LEAD INDUSTRIES ASSOCIATION

292 MADISON AVENUE

NEW YORK 17, N. Y.

February 20, 1961

SUBJECT: REPRINT FROM "AIR CONDITIONING, HEATING AND VENTILATING" MAGAZINE

To Members of the Lead Industries Association:

We are attaching, for your information, a reprint of an article which appeared in the January 1961 issue of "Air Conditioning, Heating and Ventilating" entitled: "Lead-Asbestos Pads Isolate Cooling Tower Vibrations."

This article reflects the views of an important New York consulting engineer whose firm has specified these pads under cooling towers on the Grolier Building, 575 Lexington Avenue, New York, and who has been sufficiently satisfied with the results to specify them in the same way on another skyscraper at 685 Third Avenue, which is still under construction but on which the pads have already been installed.

We are also circulating the reprint to some 15,000 architects and engineers. Reprints in quantities up to 100 are available upon request free of charge and in larger quantities at two cents per copy.

Very truly yours,

Secretary

RLZ:JRH

Att.

Lead-Asbestos Pads Isolate Cooling Tower Vibrations

AL LEICHTMAN

Weinberger, Frieman, Leichtman & Quinn
Consulting Engineers, New York, N. Y.

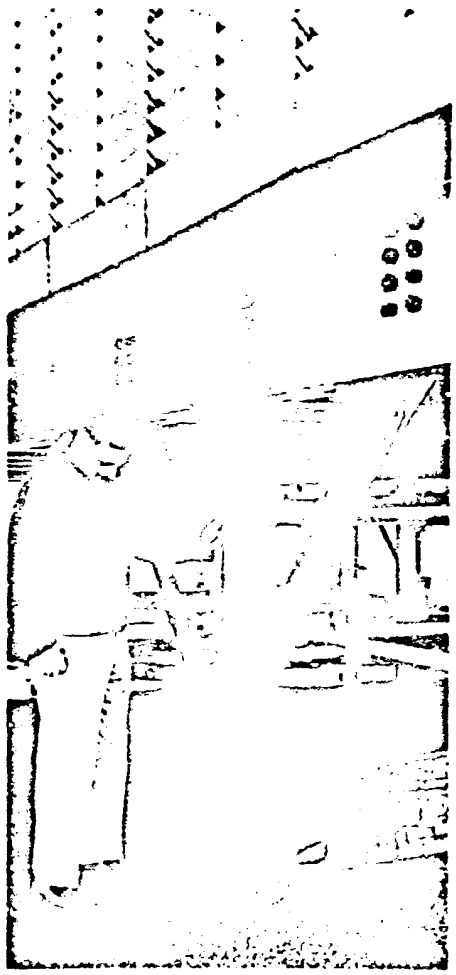

Fig. 1. Cooling tower is mounted on lead pads to isolate vibration from building. Pads foot directly on beams.

THE COOLING TOWER of the new 34-story Grolier Building in New York City is a typical skyscraper installation. With its three 60-hp, 1800-rpm motors, with spiral bevel gears driving three 12-bladed adjustable pitch fans at 202 rpm and a 6,000-gpm water pump, vibrations are initiated which, if not isolated, would be a considerable source of annoyance to office workers below. High winds, on occasion rushing through the tower slats, intensify these vibrations.

It was decided to isolate the tower from the building by separating the supporting columns of the tower from the structural beams of the building. A material was required that would have the capacity to absorb the tower's vibrations, yet have sufficient strength to support its 205,000-lb load. A combination of lead and asbestos was found to be suitable.

Why Lead-Asbestos

Our choice of lead and asbestos was based on the successful adaptation of anti-vibration pads of asbestos sealed in lead in isolating even heavier vibrations in such structures as the Waldorf-Astoria Hotel, the Union Carbide Building and other buildings directly over the New York Central Railroad tracks; the Bell Telephone Laboratories, with railroad tracks running right between the second and fifth floors, and in building construction above the New York City subway system.

Tests conducted at Columbia University many years ago proved that lead and asbestos, in combination, had superior isolation qualities. The tests also showed that together they damped better than either material alone. Both materials are easily workable. Lead is highly resistant to corrosion and impervious to water which makes it an excellent seal, while asbestos is equally noted for its chemical resistance qualities which assure long-life for the pads. An additional advantage of the combination pad is that it can carry heavy loads, a quality rare among isolating materials.

