

Coal Processing Plant Scenario

Known: Equipment

- 5 Floor Coal Processing Plant
- Mechanic's main duties performed on floors 3,4 & 5. Floor 3 needs washed down and shovel lose coal.
- 1st and 2nd work shifts are to evenly distribute the wash down of floor 3.
- Coal processed 4 of 5 days. One day for maintenance
- Two, 8-hour shifts for 5 days
- Normal production shift is 7 hours, 15 minutes (Union Contract)
- MSHA Citation for noise over-exposure of 172%
- Employee's enrolled in HCP and wearing hearing protection

Known Equipment:

1. Majority of floors are poured concrete with some steel grating.
2. Some floors have equipment from lower floors protruding through upper floors.
3. An internal crane bay extends from ground floor to roof of plant.
4. Open stairwells, with stairs constructed of steel grating, connect the floors of the plant.
5. Plant is fully automated and is governed from a noise and climate controlled room located on the 4th floor.

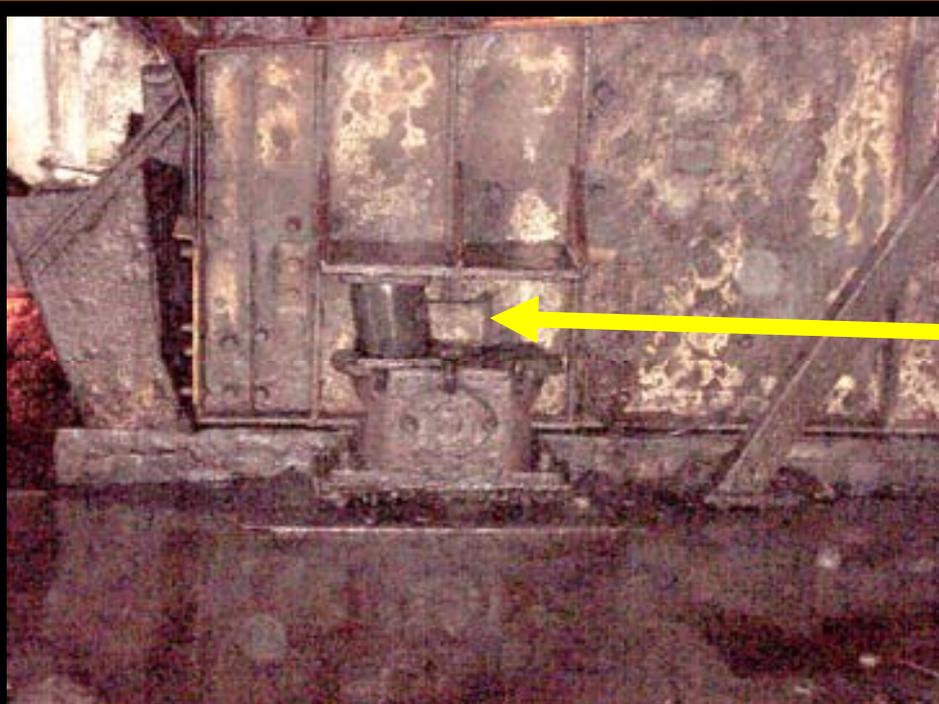
Known: Equipment



Known: Equipment-Current Noise controls

1. Polyurethane screens are used for the clean coal, except for the fines recovery.
2. Transfer points are lined with ceramic materials.
3. Vibration mounts are used on vibrating tables and motors.
4. All personnel are required to wear hearing protection during prep plant operation while in the building.

