

ACE Shock Absorbers Isolate Noise In Hydraulic Test Stand

When testing high-performance machine parts, something as simple as choosing the right methods of eliminating noise and vibration can make all the difference. And one way to achieve the most accurate testing possible is with vibration dampening machine components.

For a new test stand that measures the performance of its hydraulic pumps for excavators, Kawasaki Precision Machinery found that installing rubber-metal isolators helped reduce noise and vibration, yielding more accurate results than in the past.

ACE Controls, manufacturers of a wide range of industrial shock absorbers, gas springs and vibration control products, supplied rubber-metal isolators that are crucial to helping these test stands run. In this case study, we'll take a look at ACE's rubber-metal isolators and how they improve the testing quality of Kawasaki's hydraulic pumps.

Test stands for hydraulic pumps. Kawasaki manufactures a wide range of hydraulic systems and components, including a series of pumps used for excavators. To assure they meet the company's operating requirements, these pumps go through a series of tests before they're shipped.

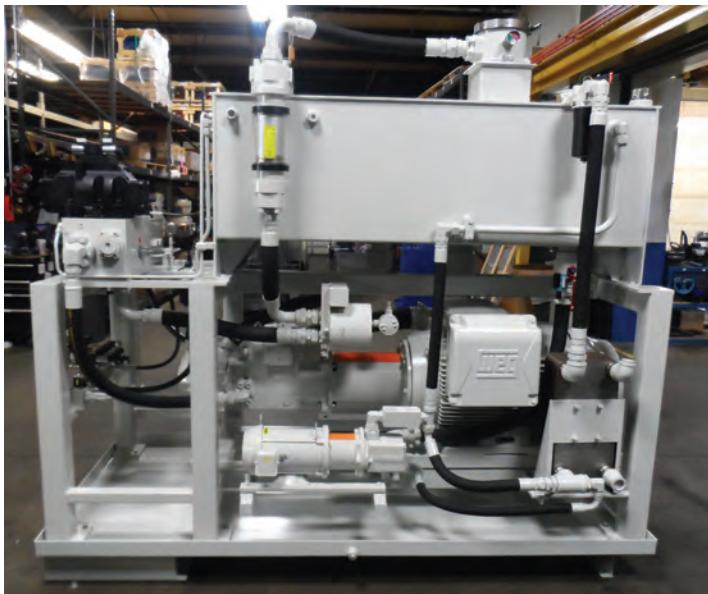
This step takes place on a test stand which runs for about 10 days each month and, with the help of ACE's rubber-metal isolators, gives off minimal noise. The stand weighs about 10,000 pounds and rests on ACE's isolators.



ACE rubber-metal isolators isolate impacts and vibrations from machines and motors, and improve wearing conditions.

Kawasaki gets 25 percent more efficiency out of the new stand than with their old models. Other technical features include 350 hp, 2,000 rpm, 5,500 psi and a flow rate of 110 gallons per minute.

To help engineers meet a strict set of testing criteria, Kawasaki tests these hydraulic pumps with an automated control system. First, they adjust the valving, oil routing and control signals until they reach the desired levels. After assembling and tuning the pump, they conduct a simulation that measures how the hydraulic pump reacts in different situations or environments.



The filter cooling pump is one source of vibration in the test stand.

Kawasaki uses a curve for measuring flow versus pressure. For a pump to pass this test, it must stay between a set of tolerances at various flow rates and pressures. If it falls outside, the pumps are flagged as a failure and the operator either has to make a modification, or a technician needs to rebuild the pump.

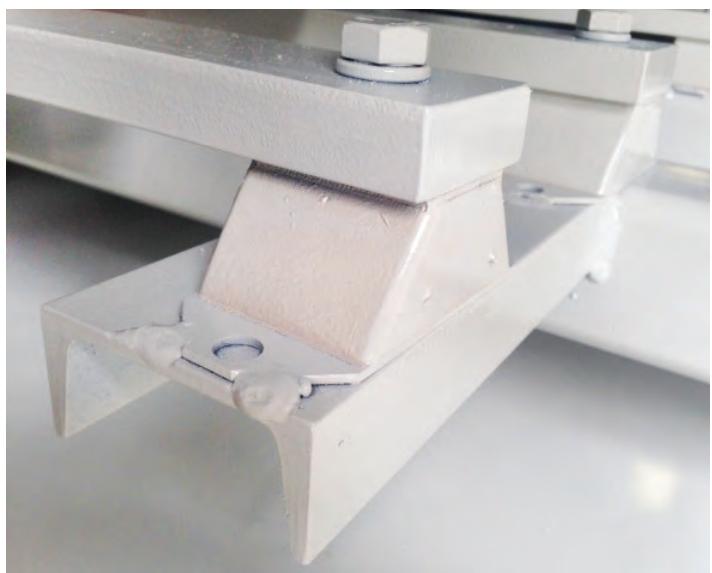
By nature, the test stands create large amounts of noise and vibration, which can affect both working conditions and test results

"ACE Controls shock-absorbing isolators came into the picture because we needed a way to isolate the noise these stands give off during testing," said Jim Hoenle, hydraulics system engineer at systems integrator MFP Automation Engineering, who designed and built the test stand.

Rubber-metal isolators reduce noise and vibration. Kawasaki needed a way to cut noise in their test stands. Originally, MFP used hard tube plumbing that added to the noise resonance. So they decided to change it out for hoses, which decreased sound. By putting ACE mounts underneath the testing stand, noise levels dropped by 2.5 decibels.

