

## 22 PURDUE ENGINEERING EXTENSION DEPARTMENT

sewer proceedings. Three years ago we found it necessary to construct a sewage pumping station to overcome the disadvantage of a submerged sewer outlet. The station was built at the main outfall and a sewer district established to include all property contributing sewage to this point. The map shows that this district included about 16½% of the area of the city exclusive of Miller and exclusive of strictly industrial territory. An assessment of about \$3.25 per lot raised approximately \$125,000.00 to pay for the station.

We are now preparing our plans for the ultimate sewage disposal plant for the entire city and will set up another sewer assessment district. An assessment of \$9.99 per lot will yield about \$2,500,000.00, which is approximately the cost of the proposed plant. Upon completion of that project Gary will have established facilities for treating all domestic sewage and will not have created another taxing body, such as results from the establishment of a sanitary district, nor will it have increased its bonded debt.

### SURMOUNTING DIFFICULTIES IN PAVING A MAIN TRAFFIC STREET

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By Ernest L. Guyer,  
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South Fourteenth Street in Newcastle, a bituminous concrete surface on a Portland cement concrete base, has been in need of repairs for eight or ten years. It is a main, heavy traffic street between the industrial section of the city and the railroad freight yards. It is also State Highway Route 3 carrying the north and south traffic along the eastern side of the state. It carries two bus lines and approximately 200 cars per hour. The street is narrow; and I well remember the night at a council meeting attended by a large number of property owners when I advised the council to widen the street. The property owners defied me to widen it one inch, because it had taken forty years to grow the beautiful trees that were in the parkway space.

It was the general thought of the citizens, especially the abutting property owners, that the traction company was responsible for the failure of the old pavement. The traction company reasoned that for the small amount of time they used the street there must have been some other cause of failure, and after making an investigation, they reported to the city that the bus line was just as responsible as they.

About five years ago Prof. Ben H. Petty, of the Highway

Engineering Department of Purdue University, was called in by the city to make a survey of the street and report on the possibilities of resurfacing. The report, in short, was to the effect that it would be very unwise to resurface the street because of the fact that the concrete base was in very bad condition.

About four years ago the city passed resolutions to repave the street and informed the traction company that it would be charged for that part of the pavement between the ends of the ties. An injunction was gotten out against the city that was never decided.

### Securing Cooperation

Many times the traction officials and property owners discussed this street improvement, but always at a council meeting. Some one suggested bringing the two groups together at a dinner. This was arranged by the mayor at the Newcastle County Club. After the dinner, they adjourned to the City Hall to talk over the improvement. This meeting was a great success, for each group came to understand the other's position. It has always been my opinion that if you can get two opposing parties to understand each other's troubles, there is always a fair way to work out their problems. At this meeting, it was agreed that the traction company engineer and the city engineer should work out all the plans and specifications, each group agreeing to abide by their decision. After the meeting, the property owners decided on a 6" Vibrolithic concrete base with a 2" top wearing course of sheet asphalt. This was to be laid at a price of \$3.10 per square yard.

The traction company agreed to put eight inches of concrete beneath and around the ties, bringing the concrete to the bottom of the subbase of the pavement. They were also to replace the old ties and weld the rail joints. Later the traction company's engineer and the city engineer thought it advisable to put some sort of expansion joint material on both sides of the rail at the expense of the traction company. It was decided to put in track drains at all low points.

The expansion joint material used against the rails was shaped like the side of the rail and fit close, leaving room at the head of the rail for the flange of the car wheel. It was 2" thick and acted as a cushion. The property owners agreed to pay for the pavement as though there was no track on the street.

We have in Newcastle an understanding with all utilities that when a paving petition is granted by the council they are to put in their pipe lines and other service immediately, the street to be improved the following year. In this way there are no two contractors at work on the same street at the same time, necessarily in each other's way. It also allows

one year for all trenches to settle, thus eliminating to a certain extent the future cracks and bad places in the pavement.

Fourteenth Street was well trenched. The Interstate Public Service Commission put a 10" line the full length of the street with connections at every house, and the city water department put in a 6" line part of the way. This past summer, preceding the improvement, the street was pretty well torn up.

### **Inspection**

The traction company engineer and I agreed that we were to have professional inspectors throughout the entire work on the street. (The H. C. Nutting Company of Cincinnati, Ohio, were employed.) Test cylinders of concrete were made from the track base as well as the pavement base. They furnished the cylinders, we made the samples, and they cured and tested them. During the laying of the asphalt, they had two men on the job, one at the plant, and another on the street. It was their duty to see that the work tallied with the specifications. The cylinder samples were taken at no specified time, but at least one was taken both in the morning and afternoon of each day.

The track foundation was to be laid as much as possible without any traffic. This could be readily done except on that part near the traction station and freight yards, where the concrete base had to be laid under traffic. In order to get their track base in without any traffic, the traction company laid a temporary track on the old pavement just to one side of their track which handled all traffic until the base had properly cured. This worked out very satisfactorily both to the city and the traction company.

The base of the pavement was put in and allowed to set 21 days before the asphalt was put on. Cracks developed in this base at about 30' intervals.

The Vibrolithic Concrete Company finished the concrete base. This was done by placing, side by side, 2" boards with holes bored in them from 8" to 10" apart and ribs on the bottom side of the boards that would make indentations or grooves in the pavement  $\frac{1}{2}$ " deep,  $1\frac{1}{2}$ " at the top and 1" at the bottom. The tamping machines were then run over these boards until the surplus water was taken out of the concrete and maximum density secured. It was noticed that since it would compact about  $\frac{3}{4}$ ", to get the full 6" thickness we were required to spread  $6\frac{3}{4}$ " of plain concrete. I had seen one job prior to this and having occasion to cut into it some years later, found it to be very tough and hard to cut through. There was no visible showing of honeycomb or voids. The extra cost of the Vibrolithic process was 30 cents per square yard.

In Newcastle, we have an ordinance that every property owner who wishes the head of the curb left off for a driveway must apply to the city engineer's office for a permit. This permit is made out in triplicate, one retained at the city engineer's office, one given to the property owner, and one given to the contractor. (We have plans for the driveways in the office.) Before the pavement is accepted the contractor must finish the driveway. Then we know when the street is finished and ready to be accepted by the city that every portion is completed, and there is no patch work to be done in the future.

## ELIMINATING THE UNQUALIFIED CONTRACTOR

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An unqualified contractor, according to a recent prize-winning definition, is "One who takes a job for which he is not experienced, or for which he has not the suitable equipment and sufficient capital to finance, or at a price which does not insure to him a reasonable profit." This is a comprehensive definition, to say the least, and one which embraces the smallest as well as the largest operator. Moreover, it indicates that to be unqualified, a contractor need not be either bankrupt or in disrepute. Of course, if he persists in his malpractices he will ultimately be either, and most likely both.

The origin of the unqualified contractor is unknown to the writer. I sometimes think that he was closely related to Topsy, and that together they "just growed up." The unqualified contractor differs from Topsy, however, in that in his growth he has been aided and abetted by other elements of the industry until he has become gigantic in his growth, and, consequently, a menace to the economic structure of the construction industry. Unaided and standing alone it would not be difficult to eliminate him; in fact, he would have long since eliminated himself by reason of his uneconomic procedure.

It would appear on the face of it that support for the unqualified contractor would be equally uneconomic, and that both he and his supporters would sustain losses alike. Were it not for the paternalistic legislation on our statute books today, it is highly probable that such would be the case. As it is, however, with the material producer selling his product without regard to the buyer's credit because of statutory