

## CIVIL ENGINEERS BUILD BEST ROADS

### PLAN OUTLINED TO SECURE BEST DISTRIBUTION OF ROAD POINTS

#### All Kinds of Roads Discussed from Dirt to Permanent Roads

(By Murray Kay, C. E.)

Now that there seems to be a general understanding of the value of good roads and various ways and means are being rapidly adopted to raise large sums with which to build them, it may be a good time for an examination of methods to obtain the best results for the greatest number in making the contemplated expenditures.

It is not possible to reconcile the two important points which will at once engage the attention, viz: That the safest and least wasteful manner of investment is to build permanent roads, but with such a policy and by reason of the great cost of such work only a small mileage can be completed each year, while conditions over the remainder of the area to be improved remain as bad as ever, probably for many years to come, awaiting the advent of the permanent work. Such a policy is not one to give the most benefit to the greatest number. It may be well, therefore, to attempt to formulate a plan to benefit at once as large an area as possible, at the same time avoiding so far as may be temporary and wasteful types of construction. Your attention, therefore is called to the following points:

In developing a system of roads and improvement of existing ones study should be made of the entire area (as of a state) to which the funds may apply and a chart should be prepared containing the following data:

- (1) Value of abutting and adjacent property for each road.
- (2) Value and importance of district to be connected.
- (3) Amount and kind of traffic each road is to maintain.

Examination of these figures will indicate what proportion of the expenditure will be warranted on each proposed road or improvement and the roads may then be classified accordingly.

In reference to amount and kind of traffic, first consideration should be given produce haul. You then have a classification something like this:

- (1) Main roads for produce haul and local horse and automobile traffic.

(2) Roads used for similar purposes, but less extensively.

(3) Roads for through horse and automobile traffic.

(4) Unimportant or by-roads. (Some of the first two eventually developing into the third.)

Bearing in mind that the expenditure should be for all classes of traffic and for the entire area so far as practicable it is immediately apparent that the fundamental steps for all road improvement and construction should be applied at once to all the roads. These fundamentals are:

- (1) Proper location as to alignment and grade.
- (2) Proper drainage.
- (3) Proper crowning or shaping of the cross section.

No matter what the proposed final improvement of any road may be these three initial steps must be taken, and as this work must be done in preparation for any kind of a future surface a large proportion of the funds so spent will be permanently saved to the community.

When you have completed the construction to this stage, what is the situation? You have improved your entire road system, say 25 per cent. You have done the kind of work that will be required for any kind of future improvement that can be devised. You have, therefore, saved to the community a large proportion of the value of all improvements made. Of course, these improvements will not last forever, with or without maintenance, but the claim is here made that such expenditure represents the best use of the money to the greatest number and is much preferable to an outlay of all the available funds in the construction of a few miles of final and permanent roads representing but a very small per cent of the total improvement area. You should now be able to develop from your chart the amounts of desirable final expenditure on each road in the system. It will be found that on many of the unimportant roads the expenditure now completed is all such roads will warrant under present conditions, and by making this 25 per cent improvement the unimportant roads have really been improved to their final or 100 per cent requirement and allotment.

It will be found that many such roads are through a material of such a natural mixture of sand and clay as to make an extremely satisfactory surface as soon as the preliminary work is accomplished. It will be found on other stretches that the addition of a light dressing of sand, clay or gravel will put the surface in most excellent condition for an un-

important country road. Therefore, as before stated, you now have a considerable portion of your improvement district in 100 per cent efficiency until such time as conditions change on the roads so treated. Building costly, permanent roads in the locations as indicated would be an economic failure. It is true that the roads so treated will require more costly maintenance than your permanent roads, but the interest on the cost of the latter will usually pay the extra cost of maintenance.

#### Intermediate Roads.

It is now advisable to put all the roads in their final condition as rapidly as the funds will permit, and the quicker the permanent roads can be built on your heavily traveled arteries the more saving will be made in reducing the higher maintenance cost on the present temporary roads.

Excluding the unimportant and the permanent classes you have a large mileage of roads of intermediate requirements, treatment of which will naturally depend on the cost allotment.

Among the suitable surface treatments for intermediate roads may be mentioned:

- (1) Sand and clay.
- (2) Gravel.
- (3) Gravel laid with heavy hot oil.
- (4) Water bound macadam. (Not to be used on roads carrying many motor cars or trucks at high speed.)
- (5) Water bound macadam with surface of heavy hot oil.
- (6) Oil bound macadam, and others.

#### Permanent Roads.

You are now ready to consider the question of permanent roads. It is probable that such improvements will be financed by long term bonds and expense items must include:

- (1) Maintenance.
- (2) Interest, and
- (3) Sinking fund to retire the bonds.

