COUNTY BRIDGES AND CULVERTS—A MAJOR PROBLEM*

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The general condition of bridges and culverts on the 66,825 miles of county roads in Indiana is such that a major attack on the solution of this traffic-handicapping problem is now imperative.

Many of these bridges were built more than thirty years ago (some wood covered bridges are over seventy-five years old) and of course were not designed to carry the heavy loads to which they are subjected today. In the meantime, because of neglect in periodical painting, the steel structures have become seriously weakened by rusting. In some cases, because of the use of dirty or unsound aggregates, improper proportioning of the mix, the use of too much water in the concrete, etc., the abutments and piers have deteriorated rapidly. Too often the footings of the abutments and piers were not carried a sufficient distance below the streambed and the action of subsequent high waters has dangerously undermined these structures and required costly underpinning. Many bridge floors have been so neglected that they present a very serious hazard to traffic. The responsible officials of each county should carefully work out a plan, covering a period of years, for the progressive rehabilitation of these structures, starting with the most urgent cases.

COUNTY BRIDGE DATA

The Indiana State-Wide Highway Planning Survey of 1936 disclosed a total of 13,952 bridges (totaling 707,443 lineal feet, or the equivalent of 134 miles of combined length) with spans of 20-feet and over on the county road system. In addition, there are many smaller structures of less than 20-foot span which are commonly designated as bridges, but which were classed as culverts and not recorded in this state-wide survey. In addition, there are probably tens of thousands of pipe and box culverts of various types, ages, and conditions.

This survey showed that 79.9 per cent of these bridges (80.78 per cent of the total linear footage) had roadway widths of 16 feet or less, thus making them practically one-way bridges. Only 3.27 per cent had roadway widths of over twenty feet.

* Cuts by courtesy of Better Roads.
Other significant results of this survey show that 11.27 per cent of the total linear footage had a load-carrying rating of 3 tons or less; 46.02 per cent rated 3 to 5 tons; and 31.4 per cent rated 6 to 10 tons. Thus about 89 per cent of the total linear footage of bridges was capable of carrying 10 tons or less, and only about 11 per cent was capable of carrying over ten tons.

On the basis of condition rating, 31.84 per cent rated good; 48.24 per cent, fair; and 19.92 per cent, bad. In other words, less than one-third of the county bridges were in good condition.

A few of these bridges have been repaired or replaced since 1936, but the vast majority of them undoubtedly are in as bad or worse a condition as they were at the time of the survey. Many county road bridges in Indiana are now in a state of collapse or are so badly damaged as to require barricades, thus putting certain sections of roads out of use, except in those few cases where it has been possible to build “run arounds” to keep the traffic moving.

Fig. 1. This failure of a small bridge in northern Indiana is typical of many occurring throughout the state.

Fig. 2. Starting reconstruction of bridge shown in Fig. 1. Steel I-beams are being placed on repaired abutments.
Fig. 3. Replacement of collapsed structure just about completed—steel handrail and timber flooring in place.

Fig. 4. Bridge completed and road open to traffic, at site of Fig. 1.
The funds available for the county-road system are so limited that many county road officials are forced to the conclusion that, since either the roads or bridges must be neglected, it is probably more expedient to spend the available funds on road repair and construction, trusting to luck that the bridges will continue to stand.

**Funds Available**

By enactment of the special legislative session in 1932 all township roads in Indiana were incorporated into the various county highway systems, thus eliminating the township as a road-control unit. This same legislature eliminated all property taxes for local roads, except those for the retirement of outstanding county and township road bonds, and placed a moratorium on the issuance of additional road bonds, which has continued in effect up to the present time. Since 1932, all county roads and bridge repair and construction has been financed exclusively from the counties' share of the state gasoline tax and motor-vehicle-license fees, except the few cases where general obligation bonds have been issued for this purpose. For the year 1940, these motor vehicle funds available for the 66,825 miles of roads distributed through 92 counties totaled $9,873,730, or an average of $148 a mile for the year. For several years the average funds available per mile have been about equal to this figure. This must cover all expenditures for equipment, repairs, materials, wages, grading, draining, dragging of road surfaces, painting and repairing of bridges, repairing of old culverts and installing of new ones, cutting of weeds and shrubs in the right-of-way, marking of highways, "black topping," and other forms of surface stabilization, etc. During the depression years, W.P.A. has aided materially in county road and bridge improvement.

The Indiana Attorney General's Office in 1938 ruled that it is illegal to levy a direct property tax for bridge repair or construction, but that such funds may be raised through the issuance of general obligation bonds to be retired by a direct property tax levy. Most counties have hesitated to embark on the latter procedure.

**Questionnaire Returns**

From a questionnaire distributed to all county road supervisors of the state in the fall of 1940, the writer gathered the following pertinent information about the present condition of county-road bridges and culverts:

1. Sixty-eight (74%) of the 92 counties returned the questionnaire.
2. Six counties report a total of 29 culverts (under 20-foot span) collapsed.
3. Twenty-nine counties report a total of 249 culverts posted for limited loads.
4. Seventeen counties report a total of 27 bridges (from 20- to 105-foot spans) collapsed. One county reports a bridge down for ten years with no funds to replace it.
5. Forty-six counties report a total of 359 bridges (over 20-foot span) posted for limited loads.
6. The estimated costs of repairing or replacing damaged bridges and culverts were too indefinite to be of value here.
7. Sixty-two counties reported a total expenditure during 1939 of $555,662 on bridge and culvert repair and new construction. One county built a $125,000 bridge.
8. Five counties report the use of general obligation bonds for bridge construction.
9. Three counties report property tax levies for bridge improvement.

