

NOISE AND VIBRATIONS:

Current Health Risks Best Addressed Through Electrification, Not Automation

The freight transportation system is extremely noisy, particularly for frontline workers and fence-line communities.

Heavy-duty trucks rumble down streets. Trains growl as they move slowly through a rail yard. Shipping containers clang and screech as they're settled onto metal frames. The system for transporting goods also creates vibrations that literally shake all that is nearby.

Similar to air pollution, the health impacts of noise from the freight industry disproportionately affect frontline workers and communities where heavy-duty vehicles and machines operate.¹⁰⁶ Homes, schools, parks, senior centers, and more are affected in urban, suburban, and rural environments. That these impacts are felt inequitably across race and class lines is not accidental: systemic racism has shaped a long history of planning and policy decisions so that freight transportation's impacts are inequitably felt most acutely in communities of color and low-income communities.

Noise and vibrations are a serious health issue.

Veronica Roman is a resident of San Bernardino, CA. She and her family live right next to the truck-laden I-215 freeway, and they're close to freight warehouses and the Santa Fe BNSF Railyard. "Cuando yo me moví aquí, me pregunté porque se mueve todo mi comedor, y mi hijo me dijo no es que aquí cada que pasa el tren todo se menea y toma un buen rato. Es como si estuviera temblando muy seguido." *[When I moved here, I wondered why my whole dining room moves, and my son told me that here every time the train passes everything shakes and it takes a good while to pass. It's like it is often trembling here.]*

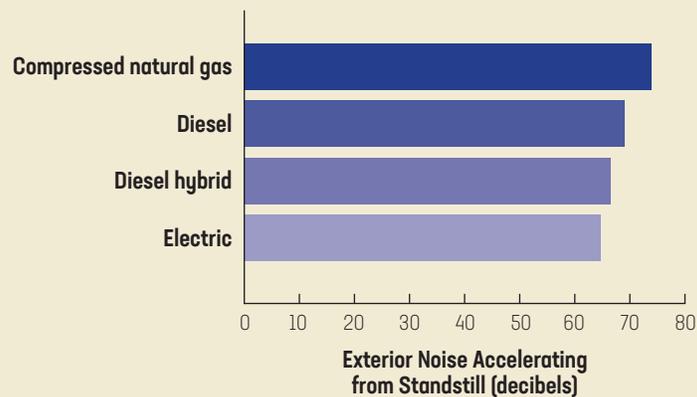
Noise pollution is more than a nuisance, and it can create serious health problems for frontline workers and fence-line communities. Workers who are exposed to vibration and noise at the same time are more likely to suffer hearing loss than workers exposed to the same level of noise alone. Exposure to both vibration and noise also increases musculoskeletal problems.¹⁰⁷ Chronic low-level noise, like constant sound from a nearby freight corridor, can interfere with people's ability to hear well, concentrate, and communicate. Multiple studies have found that unwanted noise from road traffic, aircrafts, railways, and industrial areas can disturb sleep, as well as lead to the development of cardiovascular diseases like arterial hypertension, ischemic heart disease, heart failure, arrhythmia, and stroke.^{108,109} Noise pollution can also impact mental health; a study found that adults exposed to higher levels of noise annoyance had increased risk of depression and anxiety.¹¹⁰ Freight also generates low-frequency noise and vibrations, which can lead to headaches, irritation, sleep disturbance, a feeling pressure in the head, pain in arms and legs, and dizziness.¹¹¹

Children's ability to learn and concentrate in school is also affected by noise pollution. Research has found that noise pollution from aircraft impaired students' reading abilities and long-term memory.¹¹² In another study, researchers found that higher levels of noise in the community corresponded to decreased mental health in elementary schoolchildren.¹¹³

Reducing noise and vibration is best accomplished through zero-emission technologies, not automation.

Zero-emission technologies (e.g., a battery-powered truck) have far fewer moving parts, which significantly reduces operating noise and associated vibrations. One analogous example is the exterior noise of an all-electric bus accelerating from standstill, which is notably lower than alternatives such as compressed natural gas, diesel, and diesel hybrid buses.¹⁰⁶

Electric Buses are Quieter Compared to Other Fuel Types



Implementing zero-emission technologies, be they automated or not, have limits to promoting peace and quiet: as the accompanying chart indicates, an electric vehicle is *quieter*, not quiet. In addition, the predicted overall growth of the freight system, along with the associated noise and vibrations, will likely outpace noise and vibration reductions achieved through adopting any electrification alongside automation. Finally, to the extent that freight automation permits freight facilities to run for longer periods, including during more traditional "off-hours," the burden of noise and vibrations for communities will increase.