makes a total of $1.00. On ordinary maintenance work, such a machine will average about four miles per hour, which means 25 cents per mile covered. For a two-round maintenance job, the total cost would be only $1.00 per mile of road maintained. This covers a real maintenance job with a machine heavy enough to cut a smooth base and preserve the surface material. For low cost, effective maintenance, the modern motor grader is showing results unequalled by any other type of equipment.

GASOLINE POWERED SHOVELS

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

About ten or twelve years ago, shovel manufacturers placed on the market a gasoline shovel. Until that time, steam power was almost always used. Gasoline-powered shovels have proved very economical, and the manufacturers have made many improvements. In the last three or four years, they have been able to produce shovels in the \( \frac{3}{8}, \frac{1}{2}, \frac{3}{4} \) cubic yard sizes which are light in weight and durable enough to be practical for the county to use and own.

Last spring, Kosciusko County purchased a new \( \frac{3}{4} \)-yard shovel, crawler type, with clam-shell and shovel attachments. We wanted an all-purpose machine, one that we could keep busy throughout the entire season. We have used this machine as a shovel for heavy grading on our new roads, cutting down steep grades on our present roadways, widening intersections, building and widening shoulders on highways, and loading trucks from borrow-pits to fill sink holes. We use it in our gravel pits for stripping the over-burden off the gravel.

This same machine, equipped as a crane, is used for stock-piling in gravel pits, and for loading trucks from stock piles at the side of the road. If we are unloading shipped-in aggregate, we can unload the material to either stock pile or trucks.

In bridge work, it is used for digging bridge abutments, removing old bridges, and placing timbers, steel, etc.

As a dragline, we use it for cleaning out ditches and for peat excavation in sink-holes. This is one of the reasons we purchased a crawler-type rather than a truck-type machine. It makes it possible to move over soft or rough ground where it would be impossible for a truck-mounted machine to travel. This machine can be moved anywhere under its own power, or transported over the highway on a rubber-tired trailer.

We have kept this machine busy constantly from the time it was delivered—six days a week regardless of the weather.

Our costs of construction and maintenance have been greatly reduced since the purchase of this machine. Furthermore, the machine is always available for any purpose; but when such equipment must be rented, it is seldom available when you want it.
We favor the \( \frac{3}{4} \)-yard shovel rather than the smaller sizes because the first cost is not much more and the cost of operation is only a few cents more a day while the production is almost double. I feel that the gasoline-powered shovel is one of the most useful pieces of equipment that a county road department can own.

### OPERATING COST OF L-40 CRANE*, PURCHASED MAY 14, 1937, AND SERVICES RENDERED

<table>
<thead>
<tr>
<th>Gravel Excavated Cu. Yds.</th>
<th>Earth Excavated Cu. Yds.</th>
<th>MAY</th>
<th>JUNE</th>
<th>JULY</th>
<th>AUGUST</th>
<th>SEPTEMBER</th>
<th>OCTOBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,595</td>
<td>854</td>
<td>236 gal. gasoline and 15 qts. oil</td>
<td>$ 37.17</td>
<td>$ 91.17</td>
<td>$ 76.53</td>
<td>$ 76.53</td>
<td>$ 69.42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Labor of operator (135 hours at 40c)</td>
<td>$ 54.00</td>
<td>$ 91.17</td>
<td>$ 132.50</td>
<td>$ 132.50</td>
<td>$ 115.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Labor of operator (290 hours at 40c)</td>
<td>$ 161.60</td>
<td>$ 181.12</td>
<td>$ 132.50</td>
<td>$ 132.50</td>
<td>$ 115.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>One tag line</td>
<td>$ 5.62</td>
<td>$ 5.62</td>
<td>$ 20.57</td>
<td>$ 20.57</td>
<td>$ 20.57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>427 gal. gasoline and 11 qts. oil</td>
<td>$ 71.50</td>
<td>$ 115.00</td>
<td>$ 132.50</td>
<td>$ 132.50</td>
<td>$ 115.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Labor of operator (290 hours at 40c)</td>
<td>$ 161.60</td>
<td>$ 181.12</td>
<td>$ 132.50</td>
<td>$ 132.50</td>
<td>$ 115.00</td>
</tr>
<tr>
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<td>$ 5.62</td>
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</tr>
<tr>
<td>1,862</td>
<td>9,632</td>
<td>507 gal. gasoline and 10 qts. oil</td>
<td>$ 76.53</td>
<td>$ 181.12</td>
<td>$ 229.60</td>
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<tr>
<td></td>
<td></td>
<td>Labor of operator (265 hours at 50c)</td>
<td>$ 132.50</td>
<td>$ 181.12</td>
<td>$ 229.60</td>
<td>$ 229.60</td>
<td>$ 229.60</td>
</tr>
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<td>One closing line</td>
<td>$ 5.62</td>
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<td>$ 20.57</td>
<td>$ 20.57</td>
<td>$ 20.57</td>
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<tr>
<td>14,504</td>
<td>8,363</td>
<td>463 gal. gasoline and 6 qts. oil</td>
<td>$ 69.42</td>
<td>$ 290.47</td>
<td>$ 88.75</td>
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<tr>
<td></td>
<td></td>
<td>Labor of operator (280 hours at 50c)</td>
<td>$ 115.00</td>
<td>$ 290.47</td>
<td>$ 132.50</td>
<td>$ 132.50</td>
<td>$ 115.00</td>
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<tr>
<td></td>
<td></td>
<td>35 lbs. grease</td>
<td>$ 4.05</td>
<td>$ 4.05</td>
<td>$ 12.00</td>
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<tr>
<td>976</td>
<td>6,211</td>
<td>623 gal. gasoline and 7 qts. oil</td>
<td>$ 83.98</td>
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<td>$ 20.57</td>
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<td></td>
<td>Labor of operator (126 hours at 50c)</td>
<td>$ 68.90</td>
<td>$ 83.98</td>
<td>$ 20.57</td>
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<td>$ 5.62</td>
<td>$ 5.62</td>
<td>$ 20.57</td>
<td>$ 20.57</td>
<td>$ 20.57</td>
</tr>
</tbody>
</table>

Total: 59,151 cubic yards.
Operating cost per cubic yard averages 1.5c.

*Note:* This cost does not include such items as overhead, interest on investment, depreciation, etc.

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**WEED MOWERS**

**Hugh W. Wagner**

Miami County Surveyor, Peru, Indiana

The official in charge of the maintenance of highways, conscientiously endeavoring to do his work thoroughly, cannot ignore the importance and necessity of removing weeds from road shoulders. This operation is essential not only for improvement in the appearance of our roads, but also for safety to the traveling public. From a practical standpoint in those...

*Crane motor 57 H.P. Waukesha at a developed speed of 1,375 r.p.m., weight 34,000 lbs.*