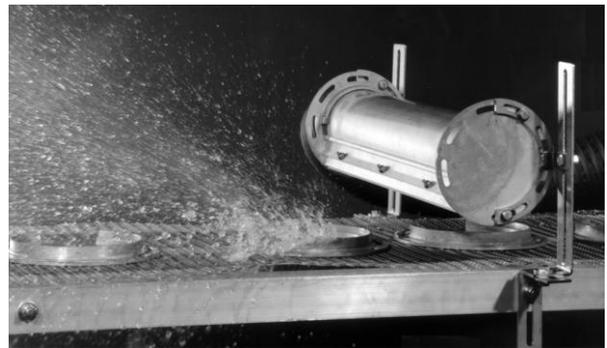


Noise and vibration are concerns in most industrial settings, and controlling them requires attention to a multitude of sources and receivers. Some high-tech manufacturing processes need extraordinary vibrational stability. All facilities include human occupants who need safe and productive environments. Workplace noise limits set by OSHA and other regulatory agencies are intended to protect workers against undue exposure to loud sounds. Similarly, hand-arm vibration regulations (see [HAVS](#)) are on the horizon in both the US and Europe. Regardless of the regulatory situation, good workplace environments promote employee morale and improve productivity. Below are some of our projects involving workplace noise and vibration; names of facilities and owners are omitted for confidentiality.



Photovoltaics Fab (alternative energy manufacturing): noise control for a new photovoltaic fab space at a startup solar energy collector manufacturer. While not breaching OSHA noise regulations, noise levels on the factory floor were uncomfortably high. Since the process lines were first-of-their-kind, little work had been done to manage workplace noise. We performed factory-wide noise surveys of the new tools and helped design compatible and affordable *in-situ* mitigations to reduce noise levels.

Continuous Process Line / Air Knife (alternative energy manufacturing): OSHA noise analyses for a continuous process line that included an extremely loud air knife. Noise levels in the area exceeded OSHA noise requirements. We developed a two-pronged mitigation approach that separated the process line from the main factory floor and implemented an administrative control. By isolating the line from the rest of the factory, we reduced greatly the number of workers exposed to high noise levels. The administrative remedy involved restrictions on the time that workers could stay in the room, therefore avoiding the costly requirements of a formal [hearing conservation program](#).



[continued on next page]

Workplace noise control & OSHA regulatory compliance



Custom Metal Works (shop): OSHA noise analyses for a noisy metal shop. The Owner had been cited by OSHA during a workplace evaluation. Due to the highly-customized work in the shop, the Owner believed that the citation was unjustified: the OSHA evaluator had inappropriately extrapolated noise levels from a short visit. We performed workstation-based surveys and interviewed the employees to generate defensible estimates of time spent at each workstation by each employee. Detailed calculations of noise dose and time-weighted averages (TWA) revealed that the shop

was actually slightly below – rather than slightly above – the regulatory limit. While the Owner still provided hearing protection (and encouraged its use) to workers, the shop avoided more-expensive regulatory burdens.

Impact Press (pharmaceutical manufacturing): vibration exposure calculations for a new drug delivery manufacturing system. When installing a new impact-based press, the Owner asked us to determine whether the vibrations created by the press would create health problems for workers. We measured vibrations from a prototype machine and performed calculations that revealed that the vibrations – while perceptible – posed no health risk.

