

THE CONSTRUCTION OF EARTH ROADS

(R. L. Morrison, Texas A. & M. College)

When a new road is to be built, or an old one relocated, the work should always be staked out by an engineer, if possible. Building a road without a survey is almost sure to result in wasting dollars to save pennies.

The engineer locates the line, takes levels, contours and cross sections, makes a profile, establishes the grades and stakes out the work. In this way the ditches are sure to be drains and not ponds, the grades will be correct, and the amount of grading to be done will be as little as can be for a good road. About \$30 to \$40 per mile is the usual cost of the engineering services outlined above. If the entire construction can be under the supervision of an engineer so much the better, for road building is an engineer's work the same as raising cotton is a farmer's work, and neither can do the other's work as well as he can do it himself.

A road should be no wider than necessary, for every extra foot in width adds to the original cost of construction and to the never-ending cost of maintenance. The width required will depend upon the traffic, but a width of 16 to 20 feet between ditches is usually sufficient.

The side slope of embankments, or dikes, is usually made one and one-half to two, that is, one and one-half feet horizontal to one foot vertical. Thus the total width of the bottom of a four-foot dike would be 12 feet greater than the top, or six feet wider on each side. The slope should never be less than this and with some materials it may have to be made greater.

In cuts the side slope varies with the material. For soft rock a slope of one-fourth to one is sufficient, common earth will stand one to one; gravel requires one and one-half to one; fine sand two or three to one, and some clays require as flat a slope as four, five, or even six to one, to prevent caving. It is always cheaper to excavate to the required slope when the road is first built than to make the slopes flatter after they begin to slide.

The proper machinery to use for grading depends upon the depth of cuts and fills and upon the distance which the earth has to be moved. If the finished grade line follows approximately the original surface, then the work can be done most economically with a grading machine, but if much excavating and filling is required plows and scrapers or wagons should be used.

In using a grading machine a light cut should first be made near the edge of the roadbed. The blade should be set at a small angle with the direction of the road, and only the point of the blade should be used in cutting; the rear end of the blade being elevated. On the next round the cutting should be carried toward the middle of the road, and the blade can be gradually lowered as the different rounds are made. If the sections to be graded are over 1,000 feet in length a traction engine can often be used to advantage in pulling the grading machine. Where there is much excavating to be done slip scrapers will be most economical if the haul is less than 100 feet. For hauls of from 100 feet to about 600 feet wheel scrapers are best, if enough scrapers are used to keep all members of the grading force busy. This will usually require one scraper for every 100 feet of haul. If the haul is over 600 feet carts or wagons should be used, and extra wagons should be provided so that while one wagon is being loaded the team can be hauling another wagon to the dump.

Fills should be made in layers about a foot thick which will be compacted by the grading team, but even if that is done an allowance of two per cent to 15 per cent should be made for shrinkage of the completed embankment. Sand and gravel shrink the least, clays more and loam the most. After all the earth is in place the roadbed should be smoothed on by hand, and in this work a template is sometimes used. This consists of a board with one edge cut out the shape of the finished roadbed, and is used in smoothing the surface. It is not necessary to remove the soil from the second round on an embankment, but no soil should be allowed to remain on the surface of the first round.

Occasionally long continuous ditches cannot be avoided, and in such cases a tile drain should be laid under the bottom of the ditch with occasional openings from the ditch into the main drain. This is done by putting a pipe in the ditch and letting the soil fall into it, and then the soil is packed around the pipe. The openings should be made by directing by means of a plow to keep track with the tile drain.

When the soil is of a generally sandy nature, or across that it drifts gradually and gives a sandy, sandy consistency, the soil with soft clay will, particularly in low places, a road will be greatly improved if it is properly underdrained. Dry clay makes a good firm road foundation, but wet clay never makes anything except mud holes, and if the ground water is within four or five feet of the surface of the road underdrains are required. In such cases one dollar spent for the tile drains will do more good than \$10 spent for grading. A tub full of mud and water will never be dried up by putting with the surface, but a hole bored in the bottom of the tub will dry out the contents in short order. A drain under a boggy place acts like the hole in the bottom of the tub.

