

On Gratiot Avenue, in the season of 1910, 9,000 feet of 16-ft. concrete roadway was built. On this pavement gravel and sand were used for the aggregate and a one-layer concrete having a 1:2:4 mix was laid. The soil is a clay loam and rather heavy. This road was not completed until late in the season and was opened to travel in November. It immediately pitted and looked rough and has been covered with a surface treatment of refined tar and fine gravel. It was re-covered this season, using a rather light grade of tar (Tarvia A) but is already shows some tendency to scale off. The experience in some other places leads the Commission to believe that a heavier grade of tar gives better results.

Beyond this portion of the roadway 326 sections of the same width concrete were laid in 1911, reaching the county line. Washed pebbles and sand were used for the aggregate in a 1:1½:3 mix, one course concrete 7" deep being laid. The records for this piece are as follows: Longitudinal cracks, 11; transverse cracks, 10; diagonal cracks, 3; holes, 6; showing a total of only 30 defective slabs, or 9.2 plus %. The traffic count on this road, taken at the county line, shows 507 vehicles daily, 65.8% of which are motor-driven.

On the Grand River Road 61 sections of two-course concrete, the same as laid in the first mile of Woodward Avenue, were built in 1909. The soil is a clay loam. The records show 11 longitudinal cracks, 2 transverse cracks, 1 diagonal crack and 3 holes, a total of 17 defective slabs, or 27.9 minus %. The traffic count showed 1,064 vehicles, 56.5% of which were motor cars.

In 1910, 341 more sections were added to Grand River Avenue under contract, the specifications being the same as for the north end of Woodward Avenue. Thirty-three of these slabs became more or less pitted, some having quite large holes. They have been repaired by covering with refined tar and stone chips so that no defects could be observed at the time of the count, hence only 308 are shown in the table. The defects noted are as follows: 59 longitudinal, 20 transverse, 29 diagonal cracks and 46 holes, a total of 154 defective slabs or 50%.

In 1911, 515 additional sections of one-course concrete were placed on the Grand River Road. Washed pebbles and sand were used for the aggregate with a 1:1½:3 mix. The Baker steel joint was used in all of this work except the first six sections. The defects noted are as follows: Longitudinal cracks, 8; transverse, 26; diagonal, 3; and holes, 5; making a total of 42 defective sections, or 8.2 plus %.

In 1912, 1,208 more sections were added to Grand River Avenue, reaching to the line between Wayne and Oakland counties. The count on these sections shows as follows: 66 longitudinal cracks, 37 transverse cracks, 6 diagonal cracks and 5 holes, making a total of 114 defective sections, or 9.4 plus %. The soil grew more sandy as the road extended westerly, considerable stretches being almost free from clay or loam.

On Michigan Avenue 481 sections of concrete, 17 ft. 8 in. wide were laid, using washed pebbles and sand for the aggregate in a 1:2:4 mix. The soil for the most part is a sandy loam, but a little heavy. The count shows as follows: 219 longitudinal cracks, 48 transverse cracks, 23 diagonal cracks, 21 holes, making a total of 311 defective sections, or 64.6 plus %. The traffic count shows 1,009 vehicles, 67.5% of which were motor-driven.

In 1911, 1,570 sections were added to this piece of road, using washed pebbles and sand for the aggregate and a 1:1½:3 mix. The soil over which this pavement was laid is a sandy loam running into light sand at the

west end. The count shows the following: 219 longitudinal cracks, 80 transverse cracks, 42 diagonal cracks, 14 holes, making a total of 355 defective sections, or 22.6 plus %. In 1912 this road was paved to within ¼ miles of the county line, and this year completed to the county line, but no record was taken farther west than the east limits of the village of Wayne.

In 1910, 149 sections of concrete 15 ft. wide and 6½" deep were laid on the River Road, using gravel and sand for the aggregate and a 1:2:4 mix. The soil over which this road runs is for the most part heavy clay. The count shows as follows: 49 longitudinal cracks, 5 transverse cracks, 6 diagonal cracks and 2 holes, making a total of 62 defective sections, or 41.6 plus %. The traffic count shows 538 vehicles daily, of which 78.9% were motor-driven.

In 1911, 434 sections were added to this road some distance below the village of Trenton. The pavement was 15 ft. wide, 7" thick, built of washed pebbles and sand for the aggregate, using a 1:1½:3 mix. The count for this stretch of road shows as follows: 165 longitudinal cracks, 17 transverse cracks, 13 diagonal cracks and no holes, a total of 195 defective sections, or 44.9 plus %.

In 1912, the gap between this piece of road and the southerly limits of the village of Trenton was closed in with a similar pavement to that just described, comprising 213 sections. The count of this piece shows defects as follows: 14 longitudinal cracks, 8 transverse cracks, 4 diagonal cracks and no holes, making a total of 26 sections, or 12.2 plus %.

The same year there was added to the south end of the work done in 1911 something over two miles of concrete roadway, but of this only 208 sections were counted. Of the sections counted, 17 show longitudinal cracks, 9 transverse cracks, no diagonal cracks and no holes, a total of 21 defective sections or approximately 10%. The soil of the entire road was heavy clay.

In 1910, one-half mile of gravel concrete of a 1:2:4 mix, 12 ft. wide and 6½" deep was built on Fort Street. This concrete, like that already referred to on Gratiot Avenue, was built rather late in the season, and was opened to traffic in November. It immediately pitted to such an extent that it has since been coated with refined tar and fine washed gravel, about ¼" in size. This covering makes an excellent surface and wears fairly well. Of course it was impossible to observe any further defects in the concrete at this time. Continuing south, in 1912 450 sections of concrete 12 ft. wide, 7" deep, and of 1:1½:3 mix were added. The count on this piece of road follows: Longitudinal cracks, none, although another observer has reported there are 2; transverse cracks, 19; diagonal cracks, 9; and holes, 1. Total defective sections, 29, or 6.5 minus %.

From the foregoing, it is strikingly apparent that the percentage of defects varied greatly in the different roads. A careful study of this variation in connection with the age of the pavement will soon convince one that mere age has not produced the defects noted. For example, 252 sections built on Woodward Avenue in 1910 show but 27% defective slabs, while 308 sections built on Grand River Avenue, the same year and under the same specifications, show 50% of defective slabs. There are two noticeable differences. Grand River Avenue was built by contract on a clay loam soil while the portion of Woodward Avenue named was built by day labor under the direct supervision of the engineers of the County Road Commission, on a soil more sandy and, presumably with a little better sub-drainage. Again, 481 sections built on