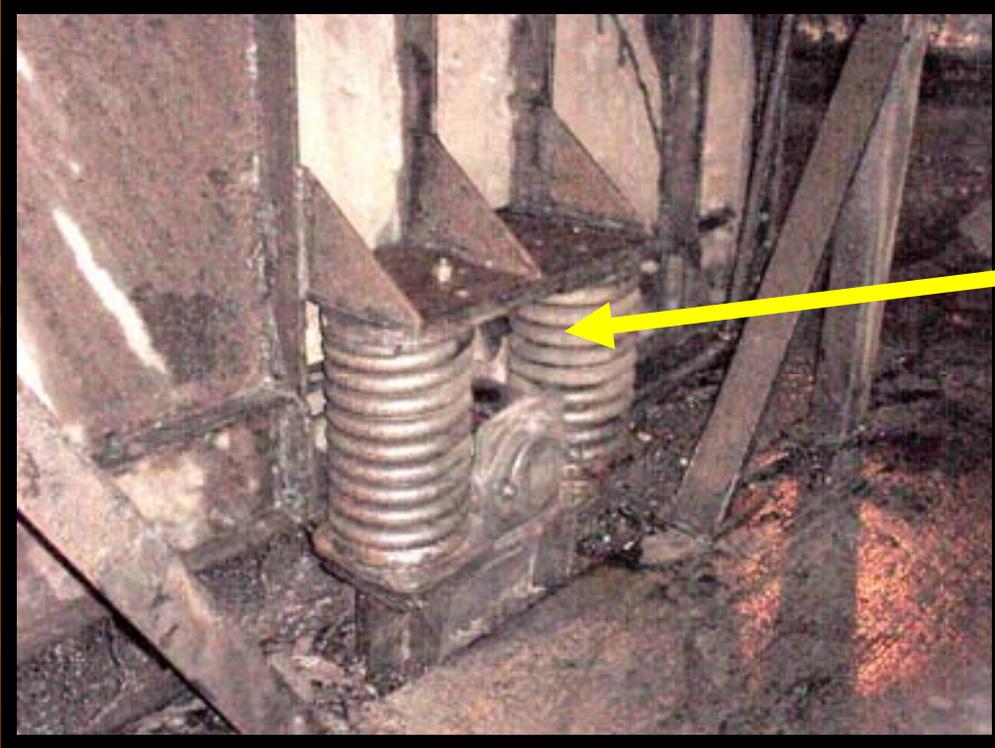
Known: Equipment-Current Noise controls



Vibration Isolators



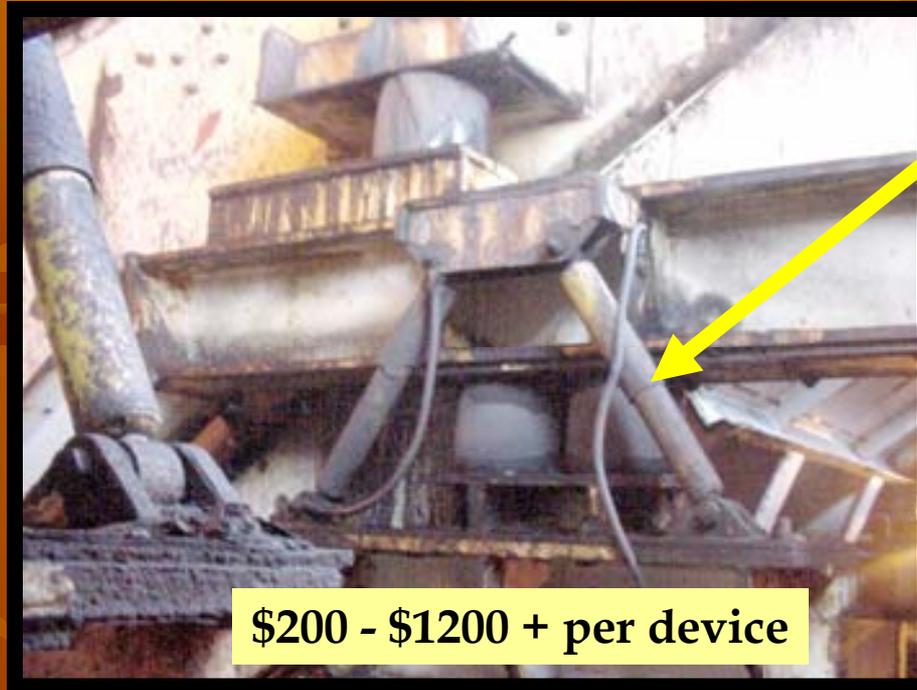
Known: Equipment-Current Noise controls



Vibration Isolators



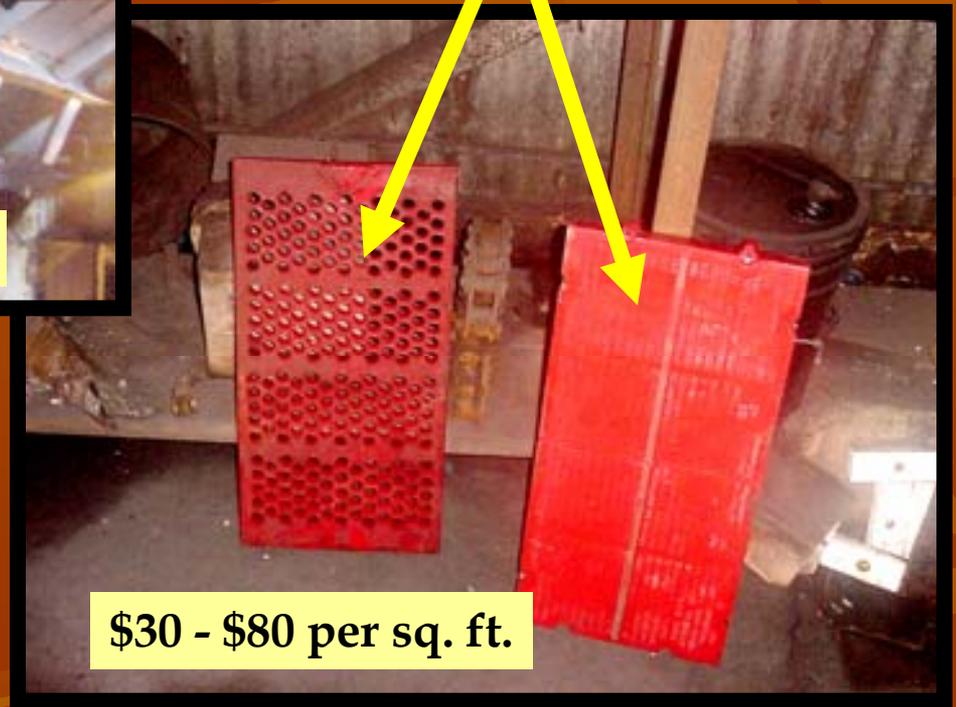
Known: Equipment-Current Noise controls



\$200 - \$1200 + per device

Vibration Isolators

Polyurethane Screens



\$30 - \$80 per sq. ft.

