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ural roads have been a problem since the first settlers arrived in North America. In the early years, there were too few, but now there

may be too many. Not too many for convenience, but certainly too many for the tight public budgets in rural areas to support. The rural road system is in financial and physical trouble, and local government officials must begin to look for ways to cope with a growing number of problems related to roads and bridges.

In most areas, the main users of rural roads and bridges are the farmers who need a field-access road system capable of handling large farm implements and trucks in all types of weather. Additional users, and in some areas the primary users, include the rural residents who want a quality surfaced-road system that provides quick access to urban areas.

Farm use of the road system has

changed along with the complexion of rural America. As late as the 1930s, the nation's farmers were still lobbying for "farm-to-market" roads. Even now, since many farmers lease or own fields that are dispersed over many miles, they continue lobbying for well-maintained roads and wide bridges capable of carrying heavy loads from field to farmstead as well as from farm to market.

Rural household travel is changing as well. Many rural residents commute to employment in nearby towns and metropolitan areas. The daily commuter demands a smooth-surfaced road that allows high speed travel that will not damage today's expensive and low-slung cars. But the rural population in many areas is also declining, leaving road segments that no longer service any households and provide only secondary access to fields.

Regardless of use or users, the system has been deteriorating for many years, and slowing the deterioration has been hindered by a lack of sufficient public funds for proper upgrading, maintenance, and repair. Deficient bridges create serious safety and traffic constraints. In 1987, the U.S. Department of Transportation rated 166,783 bridges or 55 percent of all inven-

toried, off-federal-aid bridges as structurally unable to carry a legal load limit. An estimated \$20.4 billion is needed to reconstruct and rehabilitate these bridges. The bridge problem is severely understated because bridges less than 20 feet long were not included in the inventory, and thousands of such bridges need repair.

Local officials face a dilemma because (1) their governments are legally liable for the condition of structures, and (2) reconstructing or upgrading the system is hampered by a perennial shortage of

RURAL **ROADS AND BRIDGES**: AN **EMERGING** CRISIS

by Cathy A. Hamlett and C. Phillip Baumel

CAUTION MINIMUM MAINTENANCE ROAD

funds. In spite of this, rural residents and farmers continue to apply political pressure on local officials to maintain and upgrade the rural transportation system.

This circumstance-poor roads and insufficient money to fix them—is nearly ubiquitous in the United States. Even so, all options for improving the system have not been exhausted. One choice is to boost funding for rural road and bridge reconstruction. Property taxes could be increased, additional fuel taxes or vehicle registration fees could be levied, and road funds could be shifted from urban areas to rural areas. These options are politically unpopular and unlikely to be used at a time when road funds are frequently being shifted away from rural roads and into urban streets and state/interstate highways.

An alternative is to reduce the size of the rural road system and use the savings to reconstruct or maintain the remaining system. This can be done by removing

roads that provide only secondary access or downgrading service levels that are higher than socially optimal. Down-sizing the system through quantity or quality reductions is especially applicable in the midwest where most rural roads lie on an extensive one-mile grid system. Each of the following options is a way of reducing the size or quality of the local rural road system.

Abandoning Roads

The most permanent method of reducing the local rural road system is by abandoning roads. Abandonment means obliterating the road and returning ownership of the right-of-way property to the abutting landowners. Such

obliteration removes all liability exposure from the local government. It also allows the former right-of-way to be used for productive activities, and importantly, the land goes back on the tax rolls.

Good candidates for abandonment are dead-end roads that do not serve as the primary access for a field or house. The access issue is always important because current

laws in most states allow extensive and prohibitive damage claims if property is landlocked. Other good candidates are through roads that are used by a small number of vehicles each day and are not primary access roads.

> Research on the rural road system, involving three 100 square mile areas of Iowa roads, examined the poten-

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LEVEL B' SERVICE ENTER AT YOUR OWN RISK

➢ Difficult rural road and bridge policy decisions are confronting local government officials in the United States. Continual deterioration of the system will force downsizing unless taxes are increased significantly—which is unlikely. Several alternatives to minimize the effects on the rural resident's travel cost are available. In many cases, maintenance can be reduced and dead-end roads can be converted into private drives. In other cases, little used road segments will have to be abandoned. Changes in state laws and policies are needed before public officials can effectively implement these options.

tial for road abandonment. A computer simulation of the road network in each area, complete with extensive data on trip frequency and type of vehicle, allowed careful study of a number of combinations. The potential for abandoning roads was developed by running 1982 trip patterns through a simulation model of the existing road system. The simulated road system was then altered to reflect road abandonment, and the same trip patterns were run through the altered system. The increased travel costs associated with abandonment were then compared to the maintenance and reconstruction costs saved by the abandonment. Travel costs almost always increase with road abandonment because the travelers who previously used the abandoned road must travel farther to reach their destinations.

The number of miles of roads that can be abandoned without a net loss to society was found to be limited. Since increased travel is costly, only 5-10 percent of the roads can be removed from the system before increases in travel costs begin to exceed the savings in maintenance and reconstruction costs. The net savings for the first few miles—5 to 10 percent—of abandoned roads ranged from \$70 per abandoned mile per year in an area located near an urban center to \$1,379 per mile per year in the most rural study area. Net savings were lower in the urban area because more traffic was rerouted.

