

The Knowledge Bank at The Ohio State University
Ohio State Engineer

Title: Roads

Creators: Weed, John Merrill, 1897-

Issue Date: Nov-1932

Publisher: Ohio State University, College of Engineering

Citation: Ohio State Engineer, vol. 16, no. 2 (November-December, 1932), 5, 16.

URI: <http://hdl.handle.net/1811/34960>

Appears in Collections: [Ohio State Engineer: Volume 16, no. 2 \(November-December, 1932\)](#)

Roads

By MERRILL WEED, Assistant Director, Engineering Experiment Station

WE ALL have a stake in our roads. Our faith in them is shown by what we spend for them, a billion dollars or more every year. And if we do not spend our money for roads, we pay dearly for our parsimony in extra cost for operating our automobiles.

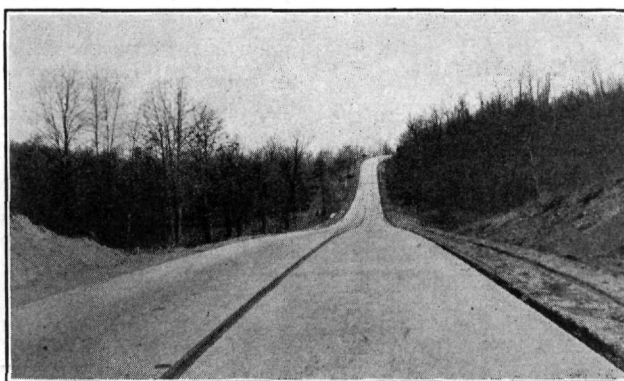
A road should be properly located. Graceful curves and easy grades that fit the hills and hollows are to a road what proper location and design are to a house. And roads, like houses, must have drainage and good foundations if they are to do what is expected of them. They respond, too, to planting of trees and care of grass on slopes and ditches by becoming beautiful as well as useful.

What the icing is to the cake, the veneer is to the woodwork, the cherry to the parfait—such is the surface of the road to its foundation. The most excellent surface cannot long endure without a solid foundation, yet the most rigid foundation is a failure without a smoothly-riding surface. And the smoothest pavement is unsuccessful if it encourages skidding in automobiles. Beauty may be only skin deep, but with a highway the surface is all important.

The earth road is most friendly, and is a delight when too much is not demanded of it. It should not be called a "dirt" road. Earth roads are private and intimate in their nature, winding among hills and shaded dells, calm and quiet for driving or for a ramble on foot. A sandy clay soil is best. That combination, if supplied with good ditches and kept smooth, will not become very muddy, and with light traffic has very little dust. Sand-clay roads respond to smoothing or stroking with a drag. Pure clay is not so good; it may become treacherously muddy in wet weather, and bumpy and rough when dried out, though a smoothed clay road, neither too dry nor too wet, is a pleasant cushiony surface to ride over.

The gravel road is friendly, too, and murmurs pleasantly under the pressure of tires, though its abrasive action is hard on rubber. A well-built gravel road gives an all-weather surface for light traffic. It, too, is improved by dragging, to draw the gravel back into the wheel tracks. The coating of loose gravel needs to be thin, just a wearing surface, on the compacted material that bears the loads. Gravel roads in dry weather become dusty under moderate traffic, and may prove unpleasant neighbors.

The next step up in the highway scale is the treated gravel. A coating of oil or asphalt on a well-built gravel road makes a smooth and dustless top, easy on the tires and springs of automobiles, and soothing to the nerves of passengers. At little cost, too. These chummy little roads have crept over many miles of country since the engineers discovered ways of breaking the oil coating of its bad habit of forming a weak crust that would scale off and leave the top full of holes. Treated gravel still exhibits such unsatisfactory behavior under the pounding of trucks and at the spring thaw following cold winters.



HIGHWAY FASHION'S DARLING
A RIBBON OF CONCRETE

Everyone has heard of macadam roads, made from broken stone. They perpetuate the name of John Macadam, a Scotch engineer who built them extensively, though the credit for the invention appears to belong to Tresaguet, a Frenchman, who, like so many of his countrymen, failed to follow up his originality. Where limestone abounds, macadam roads are serviceable and economical. When they are "water bound" there is a cementing action, and the surface is a white matrix of stones in finer material. Rubber tires are fatal to water-bound macadam, loosening the protecting fine material from the larger stones and scattering it in clouds. For heavy traffic these roads are coated like the treated gravel, from which, often, they cannot be distinguished.

