

inter-noise 83

SPACE MONITORING AND PERSONAL EXPOSURE (HEARING CONSERVATION IN A POWER PLANT)

Kiyoshi Masumoto

Masumoto Safety and Health Office

Intreduction:

Noise and hearing conservation programs at work place usually consist of first, the engineering control which to reduce noise at noise source, second, the administrative control which to reduce the amount of noise wxposed periods and third, the use of ear protective equipment which to have workers to wear ear protectors, such as ear plugs and/or ear muffs.

We, office staff had the chance of practicing the second control measure, to cut down the working hours of workers exposed to excessively high noise, achieving an improvement in hearing acuity.

Methods of study:

The study was conducted for the period of two years starting January 1979 at a power generating plant where two diesel generators, located in house and two others outside the house totally 8,000 KW in capacity were producing excessively high noise as indicated in Fig. I and Table I and ten operators were working there on shift to make records and keep up the condition of these generators.

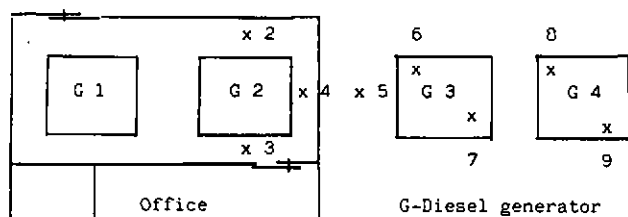


Fig 1

Station	1	2	3	4	5	6	7	8	9
dB A	101	95	96	98	95	109	106	104	101

Table 1

Instruments used for this study are as follows:

- 1 Precision sound level meter.
 - 2 Noise docemeter.
 - 3 10-channel noise accumulator.
1. Plant operators had worn noise dosemeter consecutively for the periods of one month for the purpose of finding the amount of hours exposed to noise. Average amounts of hours exposed were as shown below.

Dosemeter Range	Exposed in minutes	Exposed in hours
1	263	4.4
2	211	3.5
3	113	1.9

Table 2

Note: Range 1-Capable to accumulate noise level above 80 dB A
Range 2-Capable to accumulate noise level above 90 dB A
Range 3-Capable to accumulate noise level above 100 dB A

2. For the purpose of reducing the working hours of these operators exposed to noise, plant operation procedures were changed as listed below:
 - a. Recording of temperature, current, voltage and etc, from once in every hour to once in two hours.
 - b. The use of a noisescope to diagnose bearing wear was stopped.
 - c. The location of work shop was changed from inside the plant to outside the plant.
3. The operators wore dosimeters again and as the result of the change in operation procedures a reduction in exposed hours was made as follows:

Dosemeter Range	Exposed in minutes	Exposed in hour
1	109	1.8
2	71	1.2
3	48	0.8

Table 2

Results of the study:

The work procedures as mentioned in paragraph 2 had been followed by plant operators consecutively for next two years and the hearing acuity of subject operators was improved as shown in Table 3.

	Hearing Loss (mean value)* in dB		
	Before	After	Improvement(%)
Right ear	18.9	11.9	37.0
Left ear	21.9	12.7	40.0
Average	20.4	12.3	39.7

Table 3

* Note The following formula was utilized to average the hearing loss of subject operators.

$$\frac{a + 2b + 2c + d}{6}$$

Where: a - hearing loss at 500 Hz
 b - hearing loss at 1000 Hz
 c - hearing loss at 2000 Hz
 d - hearing loss at 4000 Hz