Our bridge gang is a vital part of our road maintenance, and to date we have kept the moving wheels of traffic on a solid bridge floor. This is all done with gas tax funds only, and at the end of the year we wonder how we accomplished so much with so little money.

REPAIRING OLD BRIDGES

Earl R. Smith,
Gibson County Road Supervisor,
Princeton, Indiana

A large portion of the water that falls on Indiana, east-central Illinois, and northwest Ohio eventually reaches Gibson County. One branch of the Wabash River has its source in Lake Celina in Ohio. This lake has an area of approximately 17,000 acres, and its spillway discharges into the Wabash River. The other branch originates near Fort Recovery, Ohio. Most of the Indiana rivers empty into the Wabash River, which has a watershed of approximately 28,435 square miles, according to the Wabash Levee survey.

In the northern part of Gibson County we have White River and Patoka River running parallel across the county, both emptying into the Wabash River near Mt. Carmel, Illinois, within about a mile of each other.

So, while you men in the northern part of the state have your troubles battling snowdrifts, a little later on Gibson County is faced with the runoff from these melting snows, along with additional heavy rainfalls, causing overflows on a vast area of bottom lands.

Gibson County covers 493 square miles. In January, 1937, our county surveyor and I estimated that about 132 square miles of our county were under water. This naturally resulted in extensive damage to our roads and bridges. This was one of the largest floods in our history, with the possible exception of the 1913 flood. White and Patoka Rivers were higher than in 1913 and did more damage.

We also have numerous dredge ditches in the western part of our county, a network that eventually drains into the Wabash River below the mouth of the Patoka River, requiring numerous bridges with the resulting upkeep. In January, 1937, three large bridges on this network washed out because of insufficient waterways which caused destructive whirlpools. It is necessary that these bridges be of ample length to span the ditches to give ample room for flood water.

At one bridge, 45 feet long, situated just below a railroad trestle, a whirlpool developed that washed out a hole 17 feet deep and 34 feet across at one abutment. The abutment was left standing on three, 26-foot, steel H-beam piling. We hauled rubbish from a large dumping ground and mixed in earth to

fill the hole. We covered the fill with "gob" from coal mine tailings, and it has held through two later floods. Since this was the only outlet for a number of people in that locality, we rushed the repairs along with enough county trucks, WPA trucks, and WPA crews to do the job quickly.

Under another bridge, 56 feet long, a similar washout, 18 feet deep and 86 feet across, occurred. One end dropped into the stream, but the other hung on the abutment. We hitched two 40-tractors, one on each corner, and skidded the bridge out onto the bank in good shape. We damaged only one floor beam.

We are fortunate in having a good foundry centrally situated in our county, which has held the bids on steel each year. We bought from them a 14-foot bent, at 3.25 cents a pound, and put it in the center of this bridge, making it 70 feet instead of 56 feet. This enabled us to put the abutments well up on the spoil banks of the ditch, out of the reach of high water, and providing ample waterway. The bridge was relocated about 150 feet upstream, away from the washout.

Less than a mile downstream a 64-foot bridge was washed out in exactly the same way, except that the hole was 23 feet deep and 156 feet across. One end hung on one abutment which remained standing, but with the approach fill washed out 14 feet behind. The abutment was supported on wood piling which apparently had been exposed by scouring. We hitched our tractors to each corner of the supported bridge end as before; but the wood piling broke off, and the bridge and abutment fell into the 23-foot hole, where they are today. We moved a 76-foot bridge from a vacated slough-crossing at the other side of the county. It was all bolted, and there were no rivets to cut. We oiled it with penetrating oil, moved it in good shape, and set it 150 feet upstream from the washout. A lot of sand and gravel had been washed out and deposited on the adjacent fields. We used WPA labor to remove this material from the fields, using it for approach fill. For this clean-up work, the landowners granted us right-of-way for the bridge site and approaches. The CCC dragline came along and filled the holes, replacing the levee which had been washed out.

We hired a former contractor to do this work. He furnished a concrete mixer, pile driver, and derrick. The new abutment excavations were dug below the water level in the ditch; then timber piling was driven in the bottom. He used hand-picked WPA labor, and we hired extra men between WPA work periods. In that way we got a very satisfactory job at a reasonable cost.

We have an experienced bridge and concrete man in our regular road crew. He builds and repairs bridges and concrete culverts exclusively. The surveyor, when needed, recommends concrete boxes on WPA projects. This WPA crew works

mostly on underpinning old bridge abutments and wing walls. He has a crew of eight hand-picked and experienced bridge men. The county pays him as foreman, the only WPA foreman paid by the county. This man carries a concrete mixer, mounted on automobile wheels, three 18-inch jacks, one 1-ton hydraulic jack, pumps, and many other tools necessary in bridge construction. They go to work all over the county in an old pick-up truck. They haul some material, but a county truck hauls for them when necessary. Our surveyor helps to make plans for almost all culverts and bridges. The foreman keeps a complete record on cost of material and labor on bridge jobs. The results are quite satisfactory.

We buy our bridge lumber at the mill; but usually when we have a bridge floor to lay, we have the lumber delivered. We pay $2.50 for red oak and $3.00 for white oak at the mill. Delivered, the prices are $2.75 and $3.25. We have various stations over the county where we keep an extra supply of lumber on hand.

CLEANING AND STRAIGHTENING WATERWAYS AT BRIDGES AND CULVERTS

Arthur Buerkle,
Tippecanoe County Surveyor,
Lafayette, Indiana

I am sure most of you will agree that, from an engineering standpoint, it is the duty of the highway maintenance forces to keep all drainage structures clear of debris, sandbars, and other obstructions which tend to reduce the waterways in time of heavy rains and floods. You will also agree that a long, straight channel will be less damaging to the structure through or under which the flood must pass.

Tippecanoe County is 24 miles long and 21 miles wide and has 850 miles of county roads. We have about 38 miles of rivers, the Wabash running diagonally across the county and the Tippecanoe traversing the upper northeast portion. There are eight large creeks, the Wildcat with three forks, the Wea with two branches, and Burnetts, Indian, Lauramie, Flint, Moots, and Sugar creeks. There are some 500 miles of court ditches in this county, including 200 miles of open ditches, besides numerous small ravines which carry considerable water in wet seasons and must have drainage structures of some type at all road crossings.

These conditions are probably quite similar to those in most of the 92 counties. The exact number of drainage structures was unknown in most counties until the Statewide Highway Planning Survey was completed. Our county was listed with 50 to 60 structures having spans of 50 feet or over and 125 or more spans of 20 to 50 feet in length, in addition to the many