

# Case Studies of Noise Controls to Reduce Exposure

by

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# Metal/Nonmetal Success Story - #1



# Underground operation



# Background information:

- Operator full shift exposure : 213%
- Equipment involved: Tamrock Toro LHD



During rebuild, home-made cab installed with acoustical treatment



# Overall view of cab exterior



# Interior view of ceiling materials.



# Interior view of door panel treatment





# Interior view of side wall treatment



# Interior view of floor treatment



# Follow-up Investigation

- Baseline full shift exposure: 213%
- Full shift exposure: 14.43%
- Average Sound Level in cab during work cycle – 82.2 dBA
- Cost - unavailable
- Noise citation terminated!



# Coal Success Story - #2



# Underground Operation

- Diesel Powered Rail Mounted Man Bus



# Old Design – Air Vents



# New Design – Air Vents

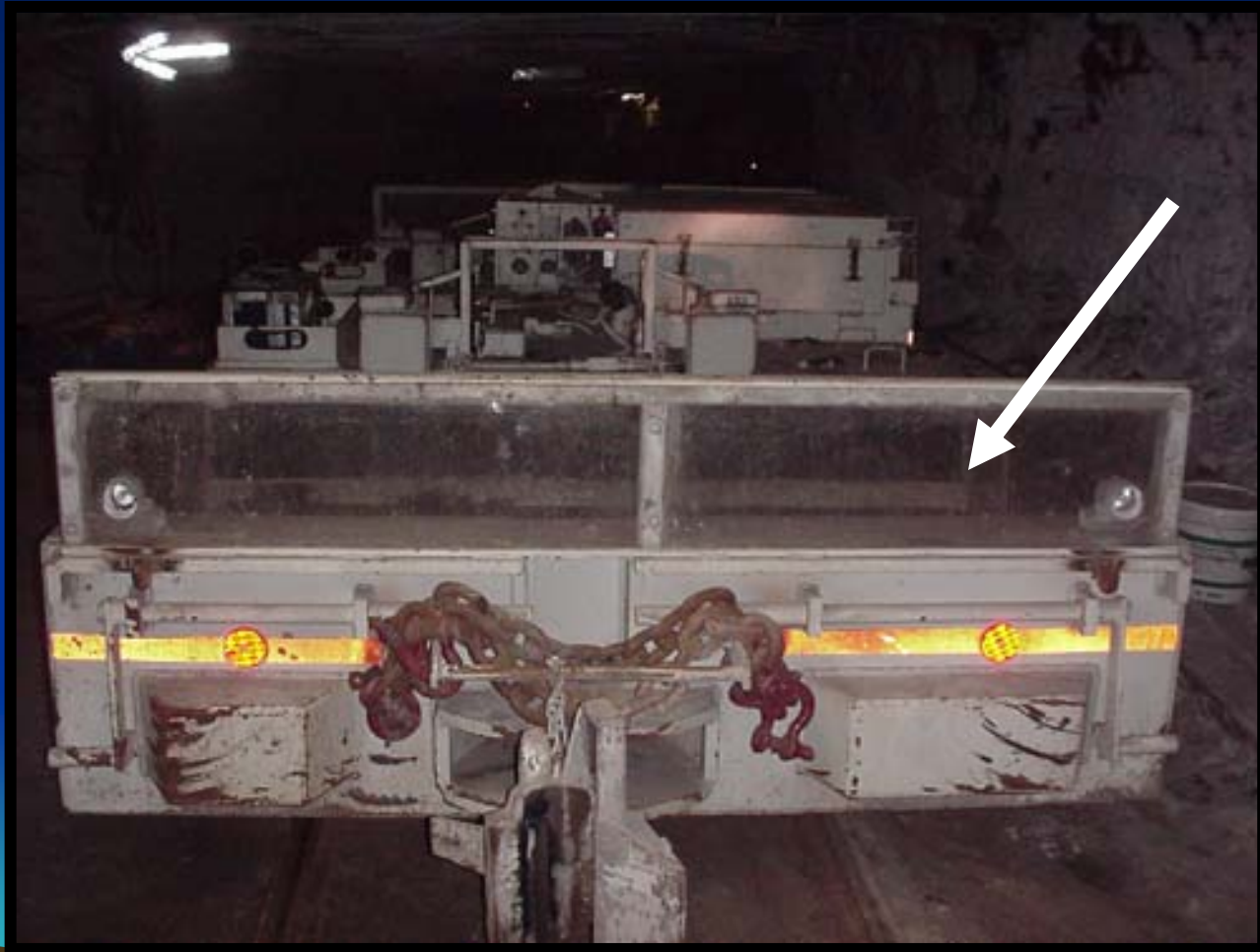


# Old Design- passenger compartment





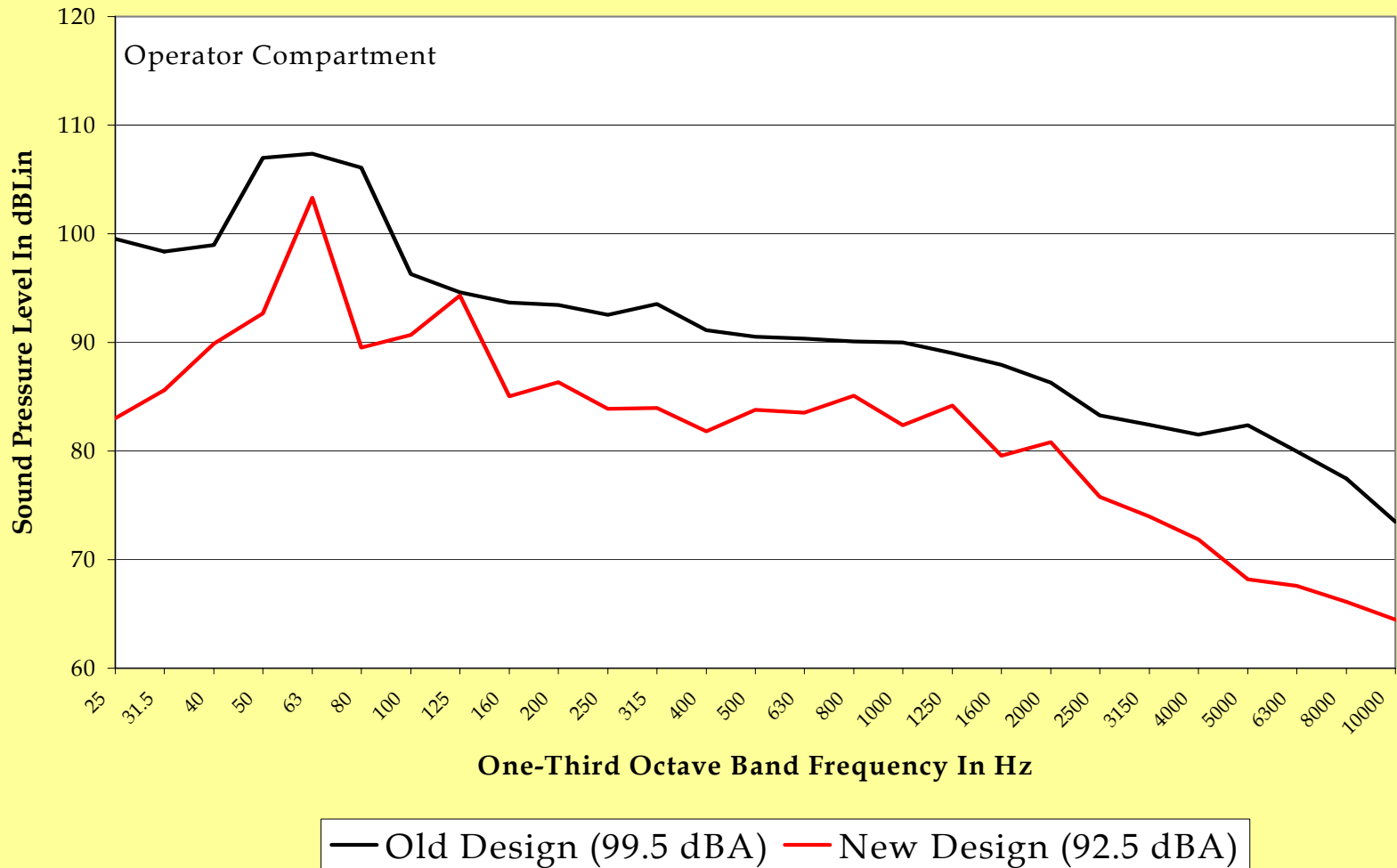
# New Design – passenger compartment



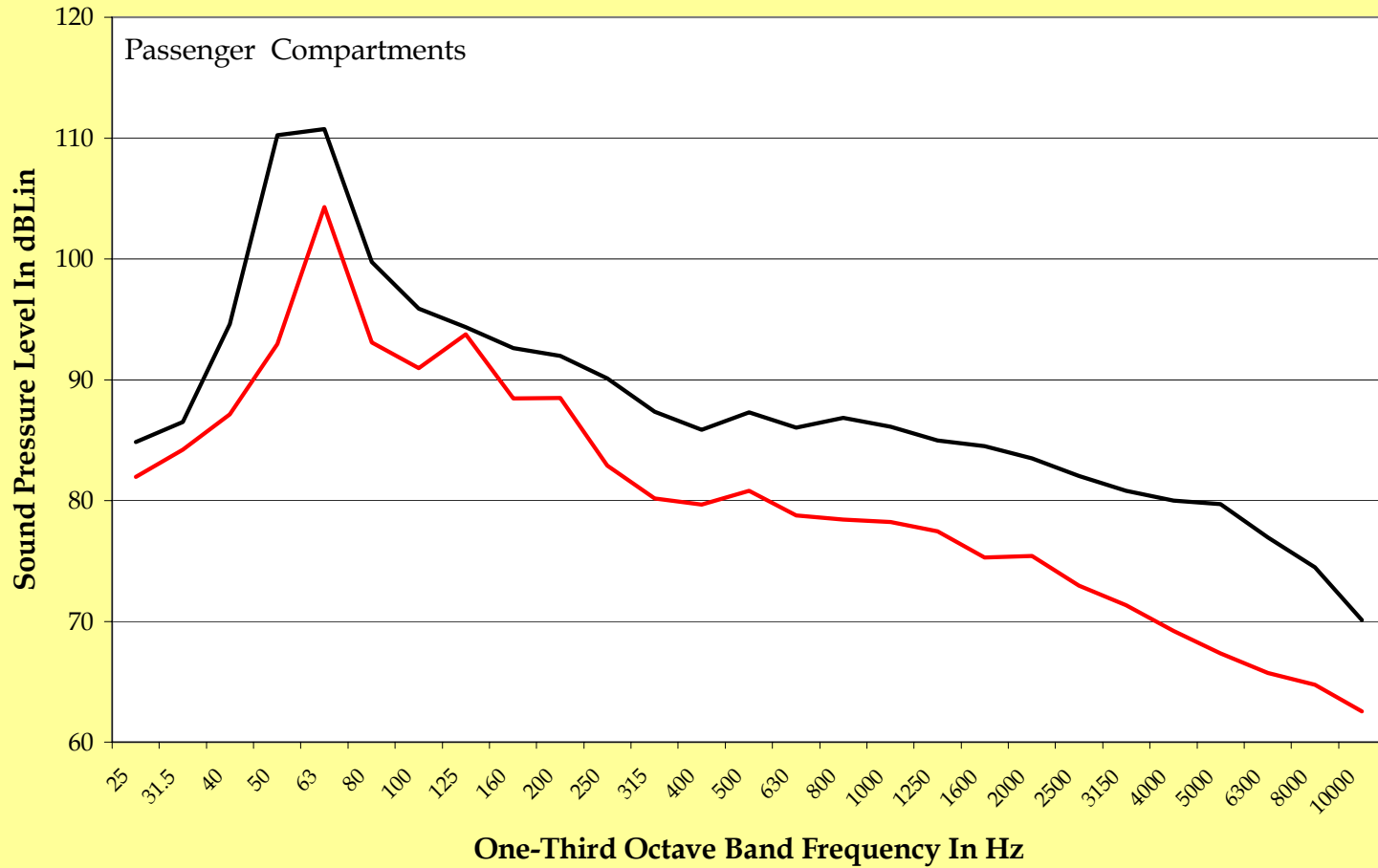
# Compartmental Acoustical Treatments



# Noise Spectra Comparison



# Noise Spectra Comparison



— Old Design (96.3 dBA) — New Design (89.1 dBA)

# Noise Exposure Data

Condition		Travel Time Minutes	Operator Position		Personnel Compartments			
			90 dBA Threshold		Front Compartment		Rear Compartment	
			Dose %	L <sub>avg</sub>	Dose %	L <sub>avg</sub>	Dose %	L <sub>avg</sub>
Old Design	Avg	30.2	17.7	96.4	14.2	94.9	17.8	95.6
	SD	4.7	8.9	3.4	10.0	6.7	13.4	5.0
New Design	Avg	26.2	6.3	90.8	2.9	85.2	3.4	86.4
	SD	1.0	1.3	1.5	0.7	1.7	0.7	1.0
Difference		4.0	11.3	5.6	11.3	9.6	14.4	9.2

Cost ~ \$97,000

# Metal/Nonmetal Success Story - #3



# Surface operation



# Background information:

- Driller full shift exposure : 486.7%
- Equipment involved: Tamrock SD600 Slot Drill





As part of the evaluation, an operator control barrier was installed on the drill



# Another view of the operator control barrier



In addition to the operator control barrier, a three-sided portable enclosure was also evaluated



# Another view of the three-sided portable enclosure



# Results of evaluation in terms of full shift exposures

- Baseline : 486.7%
- Drill with operator control barrier: 354.9%
- Drill with operator control barrier and three-sided portable enclosure: 144.4%
- In addition, the  $L_{avg}$  at operator position was reduced from 101.4 dBA to 92.7 dBA!
- Cost less than \$1,000



# Summary

- Engineering and/or administrative controls can be successful in significantly reducing or abating overexposures to noise.

