

The well-known Topeka mix is an asphaltic concrete, but the original specification is now modified to give a better grading of the proportions of the finer constituents. Two modified Topeka mixes are shown in the following :—

	No. 1. Per Cent.	No. 2. Per Cent.
Asphalt cement	7 to 11	7 to 9
Passing $\frac{1}{2}$ in. and retained on $\frac{1}{4}$ in. mesh ..	5 to 10	5 to 10
Passing $\frac{1}{4}$ in. and retained on 10-mesh ..	11 to 25	12 to 22
Passing 10-mesh and retained on 40-mesh ..	7 to 25	12 to 20
Passing 40-mesh and retained on 80-mesh ..	11 to 36	18 to 26
Passing 80-mesh and retained on 200-mesh ..	10 to 25	12 to 20
Passing 200-mesh	5 to 11	9 to 14

Asphaltic concrete holds a midway place between bituminous macadam on the one side and sheet asphalt on the other.

In Denver I inspected a number of asphaltic-concrete pavements which were put down on old water-bound-macadam roads. A $1\frac{1}{2}$ in. wearing-course on top of a $1\frac{1}{2}$ in. binder course only was used. The binder course was mixed in the proportion of 50 lb. of asphalt-cement to 250 lb. of sand and 750 lb. of smelter-slag (maximum size 1 in.). The surface course was mixed in the proportion of 80 lb. of asphalt-cement to 85 lb. of limestone dust, 535 lb. of sand, and 300 lb. of slag (maximum size $\frac{3}{8}$ in.). The cost was only 4s. 6d. per square yard, and, with the exception of minor cracks, the pavements seemed to be standing up well to the traffic.

In the Topeka type of surfacing the coarse aggregate constitutes barely one-third of the mass of the pavement. It is claimed that this amount is not entirely sufficient to place the stones in close-enough contact to prevent displacement, hence in many cases the coarse aggregate has been increased both in size and amount, so that more dependence could be placed on the interlocking action of the stones.

As an indication of the great attention given to the details of construction of asphaltic concrete pavements by the American engineers, an extract from one of the very latest specifications for a $1\frac{1}{2}$ in. wearing-course on a $3\frac{1}{2}$ in. base is attached to this report (see Enclosure B).

MASTIC ASPHALT.

I did not see any mastic asphalt being laid in America, but inspected a number of plants working in England. Mastic asphalt is composed primarily of similar ingredients to those found in compressed-rock asphalt, with the addition of a suitable percentage of bitumen to bring the mixture to such a consistency that it can be floated by hand with wooden trowels. It is usually applied in a 2 in. layer on a concrete foundation not less than 6 in. in thickness, but it may also be laid on a good macadam foundation. The mastic mixture is prepared in 6-ton horizontal portable boilers, which are fitted with paddles, driven usually by portable engines. The mastic is first prepared in blocks, which are melted and mixed with small screenings on the job.

A standard mastic asphalt for work in England has the following composition :—

	As manufactured in Block Form and despatched from the Depot. Per Cent.	As mixed and laid on the Job after the Addition of Screenings. Per Cent.
Bitumen	16.4	10.8
Passing 200-mesh screen	43.2	22.1
Passing 100-mesh screen	9.2	7.0
Passing 80-mesh screen	2.0	2.8
Passing 50-mesh screen	10.8	5.6
Passing 40-mesh screen	4.5	2.6
Passing 30-mesh screen]	6.8	2.3
Passing 20-mesh screen]	4.7	3.7
Passing 10-mesh screen	2.4	5.5
Retained on 10-mesh screen	nil	37.6

CONCRETE ROADS.

In speaking of concrete roads care should be taken in defining accurately what is meant by the term. There is no doubt as to the classification of an unprotected concrete surfacing, but concrete may be used for the construction of a base to support a wearing-course of $1\frac{1}{2}$ in. sheet asphalt. Such a pavement is not called a concrete road in the United States. Yet those roads which consist of a layer of concrete with a $\frac{3}{8}$ in. protective coat of bitumen and screenings are classed as concrete roads.

It is almost universally agreed that concrete as a base for sheet asphalt, wood blocks, &c., is unrivalled, but opinions differ quite widely as to its place in the scale of wearing-surfaces. While the sheet-asphalt wearing-surface on a concrete base constitutes the most popular city pavement in the United States to-day, the unprotected concrete pavement is the most popular surfacing for the more important rural highways. Many exhaustive tests have been carried out on unprotected concrete roads, and in spite of a certain amount of prejudice engendered by the fairly frequent failures of the light 4 in. low-strength original Californian roads, the popularity of the pavement has increased enormously throughout the United States, and nowhere more than in California itself. Even in Britain a continually increased mileage every year is being laid down.

The greatest drawback of bituminous surfaced roads has always been the difficulty of preventing wave-formation, and it is the freedom from such troubles that has had much to do with the great increase in popularity of the concrete pavement.