

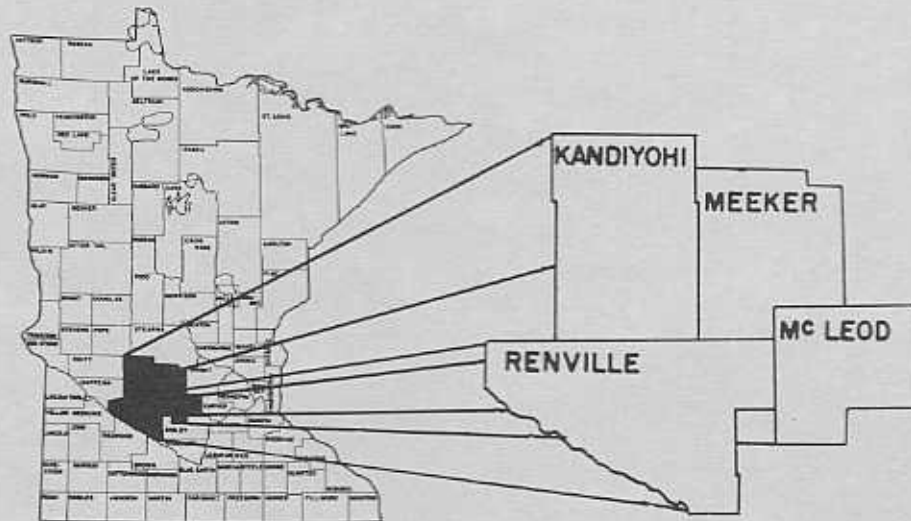
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ON THE FINANCING OF RURAL ROADS

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ON THE FINANCING OF RURAL ROADS^{1/}

by Jerry E. Fruin^{2/}

An adequate road system is essential for the economic and social well-being of the rural population of the U.S. The typical rural family relies on the road system for essential communication with town and city service centers several miles away. Children are bused to school on a daily basis. Farm produce is shipped, farm supplies are delivered, repair parts, groceries, and household supplies are purchased many times throughout the week. In fact, many rural families have one or more members who commute to factory or service jobs just as regularly as families who live in the cities. It is neither possible nor desirable for rural families to live in isolation in the country. Rural America depends on its roads to stay in the mainstream of economic activity and social development.

As a result of advances in technology, rural residents need and demand better and safer rural roads. Faster speeds of passenger vehicles require smoother road surfaces for easy control and wider roads and intersections for safety. Dependence on school buses and milk trucks rather than one room school houses and numerous creameries require year round accessibility. The heavier weights of all vehicles, from autos to semis, require stronger road beds and bridges. Many of our rural roads do not meet reasonable standards for todays use. Other

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roads may now be adequate but will quickly deteriorate if funds are not available for required maintenance.

Consequently, the road network of rural America is approaching a crisis in many areas. The symptoms are familiar. Roads are deteriorating and maintenance expenses are escalating with inflation while funds for maintenance and new construction are decreasing, or at least not increasing fast enough to keep up with inflation.

However, these are symptoms, not causes, of rural road problems. To find solutions it is necessary to look beyond the symptoms to the causes. Broadly speaking, basic reasons for these problems are:

1. The number and mileage of rural roads in many areas is excessive. Technological advances in transportation, agriculture, and related industries have eliminated the need for many roads.
2. The traditional methods of funding rural roads are incapable of keeping up with inflation in the economy -- especially if programs to reduce gasoline consumption are effective. At the same time the increased size and specialization of trucks have resulted in higher standards for road capacity and safety. This has resulted in increased construction and maintenance costs per mile of road.
3. Regulations and policies affecting rural roads are made at all levels of government to accomplish a multitude of objectives ranging from weed control to national defense. These policies are seldom optimal, can conflict and often work at cross purposes.

The impacts of these three causes are not necessarily independent, nor limited to rural roads. However, they will be discussed below from the perspective of rural transportation policy.

