"EXPERIENCE IN ACTIVATING A MASTER COUNTY ROAD SYSTEM"

E. C. Rogers, County Engineer,
Madison County, Tennessee, Jackson, Tennessee

In a bulletin entitled "The Farmers Road Problem" published in 1949 by the National Highway Users Study Committee on Rural Roads, one of the major points brought forth was the critical need for proper planning for adequate rural road systems and efficient county highway departments.

I would like to tell you of the case of Madison County, Tennessee, which will illustrate this dire need of proper planning, and which I hope will furnish several pointers to aid in the planning of other county systems. If nothing more, let me get across the point that proper planning is as necessary to efficient county road systems as drainage is to good road construction.

First, it will be necessary to give some of the history of roads, county government, income, and need for improved roads in Madison County, and to explain the situation that faced me when I came to Madison County in July 1948.

Madison County was a pioneer in the development of good roads at public expense. In 1907 when automotive transportation was in its infancy, the county issued $500,000.00 in bonds for road improvements and proceeded to plan a well-laid-out system of county roads, some of which were paved. This was even before the time the State Highway Department of Tennessee began to develop its system to any extent. But with the development of the State Highway system the county's interest in local good roads appeared to wane, and as a result Madison County has stood for severe criticism of its public road system.

Prior to 1945 the county road department was operated under the direction of an elected Board of Highway Commissioners. In that year the State Legislature abolished this board and placed the administration and direction of the road department under a County Engineer, appointed by the Quarterly Court, the governing body of counties in the State of Tennessee. This method is now in effect.

To give some idea of the income of the county, during the fiscal year 1946-47, the normal county revenues were in excess of $950,000.00, about 54% of which was derived from direct local taxation, whereas about 46% was derived from state sources. The amount derived from

direct local taxation for the road and bridge fund is a negligible part of the total revenue, which including debt service was less than 17%. The revenues of the road and bridge fund is derived largely from state gasoline taxes.

On the other hand, Madison County, with a tax rate of $1.63, had the fourth lowest county tax rate in the state; and with a total assessed valuation of about 33 million dollars, ranked seventh in the state in taxable wealth. Thus the citizens of the county had enjoyed for many years the benefits of low taxes, but had directly contributed very little toward the construction and upkeep of a system of good roads, which is one of the most important functions of county government.

With more than 80% of its area in farms, and only one commercial city and market, Madison County is dependent in a large measure on highway service. This applies to both farmers and merchants and to most of the industries. Dairying, modern diversified farming, modern consolidated schools, milk depots, cotton gins, lumber mills, and all business depending on highways for transportation, must have dependable all-weather roads. As an example, there are 63 schools scattered over the county, served by about 40 school buses, which travel over 400 miles of roads and cross over 200 untreated bridges, most of which are narrow and in poor and unsafe condition.

To give some idea of the lack of highway service suffered at times by all of these interests, the following is quoted from the report of the County Engineer to the County Court on June 7, 1946:

> "Ride over the roads today and you can hardly tell where they are.— We have plowed, pulled, stuck our trucks, in an effort to open this place so that a hearse could reach a house, so that a Doctor could reach some sick people, so that a man could reach the hospital, so another could get to work. We have sent our maintainers on roads we had little hope of being able to help. We have sunk whole carloads of gravel in one mud hole, and it would still be impassable – schools closed for a week, and will probably stay closed for other weeks unless the weather abated. The repair of wooden bridges has consumed all the time of our forces with the exception of motor patrol operations.— The calls for repairs on bridges amount to such a rate that it has been impossible to keep pace with them."

No county can reap the benefit of modern progressive business methods with roads anything like those described.

The Madison County road system consists of over one thousand miles of rural roads. The various branches of the Forked Deer River and the adjacent swamp lands crossing the county present physical difficulties that have prevented the construction of desirable connecting roads between some communities. No records were available to show all roads that were being maintained by the county. It is probable that many roads that are ordinarily classified as "private roads" or "driveways" have been worked at public expense.

In 1947, having been forced by public opinion to take steps to improve the conditions I have set out, the county authorities presented a referendum for the vote of the people for the authorization to sell $2,500,000.00 in bonds for road improvement and it was passed. This was done without any thought to planning a road system or how much money was necessary. The people were led to believe that they would all live on paved roads constructed with this amount of money in a short time. Without first making passable a network of roads that would serve the rural population during the re-vamping of the system, the highway department began paving in the summer of 1947. Money was spent to replace worn out equipment and enough additional equipment was purchased to do all the construction with county forces. The roads that were selected for improvement were chosen by County authorities without any regard to a master plan, traffic volume, or importance to agriculture and industry and in some cases were probably chosen for political reasons alone. Each member of the court was clamoring for his bit of the pie for his district. By April of 1948, with only 16 miles of road paved and approximately half of the bond money spent, the county court and the public were rudely awakened to the inevitable fact that they weren't going to get what they expected. The authorities realized at last that time and money must be spent on planning before a workable system could be had. A citizens' committee was appointed to hire an experienced firm of consultant engineers to make a study and to recommend a workable road system to the governing body of the county. The engineer having resigned, the committee was also to make recommendation to the court of a replacement. I applied for the position and was accepted.