Ordinary porous clay tile, or form tile serves very well for underdrains, and vitrified clay pipe and cement pipe are also used. Form tile should be "uniformly burned, straight, round in cross sections, smooth inside and have the ends cut off square." Vitrified clay tiles usually have bell and spigot joints, they should be free from cracks, and from large blisters on the inside surface. Like the form tile they should be straight, and round in cross-section, and should be thoroughly vitrified. Concrete pipes should be made of best quality cement mixed with clean sand and gravel. The mixture should contain at least one part of cement to one and one-half parts sand and two and one-half or three parts of fine gravel. Pipes should be allowed to season for at least three months before being used.

The tile should not be less than four inches in diameter and should be laid

TAKE "CASCARETS" IF HEAD-ACHE, BELIJS AND CONSTIPATED

Best For Liver and Bowels, Bad Breath, Bad Colds, Sour Stomach

Get a 10-cent box. Sick headache, biliousness, coated tongue, head and nose clogged up with a cold—always trace this to torpid liver; delayed, fermenting food in the bowels or sour gassy stomach.

Poisonous matter clogged in the intestines, instead of being cast out of the system is re-absorbed into the blood. When this poison reaches the delicate brain tissue it causes congestion and that dull, throbbing, sickening headache.

Cascarets immediately cleanse the stomach, remove the sour, undigested food and foul gases, take the excess bile from the liver and carry out all the constipated waste matter and poisons in the bowels.

A Cascaret tonight will surely straighten you out by morning. They work while you sleep—a 10-cent box from your druggist means your head clear, stomach sweet and your liver and bowels regular for months.

Results is very largely a matter of drainage, whatever material may be used in their construction.

The first bad effect of water is the formation of mud. The water mixes with the substance of the road, if the surface is earth or other soft material and the mixture thus formed is pushed by the traffic over the road may become almost impassable. If the surface is of hard material, but is not properly drained, the water will run along the top of the road on hills and wash out gullies, finally destroying the surface entirely. Water standing along the side soaks into the body of the road, making it soft and muddy, and ground water has the same effect. This damage is increased in localities subject to snow and frost.

To properly drain a road two systems of drainage, and sometimes three or four, are necessary. The road must be finished with a crown, or cross fall, so that the water will run off from the surface, side ditches must be constructed to take care of the water after it has drained from the surface, and often underdrains are necessary to remove the ground water.

In cuts shallow ditches, sometimes called catch-water drains or secondary drains, should be made a few feet back from the edge of the cut, on the high side, to keep the water from running down the slope and into the cut. One or two plow furrows, turned toward the bottom of the slope, are sometimes sufficient for this purpose.

The amount of crown necessary depends upon the character of the road surface. For an earth road the slope from the center to the sides should be about one inch to the foot. A 24-foot roadway, then, would be 12 inches higher at the center than at the sides. The slope should not be made steeper than this, for if the crown is too high vehicles will be obliged to keep in the middle of the road, and so form deep ruts and wear the road hollow, and it will be difficult and often dangerous for them to turn out in passing. On steep grades the crown should be increased to keep the water from running down the road.

Side ditches should be wide and shallow. Deep ditches are dangerous to vehicles and are liable to become obstructed by caving banks, brush, weeds, etc. The water after reaching the side ditches should be carried rapidly to the natural water courses and away from the road. It should never be allowed to stand in ponds at the roadside. A pond is not a drain. In order that the side ditches may drain properly the grade of the road should never be less than about one per cent, giving a fall to the ditches of one foot in a hundred.

If the water is carried too far in the side ditches, especially on steep grades, the ditches will be washed out and become deep gullies, therefore the water should be carried away from the road in as many places as possible. To do this it may be necessary to carry the water from the high side of the road to the low side at intervals, using a tile drain or culvert.

Occasionally long continuous ditches cannot be avoided, and in such cases a tile drain should be laid under the bottom of the ditch with occasional openings from the ditch into the main drain. This is done by putting a pipe in the ditch and letting the soil fall into it, and then the soil is packed around the pipe. The openings should be made by directing by means of a plow to keep track with the tile drain.

