

MAINTENANCE AND REPAIR OF NEW YORK STATE HIGHWAYS IN 1911.

The following notes on the work done by the Bureau of Maintenance and Repair of the State Highway Commission of New York during the year ending December 31, 1911, have been taken from the last annual report of the State Commission of Highways:

Patrol System.—During the year there were 2,622 miles of improved state and country system of highways under the jurisdiction of the bureau. All of the minor repairs are cared for by the patrol system comprised of 594 patrolmen in charge of patrols of 5 miles average length. These patrolmen work under the supervision of highway inspectors in charge of sections of approximately 100 miles of roads each. These highway inspectors in charge of sections report in turn to superintendents of repairs in charge of the work in each division, the state having been subdivided into six divisions.

These patrolmen are required to furnish a horse and cart together with necessary small tools and to work upon his section between the hours of 8 a.m. and 5 p.m. In general the maintenance work done under the patrol system may be described as all work necessary to keep the surface of the paved roadway in as nearly perfect condition as possible, keeping the earth shoulders smooth and safe for traffic, the entire drainage system free from obstructions, noxious weeds and brush cut within the limits of the highway, small repairs to structures and guard-rail. In addition to these duties the patrolmen in numerous instances made surface applications of various dust layers upon the improved roads as granulated calcium chloride, glutrin and in some cases did surface oiling. Also they perform considerable work in unloading and delivering along the roads maintenance materials such as stone and oil. The number of miles to be patrolled in 1912 is 3,151 and the number of patrolmen 698.

If the work of maintaining improved roadways is consistently carried on the effective life of such roads will be greatly extended. It would appear as though it could be prolonged indefinitely, if year by year the material added to the road surface be equal or slightly in excess of the material which has been worn away during the same interval of time.

The experience during the years of 1909, 1910, 1911 has demonstrated that results of the patrol system has thoroughly justified its existence. The average cost for the entire state per mile for patrols for 1911 was \$140.

For the season of 1912 it was proposed to subdivide the maintenance and repair work of the state into eight divisions instead of six, this change being necessary to give proper supervision to the rapidly increasing mileage of the improved state and county system of highways, also to have all the work in each county as far as possible under the direct supervision of one foreman or inspector, also to do most of the extensive surface piling and other repair work by contract. It is also proposed to do better and more permanent surface oiling treatment, substituting for the previous light oils applied cold with light cover costing about \$500 per mile, a much heavier grade of bituminous oil applied hot covered with $\frac{3}{4}$ -in. crushed stone and then rolled with steam roller costing about \$1,000 per mile. This treatment in addition to being more durable avoids the criticism caused by the light cold application tending to soften up during continued wet weather, producing a sloppy condition which has been very much objected to by both vehicular and pedestrian traffic. While the first cost of this surface treatment is an increase over previous practice it is expected that in the

long run it will result in a decrease of the total maintenance charge over a long period of time.

In 1911 there were resurfaced 48.23 miles at a total cost of \$312,449, making the average cost per mile \$6,509.

This resurfacing consisted of scarifying, placing stone and bituminous top dressing.

The total number of miles oiled in 1911 was 269. Total cost of oiling was \$250,601; average cost per mile for oiling was \$932.

The following is a summary of the result of the experiments:—

Oiled Surface Treatment Using Trinidad Liquid Asphalt "AA," Genesee County Road No. 586.—The summer season of 1911 was far advanced before the programme of surface oiling which had been laid out for the season's work was begun. It was determined to treat the surface of various roads with Trinidad Liquid Asphalt "AA" instead of the ordinary bituminous material C. O. and this was done upon Genesee county road No. 586 during September and October.

The usual methods for applying C. O. were followed, comprising sweeping the macadam clean of all mud, dust and loose material, followed by minor surface repairs to ruts, depressions, etc., with $\frac{3}{4}$ -in. crushed limestone, the surface then being treated with Trinidad Liquid Asphalt "AA" which had been previously heated on account of the cold weather due to the lateness of the season so as to flow freely. Long stretches of one-half of the width of the road were treated and covered at a time so as to interfere with traffic as little as possible. The material used for covering the oil was rescreened or dustless limestone screenings. The oil was applied at the average rate of $\frac{1}{2}$ gal. per square yard surface and the completed cost of the treatment, including all material and labor was \$0.07 $\frac{1}{2}$ per square yard. The oil cost in tank cars f.o.b. siding at delivery points \$0.06 $\frac{3}{4}$ per gallon average. The stone for cover cost f.o.b. siding at delivery points \$0.975 per net ton average. The total quantities of materials used were 988 net tons stone and 16,030 gals. oil. The width of the treated surface was 16 ft. and the length was approximately 5.2 miles. At the close of the year this surface was in excellent condition, there being no apparent tendency to mush up and become sloppy due to softening under continued wet weather. No roller was used during the prosecution of this work and the results were very satisfactory. The work was carried on under the patrol system the supervision of the Bureau of Maintenance.

Experimental Pavement Consisting of Limestone Top Course Macadam Bound with Glutrin.—Hudson Avenue, Sec. 1, Road No. 15, was originally improved during 1900, its length being 3,326 ft., or 0.65 mile at an expense of \$7,242.67, or at the rate of \$11,370 per mile, the surface being 16 ft. wide, the foundation course being of crushed limestone 4 ins. thick and the top course crushed trap rock 2 ins. thick, all water bound. The traffic carried by this road is exceedingly heavy, heavy loaded horse-drawn trucks of market produce, and sand and gravel from local pits predominating. The resulting wear required extensive repairs from time to time.

The cost of maintenance previous to 1907 was \$6,376.40; expenditure in 1907, \$277.81; in 1909, \$2.25; in 1910, \$542.27; in 1911 previous to this work, \$46.55, making a total cost per mile per year for maintenance, \$1,045.

During 1910 and 1911 the road was in a bad condition, depressions and ruts through the entire length of the roadway. This having been brought to the attention of the department during the latter part of September, 1911, it was decided to resurface the road with limestone bound with limestone dust and glutrin in solution, the general plan proposed being to fill up the depressions and ruts with coarse broken stone, restoring proper crown to the remaining old