1. The Number of Rural Roads

There are too many rural roads. The situation is analogous to that of the railroad industry where one of the major causes of the financial problems of railroads is that there are too many low density branch lines [1, 7]. These railroads were built to provide transport throughout the countryside prior to the development of motor trucks. The rural road system also was generally in place before the development of motor vehicles. The network of roads at one mile intervals in most farming areas in the Midwest was developed for horse and buggy transportation. When the roads were initially laid out they were narrow and required little land. If the Midwest were virgin territory being settled today, the rural road system would be designed for larger farms and motorized transportation. Roads should be placed at least two miles apart so that "sections" would consist of at least four square miles. This would allow the same accessibility to 320 acre farmsteads as one mile intervals allow to 160 acre farmsteads with one-half the road mileage. The maximum that one-way distances would increase under such a system is two miles or 2 to 6 minutes driving time depending on the type of vehicle. This contrasts with the fact that a horse and wagon would generally take 20-30 minutes for an extra two miles.

A major cost of any transportation system is the opportunity cost of the resources committed to that system. These resources include the

land required for the roadbed and right of way, the capital costs of physical structures such as bridges, culverts and road structure, and the capital goods committed to annual maintenance of the road.

The solution for excess road mileage is obvious although the method may not be. The number of rural roads should be reduced. This would return valuable farm land to production, reduce current expense on roadway maintenance, and require fewer expensive structures like bridges, culverts, and railroad crossings to be maintained and eventually upgraded or replaced. Safety would be improved as hazardous areas such as intersections and railroad crossings are reduced.

Local officials must determine the road requirements necessary to provide reasonable access and convenience. They should develop systematic plans to reduce their road network to that level. Such a plan should consider current and prospective traffic patterns, homestead and business locations and the design and condition of roadbeds. Other considerations include the age, condition, and weight or size restrictions on bridges and viaducts, as well as road safety hazards, and the costs and problems of converting roads to alternative uses.

Adequate access must be furnished to existing homes and business not on the final road system. This could be done by providing and maintaining private drives to existing structures as long as residences or businesses remain and by providing easements over the to-be-abandoned roadways to any unoccupied parcel that would become land locked. In some cases it might be necessary to make compensatory payments to injured landowners. It might even be advantageous to build some new roads in order to eliminate poorly located existing roads.

2. Financing Rural Roads

The traditional sources of highway funding are gasoline taxes; vehicle and operator licenses; and general taxation, primarily the property tax. Revenues from the first two sources do not increase as a result of inflation.

Unlike the receipts from a general sales tax which will increase as the same quantity of goods is sold for more money, the gasoline tax is based on physical volume. The national weighted average of state gasoline taxes collected increased from 7.0¢ to 7.7¢ or 10 percent per gallon between 1970 and 1975 while the average price of regular gasoline in the United States including taxes rose 64 percent from 36¢ to 59¢ per gallon [8]. Total state and federal gasoline tax collections rose only 28 percent in this time period from \$10 billion to \$12.8 billion. Undeclared GNP increased 51 percent during this period so that total gasoline tax collections declined as a percentage of GNP [3]. In fact, total gasoline tax collections actually decreased for a time after the energy crisis due to decreased gasoline consumption.

In the past, a major source of increased gasoline tax revenue was furnished by decreasing automobile fuel efficiency. Gasoline consumption (and taxes) increased faster than the number of miles driven. Miles per gallon decreased as a result of the public desire for heavy powerful cars and of governmental requirements to meet pollution control standards. The efficiency of the average automobile dropped from 14.95 miles per gallon in 1950 to 14.28 miles per gallon in 1960 and to 13.29 miles per gallon in 1973.

This trend has been stopped as the auto manufacturers have responded

to governmental mandates to get better gasoline mileage from 1977 and later automobiles. One stated goal of President Carter's energy program is to reduce gasoline consumption 10 percent by 1985 [2]. Although stiff gasoline taxes are one of the proposals, these revenues are to be used for various tax rebates and not earmarked for highways. Consequently, if the energy program is successful, the gasoline tax revenues available for rural roads may decrease even more in the future.

