

### Latest Developments in Poured Joints for Vitrified Pipe Sewers

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Developments of the past few months in sewerage practice make it virtually certain that the process of troweling sewer pipe joints by hand out of Portland cement mortar will be replaced by poured joints within a comparatively brief period. The Sewer Pipe Manufacturers' association, a body organized for publicity and research in the sanitary field, has stood sponsor for experiments directed toward this outcome and its field commissioner, John L. Rice, expresses himself as satisfied with the outcome.

#### *Disadvantages of Troweled Joint*

The association takes the view that their material has suffered too long from unmerited criticism, growing out of instances where the methods of joining have been defective. Against the hand troweled joint, it is recognized that a trench is an awkward place for careful workmanship and that, where success depends upon the skill of a manual operation, there would be a considerable number of faulty joints due alone to the difficulties under which the sewer worker labors.

But the difficulty with this form of joint has at least two other sources:

1. Cement and sand mixed in a comparatively stiff consistency do not result in an impervious compound, when set, as is the case with a grout of the same composition mixed thin enough to pour.
2. Two-thirds of the trouble with hand troweled joints results from manipulating the pipe in making the ensuing joints. Even if the troweled joint is perfect, when made, it is shortly cracked by handling the other end of the pipe.

#### *The Remedy for Poor Joints*

Looking for a thorough going remedy, the association saw the comparative futility of mere emphasis on careful workmanship. The problem was to insure the penetration of the joint

of scales can be used in a single form, varying with the diameter of the pipe. Before applying the forms, the bell is caulked with just enough oakum to prevent the joint material from reaching the interior of the pipe.

#### *Joint Material*

For joint material the association has expressed approval both of cement grout and certain bituminous compounds of the character of G. K. compound, produced by the Atlas Company. The latter is especially recommended where rapid setting is a necessity and where, for any reason, such as trenching through filled earth, a certain amount of elasticity in the line makes a desirable safeguard against breaking strains upon the pipe line.

As the sanitary regulations of most cities direct that house drain trenches shall be left open for 24 hours after construction for purposes of official testing, the grout joint has time to set before the trench can be closed. Tests conducted under these conditions have proved uniformly that the poured grout joint is thoroughly impervious as well as economical of material, rapid and convenient of construction.

The need of removing the form is recognized, however, as a slight handicap in operations where it is desired to close the trench promptly, as in machine excavation of municipal sew-



MODERN METHOD OF POURING JOINTS IN PIPE SEWER CONSTRUCTION.

Left to Right: Applying the Form in the Trench—Pouring a Joint with Cement Grout—A Neat, Economical and Impervious Joint.

material into the recesses of the pipe bell and to prevent manipulation of the pipe after the material was in place and before it was set.

Obviously gravity was the most reliable force in insuring penetration. To prevent disturbance of the joint, the one requisite was to provide forms which could be applied to all of the joints of a pipe line in sequence and then permit them to be poured in sequence, leaving the form in place until the initial set is complete.

#### *The "Flexform" Joint Form*

In working out the solution along these lines, the greatest assistance was realized from De Witt H. Wyatt, a young engineer living in Columbus, Ohio, who had begun his experiments independently, but continued them in co-operation with Commissioner Rice. He invented a joint form, which he has named the Flexform, consisting of a series of overlapping, scale-like sections of sheet metal, clamped around the pipe in such a manner as to afford just room for the joint material. There is a hopper or funnel at the top through which the material is poured. The scale structure permitted a certain amount of leakage, not enough to result in serious waste, but enough to safeguard against air pockets in the lower part of the bell.

#### *Joints Caulked with Oakum*

In earlier forms of the device the sheet metal sections were strung on two steel cables of small diameter, but the newer ones are joined with hooks, so that a greater or lesser number

ers. Ensuing experiments have been directed toward developing a joint form cheap enough to be left around the joint and buried in the ground. Announcement of success in this quest is confidently anticipated.