While the survey by Polk, Powell and Hendon, Engineers, from Birmingham, Alabama was being made and with the full cooperation of the county court who now realized that the success of the program depended on planning instead of politics, I began work. It was apparent that much work had to be done in a short time if the roads were to be passable that winter. There was not sufficient time to properly

grade and drain three or four hundred miles of roads in four months, so surfacing with gravel was begun at once and resulted in the resurfacing of about 400 miles of the most traveled roads of the county. In conjunction with this, as much ditching and drainage was done as possible. We changed from the use of untreated timber culverts to concrete and metal in order to obtain a degree of permanency to our work and to eventually stop the tremendous maintenance bill.

With a mild winter and the completion of the survey by the engineers, I was able to spend much time with my primary job of planning for the future, using their report as a handbook.

Let me, at this time, outline the recommendations made by Polk, Powell and Hendon in their report to Madison County which are basic steps that should be incorporated in any master road plan, whether done by hired consultants or any public official or citizens study groups.

(1) A resolution should be adopted defining the county road system as to what roads are public roads and to be worked at public expense, excluding those classified as "private roads" or "driveways", and to limit the work of the highway department to this official system. Provisions were to be made to "add to" or "take from" this system by official action as the need arose.

(2) The roads contained in the system should be classified into several general classes based solely on the existing use of the roads and the future development of the county. A sound, well-designed road classification is necessary to permit proper planning of maintenance and construction programs, to avoid making large investments on roads of minor importance while the main arteries remain unimproved, and to prevent the construction of inadequate facilities as has happened in Madison County. It was recommended that the roads be classified in three classes; (a) Primary Roads which shall consist of roads of considerable continuity and which carry relatively large traffic volumes to act as traffic arteries for inter-communication among the various major sections of the county. (b) Secondary Roads which shall consist principally of roads supplementing the primary system and which will serve as a means of inter-communication between this system and smaller areas or among smaller areas. (c) Land-use Roads which shall consist of roads used primarily to provide access to abutting properties. The system embodies 134 miles of primary roads, 300 miles of secondary roads and 400 miles of land-use roads.

(3) The next section of the report dealt with the design and construction standards of the roadways and bridges on the three classifications of roads. These design standards included width of rights-

of-way, maximum degree of curve, sight distance, width of roadbeds of pavement and bridges, and design loads of bridges.

(4) Recommendations were then made for an improvement program to bring the road system to standards required. This embodied recommendations to grade, drain, and pave the 134 miles of primary roads and 70 miles of secondary roads, and building approximately 15,000 linear feet of bridges on all classes of roads. It was recommended that the construction be completed in four years and that much of the work be done by contract. The total estimated cost of this four year program was $5,546,000.00. This did not include cost of work on other roads that were to be accounted for in the maintenance program. The remaining secondary roads were to be surfaced with gravel and the land-use roads with some local material. (No road aggreates are available in Madison County.)

(5) It was suggested that the maintenance forces of the county road department be reorganized so that they could intelligently and efficiently accomplish their task. It pointed out that the maintenance cost would decrease with the completion of the improvement program. It stated that experienced personnel must be hired to supervise various maintenance operations and that maintenance forces and construction forces on the improvement program be separated, each with its part of the work. All maintenance work should be done so as to gradually improve the condition of the road. A maintenance budget of approximately $260,000.00 was recommended after completion of the four year program.

(6) The last important step, the report recommended that the administrative organization of the highway department be reorganized. The most significant deficiency seemed to be the lack of control over road department matters by the governing body of the county. There were no specific policies to authorize programs of work to be performed by the department. The duties of the County Engineer and his department had not been limited, circumscribed, or definitely stated. The Engineer, in sole charge of the department, could operate as he saw fit on programs and policies without regard to long range planning or previous policies. To correct this situation the report recommended that changes be made setting out the duties of the County Engineer as administrative and executive director of his department and as such he would direct, supervise, and administer all matters pertaining to the selection, construction and maintenance of the county road system as adopted by the Quarterly Court. The County Engineer was to prepare a comprehensive and continuing highway program

to be approved by the Court. He was responsible for the selection of all road and bridge materials and equipment to be used by the department; for the determination of engineering standards, alignments and grades of roads and bridges in the road system; for the letting of contracts for the design and construction of new work, subject to prior authorization by the Court; for the inspection and acceptance in the name of the county, of all roads and bridges therein; for the expenditures of all county funds allocated or appropriated for county highway construction and maintenance and for properly accounting for these funds.

