

36 *PURDUE ENGINEERING EXTENSION DEPARTMENT*

from 20% to 40% on these small bridges. This is eliminated by the labor-material plan.

I see no reason why the county cannot employ skilled labor just as cheaply as the contractor. I have sometimes noticed that in regard to unskilled labor, since the contractor is under bond to perform his contract, and limited as to time of completion, that the tendency is to demand an even higher wage from him than from the county which is free from such limitations.

One more item of expense may be almost eliminated, and that is the expense of the superintendent of construction. This superintendent, on small bridges, is usually appointed for most every reason other than his peculiar fitness for superintending the construction of a bridge. It is generally for the reason of politics or more politics. I am not making this statement against either political party. I believe it is true of both. The highway superintendent having a competent foreman in charge of his bridge building may take care of this matter in connection with his other duties without incurring much additional expense.

In conclusion I will say again that local conditions and the results which you are getting by the contract system in your own counties should determine whether or not you make a change.

If you are satisfied that you are getting 100 cents worth of work for the dollar expended by the latter method, then my advice would be continue the contract system. If not, I feel that you, as in our case, will be justified and the taxpayers greatly benefitted by trying the labor and material method.

THE COUNTY SURVEYOR'S ORGANIZATION FOR FIELD AND OFFICE WORK

By H. D. Hartman,
Surveyor of Wabash County.

Prior to 15 or 20 years ago no uniform rules governed the surveyor's office. It was considered a minor office. Surveyors never got together and had no concerted ideas. One surveyor had one idea of the office and how it should be run while the man following had different ideas. This does not make for efficient engineering. The surveyor's office was created in 1851

by constitution. Surveyor's duties in those days, while important, were few. He did not need to have diversified knowledge of engineering. Land surveys constituted the bulk of his work. The rapid settlement and growth of the state in agriculture created a demand for drainage. A great part of the state was composed of swamps and undrained land. The legislature recognized the demands of the people and passed drainage laws. The great drainage systems of the state created not only engineering problems but the county surveyor had to school himself along other lines, such as assessing of lands, knowledge of land values and benefits to be derived from drainage. The legislature created other officials such as drainage commissioners, etc., but the bulk of the work rested with the surveyor. Thus was another great duty imposed upon the surveyor.

Then about 25 years ago there came a great revolution in transportation. The gasoline motor sprang into existence over night and changed the whole scheme of modern transportation. As a result of this great automotive development, the demand for modern highways was born as well as the complicated legal and engineering systems necessary to construct and maintain them. Thus was created the last and most important duty which fell to the lot of the county surveyor or engineer.

The county surveyor should have one or more competent deputies or assistants engaged on a yearly salary basis. One is sufficient in the average county. The surveyor cannot attend to every small detail of engineering which arises in the busy season without competent help. The deputy should be able to take the place of the surveyor at any time. The surveyor as well as the deputies should be competent draftsmen.

A surveyor cannot drive stakes, run rod, chain or instrument, etc., and do them all well. He should obtain good rodmen and chainmen and hold the same men as long as possible. Get young men from high school or college and train them. Good work cannot be done by rodmen or chainmen unless they have some idea of what you are trying to accomplish.

Every surveyor's office should have office assistance, preferably a stenographer, especially in the busy season. People are constantly coming into the surveyor's office in late years seeking varied information, and they are entitled to service.

Next in importance to good men should come well kept and well indexed note books. Get plenty of data on the work. All work should be properly headed, should show dates, names of all present and notes about weather conditions. In the surveyor's office all drawings, plans, note books, etc., should

be filed away. Copies of all reports made and proceedings in road and ditch matters as well as bridges, etc., should be kept and properly filed away for future reference.

There should be adopted in the near future a uniform system of plans and profiles to make same standard as to size and general make-up. We should also adopt a book of conventional signs for use on drawings. This would make it easier for contractors and others to interpret drawings. Counties should have a uniform datum for levels. Each road or project now has a separate datum line. Each county should have in the surveyor's office a map and record showing the details of each road and bridge in the county. The map should show data such as length, width and kind of road and name of stream, span of bridge, area of opening, whether concrete, wood or steel bridge, etc. The importance of such a record is quite evident.

Road superintendents on new work should be considered part of the county surveyor's organization, and should report to the surveyor each day by making out a daily report devised by the surveyor. The county surveyor's men should be quiet and well mannered on the work and not make wild or unwarranted statements to the people.

Work should be arranged by agreement with the court or commissioners so that the bulk of designing or preliminary work can be completed in the winter time in order that more attention can be given to construction in summer. Thus the surveyor's work is more uniformly distributed throughout the year.

THE COUNTY SURVEYOR'S ORGANIZATION FOR FIELD AND OFFICE WORK

Discussion by W. E. Morthland,
Porter County Surveyor.

The subject assigned to me is a difficult one to discuss owing to the fact that each of us is confronted by different circumstances. As regards pay, some of us are well provided for with yearly salaries while others work by the day when there happens to be county work to be done. Some of us have to work up private practice with small towns and among individuals in order to keep any organization at all. Restrictions by our boards of county commissioners and the State Board of Accounts greatly influence our organizations.