Maintenance of all classes of roads should begin with their construction. The first requirement for a road which is to be financed by long term bonds is obviously to select the type of construction that will surely outlive the bond term, and as such term is likely to be 50 years it is therefore desirable that the material be that of the most permanent known. If this theory be correct, you have only one choice—concrete. All road authorities agree that there is much question about the value and permanence of the different surface treatments. Admit this for the time being, if you please, and you find that whatever your mistakes may be in surface treatments you always have the permanent base representing, say, 75 per cent of the investment. This much of your expenditure is therefore safeguarded forever and you cannot lose it no matter what mistakes may be made as to surface treatments. If, as stated, authorities differ somewhat as to surface treatments, consider the points on which there is no disagreement and which have been subject to the tests of time and experience.

- (1) A hard, unyielding surface, such as concrete affords, is not desirable in that it is hard on the horse and vehicle, tending to break the strain.
- (2) It is slippery in wet and frosty weather.
- (3) It is noisy and frequently originates dust.

The plan of roughening the surface to afford better footing for horses has been tried and proven unsuccessful in that you increase the tractive force necessary to move the loads and render it more subject to wear, thereby increasing the noise and dust. A surface must be smooth to facilitate the moving of heavy loads, otherwise your object in surfacing is largely defeated.

Modern practice favors a resilient or rubbery surface, rely-

ing on this quality of resilience rather than roughness for a footing. Such surfaces are usually composed of bitumen in various forms and thicknesses, mixed with screenings for the shallower depths and with larger stone for the greater, the latter affording more wear. Thicknesses of this bituminous coating have varied from one-fourth inch to more than three inches.

Such a smooth surface has the following advantages:

Minimum tractive for hauling. Affords one of the best known footings for horses on grades. Originates no dust; is noiseless, water-proof and sanitary. Cost and maintenance are fairly low. Repairs are easily made.

One of your greatest questions is still to come, viz: Who is competent to design, lay out and build these roads?

In the newer and more rapidly developing parts of this great and glorious country the usual popular demand is for a so-called practical road builder; but bear in mind, it is hard to find a man in any walk of life, particularly among farmers and others living in the county, who does not believe deep down in his heart that he is a practical road builder. Be not deceived, but remember that all your present disgraceful roads have been built by these so-called practical road builders.

If you have a dearth of highway engineers you will find no difficulty in developing such men from those engaged in kindred and often much more exacting branches. To believe that engineers employed on work like the Panama canal and other canals, large irrigation projects or water systems like that now under construction for the city of New York and large railroad enterprises cannot qualify as highway engineers is to credit yourself with a lack of sense. Admit, at least, in the face of the present system, or lack of system, that the civil engineer is worth a trial.

America will surely come to the front in good road building and has already some splendid examples of scientific road construction, notably in Massachusetts, New York, Rhode Island, Michigan, California, Washington and elsewhere. These magnificent roads, which are a thing of beauty and a joy forever, are such examples of practical road construction that he who runs may read. They were built by engineers who are the only practical road builders.—Hood River Glacier.

## LEGAL NOTICES

### Notice of Contest.

(For Publication.)  
DEPARTMENT OF THE INTERIOR,  
UNITED STATES LAND OFFICE.  
Portland, Oregon, July 26th, 1913.  
To Anna K. Starr, of Gales Creek, Oregon, Contestee:  
You are hereby notified that Marie Steahr who gives 587 Madison St., Portland, Oregon, as her postoffice address, did on July 12th, 1913, file in this office her duly corroborated application to contest and secure the cancellation of your Homestead, Entry Number 16249, Serial Number 01374, made May 9th, 1907, for Northwest one fourth, Section 14, Township one North, Range five West, Willamette Meridian, and as grounds for her contest she alleges that said Anna K. Starr has never established residence on said entry, has never cultivated any part of the same nor made any improvements thereon, has never lived on said land, but has wholly abandoned the same for more than six months immediately preceding the beginning of this contest.

You are therefore, further notified that the said allegations will be taken by this office as having been confessed by you, and your said entry will be canceled thereunder without your further right to be heard therein, either before this office or on appeal, if you fail to file in this office within twenty days after the FOURTH publication of this notice, as shown below, your answer, under oath, specifically meeting and responding to these allegations of contest, or if you fail within that time to file in this office due proof that you have served a copy of your answer on the said contestant either in person or by registered mail. If this service is made by the delivery of a copy of your answer to the contestant in person, proof of such service must be either the said contestant's written acknowledgement of her receipt of the copy, showing the date of its receipt, or the affidavit of the person by whom the delivery was made stating when and where the copy was delivered; if made by registered mail, proof of such service must consist of the affidavit of the person by whom the copy was mailed stating when and the postoffice to which it was mailed, and this affidavit must be accompanied by the postmaster's receipt for the letter or letters so mailed.

You should state in your answer the name of the postoffice to which you desire future notices to be sent to you.

H. F. HIGBY, Register.  
Dates of publication July 31, August 7, 14, 21.

Notice to the Public.  
Notice is hereby given that the long Bridge across Dairy Creek, West of Hillsboro, will be closed to traffic after Tuesday, July 15th, 1913, from 8 a. m. to 5 p. m. of each day until the repairs on the same are completed.