Average Sound Pressure Levels Of Areas In Plant (excluding rooms)

Floor	Location	Sound Level Range	
		dBA*	Linear**
5	Near mechanics well and heavy media cyclones.	87.5 - 90.5	97.2 - 99.6
4	Near mechanics well, cyclone clean coal sieve bends and screens, and 4½ floor.	93.3 - 99.3	103.4 - 107.3
3	Near mechanics well, heavy vessel screens, cyclone clean coal centrifuges, cyclone refuse screens, and 3½ floor (K-Ray adjustment area).	92.6 - 98.0	104.2 - 107.2
2	Near deslime screens, size tech. vibratory screens, fine clean coal centrifuges, material chute, and 2½ floor (Secondary magnetite separators).	89.4 - 95.4	101.2 - 104.1
1	Near heavy media vessel sumps/heavy media pumping and polishing sumps.	86.5 - 87.3	95.6 - 97.4

*Sound level using an "A-weighted" network

**Sound level using an un-weighted network (flat response)

Average Sound Pressure Levels Inside Plant Rooms

Floor	Location/Condition	Avg. Sound Level	
		dBA*	Linear**
5	Electrical control room/doors open	84.2	95.4
4	Prep plant control room	76.3	91.3
1	Welding shop/minimal activity	75.9	85.9
1	Foreman's office	71.0	80.2
1	Spare parts room/no door	83.9	91.2
1	Quality control room	71.7	84.3
1	Lunch room (staging area)	70.6	79.6

*Sound level using an "A-weighted" network

**Sound level using an un-weighted network (flat response)

Dosimeter Survey Results

Occupation	90 dBA Threshold
<u>Mechanic:</u> 3 rd , 4 th and 5 th Floors	Run Time: 484 min.
	% Dose: 138.9
	L_{avg} : 92.3
	Proj. Dose ₈ : 137.2

Time-Study Breakdown

1. 130 Minutes (out of 484) or 27% of the time was spent actually washing down the 3rd floor.
2. 84.3 % of the Total Dose (138.9%) was accumulated while washing down the 3rd floor.
3. 15.7 % of Dose was accumulated from duties conducted on other floors.
4. Near the end of the shift the mechanic spent 11-minutes, on the 4th floor, observing others working on the ground outside the building. (93.3-99.3 dBA area)