Tar or asphalt put on the stones as a macadam is being built makes a bituminous macadam, with a glossy black surface like that of the treated roads.

The "black tops," as these tar-protected roads are called, have a flexibility that makes them easy to ride over, and if the haulage over them is not too heavy they are durable and economical. Sometimes they fail by cracking all over, making an "alligator hide." In wet weather they are liable to be slippery, and horses do not like them. Their black surfaces devour the light from the most powerful headlamps. For compensation, in bright sunlight they are free from glare, and form a contrasting background for white paint lines to guide the traffic.

The traditional material for hard-surface roads is brick. Bricks have a rugged honesty and dependability that one cannot help admiring. Laid on a flexible foundation brick may become very rough, but on a firm stone or concrete these hard clay blocks will carry heavy loads for years

(Continued on Page 16)

The Mount Vernon Bridge Co.

*Engineers and Manufacturers
of*

Iron and Steel Mill Buildings and
Structural Work, Railway and
Highway Bridges, Roofs,
Viaducts, Etc.

**Builders of the Structural Steel
Work in the Ohio Stadium**



MT. VERNON, OHIO

Roads

(Continued from Page 5)

without a murmur, except the clop-clop of iron-shod hoofs that strike sparks on dry dark nights.

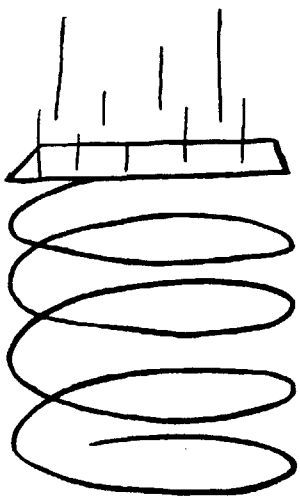
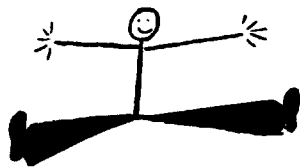
The older brick roads were filled with sand between the blocks, so that the edges often became rounded, and sometimes the bricks were taken from their sand cushions and turned over for another tour of duty. Then came a time when the bricks were fastened in tightly with a thin slop of cement and water, so that the road surface was a solid sheet, the pink of the blocks surrounded with the white of the "grout," as it is called, like the mosaic of brick and mortar in a building. It was hard to build these grouted roads so that they would be smooth, and in hot weather they sometimes blew up with a loud report, though in other ways they had excellent qualities. The mode, now, in brick, is to fill the cracks between the blocks with tar or asphalt, cushioning each brick from its neighbor. The effect is most excellent save when in hot weather the tar melts and comes out, a sticky mass, on top of the pavement.

A red brick pavement, edged with white, and bordered with green grass is gay and colorful. It is busy, too, for brick roads are expensive, and it knows the rumble of trucks and the speedy flight of bus and automobile.

Fashion's darling in roads today, prim and tidy in its white sedateness, is the ribbon of concrete stretching for miles across our countrysides. Here is magic in everyday life, the miracle of mixing sand, gravel, and water, with a cement powder, and seeing the mass turn into stone that may be molded, rubbed and belted to a smooth, yet gritty, surface which the flying wheels catch in a firm grip, for concrete is almost free from skidding. The new concrete roads are built with almost the precision of exact science. The curves are widened and raised on the outside, and flexible joints avert danger of blow-ups. The secret is infinite care. Black traffic lines show up well on concrete. Its light color is a boom for night driving, though a bit hard on the eyes in the glare of the noon-day sun.

Like all road surfaces, concrete has its little weaknesses. There is sometimes a slight shock as a wheel rolls over a joint. Sooner or later there is always some cracking, at first small and innocent like the first gray hair, and later—especially if the road was not placed on the firmest of soil—faster and faster, covering the white pavement with a network of cracks that must be painted with tar to keep out moisture.

A road, like a life, has its limit of usefulness, and care in its making and maintenance only puts off the inevitable time when it must be reconstructed. With roads that are well built and well maintained time deals lightly. Frail roads, or those that are slighted in the building, fail early. Their pot holes and chucks are enemies of automobiles. They are a poor investment. Roads that are strong enough for their purpose are like faithful servants, performing their duties day by day, and paying for themselves many times over before they must yield to the necessities of the times and make way for a new pavement.



*It puts spring
in your muscles
Drink milk for lunch*