

Noise And The Combo Jetter: An Unrecognized Worker Health Issue

Summary

Municipal maintenance operators using jet/vac units (“combo sewer cleaners”) to clean pipes, clear pipe blockages, and remove accumulated debris within sewer and drain systems are exposed to significant noise levels over long periods of time. Most combo systems currently on the market position the operator at a front-mount hose reel, next to the main source of unit noise, the chassis powerplant that drives both the water pump and vacuum blower.

Noise is one of the biggest workplace health and safety issues. Consistently high ambient noise levels are the leading cause of worker hearing loss and elevate injury risk due to stress and distraction. While hearing protection can remediate many of the effects of loud machinery, decibel level reductions are the best way to reduce the exit of trained personnel due to hearing loss.



Enter the Noise

Most combo sewer cleaners attach the hose reel, effectively the “business end” of the unit, to the front bumper of the chassis. This approach dates back at least to the 1950’s, when existing leaf cleaning trucks began being used to remove debris from catchbasins, storm drains, and pipes. Articulating reels capable of efficiently managing the hundreds of feet of high-pressure water hose needed to clean long pipe runs have always been too large to be accommodated on sides of the truck. Two practical combo hose reel location options exist, one at the front of the truck and one at the rear. The front-mount option, due to both perceived ease of positioning and historical inertia, remained the preferred approach as a market for specialized combo units developed in the 1960’s.



Initially, most combo jetters were powered by a separate auxiliary motor, mounted behind the unit cab. An increasing need for power, however, driven by units being used for bigger jobs, and focus on economical operation, pushed most combo jetters away from relying on an auxiliary power source towards being driven by the chassis powerplant. While these high-powered vocational truck motors can efficiently power the largest pumps and blowers, the end result was to move the truck’s primary noise & heat source in close proximity to the worksite. When the unit is at its most effective, providing high pressure water and vacuum for big jobs, the powerplant is also at its loudest, often for hours at a time.

Noise as a Worker Health Hazard

Ambient noise can be a serious hazard for outdoor workers because it negatively affects hearing, communication, awareness, stress levels, and overall safety

Long-term exposure to loud noise can cause permanent hearing loss or tinnitus (ringing in the ears). The US Occupational Health and Safety Administration (OSHA) defines sound levels above 85 decibels over an 8-hour time-weighted average to be hazardous to worker hearing. The National Institute for Occupational Safety and Health (NIOSH) estimates that approximately 13% of all construction & maintenance workers have hearing difficulty as a result of environmental exposure, and 52% of those noise-exposed workers report not wearing hearing protection. Approximately \$242 million is spent annually in the US on worker's compensation claims related to hearing loss, averaging \$96,786 per accepted claim.

Excessive noise can also reduce situational awareness, by masking alerts, alarms, and warnings, and create crew communications problems. Workers exposed to high noise exposure over time experience increased mental and physical strain, reducing concentration and slowing reaction times in the event of an emergency. The cumulative effect of these issues is increased accident risk due to distraction and inability to quickly perceive hazards.

Noise Source		dB	OSHA Exposure Time
	Gunshot	165	3 seconds
	Firecrackers	140	30 seconds
	Ambulance Siren	130	2 minutes
	Jackhammer	120	7.5 minutes
	Chainsaw	110	30 minutes
	Power Tools	100	2 hours
	Leaf Vacuum	100	2 hours
	Water Blaster	95	4 hours
	Lawnmower	90	8 hours
	Car Traffic	85	16 hours

Putting the Noise Behind You

On a combo truck, noise deadening options are limited. While some mechanical noise can be reduced by use of silencers, the main noise source, the powerplant, requires airflow to operate effectively, and has a layout dictated by over the road conditions and stock vocational chassis design. The blower and other mechanical components, also located at the front of the chassis, are additional significant noise generators. Insulating the front of the cab from noise transmission isn't an option. There is, however, an effective way to reduce the user's experienced decibel levels; put distance between the noise source and the work area. A rear-located reel locates the worksite up to 35 feet away from the powerplant, dropping noise levels in many cases below the key 85db sustained exposure threshold. Aquatech has led the market, since the 1980's, with rear-reel sewer trucks designed to provide municipal maintenance personnel with a quieter, safer work environment, improving efficiency, and reducing the risk of potentially costly employee hearing loss.

	Front Reel, Work Mode	Front Reel, Max Load	Rear Reel, Work Mode	Rear Reel, Max Load
Measured sustained decibel level	82 dB	107 dB	72 dB	82 dB

Data collected from an Aquatech B-10 1450, front reel data extrapolated from sound measurements taken 5' in front of the unit.



Conclusion

In addition to reducing worker noise exposure, mounting the hose reel on the rear of the truck provides other benefits, such as reduced highway accident risk, due to improved driver over the road sightlines and compatibility with new driver assist technologies, and improved powerplant maintenance access. With the addition of modern camera technology for improved rear visibility during unit parking, the only remaining reason to continue mounting the work end of the system directly to its primary noise source is habit and familiarity.

Citations

OSHA 1910.95 (Subpart G) Occupational noise exposure - <https://www.osha.gov/noise/standards>

NIOSH Noise and Hearing Loss - <https://www.cdc.gov/niosh/noise/prevent/understand.html>

NIOSH Construction Statistics - <https://www.cdc.gov/niosh/noise/surveillance/construction.html>

OSHA Europa, The Impact of Noise at Work - https://osha.europa.eu/sites/default/files/Factsheets_57_-_Die_Auswirkungen_von_Larm_bei_der_Arbeit.pdf

Soundtrace, Inc. – Workers' Compensation Claims for Occupational Hearing Loss: What Employers Pay - <https://www.soundtrace.com/blog/workers-compensation-claims-occupational-hearing-loss-costs>