Durability of lead-asbestos pads was demonstrated when the old Marguery Hotel in New York was razed to make way for the new Union Carbide Building. Lead pads on which the hotel had rested for more than 40

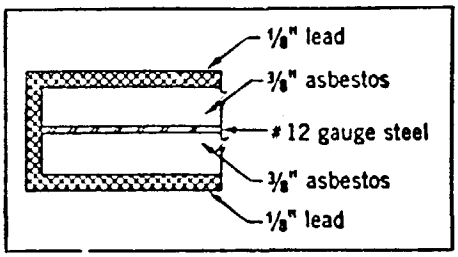

Fig. 2. Basic structure of isolating pad.

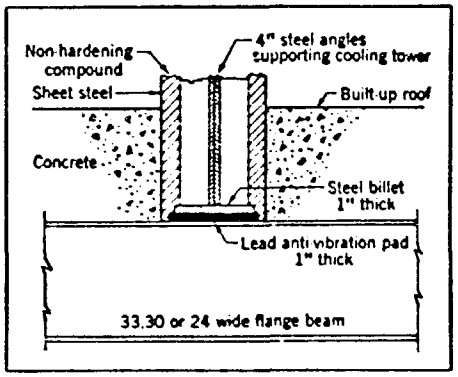

Fig. 3. Pads are installed between the base of the cooling tower's supporting columns and the actual structural steel as shown in drawing.

years were found to be in almost perfect condition, with practically no corrosion or dimensional change.

Lead pads had never been tried under a cooling tower. Would the pads be effective—since some of the vibration from the tower would be of much higher frequency than that of the railroads? Since the cost of installing the pads was relatively negligible, the experiment was justified.

Pad Specifications

Pads installed under the cooling tower are fabricated like sandwiches—two layers of ⅜-inch asbestos placed against a layer of #12 gage steel, sealed in ⅛-inch lead under pressure of 200 psi. There are ten pads of 1-inch thickness in all—one for each of the tower's ten supporting steel angle columns. Surface dimensions of the corner pads are 8 x 8 inches; those of the other pads, naturally subjected to greater load, are 8 x 14 inches. Thus, total anti-vibration surface of the ten pads is 928 square inches; pressure is about 220 psi.

Installation

The ten pads were laid directly on the building's wide flange construction beams while the building was still in its construction frame stage. Then one-inch

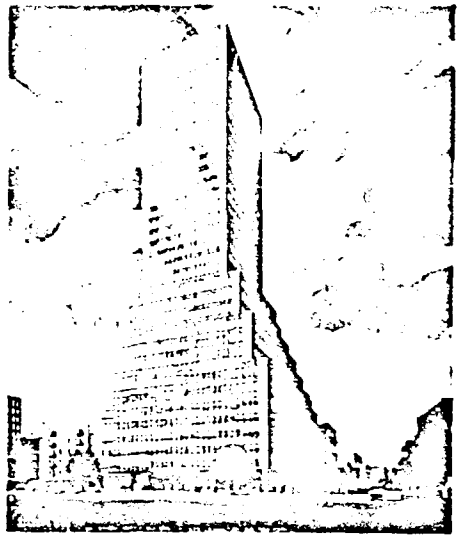

Fig. 4. Architect's rendering of new thirty-four story Grolier office building at 575 Lexington Avenue in New York City.

steel billets were laid over the pads to distribute the weight, and the tower's 4-inch angle columns bolted directly to these billets.

Supporting angle columns of the tower were also isolated from the concrete roof by containing them in pitch pockets of non-hardening mastic compound. Pitch pockets extended upward from the structural beams to about 1½ inches above the roof surface. This caulking procedure also insures against water leaking under the angle columns and into the building.

Costs Kept Down

Economy of using the pads is apparent when compared to the alternative cost of constructing the concrete roof thick enough to absorb the vibrations. Further cost saving in effected by installing the pads, billets, and tower supporting columns during the building's construction frame stage, rather than after the concrete roof had been laid. This procedure eliminates time and cost of recalling the steel workers and their equipment to install the tower's footings after the roof has been laid. Instead, all is in readiness for the cooling tower to be attached to its supporting columns, already in place, once the roof was completed.

Absence of vibrations on all floors of the building, even when the cooling tower is operating on windy days, is evidence of the lead-asbestos pads' ability to absorb effectively the cooling tower vibrations.

Sylvan and Robert L. Bien, New York City, were the architects of the Grolier Building. The author's firm was the consulting engineers. Owner-builder was Sam Minskoff & Sons, Inc. Pads were supplied by John F. Abernethy and Co., Brooklyn, N. Y.

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