

LANCASTER FLOOR DIVISION OF ARMSTRONG CORK COMPANY

Lancaster, Penna.

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A resurvey of this plant was conducted by the Industrial Health Section of the Metropolitan Life Insurance Company on April 11, 12, and 13, 1939. The first survey was made on April 9, 10, 11 and 12, 1935.

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A description of the plant and manufacturing operations were given in the first report and as these have not been greatly changed, the descriptions will be omitted.

A number of locations sampled during the first survey where no health hazards were detected were omitted at this time.

The following tables show a comparison of the findings for the 1935 and 1939 surveys.

|                                                                               |        |        |         |         |       |
|-------------------------------------------------------------------------------|--------|--------|---------|---------|-------|
| Bldg. 11, 6th floor, rotary pump, general air                                 |        |        |         |         |       |
| Bldg. 11, 6th floor, between 77 and 8 lighters                                | 33.0   | 22.4   |         | 28.4    | 255.0 |
| Bldg. 11, 5th floor, general air                                              | 38.0   | 3.9    |         | 39.0    | 21.5  |
| Bldg. 11, 4th floor, scrap                                                    | 21.7   | 91.0   |         | 29.0    | 5.1   |
| Bldg. 12, 3rd floor, Linastille Dept., buffing machine                        | 21.0   | 5.35   | 4/12/39 | 35.4    | 3.5   |
| Bldg. 67, cement preparation, mechanical oxidation room                       | 39.0   | 2.2    | 4/11/39 | 67.9    | 3.3   |
| Bldg. 67, 1st floor, cement preparation                                       | 66.3   | 1.07   |         | 69.7    | 5.9   |
| Bldg. 67, cement repair, mechanical oxidation                                 |        |        |         | 53.4    | 7.1   |
| Bldg. 405, 2nd floor, paste making                                            | 18.0   | 2495.0 | 4/13/39 | 22.0    | 164.5 |
| Bldg. 405, 3rd floor, barrel sizing, ammonia while dumping                    | 12.8   | 24.1   | 4/12/39 | 35.0    | 68.6  |
| Bldg. 201, 1st floor, saturation dept. sample taken while mixing backing dirt | 36.0   | 11.1   | 4/13/39 | 39.5    | 6.2   |
| Bldg. 66, 1st floor, paint mixing room                                        | 4/9/35 | 27.5   | 7.5     | 4/11/39 | 40.0  |
| Bldg. 44, 5th floor, cement weighing                                          |        |        | 4/12/39 | 38.5    | 7.2   |
| Bldg. 44, 5th floor, between boppers 11 & 12                                  | 41.5   | 38.4   |         | 39.0    | 38.0  |
| Bldg. 14, 3rd floor, asphalt                                                  |        |        |         | 65.5    | 4.5   |
| Bldg. 14, 2nd floor, asphalt                                                  |        |        |         | 42.6    | 6.5   |
| Bldg. 14, 2nd floor, mixing room                                              |        |        |         | 26.8    | 15.4  |
| Bldg. 14, 2nd floor, scrap breaker and grinder                                |        |        | 4/13/39 | 35.4    | 14.6  |
| Bldg. 14, 5th floor, stencil dept.                                            |        |        |         |         |       |

Only 1 man in this room, sander not operating.

Dumping cement into bins; wood floor now used instead of whitening

1 man - intermittent operation. Exhaust applied over charging hopper.

1 man - intermittent operation. Exhaust applied at charging hopper. Exhaust fan does not always operate efficiently, becoming clogged. Dust discharged directly to the outside. Respirator worn.

