® bearings and compliance with the required limit values



Elastic Machine Foundation Bearing for Protection against Vibrations and Noise

Description of the project The Getzner solution

Special requirements for vibration isolation

Since mid-2014, the Steigs hydroelectric power plant in Mels has been supplying enough hydroelectric power to satisfy the annual needs of 3500 homes. Two residential homes in the immediate vicinity presented a particular challenge to the plant's owners during the construction of the new underground power station building from 2013 to 2014. As the hydroelectric plant generates vibrations and subsequently sound radiation during operation, various conditions for protecting these homes - as well as a planned residential complex for the former power station site - had to be observed. Like the hydroelectric power plant, the two homes located just 50 metres away also stand on a rocky subsoil, which favours the transfer of vibrations. In order to prevent vibrations from being transferred through this rocky subsoil when the plant is in operation, the entire foundation within the power plant was elastically decoupled using Sylomer® materials.

Elastic bearing achieves excellent structure-borne noise insulation

To protect the power plant and the neighbouring domestic properties against vibrations, the entire power plant foundation block, floor and side surfaces were fully elastically decoupled using Sylomer®. Approximately 170 m² of different types of Sylomer® material at a thickness of 25 mm was used.

The materials were chosen based on the loads resulting from the foundation and generator, with the maximum

permissible foundation movement around the pressure pipeline also being a deciding factor. Moreover, the elastic bearing was required to exhibit excellent long-term creep behaviour; exceptional properties that materials from Getzner possess in abundance.

As Getzner has access to a comprehensive and detailed range of material data, it was possible for technical expert Dr Hansjörg Schmid to forecast the vibration propagation and secondary airborne noise levels in the adjacent family homes.

"This project enabled us to demonstrate our many years of experience and comprehensive material expertise."

Helmut Bertsch,
Getzner Project Manager.





Elastic decoupling of the power plant



Full-surface foundation bearing on Sylomer®

Effectiveness impresses client and neighbours

In order to ensure correct installation of the Sylomer® mats, the installation work was supervised on-site by Getzner employees and a final inspection was performed after completion. While this not only had quality assurance benefits, it also prevents any reduction in the effectiveness of the vibration protection due to installation errors, such as the risk of structure-borne noise bridges. Test measurements carried out after com-

missioning the system have clearly confirmed that the specified limit values are being adhered to. "The actual values are considerably smaller than originally calculated," explains Dr Hansjörg Schmid. "The residents' impressions also tally with the test measurements performed," he adds. The level difference achieved with the elastically mounted machine foundation lies between 20-45 decibels. The system has also demonstrated the predicted natural frequency of 20 Hz.

Feedback

What does the client have to say about the project?

"The measurements taken while the plant was in operation have shown that the transfer of structure-borne noise has been reduced to a minimum using the highly elastic Sylomer® materials. The residents of the neighbouring domestic properties no longer notice any disruptive vibrations, and the same is true for the newly constructed power plant. We can highly recommend the products used here for other projects."

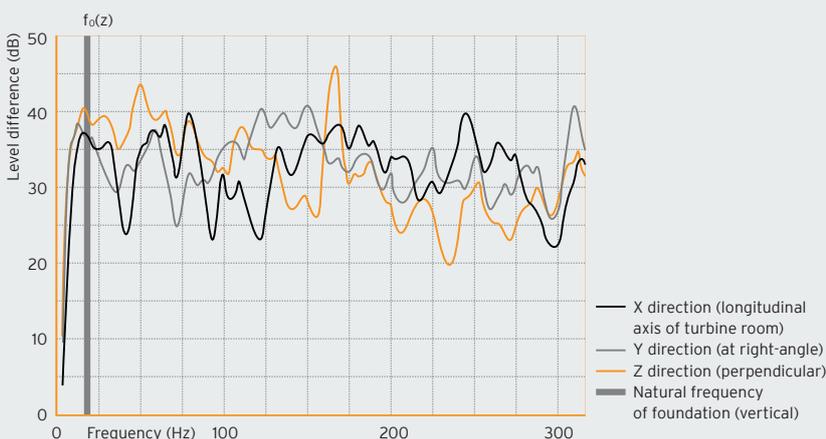
Ralph Egeter,
St.Gallisch-Appenzellische Kraftwerke AG
Head of Power Projects

"The collaboration with Getzner went very smoothly. The technical support and consultation services provided were always prompt and highly proficient, and the installation of the Sylomer® bearings was supervised and analysed by experienced Getzner employees".

Tobias Ruesch,
Ruesch Engineering AG

Level difference measurement for a foundation elastically mounted on Sylomer®

Measured on 22/05/2014





Facts and figures at a glance

Key facts for Steigs (Mels) power plant

Developer:	Kraftwerk Stoffel AG
Vibration isolation:	Getzner Werkstoffe GmbH, Bürs, Vorarlberg
Forecast calculations:	Dr Hansjörg Schmid, Engineering office for technical physics, Hall in Tirol
Opening:	June 2014
Construction period:	2013-2014
Solution:	Full-surface bearing of floor and wall structures
Material used:	Sylomer®, approx. 170 m ²
Project support:	Consultation, supervision and inspection of installation work

Technical data for Steigs (Mels) power plant

Net head:	151.2 m
Output:	3468 kW
Turbine:	Pelton 6-jet, manufactured by Andritz
Foundation mass:	377 metric tons (elastically mounted)
Turbine:	20 metric tons
Generator:	24 metric tons
Pressure pipeline:	4.6 metric tons

Further reading

Case Study: Hydroelectric power plants, Kempten (DE),
Case Study: Rettenbach hydroelectric power plant, Sölden (AT),
Case Study: Central & Park Panorama Towers Arnulfpark,
Munich (DE)

Construction references (extract)

- Europaallee, Site H, full-surface bearings for buildings, Zürich (CH)
- Saninichuou Newspaper, elastic bearing of a rotary printing press, Shimane (JP)
- Elastic bearing of a Gypsum mill, Salvador de Bahia (BR)
- Elastic bearing of a hydroelectric power plant, Tobeläckerli, Buchs (CH)
- Decoupling a compressing plant, Lingen (DE)