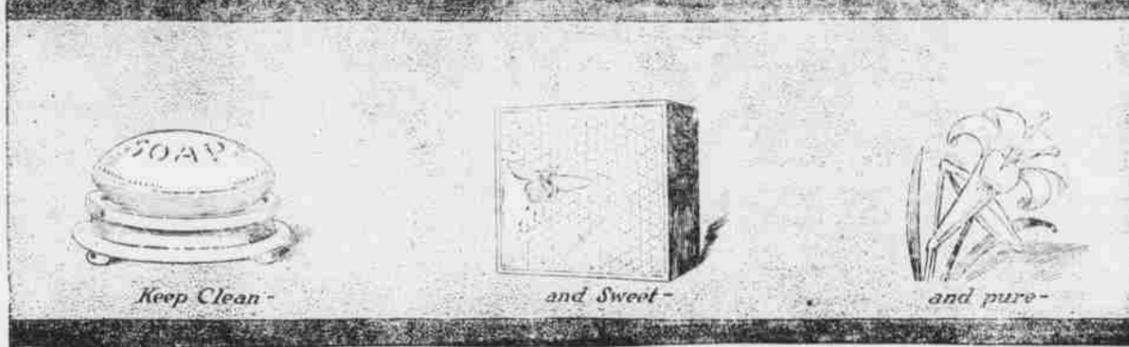
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Purity is a Great Thing, Friend!



My folks down South keep telling me: "Be clean and sweet and pure." And I'll bet you I am just about the purest cigarette ever made!

Why, the SOVEREIGN factory is dusted every morning, just like a lady's parlor. That's the sort of home I have. And I've got to make good all the time—in

the look of me, and the smoke of me.

The finest, whitest, cleanest home you ever saw. Only the purest, sweetest, richest Virginia and Carolina tobacco enters there. And when I come out, wrapped in the daintiest of white imported paper—don't you know I am proud to be a SOVEREIGN?

**You Folks of the South KNOW good blood!
You Folks of the South KNOW good tobacco!**

Next to good breeding is good dress and good taste—and I have them all. That's my claim to your friendship. I can't say more, except—

I am guaranteed by *The American Tobacco Co.* —Buy me. If you don't like me return me to your dealer and get your money back. I have said it. A Southern gentleman is known the world over for keeping his word, and I have given you mine.

Sovereign Cigarettes
FOR THE GENTLEMAN OF THE SOUTH
"King of Them All"

YES! LIFT A CORN OFF WITHOUT PAIN!

Cincinnati Authority Tells How to Dry Up a Corn or Callus So It Lifts Off With Fingers

You corn-pestered men and women need suffer no longer. Wear the shoe that nearly killed you before, says this Cincinnati authority, because a few drops of freezezone applied directly on a tender, aching corn or callus, stops soreness at once and soon the corn or hardened callus loosens so it can be lifted out, root and all, without pain.

A small bottle of freezezone costs very little at any drug store, but will positively take off every hard or soft corn or callus. This should be tried, as it is inexpensive and is said not to irritate the surrounding skin.

If your druggist hasn't any freezezone tell him to get a small bottle for you from his wholesale drug house. It is fine stuff and acts like a charm every time.

two and one-half to three and one-half feet deep. One line of tile is usually sufficient, and is practically as effective placed under the side ditches as if laid under the middle of the road. In fact a drain three feet below the bottom of the ditch may be better than a drain the same distance under the middle of the road, for the side drain will be placed a foot or more lower in the ground with the same amount of digging. It will also be easier to dig, and easier to get at if it becomes stopped up.

If the tile is carefully laid so that there will be no settlement of the joints an almost level grade will give good drainage, but it is better to have a fall of at least two inches per 100 feet, or six inches per 100 feet if possible. The greater the fall the better

the drainage. The grade should be staked out by an engineer, for a low place in the drain is liable to cause a deposit which may entirely stop the flow.