Asbestos dust

few samples in 1939

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| 1935 Survey                                                    |                  |                     |                                                                      | Lancaster, Penna. |                     |                                                                      | 1939 Survey                                                                                                       |
|----------------------------------------------------------------|------------------|---------------------|----------------------------------------------------------------------|-------------------|---------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Location                                                       | Date of Sampling | Cu. Ft. Air Sampled | Millions of Particles, less than 10 microns, per cu. ft. air sampled | Date of Sampling  | Cu. Ft. Air Sampled | Millions of Particles, less than 10 microns, per cu. ft. air sampled | Remarks                                                                                                           |
| Bldg. 678, 2nd floor, paint backing mixer                      | 4/9/35           | 13.0                | 232.0                                                                | 4/11/39           | 65.1                | 10.1                                                                 | Exhaust equipment operating in 1939; not operating at time of 1935 survey.                                        |
| Bldg. 677, 1st floor, at paint mixer                           | "                | 13.0                | 39.8                                                                 | "                 | 65.0                | 3.4                                                                  | Less activity in 1939 than 1935.                                                                                  |
| Bldg. 677, 3rd floor, discharging mixer                        | "                | 14.0                | 245.0                                                                | "                 | 14.0                | 74.3                                                                 | " " " "                                                                                                           |
| Bldg. 411A, S.P. floor, cork grinding                          | "                | 27.7                | 40.8                                                                 | "                 | 25.0                | 51.2                                                                 | Four grinders operating. There were no stones being dressed during 1939 sampling period, as was the case in 1935. |
| Bldg. 411, S.P. floor, stone dressing                          | "                | 24.8                | 123.0                                                                | 4/12/39           | 35.4                | 58.8                                                                 | In 1935, two men were engaged at stone dressing, only 1 man during 1939 test.                                     |
| Bldg. 411A, 1st floor, cork screening and bagging of cork dust | "                | 28.1                | 27.0                                                                 | 4/11/39           | 57.8                | 31.8                                                                 |                                                                                                                   |
| Bldg. 411, 5th floor, general air                              | "                | 32.0                | 2.6                                                                  | "                 | 42.3                | 14.0                                                                 |                                                                                                                   |
| Bldg. 411A, 3rd floor, bagging cork                            | "                | 41.6                | 34.0                                                                 | "                 | 26.5                | 20.3                                                                 |                                                                                                                   |
| Bldg. 494, 4th floor, cork breaking, bag dumping platform      | 4/10/35          | 13.4                | 92.7                                                                 | "                 | 36.0                | 5.8                                                                  |                                                                                                                   |
| Bldg. 44, 6th floor, balancer along at cement mill             | 4/9/35           | 12.0                | 38.5                                                                 | 4/12/39           | 29.5                | 20.0                                                                 |                                                                                                                   |
| Bldg. 44, 7th floor, calendar along, between hoppers #11 & 12  | "                | 54.6                | 28.9                                                                 | "                 | 61.0                | 24.1                                                                 |                                                                                                                   |
| Bldg. 34D, 8th floor, Rotary Bldg. general air mixing room     | 4/10/35          | 39.0                | 16.4                                                                 | 4/13/39           | 34.7                | 12.6                                                                 |                                                                                                                   |
| Bldg. 34D, 9th floor, Rotary Bldg. at hoppers                  | "                | 9.6                 | 244.4                                                                | "                 | 38.0                | 4.5                                                                  |                                                                                                                   |
| Bldg. 34D, 7th floor, south platform German mixer              | "                | 34.2                | 27.0                                                                 | "                 | 59.0                | 9.2                                                                  |                                                                                                                   |
| Bldg. 34D, 6th floor, at fl. disintegrator, discharge end      | "                | 20.1<br>36.4        | 61.7<br>12.9                                                         | "                 | 34.3                | 2.7                                                                  |                                                                                                                   |
| Bldg. 34D, 6th floor, pen loading operation                    | "                | 31.5                | 4.3                                                                  | "                 | 39.0                | 5.1                                                                  |                                                                                                                   |
| Bldg. 31, 7th floor, Rotary Bldg.                              | "                | 26.0                | 45.7                                                                 | "                 | 31.0                | 46.2                                                                 |                                                                                                                   |

1215 Survey

1215 Survey

1215 Survey

| Location                                                                           | Date    | Cu. Ft. Substance<br>Air Analyzed | Milligrams per<br>Cu. Ft. Cu. Meter 8-hr. day | Date    | Cu. Ft. Substance<br>Air Analyzed | Milligrams per<br>Cu. Ft. Cu. Meter 8-hr. day | Remarks                               |
|------------------------------------------------------------------------------------|---------|-----------------------------------|-----------------------------------------------|---------|-----------------------------------|-----------------------------------------------|---------------------------------------|
| Bldg. 677,<br>1st floor, at<br>Paint Shop                                          | 4/9/35  | 13.0                              |                                               | 4/11/39 | 65.0 Lead                         | .0001 .0105 .034                              | Less activity<br>in 1939 than<br>1935 |
| Bldg. 677,<br>2nd floor,<br>at charging<br>hoppers                                 | "       | 14.0                              |                                               | "       | 14.0 "                            | REACTIVE                                      | "                                     |
| Bldg. 340,<br>7th floor,<br>Inlay Bldg.<br>at hoppers                              | 4/10/35 | 9.6 Lead                          | .00177 .07 .56                                | 4/11/39 | 38.0 "                            | .0095 .3754 2.68                              | ✓                                     |
| Bldg. 340,<br>7 floor, south<br>platform, German<br>shop                           | "       | 36.2                              |                                               | "       | 59.0 "                            | REACTIVE                                      |                                       |
| Bldg. 340,<br>6th floor,<br>at ft. disinte-<br>grator, discharge<br>val            | "       | 20.3<br>36.2                      |                                               | "       | 34.3 "                            | .001 .0353 .282                               |                                       |
| Bldg. 31, 7th<br>floor, Rotary<br>In Bldg. south side,<br>charging hopper          | "       | 26.0                              |                                               | "       | 32.0 "                            | .0022 .4707 1.245                             | ✓                                     |
| Bldg. 31, 3th<br>floor, general<br>air                                             | "       | 38.0                              |                                               | "       | 39.0 "                            | REACTIVE                                      |                                       |
| Bldg. 201, 1st<br>floor, Estimation<br>Dept., sample taken<br>while firing backing | 4/12/35 | 26.0                              |                                               | "       | 35.5 "                            | .001 .0953 .282                               |                                       |
| Bldg. 677, 1st floor,<br>Cement preparing<br>Dept., rotary<br>charging hopper      | 4/11    | 22.5 Mangrove<br>20.8 Lead        | .352 10.68 85.44<br>.224 14.96 119.68         | 4/11/39 | 11.9 Mangrove<br>Lead             | .0044 .1954 1.243<br>.08 2.824 22.6           | ✓                                     |
| Bldg. 677, 1st<br>floor, general<br>air                                            | 4/9     | 27.0 Lead                         | REACTIVE                                      | "       | 40.0 Lead                         | .0009 .0917 .2536                             |                                       |
| Bldg. 447, 5th floor<br>In Bldg. hoppers 11                                        | "       | 44.5                              | .03043 .0152 .12                              | 4/11/39 | 79.0                              | .0042 .3248 2.6                               | ✓                                     |
| Bldg. 340,<br>2nd floor<br>Cement 111<br>charging room                             | "       |                                   |                                               | "       | 42.6                              | .0024 .0141 .1188                             |                                       |
| Bldg. 340,<br>2nd floor,<br>General Dept.                                          | "       |                                   |                                               | 4/11/39 | 35.2                              | .0023 .093 .424                               |                                       |