Exposure Contributions

Wash Down Floor 3 - 84.3%

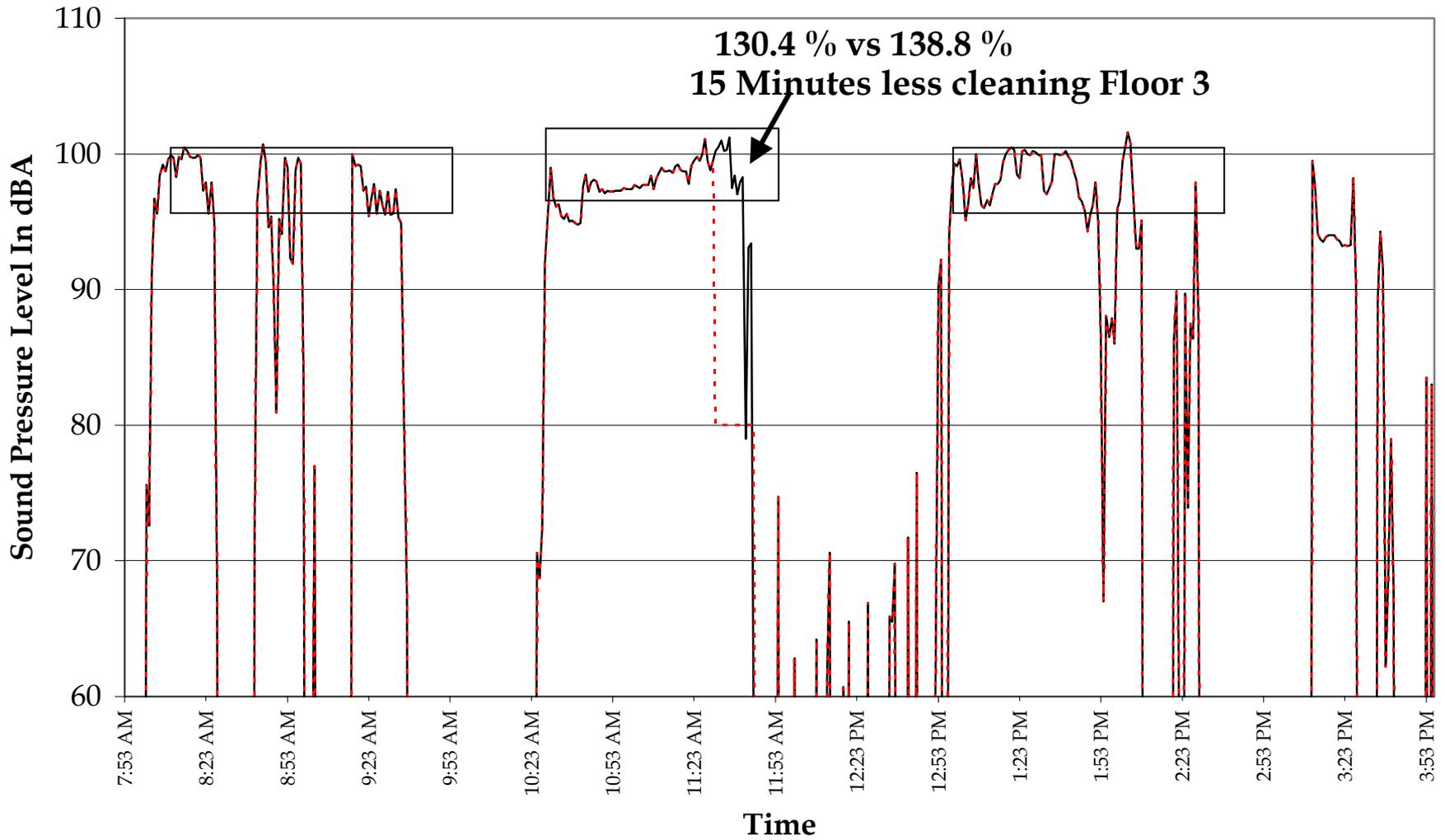
Observing Other Floors - 13.7%

Lunch/Breaks - 2%

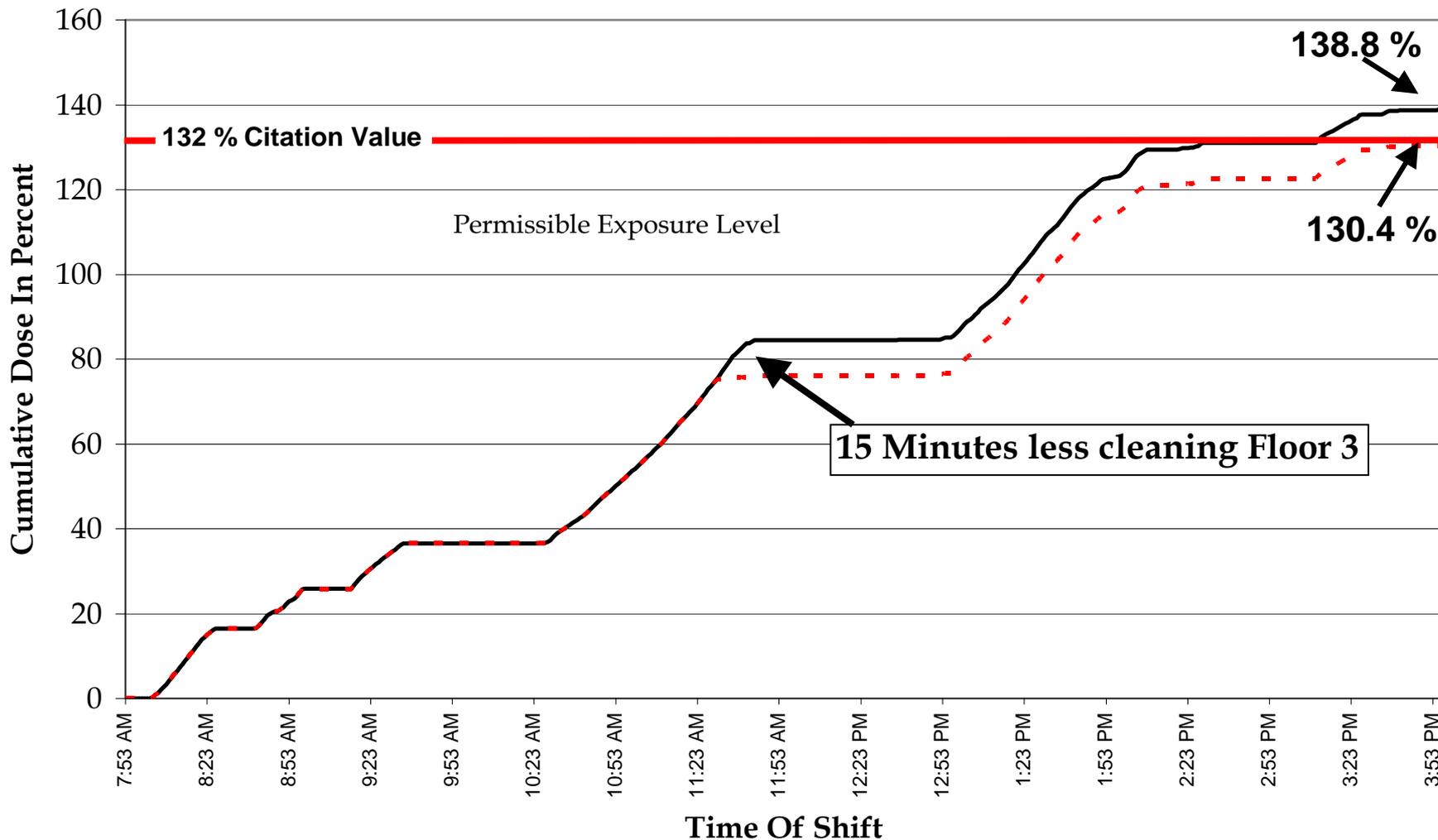
Possible Solutions:

1. Can wash down of floor 3 be done when the plant is not operating?
2. Can the wash down be completed in a shorter time frame?
3. Was the wash down time evenly distributed between the 1st and 2nd work shift mechanics?