The trench digging and tile laying should both begin at the outlet and the bottom of the trench should be finished with a curved shovel. The tile should be laid with joints close together, and if there is danger of settlement a line of boards should be placed in the bottom of the trench. The tile is sometimes surrounded with broken stone, gravel, cinders, sawdust or cotton to keep sand, etc., from entering the drain. The outlet end of the pipe should be protected with a concrete headwall. The cost will be about 50 cents per lineal foot.

H. A. Moffitt Buys a Tract of Land From E. D. Broadhurst

H. A. Moffitt, of High Point, has purchased from E. D. Broadhurst, of Greensboro, a tract of land near the Gate City, according to the deeds filed in the register of deeds office in Greensboro. The consideration named in the deed is \$190, but the real consideration is said to have been near \$20,000.

MAYR'S WONDERFUL REMEDY FOR STOMACH TROUBLE
THE DOSE WILL CONVINCE

Gall Stones, Cancer and Ulcers of the Stomach and Intestines, Auto-Intoxication, Yellow Jaundice, Appendicitis and other fatal ailments result from Stomach Trouble. Thousands of Stomach Sufferers owe their complete recovery to Mayr's Wonderful Remedy. Unlike any other for Stomach Ailments. For sale by Standard Drug Co. and druggists everywhere.

Sketch of the Life of Samuel Hill Carter

Seventy-nine years, seven months and twenty-three days covers the human life of him whose memory we know with the songs, and prayers of this hour. About 55 years have been counted in the record of the church of God; fifty years have been devoted to the loving and holy office of husband and father, and have been crowned with the instinct adoration of a devoted wife, and the tender affection of four children who linger with us today.

The life of our departed friend was not given to the world nor seen by the world; his life was not perfect; no human life is. Its sky was sometimes visited with clouds, but they were summer clouds. There were crosses in it, but they did not discourage the soul which had drunk of the waters of the river of life.

There were sorrows, but they were healed. It was not perfect; but I repeat it is perfect today.

May father, mother and the four children some glad day walk hand in hand through the elysium felled of glory to the Paradise of God.

Nash County Believes in Whole Time Health Officers

Nash county has had five whole time health officers. The county is never without a physician whose duty it is to give his full time to looking after the health of the people. The health conditions in Nash county are now in fine shape, except an epidemic of measles. After the close of the school year will be waged on typhoid fever and other summer complaints.

Children Cry FOR FLETCHER'S CASTORIA

Miss Allen Entertains at Her Home at Moffitt

On Tuesday evening Feb. 13, Miss Esther Allen of Moffitt, charmingly entertained a number of her friends the occasion being a Valentine party. A number of games were played. There was a handkerchief hemming contest in which all participated, the girls carried handkerchiefs which the boys hemmed. The prize given was a nice tie which was won by Mr. Carl Moffitt.

After the contest and games the hostess served candied popcorn balls, candy, cream and cake. The color scheme was pink and white. In a question contest Miss Allie Craven won a lovely silk handkerchief for having answered the largest number of questions correctly. Mr. June Lambert also won a prize in another contest.

Among those present were Misses Lucy Lambert, Allie Craven, Bessie Moffitt, Nina Stout and Maude Melton. Messrs W. B. Moffitt, H. R. Craven, DeWitt Stout, Carl Moffitt, L. P. Craven, Orion Stout, J. D. Lambert, Edgar Ward and R. C. Craven.

At the close of the exercises the party dispersed with many happy recollections of the evening. —Guest.

Honor Roll Third Month Gray's Chapel School

First grade—Allie Alfred, Jack Pugh, Coria Underwood, Lena Underwood, Viola Alfred, Bruce Pugh. Second grade—Camege Walker. Third grade—Velna Walker, William Cates. Fifth grade—Alice Evans. Sixth grade—Julia Sherron, Corina Davis, Jewel Siler, Ray Fount. Seventh grade—Reggie Alfred, Lillian Routh, Avis Alfred, Virgie Walker, Ney Pugh, Beatrice Fount, Hattie Davis, Eddie Siler.