The following quotations from the questionnaire returns present interesting commentaries on this bridge and culvert situation:

A bridge supervisor in the east central section says, "A special bridge fund from direct property tax would be the simplest and probably the fairest method of rebuilding out-of-date structures. A large percentage of our structures should be replaced in the next five to ten years."

From a supervisor in the west central part of the state came the following comment: "I really think that the bridge and culvert problem is now getting serious enough that the driving public will welcome a small addition to their taxes to remedy it. I have had several people come into my office and remark that there should be a direct assessment made and added to the gasoline tax money so that all bridges and roads could be improved to meet the present-day traffic."

Another supervisor in the west central section says, "We have found that by careful inspection we have been able to save several bridges and culverts by repairing them in time."

From the central part of the state comes this comment: "This year we are planning to have a cash balance of about $10,000 which will automatically go into a construction and reconstruction fund. This is our plan from year to year to correct this matter."

A supervisor from the east central section says: "We keep a close check on bridge and culvert abutments. When the abutments show they are weakening we run new footings and headwalls where needed. Our motto is, 'A Stitch in Time Saves Nine'."

A central Indiana supervisor states that, "In 1939 our county requested $12,000 on a four-cent tax levy for bridge work only. The county council approved it and there was no
Fig. 5. Another Indiana replacement project. The old rubble structure failed primarily as a result of flood scour.

Fig. 6. A large metal pipe of sectional construction serves as replacement of collapsed structure shown in Fig. 5.
local objection, but the State Tax Board cut it out. I would suggest, if possible, some kind of action immediately in order that the 1941 legislature would have an opportunity to act on this. By an emergency act of the 1941 legislature, the money could be made available during 1941. This is an emergency need. While we do not have any bridges or culverts collapsed now, we do have many badly in need of repair.”

From the northeast section comes the following comment: “We included a three-cent levy in the county budget this fall to construct and repair bridges. We have passed all the hurdles with the exception of the State Tax Board which takes this matter up today. The bridge situation in our county is going to be a real problem unless some way can be found to provide funds other than the gasoline tax which is all needed for maintenance of highways.”

A supervisor in south central Indiana states, “We believe that we will be able to take care of our culverts and bridges through our regular tax fund from the state.”

From the northwestern section of the states comes this comment: “My answer would be for the legislature to pass a law providing for construction of bridges and culverts to be paid for from taxation on property, as the gasoline tax fund received by the counties is not sufficient to care for this. I would also recommend that the state, through law, set up standards by competent engineers as to the widths of roadway and permanency of structure.”

A supervisor from the north central section says, “I believe that W.P.A. should concentrate more on this type of work and that the counties’ share of moneys needed should be raised by a direct tax levy. I do not see how any county maintenance fund could stand a very large diversion for the bridge and culvert construction work needed.”

From the south central part of the state comes this proposal: “The State Budget Committee should be authorized by the State Legislature to increase the state tax rate three cents (3 cents) per hundred (100) dollars valuation. This money collected the same as other state tax and then proportioned back to the counties in proportion to the county assessed valuation, the counties to match this amount out of their portion of the gasoline fund. Said fund to be used for culvert and bridge construction only. The present law covering new construction and reconstruction to govern all plans, specifications, contracts and construction. Under this plan the counties would be able to do a small amount of bridge and culvert construction each year. If some plan is not worked out whereby the counties can replace a portion of their old structures each year, the time will come when the counties will have to have a large bond issue to raise funds to replace bridges and culverts.”

From the northwest section comes this proposal: “Each county highway department should be investigated by some-
one free from county politics. Then recommendations should be made to the public."

A comment from north central Indiana is as follows: "A 3-cent levy for bridges over a five-year period would place our bridges in perfect shape."

From the southeastern part of the state comes the following comment: "We usually set aside about $10,000 for bridge construction and repair. If all this is not needed we spend the balance on road maintenance or construction. It looks as if it would be a choice of two things, either an additional amount from the gasoline tax to be spent on bridges only, or a property tax for bridge repair and construction."

From the south central section a supervisor says, "We have all steel bridges in the county posted with load limit signs."

A southwestern county supervisor says, "Since W.P.A. was inaugurated, all of our county road funds have gone into construction with little left over for maintenance. We have had as many as 2,250 W.P.A. men on our county roads, and at present there are about 900 working. It takes all of our gasoline money in construction to hold up our sponsor's contribution. A remedy would be to utilize our M. E. & O. funds from the government for bridge repair and construction and stop centering these funds on road construction."

From the west central county comes this comment: "I believe it would take at least $250,000 to replace the weakened and narrow bridges and culverts in our county. This does not include the bridges that run from 5- to 10-ton load. The development of our highway pavements has gone forward at the expense of our bridges."

From a southwestern county supervisor comes this comment: "We will have to spend in the coming two years to insure safety from $40,000 to $50,000 and I am doubtful if that will be enough."

In presenting this information we are attempting to stimulate the citizens of Indiana to a greater appreciation of the menace which this problem presents to the general welfare of the state. Most of our farms depend on county roads for an outlet to market, much business in our small towns and cities originates somewhere on these county roads, and the delivery of mail, the transportation of children to consolidated schools, and many other similar activities vitally affecting our people will in a few years be seriously handicapped as a result of the rapid, progressive deterioration of these structures. By neglecting to provide the funds for repair or reconstruction of these damaged or destroyed bridges and culverts, we are simply postponing the day of judgment, since eventually we will be faced with a very large outlay of funds to correct this situation over a short period of time. Indiana is no exception in this respect. Similar conditions exist in many other states.