sample 1939

### CONCLUSIONS AND RECOMMENDATIONS

In general the dust counts of the two surveys check. Variations are due either to the control of dust or change of activities in the departments.

Stone dressing is still done in the cork department and, although the operator is provided with an approved type dust respirator, other employees in the same department are not protected against this dust.

Improvement has been made in the substitution of inert materials for some toxic ones and also in the handling of dust-producing materials. Constant supervision and instruction of employees will tend to reduce the dust generated in the handling of materials.

When designing new equipment and installing new processes, it would be wise to consider the possible methods of dust control. Such forethought would not only eliminate a possible health hazard, but would effect a considerable saving, as it is always more expensive to install dust control measures later.

✓ In the print block wash up department a mixture of gasoline and bensol is used to clean the wood blocks. A large exhausted hood has been installed for the control of the generated fumes. The solvents are kept in open tanks and the blocks are left to soak. After soaking, the blocks are washed in gasoline and then dried by blowing with air from a hose. Apparently the operator only runs the exhaust on the hood when blowing off the blocks. He blows the air in all directions and does not always place the blocks under the hood. As a consequence, solvent vapors are dispersed throughout the department.

The following concentrations were found:

|         | Parts per Million |         |                                                         |
|---------|-------------------|---------|---------------------------------------------------------|
|         | Minimum           | Maximum |                                                         |
| Benzol  | 640               | 2800 -  | maximum permitted for Benzol<br>100 parts per million   |
| Naphtha | 468               | 1170 -  | max. permissible for<br>Gasoline 1000 parts per million |

The exhaust on the hood should be operated at all times, when employees are working in this department.

Solvent tanks should be placed under the hood and kept covered when not in use.

The operator should be instructed to blow the blocks off under the hood at all times. It would be better to allow the blocks to dry under the hood than to attempt to speed up the operation by blowing them off.

### Health Hazards

The toxicities of lead, manganese, benzol and naphtha were discussed in the previous report. There are still hazards from the use of these substances. The concentrations of benzol and naphtha are very high, many times the maximum allowable concentrations.✓

### Harmfulness of Silica Dust

There is a hazard from silica dust from the operation of stone dressing. These stones are made of granite which has a free silica content of about 35%. The hazard of silica dust with special reference to the lungs has long been appreciated. It has been firmly established that the inhalation of this dust results in a fibrosis of the lungs, which disease is known as "silicosis", and its presence, for some reason as yet ill-defined, results in extraordinary pre-disposition to pulmonary tuberculosis. It should be borne in mind that silicosis develops very slowly, taking from five to fifteen and even twenty to twenty-five years to become established. This rate of progress is influenced mainly by the dosage of silica which the lungs receive and this dosage, in turn, depends upon three variables: the amount of silica in the dust, the quantity and particle size of dust in the air, and the extent of exposure. Individual idiosyncrasy might be included as a fourth variable. However, little is known of the variation in susceptibility in those exposed to dust.

In an investigation of granite cutting plants,<sup>(1)</sup> conducted by the United States Public Health Service, most of the workers were found to be exposed to an average of about 60,000,000 particles of dust of less than 10

(1) U.S. Public Health Service, Trans. Dept. Public Health Bull. #187, Health of Workers in Dusty Trades, II. Exposure to Siliceous Dust (Granite Industry), Gov. Print. Office, Wash. D.C., July, 1929.

microns in greatest diameter, per cubic foot of air. The dust contained about 70 per cent silica, of which about 35% was in the form of quartz or free silica. Under such conditions, there was an almost universal occurrence of silicosis among those exposed 20 years and longer, and a large proportion of the workers developed pulmonary tuberculosis. It was not found in this investigation that it would be necessary to eliminate all of the dust to do away with the hazard. A safe limit of between nine and twenty million particles of dust, less than 10 microns in longest diameter per cubic foot of air, could be established.