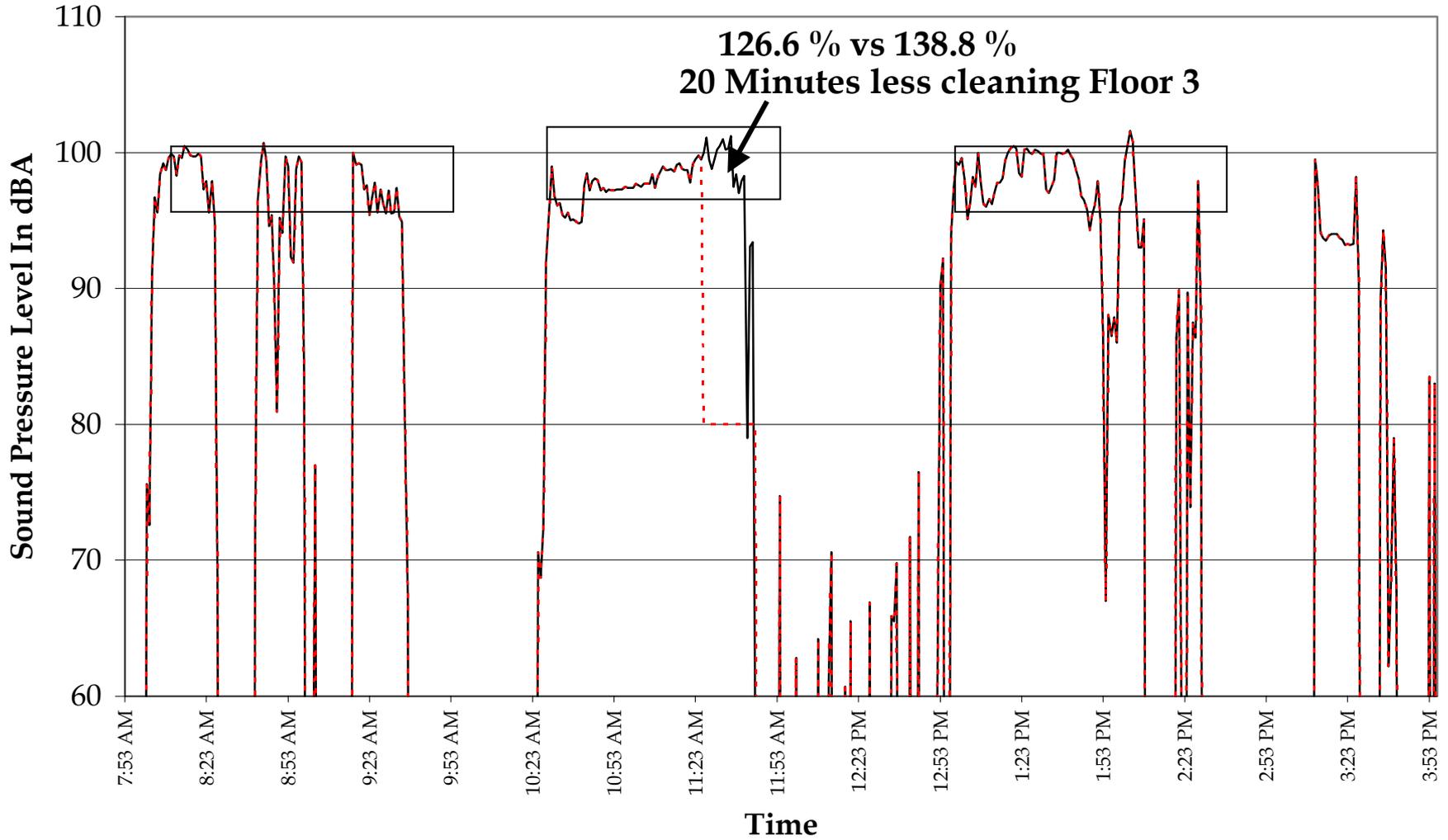
Plant Mechanic Dosimeter Data



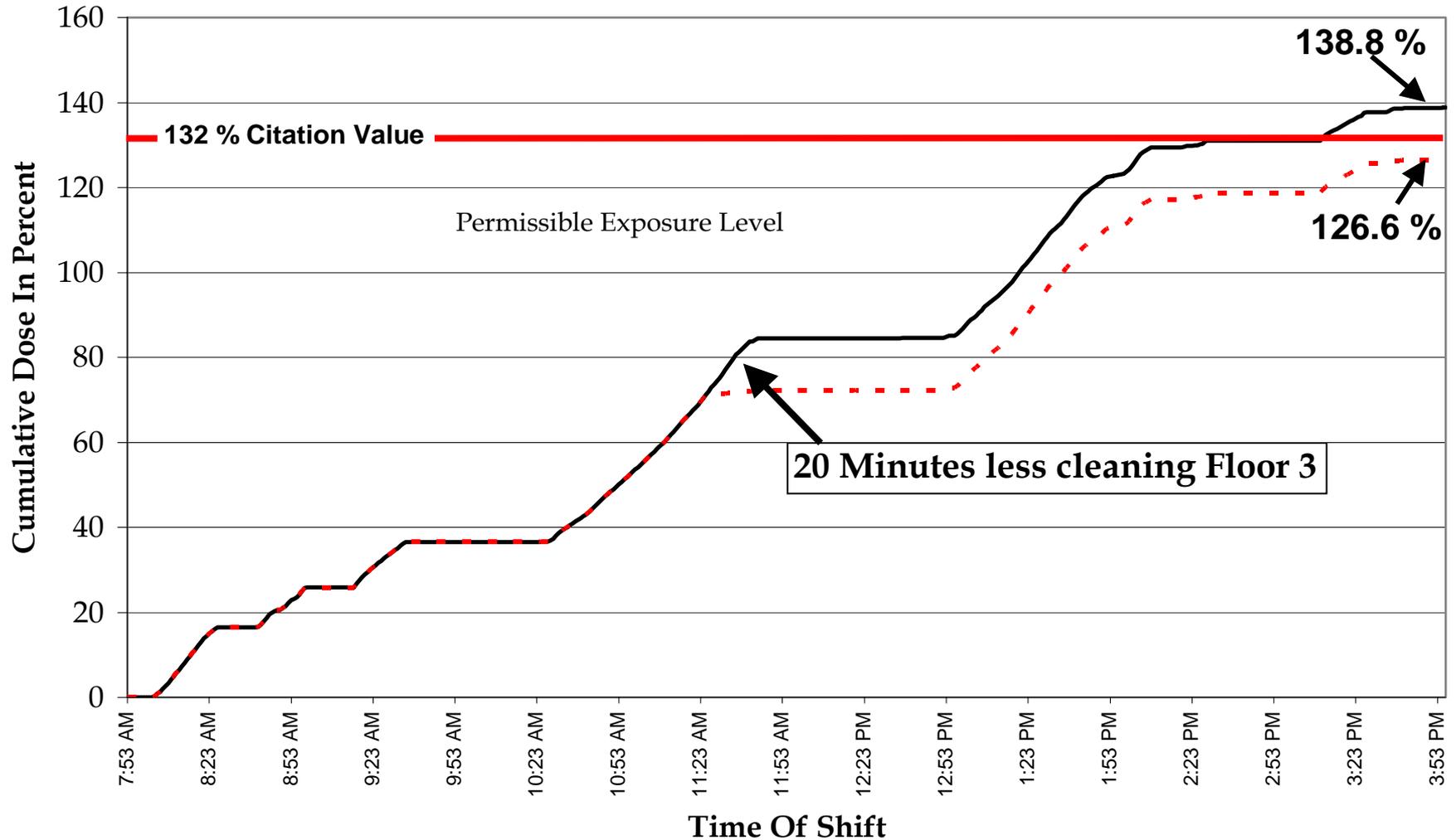
Plant Mechanic Cumulative Dosimeter Data



Plant Mechanic Dosimeter Data



Plant Mechanic Cumulative Dosimeter Data



Eventual Outcome

- The Normal (Union Contract) production work-shift is to be 7 hours, 15 minutes. The remaining 45 minutes is to be used in the bath house washing and changing clothes.
- The 1st shift mechanic should not clean as much as he sometimes does. He is to leave an “equal amount” of coal for the 2nd shift mechanic to clean.
- Make improvements to the production equipment or techniques so that less coal is being spilled, thus less time needed to clean the excess coal.