Other forms of highway oriented fees and taxes, such as drivers licenses and auto and truck licenses, are usually stated in fixed dollar amounts and not likely to increase with inflation. In fact, since many of these fees are fixed by legislative action, attempts to obtain significant increases frequently meet fierce opposition and lobbying from the affected user groups (who generally are the primary beneficiaries of road and highway expenditures). Total vehicle and operator license fee collection increased only 38 percent between 1970 and 1975 [4].

On the expenditure side, the major inputs to new or improved roads are rising in dollar cost as fast or faster than inflation generally. The prime example is asphalt, whose basic cost is based on crude oil prices. However, the costs of major expenditure classifications like construction equipment and structural steel have also been rising faster than general levels of inflation. As a consequence, the Federal Highway Administration's highway construction index increased from 125.6 in 1970 to 203.8 in 1975 [8].

There is concern expressed by some observers that some of the revenues historically used for roads may be diverted to other uses. For many years, the idea of "highway trust funds" composed of gasoline tax receipts and highway user fees and dedicated to road construction

and maintenance was nearly inviolate. In recent years this concept has come under increased criticism. Proposals have been made, with some success, to have these traditional highway funding sources viewed as "a transportation trust fund" which could be tapped to fund various proposals from bikeways to mass transit systems. This is not necessarily bad, as many of the proposals have merit and are for complimentary forms of transportation. An adequate transportation plan, however, should ensure that sufficient funds are available for rural roads. This is especially important because of the dependence of county and township roads on property taxes.

Although the situation varies from state to state, local roads have generally been heavily supported by property or other local taxes. This is not true for the interstate system and most state highway systems, which have been built and maintained by gasoline taxes and license fees. Federal policy has encouraged the use of state fuel taxes for highways since the 1920's and the Highway Revenue Act of 1956 assigned the Federal fuel tax and the excise taxes on automobiles, parts, and tires to the Highway Trust Fund [5]. However, local highway user revenues fall far short of covering local highway expenditures. In 1975 local governments spent more than twice as much on highway construction and maintenance as they received in user revenues and from their allocations of state and federally imposed user taxes. In contrast, total state and federal highway user revenues and highway expenditures were about in balance [4]. A judicious review of federal and state gasoline tax expenditures might reveal that the greatest needs are in the rural areas.

One way to cause revenue changes to approximate the general level

of inflation would be to convert the gasoline or fuel tax to a sales tax based on dollar sales, not gallons. The tax level would be established to approximate current levels with increases in the rate programmed for the next several years as part of the national program to reduce dependence on petroleum imports. Such a tax would be both a revenue raising device and a policy instrument.

3. Policies Toward Rural Roads and Rural Transportation

Because of the many jurisdictions involved at all levels of government and because of the multiple funding sources, it is only natural that conflicts result concerning the objectives of the rural road system and how they should be achieved. In addition, coordination between levels of government and adjacent jurisdictions is often lacking. A common example of this lack of coordination is network discontinuities, such as a 9-ton all weather road connecting with a 5-ton road at a county or township line.

Other examples are less obvious. For instance stringent construction, safety or even funding requirements imposed by higher level governments can limit the options of local governments, causing the construction of fewer roads and bridges than would be possible under more flexible conditions. For example, it may be necessary for a county to replace a structurally sound but low clearance bridge in order to receive state aid when rebuilding a road. This might be the result of state policy aimed at upgrading all state aid roads to given standards, such as those established for the federal system. This objective, however, might conflict with the need of the county to overlay many miles of deteriorating roads which have adequate clearance bridges or with the need to replace an unsafe bridge

on a good road. Construction decisions requiring large capital outlays such as bridges, right-of-way purchases, and upgrading roadbeds should be made by conscious decision and not imposed by regulations.

