

Noise - The Third Pollution  
Suggested Guidelines for Action Now

D.H.R. Blake  
MacMillan Bloedel Ltd.  
1075 West Georgia Street  
Vancouver, B.C.

### Introduction

One of the things that sets man ahead of other animals is that he is supposed to learn faster from his mistakes. In the case of the first two pollutions, those of air and water, premature regulations enforced by Governments caused a waste of millions of dollars because new technologies with more positive, more economic solutions were on the horizon. Perhaps in recognition of this, Governments in the United States and Canada appear bogged down in coming to grips with firm regulations on noise. None of us, I am sure, would like to repeat the classic errors of the automotive industry that: - reduced some pollutants to within limits, but simultaneously introduced new toxics at the same time, and also greatly increased our consumption of dwindling petroleum. Lo and behold! We now have broken new frontiers with lean-burn engines and smaller cars which are economic logical answers to thinking citizens who recognize that we live beyond our energy supply.

In spite of squabbles over: - 85 dBA vs 90 dBA, all known technology applied against practical technology, administrative controls or not, economic impact against union demands for removal of the need for hearing protection regardless of cost; industry must continue to move toward prevention of noise induced hearing loss of its employees by enforcement of hearing protectors and the elimination of noise in a logical economically feasible manner.

### Suggested Guidelines for a Rational Approach

No matter what regulations Government bureaucracies of ever increasing size ultimately decide, the end point is to quieten our environment in the work place to below levels that cause hearing loss over and above that of natural aging. Does it not therefore appear rational to spend our hard earned dollars to reduce sound energy on a basis of maximum benefit to the most employees? Such a system can be instituted by a suggested "Rine" formula with "Rine" meaning the "Relative Importance of a Noise Expenditure".

Noise levels dBA plotted on logarithmic paper with 90 dBA for 8 hours as a base reference produces a straight line. This plus the basics of the Rine formula are reproduced in the chart. To assess the energy being absorbed that is damaging to employees affected, noise dosimeters can be used or intelligent estimates made based on known time of the employee in a steady state noise. In the case of intermittent noise such as a whole log chipper which generates 110 dBA chipping a 30" log 30 feet long in 30 seconds, a recording sound level meter or watt meter on the motor gives a good positive measurement of intermittent noise.

The basic formula which is applied to each employee station affected by the noise source is:

$$\text{Rine} = \frac{(E_B - E_A) (h/8) N}{M} + \frac{(E_{B1} - E_{A1}) (h/8) N_1}{M} + \dots$$

$E_B$  = Energy equivalent before abatement (if sound level is continuous at 100 dBA  $E_B$  is 400% from graph)

$E_A$  = Estimated energy equivalent after abatement (if we expect 93 dBA  $E_A$  would be 150%)

$h$  = Estimated exposure of station for 8 hour shift (dividing by 8 hours puts it in ratio for time exposure)

$N$  = Number of employees in station over 24 hours (i.e. three shift operation exposes 3 times as many people as a single shift)

