

Press Release

Vibracoustic presents innovative power train mounts for consumption- and CO²-optimized engines

Weinheim, 05 December 2008

Since the first elastomeric engine mounts were installed in the Rolls Royce Silver Shadow a little more than 100 years ago, they have been turned into sophisticated high-tech components. Engine mounts fulfill a whole array of functions:

They support the engine dead weight, the driving torques and inertia forces when accelerating, slowing down and negotiating curves (while ensuring a safe crash behavior), they isolate noises and vibrations arising from the combustion process and the mechanical inertia forces of the engine and finally, they dampen the vibrations triggered over the roadway.

The frequency band of such phenomena ranges from 6 Hz, e.g. when the vehicle is shaking with amplitudes of several millimeters, up to more than 1,000 Hz linked to acoustic problems. Each of these “comfort killers” can be remedied easily, when taken individually: hard-adjusted mounts absorb braking and cornering forces in an optimal manner. This is a positive factor in terms of driving dynamics. Softly adjusted mounts featuring low elastomeric damping characteristics isolate structure-borne noises and vibrations in an optimum way. This is a positive factor in terms of automotive acoustics. A high degree of elastomeric damping with hard mounts is, in turn, an optimum feature, e.g. to prevent engine spluttering. This is a positive factor for driving comfort. The challenge faced by design engineers consists in reaching the optimum compromise when designing elastomeric mounts within conflicting solution approaches for each vehicle involved, and for each engine and gear combination in individual cases.

Essential technical progress originated from hydraulically damping engine mounts, so-called hydro-mounts, developed in the 1970s. Hydro-mounts solve conflicting objectives by separating isolating and damping functions. Optimum isolation is achieved by using highly resilient elastomers. Optimum damping characteristics are ensured by an integrated hydraulic system. Different bearing effects are obtained, depending on the requirements involved, by means of a decoupling device incorporating a diaphragm. Despite their additional hydraulic function, traditional hydro-mounts continue to be designed in terms of damping and isolation

on the basis of varying maximum values, depending on each engine or vehicle concerned. Since then, the functions have been unable to adapt themselves dynamically to changing driving conditions.

In order to reduce vibrations even further, the installation of compensating shafts is now state-of-the-art technology, especially on engines incorporating four or less cylinders. However, compensating shafts are not only costly with a unit price of up to € 100, but they also increase consumption and CO² emissions, as a result of mechanical friction and a weight of up to 10 kg.

Two newly developed engine mount systems from the vibration control technology specialist Vibracoustic will make the installation of cost- and consumption-intensive compensating shafts obsolete in future:

The electrically adaptable hydro-mount (EAHM) offsets the additional forces generated by the engine due to the absence of the compensating shaft by providing enhanced vibration isolation within a broad frequency range of 20 Hz to 160 Hz. An integrated driving module modifies the geometry of an adjustable duct inside the hydraulic system, depending on the engine speed. Dynamic stiffness is then reduced and evolves at a minimum level over the entire speed range. As a result, it is lowered below static stiffness level, thus leading to smooth bearing characteristics, while excluding the drawbacks they entail.

The traditional hydraulic system in hydro-mounts is enhanced by the high-frequency absorbing mount (HFAM) on the basis of an innovative nozzle system featuring an integrated high-frequency absorber. An efficient and inexpensive solution based, to a large extent, on standard mounts, which requires neither additional building space, nor control or regulating appliances.

In addition, metals are to be replaced by plastic ones on both developments. New kinds of combined vulcanization and injection-molding processes are providing new potentials for further weight and cost reductions.

Both innovations make it possible not only to achieve considerable cost savings, thanks to the elimination of the compensating shaft, but also to reduce consumption by approx. 1%. The enhanced efficiency of the new mounts is in line with the increasingly stringent vibration control technology requirements to be expected in future in the wake of combustion process optimization and generally higher engine power density values.



HFAM are based on standard mounts and require no additional building space

Press Contact:

Silke Benzin
Vibracoustic GmbH & Co. KG
Strategic Marketing
Tel. +49 (0)6201 80-6876
Fax +49 (0)6201 88-6876
silke.benzin@vibracoustic.de

Vibracoustic, a company of the Freudenberg Group, generated a turnover of 880 million € with 32 locations and 5000 employees in 2007. “We convert noise and vibration into sound and comfort”. This claim is based on substantial system competence, a comprehensive product and service program and a global network of development and production facilities. Vibracoustic solutions are supplied to all leading automotive manufacturers.