

chinery is a part of the mixer outfit, such as the Humphrey conveyor equipment.

George E. Lewis, of the Marion Double Wall Co., Marion, Ohio, who has had a great deal of experience in constructing Van Guilder houses, has solved the elevating problem as required by the Van Guilder wall machines by using a small lift which carries a flat platform wheelbarrow loaded with pails full of concrete. This is the quickest, easiest and most economical way of handling the materials. A pail full is just the right amount to be tamped into place at a time, and a good operator can tamp as fast as an assistant can throw it into the forms. The pails are easily wheeled to place, and by using a system of inexpensive, collapsible scaffold horses to carry the plank runways, they can be kept within easy reach of the forms with but very little effort.

They use a small portable lift which consists only of two guides built up in interchangeable sections and bolted together. These are held in position by staying to the different floors as the work progresses. Where it is impossible to put the lift inside of the building, they have used it outside by means of just a few extra stays. The platform of the lift itself is about 2 ft. 6 ins. by 3 ft. 6 ins.,—just large enough to carry a wheelbarrow but not so large that it will be too heavy for the power plant. They use a mixer with $3\frac{1}{2}$ or $5\frac{1}{2}$ h.p. engine, either of which is sufficiently strong to operate the lift and mix a batch at the same time.

The mixer should have a hoisting drum attached to operate the lift, and should be sufficiently open to be easily cleansed. The hoisting attachment is usually added to standard mixers as a special appliance.

Construction of the one hundred concrete houses at Donora, Pa., was started with a high tower, but the tower was dispensed with later and small mixers and hoists substituted with better results. A small mixer was placed alongside each house during concreting. The concrete was handled in buggies, lifted by swing derricks.

Houses consisting of reinforced concrete foundations and walls with a brick veneer were constructed in groups of ten by Daniel Crawford, Jr., at Long Island City, N.Y. The equipment used consisted of a one-bag capacity side loader mixer, a 7-h.p. kerosene hoist, and a mast-hoist bucket plant, this equipment being placed on the street in the centre of a group of ten houses, so that five houses were poured without moving any chutes. After five houses were poured, the chutes would be swung around to pour the remaining five, so that from one set up of the plant the entire ten were sufficiently covered.

A 50-ft. mast was used, this being framed by carpenters on the job, the mast being hollow and framed out of 2-in. stuff. In erecting this mast a light gin-pole about 35-ft. long and 6 ins. in diameter was first put up, then the mast for the bucket was rigged up to the gin-pole and set up, and the four supporting guys made fast. The cable for the bucket hoist line was reeved up before the mast was set in place, and the lifting was done by the hoist that was afterward to be used to elevate the bucket and in dismantling. The frame supporting the chutes was then clamped fast near the top of the mast and the plant was ready for operation as soon as the chutes were hung in place.

The plant handled about 70 yds. per day with a crew which consisted of one foreman, three men wheeling aggregate, one man handling cement and water, one hoisting engineer, and the men tamping and handling chutes.

In constructing the Van Guilder houses at Youngstown, Ohio, a $\frac{1}{4}$ -yd. mixer was used, and the material conveyed in buckets on platform wheelbarrows operated on runways up to the second floor level. The buckets were passed up by hand for second-story walls. The crew consisted of 8 men up to the second floor, and 9 men for the second story.

Surface Finish

It is usually assumed that the exterior walls of monolithic concrete houses cast in forms require some treatment to make them attractive. It is not within the province of this committee to say what color, combination of color, or light and shadow is best suited to the exterior of houses. A wide variety of colors, lights, and shadows, however, are obtain-

able with concrete, and final decision as to finish must be made to conform to local conditions, and especially to the grade or class of the houses.

There are two general ways of obtaining surface finish: (a) Application of coloring to the concrete surface after the forms are removed; (b) treatment of the surface itself either before or after the forms are removed. Color may be applied directly to the concrete surface either as stucco or paint. Stucco may be had in any conceivable shade of color, and a considerable range of choice is also afforded by special paints suitable to concrete surfaces. A machine for applying stucco, known as Hodges stucco machine, has lately gained considerable attention. Saving the expense of painting has been given as one of the advantages of concrete houses. Stucco, applied directly to the concrete surface without the use of lath or fabric of any sort, will be absolutely permanent if the work is properly done, and freshening of the surface to restore the color may be effected by the simple process of washing with a hose and scrubbing.

Surface finish obtained by depositing colored aggregate or coloring material in the forms next to the surface or by mechanical means, such as tooling, sand blasting, etc., or a combination of these, will usually cost less than stuccoing and will produce an absolutely permanent finish. The variety of color effect is, however, much more limited than is obtainable with stucco.

Interior Construction and Finish

The truth is outstanding and should not be lost sight of that the monolithic concrete house in which concrete has been consistently used in walls, floors, partitions and roof *does* represent the highest type of firesafe, permanent, maintenance-free house.

It is universally admitted that concrete floors are fireproof and sanitary. There is, however, a marked difference of opinion as to the desirability of a concrete floor surface from the standpoint of comfort and coziness.

Wooden floor surfaces are applied either by embedding nailing strips in the concrete or by covering the structural concrete floor with "Nailcrete" or a mixture of cement mortar and sawdust or cinders. The best solution of the concrete floor problem is the use of easily removable floor coverings of carpets, rugs, linoleums or patented floor coverings. Inserts for buttoning down floor covering may be embedded in the concrete. The covering is easily removed and the floors may be flushed and scrubbed.

Solid monolithic concrete walls are no exception to other masonry walls in regard to the requirement for insulation to prevent condensation of moisture on their interior surface. Furring, lath and plaster should be used, producing an air space between the concrete wall and the surface of the interior finish. For this purpose wooden nailing strips or plugs to which the furring may be attached should be embedded in the concrete wall, or wires or "hairpins" allowed to protrude from the concrete, for the attachment of ribbed metal fabric or wire mesh. Whatever detail is adopted, the fundamental requirement of insulation must be provided, and either a "dead" air space must be obtained or some insulating material such as linofelt, cabot's quilt, cork-board, etc., used between the concrete and the inside finish.

Partitions in a thoroughly fireproof house should also be fireproof. In monolithic houses of the bearing-wall type with concrete floors, it is usually economical to make some of the partitions heavy enough to carry the floor loads, thus cutting down the floor spans and obviating the use of columns or deep beams. These partitions are then similar in construction to the exterior walls and are fireproof. Furring is omitted and the finish applied directly to the concrete surface. Partitions that do not carry floor loads may be constructed by plastering and back-plastering on ribbed expanded metal or mesh. Openings in such partitions may be secured by using pressed steel or concrete studs at each side of opening. Plastered partitions may be made to form a dead air space by constructing two walls a few inches apart, both plastered on expanded metal or mesh reinforcement.

In order to carry out the idea of firesafeness completely, the roof must be incombustible. If the ceiling of the top