Three main groups share the increased travel cost that stem from abandonment. Farm traffic incurred more than half of the increased travel costs in almost all cases. Households accounted for almost 40 percent of the increased cost. with post office and school vehicles making up the remaining 10 percent. While a limited number of individuals, primarily farmers, incur the costs of abandonment, the savings from reduced maintenance and reconstruction costs accrue to the county or local government - the local "general public."



Making Public Roads into Private Drives

Conversion of roads to private drives is a less severe alternative than road abandonment. The intent is that the existing road will remain open but as a private road. A road serving a single or limited number of fields or houses is removed from the public system by transferring ownership and maintenance responsibility to the

Line-up of trucks that converge at the local elevator from rural roads. Loaded tandem-axle trucks weigh up to 23 tons.



abutting land owner or owners. The private road owners are forced by liability considerations to post the road as a private drive or to use a gate to restrict traffic. The road (and bridge, if applicable) still generates maintenance costs even if maintained at a lower level, but the maintenance burden is transferred to the few who use the private road.

Roads that are likely prospects for abandonment—dead-end or low volume roads—are also good candidates for private drives. Landlocking is not an issue because the road remains intact, albeit closed to through or public traffic. More roads are candidates for private drives than for abandonment because access is not denied.

Substantial savings are available to the local government that converts some public roads to private drives. The increases in travel costs are less than in the case of abandonment. Converting dead-end roads to private drives results in almost no rerouted traffic because the traffic on dead-end roads is generated by those who live and/or farm on the abutting land. Non-dead end roads that are converted to private ownership also show promise, because most of their traf-



Many old and deteriorating bridges cannot carry legal loads hauled by today's trucks.

fic is generated by those who own the roads. Lower maintenance standards also make the private drives less expensive. Net annual savings ranging from \$1,518 to \$2,442 per mile per year came from the conversion alternative.

In midwestern states such as Iowa, this type of reduction strategy has not been used extensively. Laws about damage claims and legal liability are still unclear, especially when there is more than one prospective owner for the private road.

Low Maintenance Roads

Rather than reducing the quantity of publicly-owned local rural roads, the low maintenance option calls for a reduction in road quality. This alternative—largely restricted to gravel roads—involves reducing public maintenance standards. Mainte-

Poor roads and insufficient money to fix them are nearly ubiquitous in the United States.

nance can drop back to one grading per year, no snow plowing, minimal drainage maintenance, and no road or bridge reconstruction. Signs are posted to warn drivers that they enter the road at their own risk. The local government still incurs some liability, though the full extent of this is unknown: it has not been tested in the courts.

Because no winter maintenance is performed, roads serving as the only access to a house or farmstead are not candidates for low maintenance. Roads serving as the only access to a field are candidates under the rationale that a farm tractor can get through a road no matter what the weather.

Substantial savings—\$2,900 to \$3,400 per mile per year—result from this strategy. The greatest savings to local governments result from the absence of any reconstruction expenditures on the roads or bridges. Obviously, if bridge reconstruction falls to zero, bad bridges will eventually force a road closing.

Low maintenance roads bring other consequences. There is usually less political uproar when the county or local government classifies a road into the low maintenance category than when a road is converted to a private drive. As years go by, most travelers become accustomed to avoiding a low maintenance road while the affected farmers and local residents can still use it. Eventually, the road and any bridges that have not been repaired will deteriorate so badly that the county has little trouble closing the bridge, abandoning the road, or returning the right-of-way to private ownership. Moreover, converting a road to low maintenance can be an excellent tool for gathering information. At the cost of a few signs, the county can designate a road as "low maintenance." If only a few people call to complain, the road is probably a good candidate for eventual conversion to private ownership or abandonment. If many road users complain, the road is likely to be an important part of the road network.

Political Implications

Politics is a major thread running through the emerging road and bridge crisis. Most local officials are elected by or are in some way answerable to local citizens, so decisions on how to reduce the road system will be made with great political care. Nonetheless, the choices are unavoidable because the system's funding and physical condition continues to deteriorate. Abandonment, conversion to private drives, and low maintenance are all options that can be considered. Some roads can be abandoned with a net gain to society, though with a direct loss to the local farmer or resident user. Still more roads can be converted to private drives, with society again a winner. Even more roads can be reduced to low maintenance status. The political ramifications of a decision to change the status of a road are not necessarily eased by objective research showing the magnitude and distribution of costs and gains (savings) that will accompany the change.

Changes in state laws and policies that help insulate the public decision maker who must opt for a change in the road system include:

- Denying financial claims to individuals if the proposed road abandonment is a second access.
- Placing an upper limit on damage claims.
- Permitting local governments to withdraw or revise a reduction plan if an appeal to a higher court results in an excessive damage award.
- Appointing citizen committees to help develop and implement road reduction proposals in order to reduce political pressure on elected officials.

Other unresolved issues include finding a reasonable method for dealing with abutting land owners for the change from public to private ownership; developing a method of arbitration between adjoining land owners who jointly own a road; and, perhaps most important, devising a method of educating the public on the costs and savings of road system changes.