RUBBER-METAL ISOLATORS

- COM-52160:
 - Minimum load: 10.9 kg.
 - Maximum load: 27.2 kg.
 - Weight: 50.8 mm.
- COM-52167:
 - Minimum load: 127.0 kg.
 - Maximum load: 317.5 kg.
 - Weight: 101.6 mm.
- Natural frequency of 4.5 to 16 Hz.
- Load range between 14.3 and 1,100 lbs.
- Operating temperature range from -22 to 176°F.
- UV radiation resistance.
- Outer body: Zinc-plated steel.
- Isolation medium: Neoprene (Chloroprene Rubber).
- Low-frequency application range from about 15 Hz.

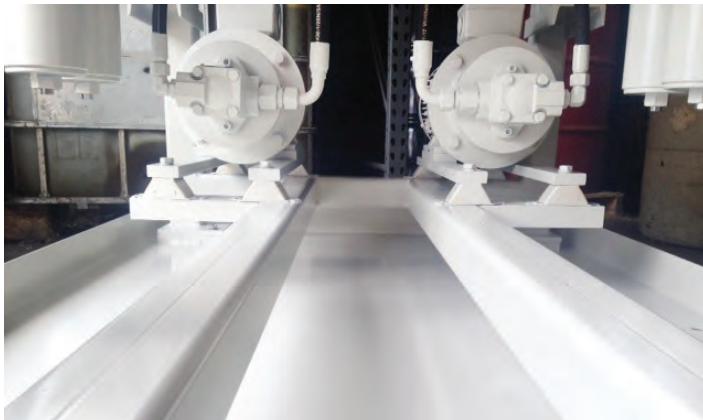


ACE's vibration pads helped test stands withstand the intensity of the rigorous testing system.

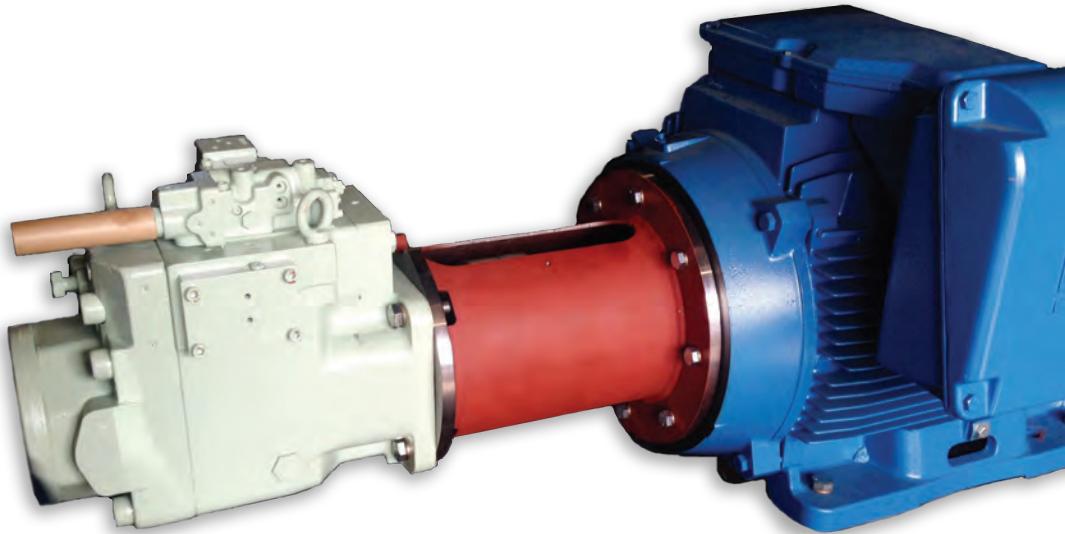
Using ACE's rubber-metal isolators helped these test stands withstand the intensity of this rigorous testing system. Comprised of eight different families, ACE rubber-metal isolators are ideal for a wide range of applications. They isolate impacts and vibrations from machines and motors and improve working conditions for engineers and the environment, increasing production rates.

ACE rubber-metal isolators help applications like leveling or robust machine feet, tube elements, vibration isolating connection devices and quick attachment elements.

For Kawasaki's test stand, MFP Automation Engineering used the COM-52160 and COM-52167 rubber-metal isolators. These robust, heavy-duty mounts excel at preventing vibrations and structure-borne noise from unbalanced masses such as pumps and compressors. They're used in vertical load applications such as small motors, pumps and compressors.



ACE's maintenance-free shock absorbers improve efficiency in low frequency application ranges of 15 Hz or greater. In pairs, the frequency reduces to between 6 and 10 Hz.



To assure that Kawasaki pumps meet the company's operating requirements, they go through a series of tests prior to shipping.

ACE's COM mounts are maintenance-free and ideal for improving efficiency in low frequency application ranges of 15 Hz or greater. When mounted in pairs, the natural frequency reduces to between 6 and 10 Hz. Interfering frequencies isolate when they get above 900 rpm. At 25 Hz, there's a 90 percent level of isolation. Made from galvanized metal and neoprene, they can withstand temperatures between -22 and 176°F.

Also battles vibration. ACE isolators also prevent vibration from going into the floor from the pump and drive motor. The vibration got so severe sometimes that workers felt it in their feet during testing.

By isolating the motor in the test stand and its vibration, ACE removed the low resonant sound that travels through the c-channel. This helps get rid of sound because you're isolating vibration by having the vibrator between the motor and frame. Keeping the frame free of vibration is key to reducing noise in the system.

To learn more, please visit: www.acecontrols.com