$M$  = Estimated cost in \$1,000

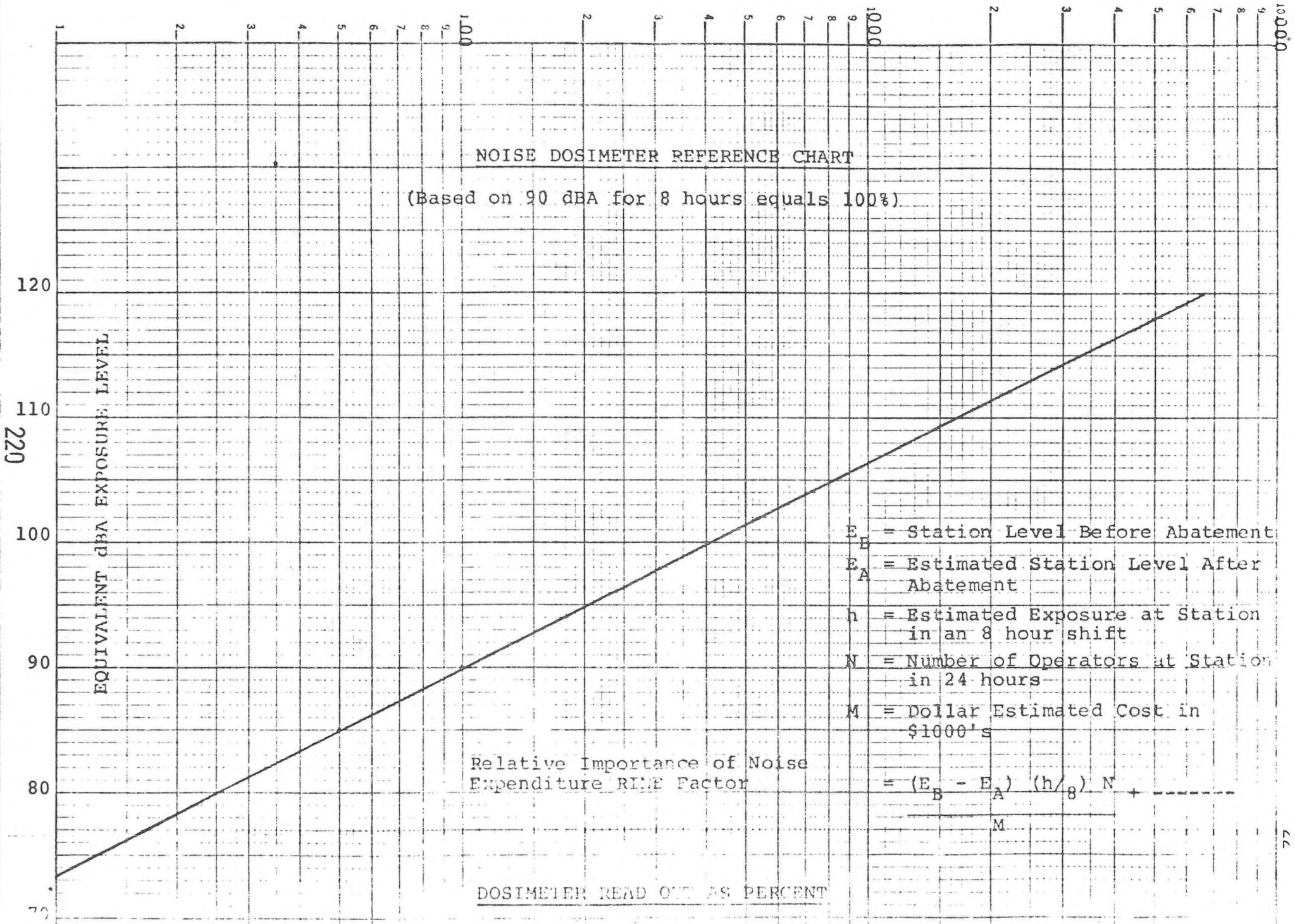
By summing these we get a factor which is positive identification of cost effectiveness of the abatement dollar. The higher the factor the higher the priority on reducing damaging noise energy for employees in the plant.

We do little these days successfully without full involvement. The Rine formula assists in convincing management that we spend our money wisely. It assists in assuring department managers that the choice is the best for overall noise abatement in the plant. It is a convincing argument to union presidents and the employees affected that the right course is charted.

DESIDERATA #1 states at the start:

Go placidly  
Amid the noise and haste, and remember what  
peace there may be in silence.

Let us in the spirit of this code tackle our problems of noise and progress in what appears to the writer as a logical fashion to a most worthwhile goal - the progressive economically feasible elimination of noise from the work environment.



- $E_B$  = Station Level Before Abatement
- $E_A$  = Estimated Station Level After Abatement
- $h$  = Estimated Exposure at Station in an 8 hour shift
- $N$  = Number of Operators at Station in 24 hours
- $M$  = Dollar Estimated Cost in \$1000's

Relative Importance of Noise Expenditure RINE Factor

$$= \frac{(E_B - E_A) (h/8) N}{M}$$