By order of the County Court of Washington County, Oregon.  
D. B. REASONER, County Judge.

## CLASSIFIED ADVERTISEMENTS

Have you anything for sale, or to exchange? Do you wish anything and do not know where to get it? Have you lost or found anything? The solution of these and many other problems is a classified advertisement in The Press.

WOOD WANTED—The PRESS desires to secure several cords of both Oak and Fir wood to apply on subscription, advertising, or job work.

FOR RENT, small house, Ed. Naylor, phone 0185.

For Sale—Brood sows and pigs. Call at Goodman and Ruggie Ranch one mile south of Gaston. 3-1f

WANTED—Young pigs, phone 1047, Mary R. Sorber, 361f

Dr. Lowe, August 14. 3-4t

WANTED—The PRESS desires to secure a live correspondent in every community in Washington county. Send in your application at once.

FOR SALE, TRADE OR LEASE—splendid eight room house, modern in every way, well located with respect to the State University and the business section of the city, located in Eugene. Will sell at a bargain or trade for Forest Grove property or close in acreage, price \$4,500 \$1,500 down or terms. Address Box 635, Forest Grove for particulars. 3-4t

### Begin Now!

to plan for that College Course.

There is considerable discussion about Education but there is no doubt that a good general college course taken right is in the long run the practical thing in Education.

A school well equipped to do first class general college work is

### Pacific University

Forest Grove, Ore.

This school begins its 60th year of successful work in such general college lines September 17th, 1913. Terms reasonable. Record and equipment good. Come and help us help you.

Come in and talk the matter over or address for Catalogue and further information

PACIFIC UNIVERSITY, Forest Grove, Ore.

### Meeting of Board of Equalization.

To the taxpayers of Washington county, Oregon: Notice is hereby given that the board of equalization of Washington county will meet on Monday, September 8th, 1913, at the court house in Hillsboro, in Washington county, that being the second Monday in September and the time and place provided by law, to publicly examine the assessment rolls of said county for 1913, and correct all errors in valuation and description or quantities of land, lots or other properties and it is the duty of all persons interested to appear at the time and place appointed, and if it shall appear to said board of equalization that there are any lands, lots or other property assessed twice or in the name of a person or persons not the owner of the same, or assessed under or beyond its value, or any lots, land or other property not assessed, said board of equalization shall make the proper correction.

MAX CRANDALL,  
Assessor, Washington County, Oregon.

### TRAIN SCHEDULE

Giving Correct Time of the Arrival and Departure of All Forest Grove Trains

#### OREGON ELECTRIC

LV PORTLAND	AR FOREST GROVE
6:45 a. m.	8:05 a. m.
8:05 a. m.	9:25 a. m.
10:25 a. m.	11:45 a. m.
1:25 p. m.	2:45 p. m.
3:45 p. m.	5:05 p. m.
5:15 p. m.	6:40 p. m.
6:35 p. m.	7:55 p. m.
8:30 p. m.	9:35 p. m.
11:40 p. m.	12:45 p. m.

LV FOREST GROVE	*AR PORTLAND
6:10 a. m.	7:30 a. m.
6:45 a. m.	8:05 a. m.
8:30 a. m.	9:50 a. m.
10:35 a. m.	11:57 a. m.
1:05 p. m.	2:25 p. m.
3:40 p. m.	5:00 p. m.
6:00 p. m.	7:20 p. m.
8:05 p. m.	9:25 p. m.
9:45 p. m.	10:50 p. m.

\*Jefferson Street Station.

#### SOUTHERN PACIFIC

LV PORTLAND	AR FOREST GROVE
7:15 a. m.	8:40 a. m.
3:30 p. m.	5:32 p. m.
5:40 p. m.	6:58 p. m.

LV FOREST GROVE	AR PORTLAND
6:40 a. m.	8:00 a. m.
8:24 a. m.	10:20 a. m.
*8:40 a. m.	10:00 a. m.
4:38 p. m.	6:20 p. m.

\*Sunday only †Daily except Sunday

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We want just three minutes of your time when you are again troubled with Cholera, Diarrhoea or any bowel complaint.

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Is the quickest and surest relief for bowel disorders we know of

Allays irritation—cleanses the bowels before they are checked and acts as an antiseptic. It is moderate in action—being only slightly astringent it does not go to extremes—it acts just right in every way

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North First Avenue, between Main and "A" Streets; phone 863.

Kidney trouble is particularly to be dreaded because its presence is not usually discovered until it has assumed one of its worst forms—diabetes, dropsy, or Bright's disease. If you suspect that your kidneys are affected, by all means use Hollister's Rocky Mountain Tea—the great systemic cleaner and regulator.—Vankoughnet & Reier

### STRICTLY UP AGAINST IT.



—Caine in St. Paul Pioneer Press.