Alternative Solutions

Acoustical Curtains Isolating High Noise Areas



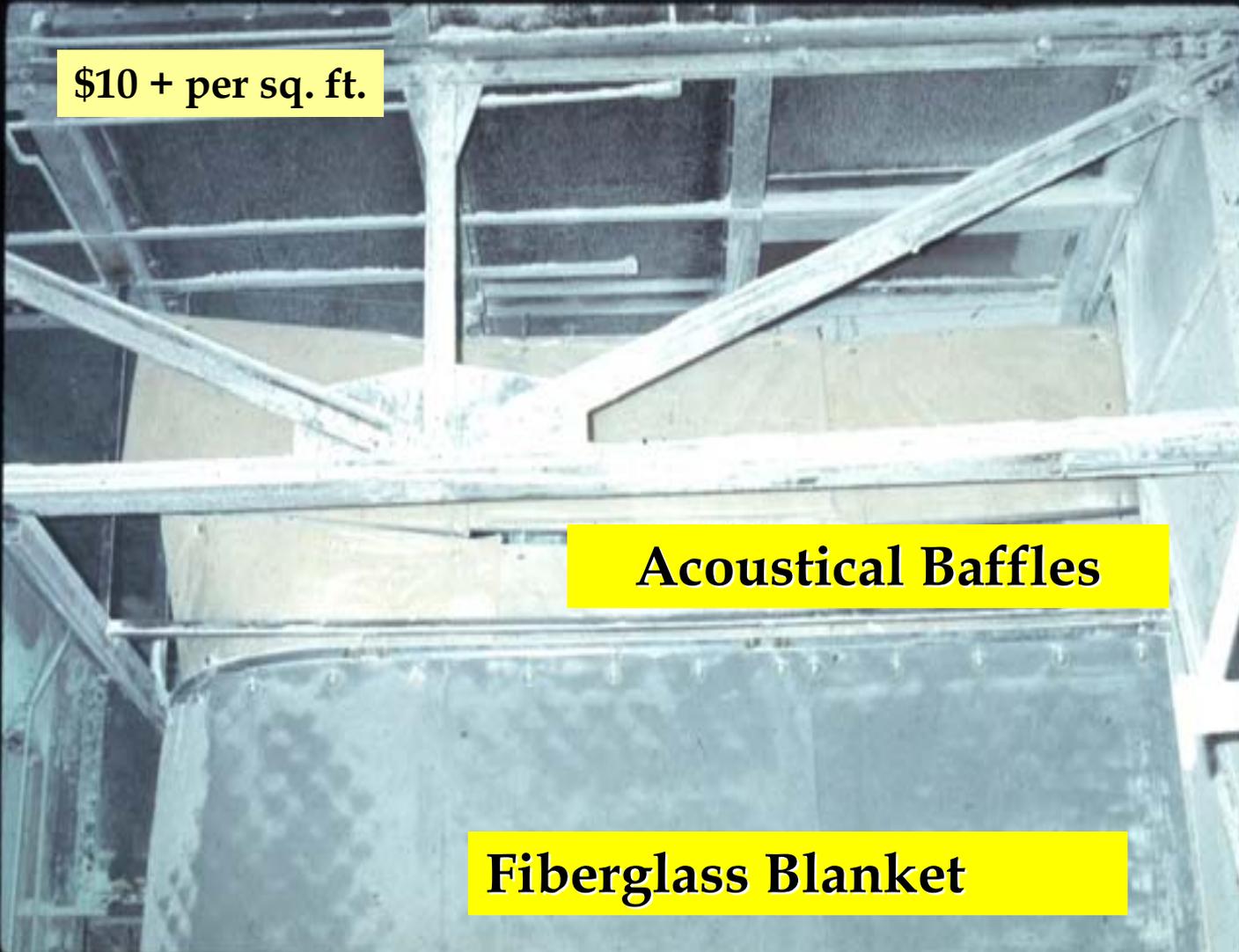
Acoustical Curtains Isolating High Noise Areas



\$10 + per sq. ft.

