

POSECO CORPORATION

Mt. Braddock Works
Mt. Braddock, Pennsylvania

General Dust, Ventilation and Noise Survey

Prepared by

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INTRODUCTION

A trip was made to Mt. Braddock, Pennsylvania on June 12, 1972. The purpose of this survey was to conduct tests for free silica, asbestos and total dust within the plant. In addition, a sound survey was taken in areas where high noise levels were thought to be excessive.

Finally, a general walk-through survey was made of the entire plant to review all working operations.

METHOD

The equipment used during the course of this survey consisted of two portable Mine Safety Appliance Gravimetric Dust Samplers. One was set up for collecting total dust and the other equipped with a cyclone attachment for measuring respirable dust only. These two pumps were attached to two employees working in areas where the dust exposure is considered potentially high. A Gast pump was also utilized for gathering a stationary total dust sample in another area of the plant.

The instrument used for the sound survey was a Bruel and Kjaer Impulse Precision Sound Level Meter Type 2204 equipped with an Octave Band Filter Set and calibrated before and after the survey with a Bruel and Kjaer Piston Phone, Type 4220.

RESULTS

The sound survey was taken at several different locations within the plant where management considered the noise levels to be high. The type of noise present is "continuous" and all readings were made in decibels on the "A" weighted scale.

<u>MACHINE OR AREA</u>	<u>HEARING PROTECTION NEEDED - HP</u>	<u>SOUND LEVEL IN dBA</u>	<u>NUMBER OF EMPLOYEES IN AREA</u>
Profax-Ralminex	-	80	1
General Aisle Area Near SAM 1650 Operation	-	82-86	7
Kent Machine	HP	90-95	1
Outdoor Fan by Kilns	-	97	0
Exothermic Buildings			
Jolt Machine	HP	106	1 Per Unit of Time 5 Operators

<u>MACHINE OR AREA</u>	<u>HEARING PROTECTION NEEDED - HP</u>	<u>SOUND LEVEL IN DBA</u>	<u>NUMBER OF EMPLOYEES IN AREA</u>
Compressor or Area		94	0
Green Building			
Hydraulic Press	-	83	5
Lab Room			
Vibrating Machine	-	103	1-3

Analysis of the three millipore filters showed the following results:

<u>SAMPLE NUMBER</u>	<u>AREA</u>	<u>TYPE TEST</u>	<u>NET WEIGHT (Mg)</u>	<u>ASBESTOS FIBERS PER (cc)</u>	<u>% FREE SILICA</u>	<u>TLV IN Mg/M³</u>	<u>MEASURED CONCENTRATION WITHIN PLANT M³/M³</u>
1	Pulping Platform	Total Dust	18.17	0	5	3.75	60
2	Exothermic Mixing	Respi- rable Dust Only	0	0	0	-	-
3	Profax Packaging	Total Dust	2.93	0	1	7.5	4.7

FEDERAL REGULATIONS

Federal regulations on noise are clearly stated in the Occupational Safety and Health Act which has recently been enacted into law by Congress. This Act limits the length of time an individual may be exposed to particular levels of sound. A copy of the permissible noise exposures are attached with this report for your convenience.

This Act also requires that the employer provide and enforce the proper wearing of adequate ear protection to all employees who are exposed to 90 decibels of sound (A weighted scale) for the normal work period of an eight hour day, 40 hour week. This ear protection should be in the form of ear plugs or ear muffs. However, ear protection is considered acceptable by the Act only after it has been determined that the noise cannot be engineered out of the operation.

FEDERAL REGULATIONS

Fibro-Genic Dusts

Free Silica - Respirable and Non-respirable

Threshold Limit Values refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effects. Because of wide variations and individual susceptibility, however, a small percentage of workers may experience discomfort from substances and concentrations at or below the threshold limit; a smaller percentage may be effected more seriously by aggravation of a pre-existing condition or by development of an occupational illness.

Threshold Limit Values refer to time weighted concentrations for seven or eight hour work days and 40 hour work weeks. They should be used as guides in the control of health hazards, and should not be used as fine lines between safe and dangerous concentrations.

The American Conference of Governmental Industrial Hygienists has developed a formula for determining the Threshold Limit Values of both respirable dust and total dust. They are given below:

TLV for Respirable Dust - Mg/M^3
(Milligrams per cubic meter)

$$\frac{10 \text{ Mg/M}^3}{\% \text{ Respirable Quartz Plus Two}}$$

TLV for Total Dust, Respirable and Non-Respirable

$$\frac{30 \text{ Mg/M}^3}{\% \text{ Quartz Plus Three}}$$

Nuisance Dusts

Excessive concentrations of nuisance dusts in the work room air may seriously reduce visibility, may cause unpleasant deposits in the eyes, ears, and nasal passages or cause injury to the skin or mucous membranes by chemical or mechanical action per se or by the rigorous skin cleansing procedures necessary for their removal.