At the local level, regulations pertaining to road weight limits and their enforcement may not be effective in getting the maximum use out of the roads. It is necessary to haul heavy loads of commodities such as grain, milk and fertilizer over our rural roads. Recognizing this, any vehicle is allowed to travel on rural roads as long as it meets basic axle weight and total weight restrictions. It might be better if heavy trucks were more closely controlled on rural roads with respect to weight, type, and possibly even purpose. Transporting grain with farm tractors and 300 bushel trailers will do only about 1/6 of the damage to flexible pavements as hauling the same amount of grain in 800 bushel semi-trailers.

Roads can deteriorate from weathering as well as from use. A bituminous roadway's lifespan is limited even if the road is never used so being too restrictive also can be futile. On the other hand, a road receives little permanent damage from moderate overloads provided that this occurs infrequently. The best strategy may be to construct a road system with relatively low load limits and use a permit system for allowing the judicious movement of overweight loads [9]. This would be advantageous if the reduction in construction costs exceeds the sum of any increased costs of maintenance and administration after applying appropriate discount factors.

Trends on the national level toward increasing the maximum weight limits on the interstate system (20,000 pounds per axle and 34,000 pounds

per tandem axle), which has been done in a number of states, should be a cause for concern to the managers of rural roads. The provisions of the Federal Aid Highway Act of 1956 effectively established weight limits of 18,000 pounds per single axle, 32,000 pounds per tandem axle and 73,280 pounds overall [1]. Rural road systems have been designed with those limits in mind. The standard all weather road is a "9-ton road), capable of supporting an 18,000 pound axle or 32,000 pound tandem axle.

There are two reasons to be concerned. The first concern is the damage to flexible pavements that could be caused by a few trips by unauthorized interstate trucks. Increasing the load from 18,000 to 20,000 pounds on a single axle and from 32,000 to 34,000 pounds on a tandem axle will increase damage to pavements 50 percent and 25 percent, respectively [6].

The second concern is the potential cost of upgrading rural roads to 10 ton limits. In the long run this is probably inevitable as competitive pressures will make the 10 ton limit the defacto standard. In the short run, there will be added costs for road construction and maintenance on authorized feeder routes. Bridges that are structurally sound for 9 ton axles might not be safe for 10 ton axles and might need to be "posted" and added to the list of "substandard" bridges that "need" replacement. In one state, Minnesota, this change would increase the number of weight restriction postings from 3,090 to 3,801 on the 13,216 bridges that are 20 feet long and over [6].

4. Recommendations

In summary, there are three recommended strategies to relieve

the financial pressures on rural roads. First, rural transportation planners should recognize the need for reducing the total mileage of rural roads. This would reduce annual operation and maintenance expense, free land for agricultural production or other appropriate uses, improve road safety by reducing the number of intersections and allow funds for new construction and upgrading to be concentrated on the remaining roads. The result will be fewer but better and safer roads to meet the needs of rural America.

Second, fuel taxes should be increased to help achieve the energy conservation goals of the nation. However, the tax should be levied on the dollar value of gasoline sales rather than on the units sold to enable fuel tax revenues to help keep pace with inflation. From the perspective of rural transportation, increased fuel taxes should be viewed as a revenue source to replace property tax and general fund expenditures on roads. At the national level, if the fuel tax is imposed as part of a policy to reduce petroleum consumption, then it is reasonable to use the increased receipts from such a tax for transportation methods other than highways if such uses would further reduce petroleum consumption.

Finally, more analysis of the effects of different regulations and policies on the costs of road construction and maintenance is needed. There is a tremendous investment in the existing physical plant of our rural road system that should be wisely used. To do this will require coordination and planning by local, state and federal authorities with respect to such things as load limits, design standards, and financing. Greater emphasis must be placed on coordination if we are to realize the benefits of the first two recommendations, and truly be effective in financing our rural road system.

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