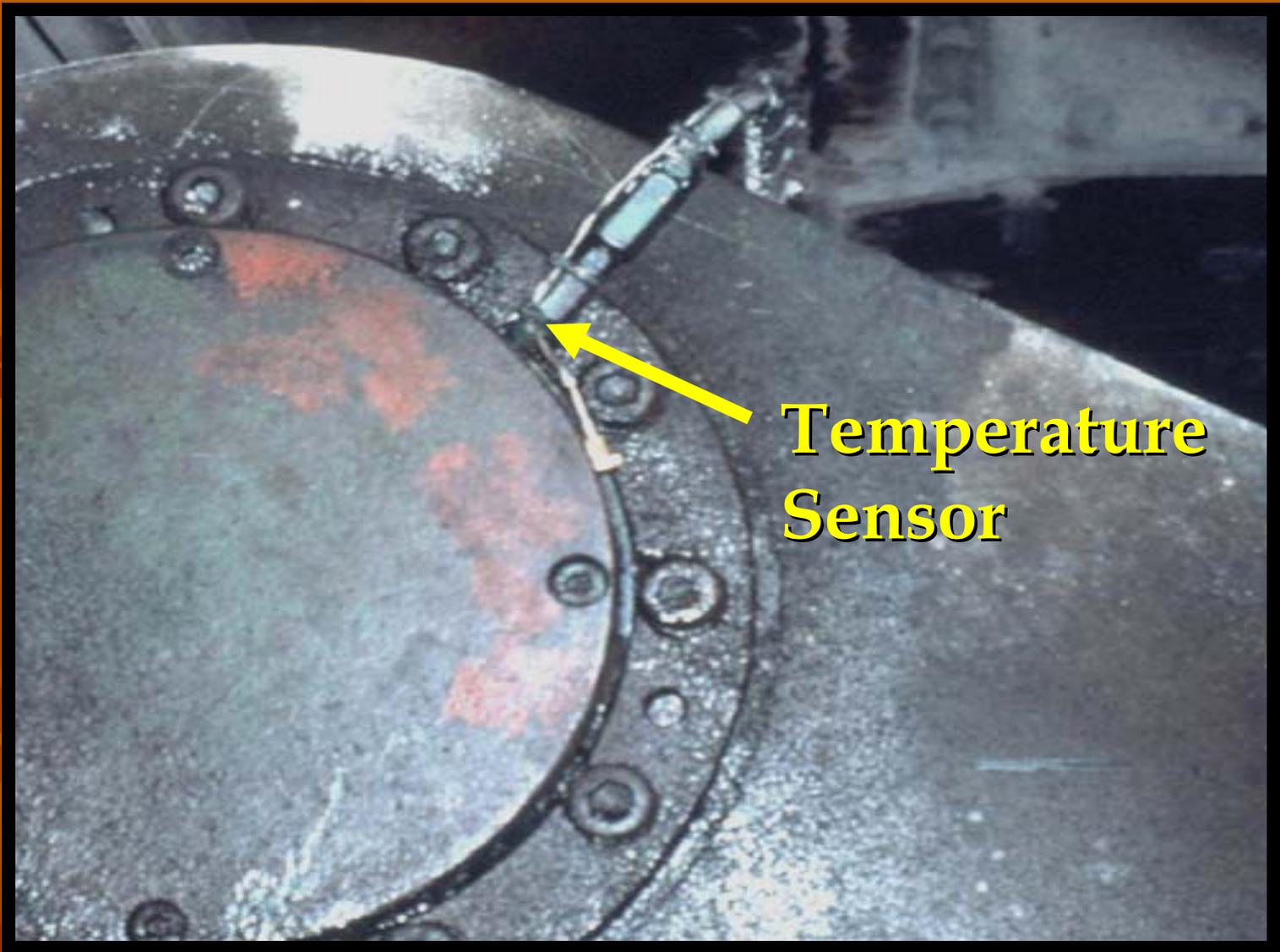
Acoustical Baffles

Fiberglass Blanket

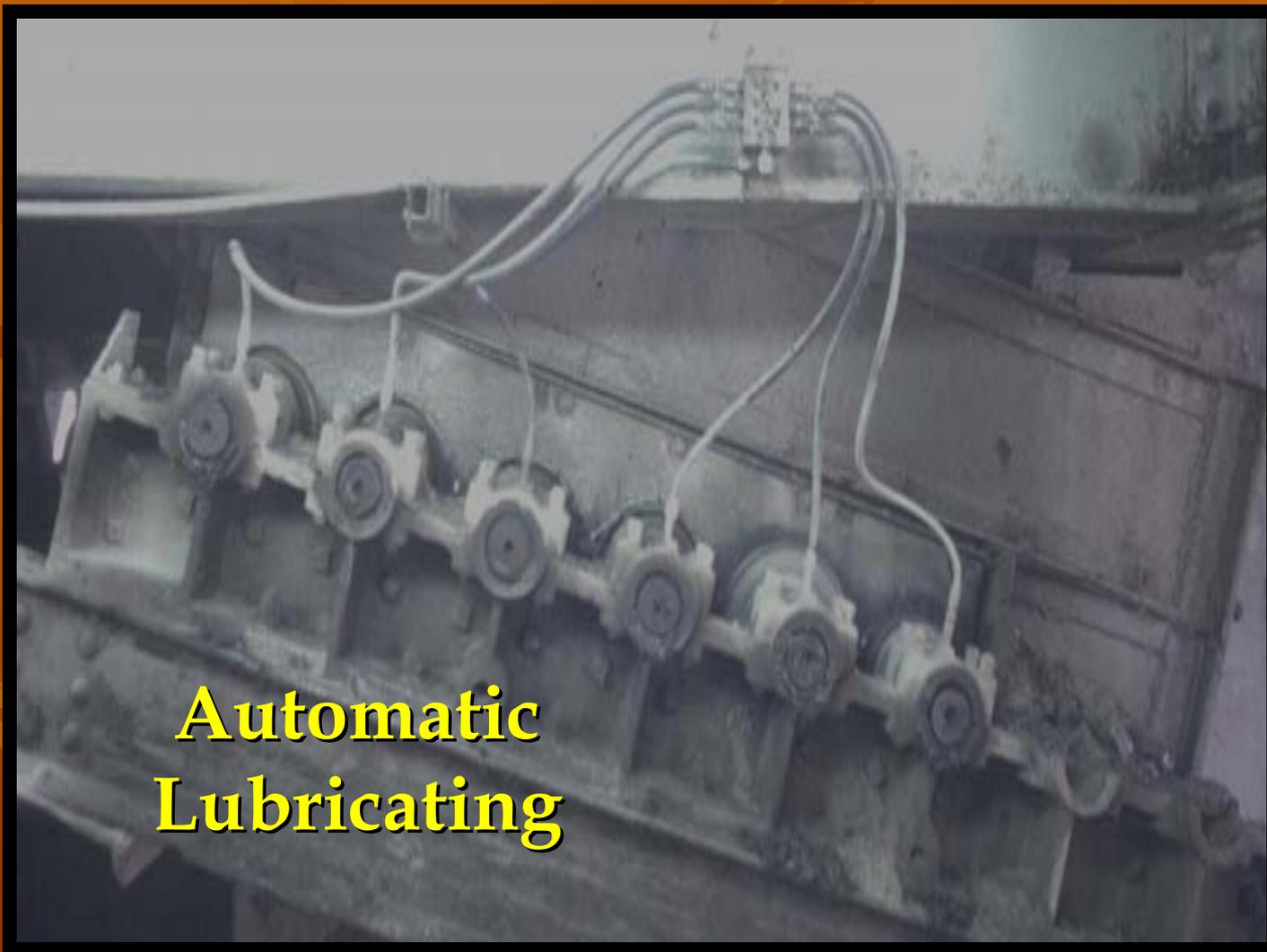




Acoustical Baffles



**Temperature
Sensor**



Automatic Lubricating

\$500 per weatherproof camera

CCTV Monitoring



**Mine Safety and Health Administration
Pittsburgh Safety and Health Technology Center
Physical and Toxic Agents Division
412-386-6933**