Our Threshold Limit Value for nuisance dusts has been set at 10 Mg/M^3 with less than 1% free silica. This value was arrived at by the American Conference of Governmental Industrial Hygienists. This limit, for a normal work day, does not apply to brief exposures at higher concentrations.

CONCLUSIONS

The results of the noise survey show that there are possibly two areas within the plant where employees are being exposed to the level of noise that is higher than the maximum permissible level stated in the Occupational Safety and Health Act.

The operator of the Kent Machine receives between 90-95 dBA for roughly 5 hours per day. The maximum permissible level for a 4 hour exposure is 95 dBA.

The Jolt Machine operator receives the other high exposure which is 106 dBA. There are other sources of high noise within the plant, but none produce a hazardous exposure because there are no employees working in these areas for any length of time.

Storage of highly flammable magnesium along with exothermic agents inside the green building produce potentially dangerous conditions that could lead to fire. The mill bake operation also located in the green building emits hydrogen gas which is highly flammable. The gas emission is the result of magnesium powder reacting with water moisture within the sand mold. It is management's desire to remove part of the overhead sprinkler system located above the stored magnesium powder.

Of the tests that were made to determine the level of dust at three locations within the plant, the results show that on the pulping platform position, the detectable level of free silica is well above the Threshold Limit Value for that substance. The measured concentration was 60 Mg/M^3 while the TLV was calculated to be 3.75 Mg/M^3 . This is an exposure that is approximately 16 times the above maximum permissible limit. The dust sample was taken over a 3 hour time period. The quantity of dust collected was so high that it was equal to 6 times the maximum allowable limit for nuisance dust which is 10 Mg/M^3 .

The other total dust sample collected was in the Profax packaging area. Here the measured concentration of 4.7 Mg/M^3 was obtained. The calculated TLV was equal to 7.5 Mg/M^3 . Since the measured concentration is approximately only one-half of the TLV, there does not appear to be a problem in the area at the present time. The sample was collected over $3\frac{1}{2}$ hour time period at a rate of 3 liters per minute.

The third sample was taken in the Exothermic mixing operation and the test was made only for respirable dust. The millipore filter did not pick up any detectable amount of dust during the entire sampling operation. This would indicate that at the time of the sampling there was very little if any exposure to the employees working in the area. As a result, no corrective action will be required at this time.

The test for asbestos fibers in both total dust samples proved negative. In the areas tested, there does not appear to be any problem relating to these fibers.

RECOMMENDATIONS

It is suggested that management supply the operators of both the Kent Machine and the Jolt Machine with hearing protection. Ear muffs will offer a greater degree of protection to a worker than would ear plugs. ~~It is also management's duty to enforce the proper wearing of~~ all hearing protection by their employees. Again, muffs have an advantage over plugs because they are much easier to see and their use can be more readily enforced.

One final suggestion to be made in this area is that a hearing conservation program be adopted whereby all employees exposed to high quantities of noise be given audiometric examinations once as part of a pre-employment physical and then once or twice a year thereafter. The information obtained from these examinations can be used to determine if any hearing loss has occurred prior to employment or during any length of time after the start of work with the company. If hearing loss is detected, this can lead to one of three conclusions. Either that the individual is more susceptible to hearing damage, that the ear protection program is ineffective, or that the ear protection furnished is not being properly used. Once this has been determined, appropriate action can be taken.

It is recommended that the magnesium powder be moved out of the green building and stored in a detached fire-resistant building, protected from moisture, chemicals such as chlorine, bromine, iodine, acids and all possible sources of ignition.

It is suggested that the overhead water sprinkler system within the green building remain intact. If water spray falls onto a magnesium fire it will not put the fire out, but will cool the surrounding areas and will also tend to confine the fire to a general locality. Direct high nozzle water application should be strictly avoided when putting out a magnesium fire.

The Exothermic materials located within the building should be kept at a safe distance from the mill take operation in order to keep any accidental fire from starting.

The entire green building has inadequate ventilation and should be equipped with a make-up air system. Such a system would provide an ample supply of outside air into the in-plant environment while at the same time exhausting out the contaminated air. The need for such a system would be apparent during the winter months when the doors to the building are closed and no air circulation is present.

Finally, it is strongly recommended that the operator(s) working at the pulping platform location be equipped with a Bureau of Mines Approved Respirator(s). The level of dust is very high in this area and management should strictly enforce the proper use of the respirators. It would be wise also to place warning signs in this area to remind all workers that respiratory equipment is required.

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