It further recommended that the County Engineer be directed to prepare and submit to the Quarterly Court for adoption, an annual budget of all expenditures to be made on county roads for the following year. Estimates of cost of maintenance work should be based on (a) paved roads (b) unpaved roads (c) bridges, and (d) minor construction and betterments. Estimates of costs of construction should be submitted by individual projects and should be based on estimated construction quantities taken from complete and accepted plans and specifications. Appropriations for construction projects should be made by the Court for each project approved. When adopted the annual budget should be rigidly adherred to and subjected to review and audit by appropriate county officials.

For the reorganization of the Department the County Engineer should be directed to submit to the Quarterly Court for consideration and approval a personnel organization chart or diagram which, when adopted, will be followed until modified by action of the Court. He should prepare and submit for approval, a personnel classification and rate schedule providing maximum minimum pay for all employees by job.

The County Engineer should be directed to set up and adopt a comprehensive, uniform accounting and control system applicable to all expenditures made through or by the road department. The procedure should be designed to accomplish the following major purposes: (1) to provide accurate records of detailed cost of each phase of the work with particular reference to specific projects designated by the Engineer (2) to provide necessary check and certification of all expenditures (3) to provide a basis of comparison between estimated costs of work and actual costs incurred (4) to provide statistical and cost data to be incorporated in reports to be filed by the department with the Quarterly Court (5) to provide accurate and complete records of cost and use of the major items of construction equipment.

(7) The final section of the report by Polk, Powell and Hendon, deals with the financing of the recommended program. In this case a tax increase was recommended to provide funds to pay the indebtedness of bonds authorized for the improvement.

I have merely scratched the surface of the report by the consultants with these important recommendations. Let me give you now the manner in which this report was accepted by the people and the County Court, and the effect it has had on the operation of the highway department.

The report was not met with much enthusiasm by the public. They expected and had visioned a cheap, easy and early solution to their problems. They were astounded at the figure of $5,546,000.00, and at having to wait four years for good roads. They had never been impressed as to the cost of modern construction. The mere $100,000.00 yearly fund given the highway department the past 20 years seemed to them enough. They couldn't see that the lack of funds had been a major factor in the condition of their roads.

The County Court, although realizing that a large sum of money was going to be needed, couldn't find means to begin to appropriate this amount and they also wanted quick results.

I spent long hours of study and explanation with the members of the Court to convince them that we could derive much constructive help from the recommendation given us. It was true that we could not finance an extensive improvement program at that time, but I saw no reason that would keep us from putting into effect all the recommendations that would not call for additional revenue. The point in having a master plan for a road system was to be able to efficiently allocate funds when they became available.

I prepared a resolution and presented it to the Quarter Court in January 1949, putting into effect all the recommendations I have mentioned and stating that the ultimate aim of the department was to carry out the actual construction program as a long range program when monies became available. This resolution embodied the adoption of a road network using existing county and state maps, the classification of these roads and design standards. It set up organization of maintenance forces and the duties of the County Engineer as brought out earlier. In addition the resolution set up a Highway Committee composed of ten members of the Court, who were to cooperate with the Engineer in an advisory capacity for further planning studies and solution of problems that arose requiring policy ruling by the county government. This resolution was met with favor and adopted.

At the same time I submitted personnel classification and pay schedules and made suggestions for vacation, sick leave, and compensation pay. I also submitted an organization chart for personnel responsible to the Engineer. These policies were officially adopted.

With the adoption of these resolutions I felt we had won a victory for we had made the first step toward properly planned and organized county highway operation.

In the past year we have progressed rapidly and have benefited tremendously because of these steps we had taken. Remaining bond monies were spent improving drainage structure, road beds and ditches, and replacing worn out surfaces. By having a plan we were able to allocate work where it was most needed to improve the entire system. When unexpected monies were made available by the Tennessee Rural Road Act and as our share of Federal Aid Secondary funds became available, I was able to recommend to the Highway Committee and they to the Court for their approval, construction projects on the most important roads in our system as set up by our master plan. There was no squabbling as to who would get the projects.

I have set up an effective accounting system including budget control, warrant control, purchase control, construction and maintenance cost records, equipment operational cost record and perpetual inventories of materials and parts.

The public whom the department serves, seeing this operation on a business like basis has changed its opinion from ill will and criticism to understanding and praise. The rural population is much more willing to wait their turn in the improvement of the county roads since they can see and understand the progress being made due to proper planning. Realizing that more money is necessary and confident that it will be used efficiently and towards an end, the County Court has initiated a property revaluation program with equalization and reassesment of taxes in mind in order to provide the money to complete our master plan.

In closing, let me remind you, that as engineers and college professors say, the most important part of road construction is drainage, drainage, and drainage; the most important part of efficient operation of any highway department is planning, planning and more planning.