Engineering Control Development

Known:

1. Dose for complete 10-hour shift is 325%
2. Operator ear sound levels:
   - 95 dB(A) while tramming – 2 Hrs
   - 100 dB(A) while drilling – 5 Hrs
   - 90 dB(A) during maintenance/down time – 2 Hrs
   - 80 dB(A) while on break – 1 Hr

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Calculation of %Dose (PEL)

$L_{p'}$ dB(A)	Time Allowed (hrs)	%Dose per hour
<90	∞	0
90	8.0	12.5
91	7.0	14.4
92	6.1	16.5
93	5.3	18.9
94	4.6	21.8

$L_{p'}$ dB(A)	Time Allowed (hrs)	%Dose per hour
95	4.0	25.0
96	3.5	28.7
97	3.0	33.0
98	2.6	37.9
99	2.3	43.5
100	2.0	50.0

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Exposure Contributions:

Drilling – 250%

Tramming – 50%

Maintenance/Downtime – 25%

Drilling Solutions:

A well designed windshield ~ -3 dB(A)

- 97 dB(A) for 5 Hrs => Drilling – 165%

A well designed cab ~ -20 dB(A)

- 80 dB(A) for 5 Hrs => Drilling – 0%

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Tramming Solutions:

A well chosen muffler ~ -15 dB(A)

- 80 dB(A) for 2 Hrs => Tramming – 0%

Maintenance/Downtime Solutions:

A well designed fan silencer ~ -20 dB(A)

- 70 dB(A) for 2 Hrs => Maintenance – 0%

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Before:

1. Dose for complete 10-hour shift is 325%

After:

1. Dose for complete 10-hour shift is:
   - 165% with a windshield and all other controls
   - 0% with a cab and all other controls

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Before	After
Tramming 95 dB(A)	Tramming 80 dB(A)
Drilling 100 dB(A)	Drilling 97 or 80 dB(A)
Maintenance 90 dB(A)	Maintenance 70 dB(A)