

Elastically Isolated Generator



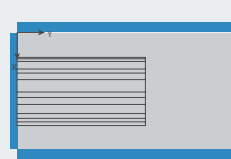
Example of elastic bearing of turbine foundation



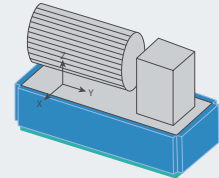
Front view



Side view



Ground view



Isometric view

Mass inertia moment

Direction	Inertia of mass
lxx	4349478 kgm ²
lyy	1639716 kgm ²
lzz	4970879 kgm ²

Inertia of mass, of all optional forces and masses, referring to the origin.

Natural frequencies

Direction	Natural frequencies
fz:	17,8 Hz
fuz:	16,5 Hz
fxu:	12,8 Hz
fxo:	20,6 Hz
fyu:	15,5 Hz
fyo:	23,4 Hz

Given natural frequencies occur when using above mentioned bearing materials. fz describes the natural frequency in vertical direction, fuz the rotary natural frequency around the vertical axis and fxu, fyu, fxo, fyo the sweep frequencies

around an upper (fxo, fyo) and lower (fyo, fxo) centre of rotation. In this calculation the influence of the subgrade was not taken into consideration.

Isolation values

Frequency	Insulation in z-direction
20 Hz	10,2 dB (-222%)
25 Hz	0,2 dB (-2%)
31,5 Hz	-6,4 dB (52%)
40 Hz	-11,8 dB (74%)
50 Hz	-16,3 dB (85%)
63 Hz	-20,5 dB (91%)

Given insulation values are only valid for a one-mass-spring system. This means that the machine and fundament are assumed as stiff masses.

Aim

Generator borne vibrations that are transmitted to the surrounding areas can influence the functionality of near-by equipment, impact product quality, and machinery life cycle costs. These vibrations can affect the overall work environment of the adjacent areas and should they become structure borne cause damage to the building or structure in which they are located.

Solution

Highly engineered cellular urethane materials manufactured by Getzner Werkstoffe called Sylomer® and Sylodyn® are specially designed to reduce vibration and structure borne noise for machinery applications. The wide static load capacity range (1.60 psi - 435.11 psi), thicknesses, and dimensions allow for Sylomer® and Sylodyn® solutions to be easily customized to the needs of your specific generator for optimal isolation. Sylomer®, Sylomer® HD, and Sylodyn® materials have properties that are very similar to that of a mechanical spring. Sylodyn® is the material most like a mechanical spring as it has very little damping and can achieve natural frequencies as low as 4 - 5 Hz. Sylomer® HD is a pure damper with little to no spring and

a mechanical loss factor of 0.55 - 0.60. Standard Sylomer® is a combination of both spring and damping. Since Generators require some internal damping during the startup and shutdown phases standard Sylomer® is the right material for generator applications.

With special footing designs Getzner engineers are able to eliminate the loss of performance that is typical for prestressed solutions. The footing design would be based on the fact that prestress forces do not have any inertia and therefore in turn do not contribute to vibration insulation. By optimizing the build up it is possible to reach frequencies below 7 Hz with a bearing thickness of around 3". This results in highly efficient solutions that show a -91.6 % or 21.5 dB reduction value at the rotation frequency of the motor as shown for the 2100 kVA Sterling Wilson diesel generator

