Buildings for Inflammable Atmospheres

D. G. Williams
Chief Engineer, Trojan Powder Co.
Allentown, Pa.

HIDDEN POCKETS in the construction of floors, walls, partitions and roofs of industrial plants, where the manufacturing processes involve inflammable, explosive or dusty and gaseous atmospheres, have been the source of considerable trouble—sometimes causing disasters. Inflammable dusts and gases cannot be removed regularly from these hidden spaces. Thus, when a fire breaks out in an operating area, the inaccessibility of these hidden pockets makes it impossible to attack the fire with ordinary fire-fighting equipment without first having to tear out large sections of floors, walls, partitions or roofs. This means unnecessary destruction.

Design for small timber buildings

A type of construction has been developed to overcome this difficulty in relatively small operating buildings, such as timber structures commonly used in the explosive manufacturing industry. No credit is claimed for having originated this general method of construction, but its practical application to this particular kind of industrial building may be new. All floors, walls, partitions and roofs are designed and built as solid structures with the elimination of hidden pockets and open surface joints. A design can be evolved to meet almost any special requirement.

There are a variety of materials that can be used for exposed surfaces to meet exposure to weather, fire, or fumes; insulating boards can be applied to reduce heat transfer; fire or flame-proofed lumber can be employed if required; plywood can be used if surfaces are not too extended; and tongue and grooved lumber of almost any thickness is suitable to obtain the strength required. Exterior surfaces can be glued in place if desired, and joints can be filled with properly chosen flexible caulking compounds. Practically any type of floor covering can be installed.

One point must be borne in mind; this type of construction results in a tight building and if any pressure exists or may exist inside the building at any time, proper provision must be made for its relief.

Several variations of this general type of construction are shown in the accompanying drawing. Its use in a relatively small narrow building is shown in Detail A, where the roof span can be taken care of by using roofers of proper thickness without intermediate support, and where side and end walls can be made up of plywood sheets with T-shaped posts at the joints for stiffening and to obtain tightness. The design has fixed window sash, covered flooring and a painted interior lining which permits of complete hosing out without damage to the building.

The design shown in Detail B is adapted to a large building with roof span that requires intermediate support and with a relatively heavy timber framework for rigidity. In this particular case, side walls are constructed of vertically placed T&G boards with hardboard lining glued and nailed to the interior surface and with joints caulked. The exterior surface is flat galvanized iron over building paper. Horizontal interior beams and braces are roofed to prevent dust collecting ledges. No insulating board was deemed necessary in this instance, but it can be used if required.

The same general type of construction as shown in Detail B is illustrated in Detail C, but adapted to long buildings where such intermediate roof supports as are shown in Detail B would become impractical because of their required section. This design uses arch supports for the roof and instead of the steel gusset plates, commercial glued timber arches could be substituted.

Floor construction with raised sills and protected curbs, as shown in Detail D can, if necessary, be adapted in buildings where the manufacturing processes involve the spillage of corrosive liquids.

All of the designs described have been constructed and are in active use—some of them for a period of several years.

Municipal Central Heating System Serves Whole City

First and only city in the country where a central heating system provides heat for the entire population is Virginia, Minn. In that community all homes, stores, schools and churches are served from steam mains running through every street in town, temperature in the individual houses being controlled by a thermostat in each.

The system is municipally owned and operated as a non-profit enterprise. Cost figures are especially interesting because of the community's location in northern Minnesota, where winter conditions are severe. The plant is said to burn 43,000 tons of bituminous coal a year, at a cost of $7 per ton. The average householder occupying a 5-room house pays $70 a year to heat his house and hot water, about half the cost for heating on an individual basis. Differing ability of the householder to economize and properly operate his heating system naturally results in variations from this average.

In addition, the steam is first used to generate electricity before it is piped into homes and business establishments, the community profiting through this auxiliary use of the central plant. Lower cleaning bills, less laundry and fewer colds are some of the incidental benefits that have resulted from the virtual smokelessness of the city since the central plant's establishment. Also, the refuse collection problem has been simplified by the elimination of ash receptacles, and fire losses in dwellings are said to be 40 percent lower than formerly.

ENGINEERING NEWS-RECORD

Devoted to Buildings, Sewers, Waterworks, Bridges, Roads, Dams, Foundations, Earthwork, Flood Control, Public Works, Shipbuilding, Irrigation, Canals, Railroads

McGRAW-HILL PUBLISHING COMPANY, INC.

Publication Office: 99-129 North Broadway, Albany 1, N. Y. • Editorial and Executive Offices: 330 West 42nd Street, New York 18

JOHN ABBINK, *Publisher*

WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Manager*

Vol. 133 DECEMBER 28, 1944 No. 26

COMING NEXT

• Methods of widening highways, which is one of the current problems of highway engineers in these days when new construction is limited, will be given in the Annual Highway Number, January 11. Other features of this issue will be a discussion of truck size and weight restrictions for future highway work, and details of important postwar projects.

• Also in this issue: An illuminating article on Pacific battlefront sanitation experiences and the methods being employed to safeguard the health of our troops; tests and investigations being conducted by the Tennessee Valley Authority on the use of asphalt grout to stop severe leakage from reservoirs; use of precise leveling equipment to speed up surveying work, increase accuracy and cut cost; design and construction features of airplane propeller test cells at Wright Field.

LOOKING AHEAD

• Maintaining a smooth and dust-free surface on concrete floors where they are subjected to heavy traffic by steel-tired warehouse trucks is a constant maintenance problem. A method, which will be described in the Jan. 25 issue, has been developed for resurfacing trucking-aisles with concrete and asphalt mastic, also procedures for the hardening of concrete to prevent dusting.

• A water reservoir of unusual design is being built in Washington, D. C. The structure is in the form of an open-bowl, and is enclosed by a 17-ft. high brick baffle wall of serpentine design, which is expected to increase its stability. Construction provides for a future roof when the structure will be used as a recreational building. The project will be described in the Jan. 25 issue.

• Some suggestions will be included in the Jan. 25 issue on "Adding Years of Service to Equipment," which will be of special interest to contractors who are endeavoring to extend the life of their machines through the early postwar years when this type of equipment may be difficult to obtain.

Number of copies of this issue printed: 36,023

DO YOU WANT AN INDEX?

Due to the paper shortage, no index for volume No. 133 (July-December, 1944) will be issued except to subscribers who ask for it. If you want a copy of the index please send in the coupon below.

Editor—Engineering News-Record
McGRAW-HILL PUBLISHING COMPANY
330 West 42d Street, New York 18, N. Y.
Please send Index to address below

Name .....

Street .....

City .....