

## PRINCIPLES COVERING DESIGN OF INBOUND AND OUTBOUND FREIGHT HOUSES.

THE economical handling of less-than-carload freight at terminals is a problem that is giving a great deal of concern. The cost of handling a ton of freight a mile by train is approximately known, but it is almost impossible to figure the cost per ton mile for trucking and handling of unclassified freight at the freight house. The cost of terminal handling in all cities is so great compared with the cost of moving a train or a vessel when started on its journey that the latter can be ignored. Freight house design should receive serious consideration. In this connection much of interest and value will be found in the following principles adopted this year by the American Railway Engineering Association and appearing in the recently issued supplement to the 1914 manual.

In outlying districts, where fire hazard is not great and business is not large, and the building laws will permit, frame freight houses having wood floors on joists, studding covered with wood sheathing or metal siding, and wood rafters and sheathing covered with appropriate roofing, are fairly satisfactory and cost less than any other type. Floor for this type should ordinarily be designed to carry 250 lbs. per sq. ft.

With such construction there should be ventilation beneath the floor, but access to the space under the house should be prevented to avoid the accumulation of rubbish and increased fire hazard.

But even where a frame house is to be used, it is better practice to use a fill between concrete foundation walls, eliminating some fire hazard and decreasing maintenance charges.

Where the laws prohibit frame structures and the value of freight stored is considerable and it is necessary to build freight houses of so-called fireproof material, floors should be placed on a fill between foundation walls, and the exterior walls should be of masonry or steel frame covered with metal siding. Roof trusses, framing, etc., can be of wood, covered with appropriate roofing, but to provide better fire protection fireproof construction should be used.

Fire walls of brick or other non-combustible material should be located so as to conform to the requirements of the underwriters. The strictest practice limits the area between fire walls to 5,000 sq. ft. This especially applies to houses with no outside platform. In wide houses, this locates the walls rather close together for economical operation. Fire walls should in no case be more than 200 ft. apart.

Doors in fire walls should be as limited in number as possible, no one door opening should exceed in area 80 sq. ft., and all should be equipped with automatic fire doors.

Where non-fireproof construction is used in inflammable parts, the structure should be covered with fireproof material for a distance of at least 5 ft. on either side of the fire wall. This refers especially to overhanging roofs.

Where but a single house is needed, a width of from 30 to 40 ft. is good practice.

When the amount of freight handled is sufficient to justify it, separate houses for inbound and outbound freight are desirable. When these are provided, the outbound house should be narrow, not more than 30 ft. wide, and the inbound 40 to 70 ft. wide, it being considered expensive operation where a house is in excess of 70 ft. in width.

A platform 8 to 10 ft. wide, along the track side of the house, avoids the necessity of considering the location of doors in spotting cars on the track next to the house, and also eliminates the necessity of keeping an aisle-way inside the house on the track side. It should be at least 8 ft. wide, to give sufficient room for two trucks to pass.

The distance from the centre of the nearest track to the face of the platform or freight house should be not less than 5 ft. 9 in. where tracks are on tangents.

The top of rail should be 4 ft. below the floor or platform level at the track edge, where refrigerator cars are not to be handled in any quantity. With occasional refrigerator cars, the doors can be opened before the cars are set.

Where refrigerator cars are to be handled regularly, the height should not be more than 3 ft. 8 in., this conforming to the recommendations of the M. C. B. Association. The alternative of spacing tracks at least 7 ft. from platforms is usually expensive at important terminals. Many roads are building cars that are lower than the maximum figures given above, and each road in deciding the height of platform above the top of rail should take into consideration the sizes of cars that predominate on its line.

The platform should be protected by an overhanging roof, not greater than the width of the platform, and at least 10 ft. above the platform level.

Where state laws permit, protection over the cars is often used. This should be at least 17 ft. above the top of rail and should preferably extend to within 18 in. of the middle of the car. This will allow walking on the top of cars.

There should also be an overhanging roof or other protection on the team side to protect goods while being unloaded, the overhang to be at least 4 ft. and preferably more, 12 ft. being needed to give protection from a driving rain.

Freight houses without outside platforms would seem desirable in some localities, especially in northern climates, where there is considerable snow and sleet, as these houses can be entirely closed, except for that part of the house where the freight is being received or loaded. At some points where ample track-room is not available, the elimination of the outside platform gives better results.

With this type it is necessary to leave more trucking space inside the house longitudinally the full length of the building. With the house congested with freight, it is difficult to keep the aisle-ways from being crowded up so that it is almost impossible to get through with a truck that is loaded with large packages. This causes delay and confusion.

On the street side, the floor of the inbound house should be from 3 to 4 ft. above the street grade, depending on the type of trucks in use. At the outbound house the height should not exceed 3 ft.

To assist trucks, the floor of the inbound house should be sloped toward the street; approximately 1 in. in 8 ft., this being for the house proper. An outside platform on the track side should slope approximately 1 in. toward the tracks for draining.

For the outbound house, the floor should slope from the street to the edge of the platform alongside of the car not more than 1 in. in 8 ft.

Several kinds of doors are satisfactory, counter-balance lift (either folding or not), rolling shutters and parallel sliding.

It is advantageous to have as much door opening on the team side as possible. And with all types of doors