

changing over to the patrol system on January 1, 1929. We found this system a great saving over the old assistant superintendent method.

The increasing use of motor vehicles in agricultural districts and smaller communities of this state is being reflected in the tremendous increase in the building of higher types of local and county roads, which are necessary as feeders to heavily traveled highways. With each succeeding year, the percentage of graded and drained earth roads decreases and the percentage of surfaced roads increases.

WHAT CONSTITUTES A COUNTY HIGHWAY PROGRAM?

By E. L. Gates, Superintendent of Highways, DuPage County,
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I presume that this question might be answered in a great many different ways and that all of them might be correct. I can only give some suggestions that have grown out of my experience as superintendent of highways of DuPage County, Illinois. This immediately answers one phase of the subject, for the location of a county has a great deal to do with its program.

A county may be next to a large city or a large city may be situated in a county. The traffic in this kind of county would be a great deal different and would call for a different program from that in a county situated some distance from a large center.

The physical condition would also have a great influence on the highway program of the county.

I would say that the ability to raise funds for roads would be next in importance, for it takes money to carry out a program; although a well defined plan can still be made up and an ideal established, even before enough money is available to accomplish the program.

However, in our planning, we have to watch the financial side of the question just as we would in any other business.

Probably a definite idea of the needs of a locality and the funds available are all we need to start a program.

I presume all will admit that wherever we are situated or how much money we may have, there should be a well defined road program if we ever expect to have good roads.

Maps

After we know where we are situated, it is essential to have maps of the county or locality showing the location and names of all roads. All bridges and large culverts should be shown, and of course records showing the kind of roads and also the kind of bridges should be available.

We have made maps of our county on a scale of 100 feet to 1 inch and put one quarter-section on each sheet. We have also located the buildings approximately on the maps. We have found that these maps have been of the greatest assistance, not only to the road department but to the county as a whole, as they are used for assessment purposes. The subdividers in making their subdivisions are required to bring in their plats on the same scale. In this way we can check up very easily and quickly to see that roads meet each other and do not leave jogs. In locating a new road we can plat it on these maps, and as the buildings, large streams, and railroads are also shown, we can readily see what has to be done to open up the road. The landowners' names are also shown so that we know with whom we have to deal.

You would be surprised to know of the mistakes that are found when you try to plat a whole county according to records. You would also be surprised to find that some property was not assessed at all and some was assessed more than once. When it comes to road assessments, this means a great deal, for we need all the money we can get for road improvements. In planning a state road, the state highway department has sent engineers to our office to get records from these maps. We have also sold some prints to real estate dealers and others, which helps take care of some of the cost.

We have found that we could have saved a large amount of money by starting this map system sooner, and we can recommend it to any county. The sooner they start it the better off they will be.

Records

In DuPage County we found that the road records were in miserable shape. These records were scattered hither and yon. We found one clerk keeping his records in the attic of his home, and found one township without any records except of recent date. Rather than lose such records as were

available, we hired a clerk and a stenographer to copy all township and county road records and make three copies, one to go to the town clerk, one to the county recorder, and the other to be retained by the county superintendent of highways. These typewritten and indexed copies were bound in loose leaf covers. We can now look on a map and readily find where the road is recorded and turn to the description of it.

We also make up the new records whenever a new road is established or an old road vacated and send them to the clerks for insertion in their books.

Co-operation

This leads us into a situation where co-operation between the county superintendent of highways and (in Illinois) the highway commissioners, town clerks, and supervisors, or (in Indiana) the trustees, boards of commissioners, and county surveyors must be of the very best sort or our program is hindered.

The county superintendent of highways and county officials should also co-operate with the township and state officials and with the officials of neighboring regions which the county is serving or they too will hinder the program. There is also the public with whom we have to co-operate. This co-operation is exceedingly difficult, especially in Illinois.

The shortness of the term of office, lack of power to stick to a good program when it is established, and pure laziness or lack of interest are the greatest troubles our road officials have in regard to establishing a road program.

What kind of meeting would we have here in this road school if someone did not take the time to work out a program?

Even if mistakes are made in a program, it is still better to have something definite to shoot at rather than to try to shoot at everything in general.

I once had a supervisor on our road committee who was always saying, "I would rather be cussed for doing something than be cussed for doing nothing". So, even if we do make mistakes, let's make them according to a program and admit and profit by them.

Finances

Now to get back to some of the things that should enter into a program. After we have our maps and records in good shape, it seems to me the financial question is next. I will say here that this causes more trouble than anything else.

In Illinois the supervisor is the treasurer of the township. I know of some supervisors who do not know how much money their townships have in the bank or how much of an indebtedness exists. The county, as well as each township, should have a budget and know exactly where it stands and how much there is to spend for maintenance, new construction, new machinery, etc.

All expenditures in counties in Illinois are supposed to be reported to the county superintendent of highways by the commissioners. We have a special book printed so that the commissioners list their orders in duplicate and send a copy to the superintendent, the commissioner keeping the original in the book for his own record. At first the commissioners did not like this, but now we find they would not be without this record, as they can turn to it without going to the town clerk. Each item is numbered and corresponds with the clerk's order numbers and also with the supervisor's or treasurer's check numbers.

