MICRO/LEVEL® ISOLATORS ELIMINATE FOUNDATION SETTLING UNDER 800 TON BLANKING PRESS

An 800 Ton Verson Blanking Press was installed in a plant located in the Mississippi River Valley. Soil tests conducted at the plant site revealed a high water table and soil that was mostly silty sand. To counteract the undesirable soil conditions, a foundation was designed and built that weighed three times the press weight. The press was then hard-mounted (anchored) to the foundation.

Within the first year and a half of operation, the mammoth foundation settled six inches. As a result, bearing walls cracked and the main roof support columns had to be shimmed and reshimmed every few months. Total building maintenance cost for damage caused by the shock loadings was over $10,000.

A couple of years later, a similar press was scheduled for installation. To prevent a repeat of the previous problems, this press was installed on four Vibro/Dynamics' Micro/Level Isolators, Model BFM1160. Each isolator was equipped with a three-inch diameter precision leveling screw used to adjust the level of the press.

Vibration and sound measurements verified observations that the foundation vibration resulting from operation of the isolated press was significantly less than that of the hard-mounted press. It was also noted that the noise at the operator's station had a different tone, it was deeper and more solid than the hard-mounted press's high-pitched, clanging sound.

To stop the foundation settling being caused by the hard-mounted 800 ton press, it was reinstalled on Micro/Level Isolators. This involved raising the press slightly, chipping a small amount of concrete off the top of the piers, and then installing the Micro/Level Isolators, leaving the height of the feed line unchanged. The piers were capped with a hard cement grout and trowelled flat to provide a good surface for the isolators.

Each isolator was custom-engineered to effectively reduce the impact forces transmitted by the press feet to the foundation while at the same time providing the stability required to prevent the press from swaying or rocking.

These presses ran for eight years mounted on Micro/Level Isolators without additional foundation settling or building damage before they were relocated to another facility. They were reinstalled on the same Micro/Level Isolators at the new plant and performed trouble-free.

NOISE AND VIBRATION MEASUREMENTS

Noise and vibration measurements were taken with the press bolted down and then installed on Micro/Level Isolators. In order to ensure the validity of these tests as a means for determining the effectiveness of the isolators, they were conducted at night when other equipment was shut down so the ambient background noise and vibration would not affect the readings.

Noise readings were taken four feet from the press at the operator's station. Because the speed of the press was only 14 SPM, dBa readings were meaningless and did not apply. Impulsive peak readings were observed at each octave band in the audible range and corrected by the A-scale weight factor corresponding to the sensitivity of the human ear.

The effective overall impulsive noise level, determined by integrating the dB octave bands, was 6.5 dB less when the press was operated on the BFM1160 Micro/Level Isolators than when it was bolted down.

With the press bolted	Noise Attenuation
500 Hz	8 dB
1000 Hz	4 dB
2000 Hz	4 dB
4000 Hz	12 dB
8000 Hz	8 dB

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2443 Braga Drive, Broadview, IL 60155
Tel.: 800.842.7668 • vibro@vibrodynamics.com
www.vibrodynamics.com

Though the noise readings in the 31.5 to 125 Hz bands were higher when the press was operating on isolators, the noise levels in these frequency levels were so low that they had no measurable effect on the effective overall noise levels. The 6.5 dB attenuation covers the entire audible range from 31.5 to 8000 Hz bands.

Foundation pier vibration was measured vertically and horizontally, with the press bolted down, and then installed on Micro/Level Isolators. Using a piezo-electric accelerometer to pick up vibration at all frequencies through the 8000 Hz range, octave band and overall readings were taken.

With the press bolted down, the greatest vibration occurred in the 1000 to 8000 Hz range of frequencies. On the isolators, overall vertical foundation vibration was reduced by 75%, and overall horizontal foundation vibration was reduced by 78%. The isolators were most effective in reducing vibration in the high frequency bands as indicated in the following table:

Frequency Band	Vibration Reduction	
	Vertical	Horizontal
1000 Hz	10%	30%
2000 Hz	93%	76%
4000 Hz	87%	98%
8000 Hz	68%	62%

While vertical vibration in the frequency domain below the 1000 Hz band was approximately the same magnitude with or without isolators, horizontal vibration in these bands was reduced about 50%.

NOISE AND VIBRATION ATTENUATION

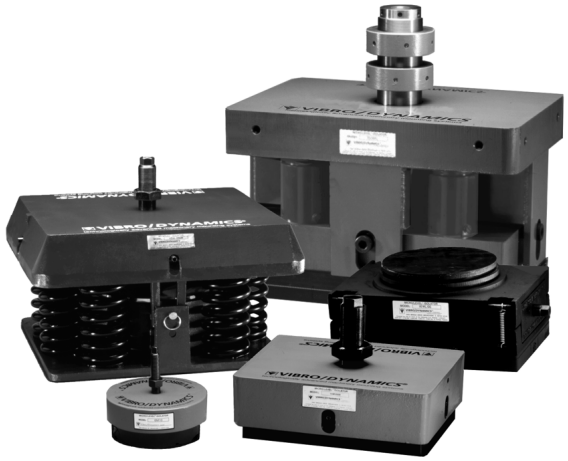
Figure 4 represents the noise and vibration attenuation of the press installed on BFM1160 Micro/Level Isolators in the audible frequency bands. There seems to be some correlation between noise attenuation and the attenuation of vibration of the foundation.

The following table lists the overall attenuation:

Noise Attenuation	6.5 dB
Attenuation of Vertical Vibration	11.0 dB
Attenuation of Horizontal Vibration	12.0 dB

NOTE:

Since the above presses were installed on Type BFM1160 Micro/Level Isolators, new Micro/Level Isolators have been developed capable of reducing transmitted impact force and foundation vibration even more effectively. Measurements on other presses show up to 97% reduction on foundation vibration. For details send for Technical Bulletin M/L-422.



