

surface. If you are planning a retread on an old bituminous road of uneven surface, the same type of equipment will assure you a smooth, even-riding surface and will also enable you to run a wedge course along the edge, taking out much of the old high crown that we find on our older roads.

When resurfacing an oil-mat road that has been constructed without the above-described tools, the surface can be very much improved by using a smaller planer-type drag on the surface, being careful to cut only the high spots.

I feel that almost any county attempting to do its own work can well afford to purchase some of this very necessary equipment. Its cost is not prohibitive, as you can secure attachments for your graders, using a 24-foot leveling straight edge and a spirit level to insure an even crown, for \$500 to \$600.

#### SIZE OF MATERIALS

Another important item is the size of the aggregate used. Pit-run gravel, commonly used in oil mats, usually contains enough fines completely to fill all the voids, leaving a smooth, tight surface. However, on some of our retreads where rapid curing asphalts are used, it is impracticable to include the fines in the mix. In this case, it is advisable to use a thin coat of fine stone chips to fill the voids left in the larger stones. This should be done before the bituminous material has cured. After these have been applied at the rate of about 15 pounds to the square yard and have been well rolled in it, it is well to leave the road open to traffic for two or three weeks. Then after sweeping all the loose stones from the edges of the road, tread the road at about .15 gallon per square yard with a rapid-curing, heavy asphalt, and immediately apply a heavy coat of sand. The sand should be applied with a mechanical spreader ahead of the truck. This will insure a smooth, non-skid surface and eliminate all the roughness and roar one finds in so many of the seal coats where coarse aggregate is used and the voids left open. More important still, it gives you a seal against water and air, the last of which is the most destructive element to bituminous surfaces.

#### ROAD EQUIPMENT

S. R. Laughlin,  
Kosciusko County Road Supervisor,  
Warsaw, Indiana

A series of pictures which I will show you on the screen in a few minutes will give you some idea of the equipment we use. We feel that our equipment is equal to our requirements in maintaining 1,062 miles of county roads.

In 1937 we purchased one 8-ton roller, which we used to good advantage on our "black-top" roads and also on some heavy fills that required rolling.

In the same year we also purchased a  $\frac{3}{4}$ -cubic-yard, crawler-type shovel with clamshell bucket and dragline attachments to which we added a short boom and dipper stick to make an all-purpose machine, one we could keep busy the entire year.

Up until 1938 we used a 650-gallon distributor, which was entirely too small for our long hauls. This same year we purchased a new 1,070-gallon distributor, which meets our needs for long hauls and also will handle the heavy grades of bituminous materials.

It has been our custom to buy two new trucks each year. These replace our older trucks and we reduce our maintenance costs. We have a large fleet of trucks and they are from eight to ten years old before we can replace them under this plan. After being used that long, with steady work, their upkeep expense is high.

In 1937 we purchased one caterpillar tractor and 6-cubic-yard hauling scraper that so improved our methods of excavation that we added another unit in 1938.

I should like to give you a total cost and yardage of one mile of road excavation involving extra heavy yardage. For this one mile of road we used two R. D. 7 tractors and two 6-cubic-yard hauling scrapers, and in fourteen ten-hour working days we moved 21,890 cubic yards of earth. This is an average of 781 cubic yards a unit a day at a cost of \$0.107 a cubic yard.

## COUNTY HIGHWAY EQUIPMENT

Alfred Krause,

Franklin County Surveyor and Road Supervisor,  
Brookville, Indiana

The eastern third of Franklin County is practically level, with the roads laid out along the section and quarter-section lines. The remainder of the county is very rugged and hilly. The level portion, of course, has the better roads. The land is more valuable and the cost of road building has been less; hence, under the old township system there were more funds for highway use in this eastern part.

Mr. Hoffman, my predecessor as road supervisor, had a program well under way to rebuild the main county highways. The principal highway in this plan was the road from Brookville to Oldenburg, which, since it connects with U. S. 52 at Brookville and State Road 229 at Oldenburg, carries the bulk of the traffic between the central and western parts of the county. With this road completed in 1937, our next move was to get a road through the western part of the county running north and south from Andersonville to Batesville. This was most certainly a much-needed road since it connected State Routes 52 and 244 with 229. Heretofore all traffic in