Bond issues and special taxes have their place, but the greatest good they do is to set out a definite plan and program to follow so that the money is well spent.

Surveys

In making a survey for a county plan, a general idea should be formed to determine what kind of roads are necessary to serve the territory. It might be well to do this in conjunction with the state and surrounding counties. As a general thing, there are too many roads in the county. A few good ones rightly placed or improved would serve better than a large number of poor roads. The population and assessed value should be known and perhaps a traffic count made, although I have found that this does not mean much, for when you improve any road the traffic will immediately increase, even more than you planned for.

In improving the highways, a competent engineer should

be employed to make the surveys, estimates, and plans. The pavement for most county and township work is of the lower type, but the grades and lines are about as important as on the higher types and money can be saved by having competent help prepare good plans. With only about 12% of the surfaced roads in the country under county control, it is going to take a long time and a lot of money to do this important work.

Plans

Since the most permanent part of any road is the right of way, when we know what roads are to be improved, we can first take care of the right of way and often save money. In places where new subdivisions are likely to spring up, road plans assume a very important place and when we know what we want, nine times out of ten the subdivider and owners will go along with us.

Our plans call for all state roads and new roads on section lines to be 100 feet wide; all roads on quarter section lines, 80 feet wide; and all other roads, 66 feet wide. We also have three or four roads 200 feet wide.

It seems as though in counties where the land is cheapest, there you will find the narrowest right of way for roads. Why not prepare for the future and insist upon an adequate width of right of way? Even if the farmers do use part of it, it will be available when it becomes necessary to widen the road. Setback or building lines are also a help and, if possible, should be included in a county program. This is merely another means of protecting a road right of way.

Equipment

The kind of equipment will, of course, vary in each county, but I believe in the majority of cases the motorized equipment is the best. We are all familiar with the different pieces and I know from experience that, compared with horses, the motorized equipment is the cheapest and can do the work in a better manner. I would also include in the program a suitable place to house and take care of the equipment. The county, as well as each township, should have a garage or tool shed where it can repair and house its machinery.

Road Patrol

A good deal could be said about a proper road patrol system and a good deal depends on the money to take care of it. At least a system should be provided whereby all roads receive some sort of patrol. This also includes a plan for snow removal, which is a real necessity.

Drainage Structures

This part of our work certainly calls for study. A large number of old bridges were put in by guess and there seems to be a tendency to replace them with new bridges of the same size when often a smaller structure would do the work. On the other hand, mistakes are sometimes made in not having the new structures large enough.

The government has been very helpful with topographical maps which can be secured at a small cost and used to good advantage in determining drainage areas.

We have made many mistakes in the size of openings for drainage and also in the width of roadways. Narrow width of roadways with high headwalls or rails is dangerous and for this reason alone it is better to have plenty of room.

If you want something on your program that will show and be a credit to yourself and the county, build a good-looking and serviceable bridge. Concrete culverts and bridges are, of course, the most serviceable if built correctly, but for ease of installation and because of imperfect concrete, the metal culvert has come into wide range.

Accidents and Highway Safety

You may not think that this subject comes under our program, but I believe it does. A systematic course should be pursued in eliminating dangerous railroad crossings and a real study made to see which should be eliminated first, as I know all of them cannot be taken care of at once.

There are some things, however, that do not cost much, such as cutting brush, removing signs which obstruct the view, and widening approaches to the railroad tracks. These things can be done with the help of the railroad companies.

Some of our highway crossings are as dangerous as railroad crossings and these should be studied and treated in the same way as railroad crossings.

Local Materials

Available material for road work should be located in each county. We cannot pave all our roads, but instead of spending all our money in grading and oiling earth roads, we should spend some of it for gravel or stone and gradually develop better type roads.

I don't believe any of us pay attention to some of the things we have right under our noses, but are always looking for something to be brought in from the outside. A good road can be made out of gravel or stone, which will take care of the traffic on a majority of our roads. With the modern re-tread method which you have pioneered in, under Mr. A. H. Hinkle, some fine low-cost roads can be built. There is a place for each type of surface and a well planned program must be worked out in each locality.

The requirements for a county road program are:

1. A competent man to prepare a program.
2. A term of office long enough to carry out his program, and a reasonable salary.
3. Co-operation between the state, county, and township officials.
4. Proper funds for road work, with provision for a budget.
5. Proper surveys, maps, and records.
6. Right of way of sufficient width to work on.
7. Some construction work each year in addition to the regular maintenance work.
8. Use of local help and material where possible.
9. Maintenance of present roads by a patrol system.
10. Safety built into the roads and maintained by study, labor, and law.

In conclusion I would like to quote a motto I saw carved in the studio of the late Daniel Burnham of Chicago: "Make no little plans. They have no magic to stir men's blood and probably themselves will not be realized. Make big plans, aim high in hope and work, remembering that a noble, logical diagram once recorded will never die, but long after we are gone will be a living thing—asserting itself with ever growing insistence. Remember that our sons and grandsons are going to do things that would stagger us. Let our watchword be order and our beacon, beauty."