For further information contact Vibro/Dynamics LLC
2443 Braga Drive Broadview, IL 60155-3941.
Phone 708/345-2050 or toll free 1-800-842-7668.
Fax 708/345-2225.

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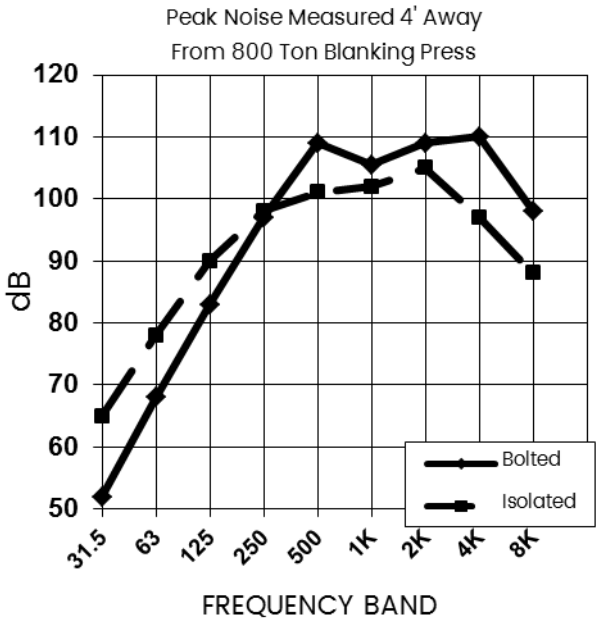

FIGURE 1

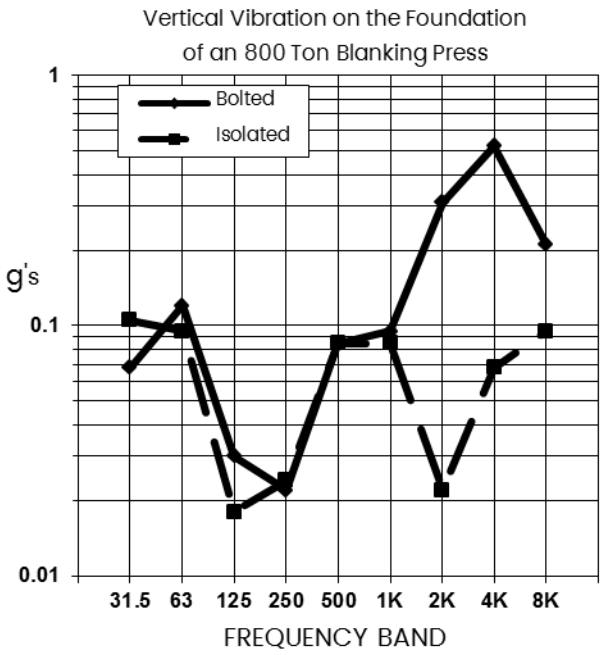

FIGURE 2

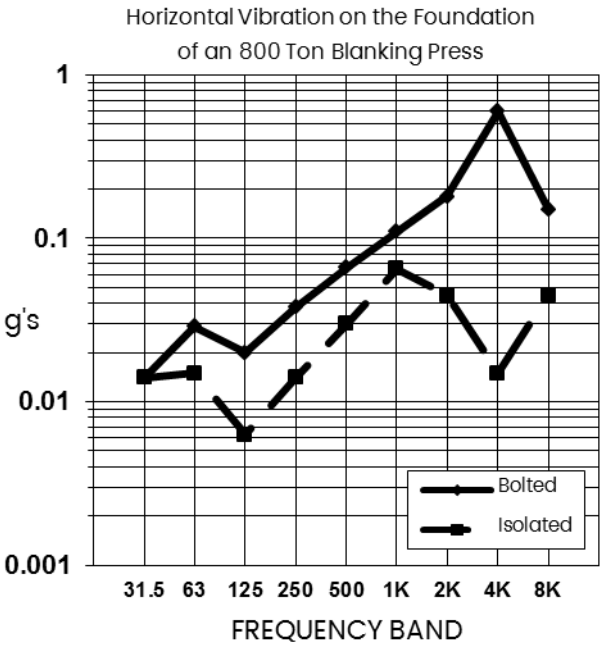

FIGURE 3

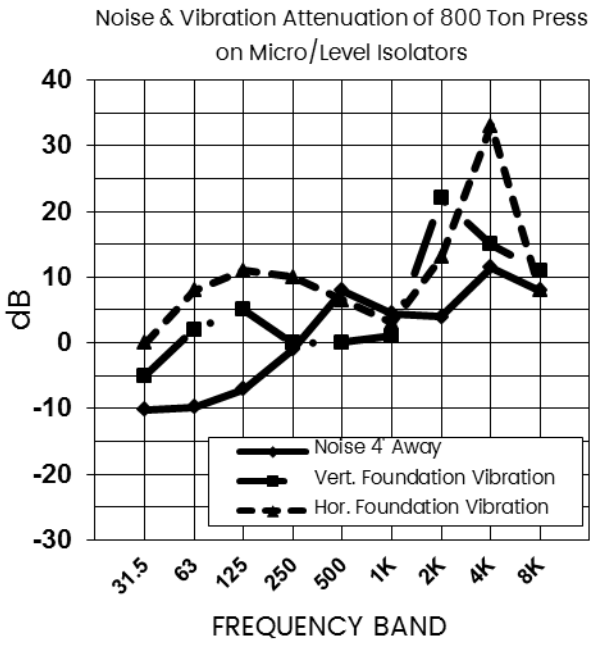

FIGURE 4