

REVIEW OF THE WORK OF THE DIVISION OF MAINTENANCE OF THE INDIANA STATE HIGHWAY COMMISSION

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Commission.

Six years ago the State Highway Commission took over a system of roads afterwards known as State Highways. To comply with the law, this system of roads reached every county seat and every town with more than 5,000 population. After the roads were designated as State Highways, the State became responsible for their construction and maintenance, including the bridges, guard rails, marking and signing and other features required to produce and maintain a system of highways that would satisfactorily and safely carry the traffic.

The development that has taken place on this system of roads in this short period of time is very marked. Although some of the roads taken over were in very good condition and have not been changed much, this can not be said of a larger part of the mileage. Many of the roads in the sparsely settled district were trails. Few through routes were suitable for traffic during the good season of the year and practically none were passable throughout their entire length during the winter, spring, or early summer.

The construction division has paved nearly a thousand miles of roads. The bad gaps in the through routes have been improved with stone or gravel when not paved. The narrow roads have been widened. Continuous maintenance throughout the year has been maintained on practically the entire system. As a result we now have a system of about 4,000 miles of state road that are not only passable throughout the year, but are as a rule in excellent condition most of the year. This transition has been brought about in the face of an increase of traffic during the six years of 100 to 200 per cent. Some districts in the state have been opened to a method of transportation that is developing them rapidly.

We have usually rated our field men by the condition in which they kept their roads. This was the greatest stimulus for maintaining a good road. The experiences of some of our men and even hardships suffered by them in the first years of the work are hardly known. One may learn of these best while chatting with them as the soldiers do, who narrate their experiences about the camp-fires.

In this brief paper, however, we will not dwell on such

matters, but will jump from peak to peak, getting a birdseye view of some of the work accomplished, now and then dropping down to look at a detail which may be of special interest or value to those engaged in road work.

Organization of the Division of Maintenance

When the Division of Maintenance was organized in the early part of 1920 there were five district engineers and 25 superintendents. The road mileage in the state system has increased and our organization has increased to take care of this mileage until we now have 6 district engineers and 32 superintendents. On October 1, 1925, our records showed that we were employing 69 foremen, 247 patrolmen, 266 teams with drivers, 41 skilled laborers, 28 tractor operators, 454 truck drivers, 964 common laborers, 13 roller operators, and 7 miscellaneous positions, or a total field force of 2,134 men. This does not include the mechanics and their assistants in the local garages, as these are carried on the motor transport payrolls.

The division does much of its work by contract and the percentage of such work determines the number of employees carried on the state payroll. During the rush period in the late fall and early winter of 1920, we had nearly 5,000 employees on our payroll. This rush of work was brought about by the delay in our new organization getting under way, and also because of the demand to put as many state roads as possible in passable condition for the winter and spring season.

Miles of Road in the State

The work done by the State Highway Commission in the past six years is shown in a general way by comparing the lengths of different types of surface in the state system when taken over with the present lengths. The comparison shows the work accomplished by the whole Department and not merely that of the Division of Maintenance.

TYPE	Brick	Cem. Conc.	Bit. Conc.	Bit. Mac.	Surf. Treat. Mac.	Stone	Gravel	Earth	Misc.	Total
Miles when taken over..	41.0	96.7	7.5	24.0	68.8	796.1	1,892.7	264.7	3,191.5
Miles Jan. 1, 1926.	68.6	933.8	26.0	172.8	23.7	999.7	1,629.0	60.9	20.8	3,935.3

We have recently compiled the lengths of all types of roads in the state by counties, classifying them as state, county and township. This is the most complete report on the lengths of the several classes and various types of road that has ever been compiled. We might say that it is the only complete report of its kind that has ever been made.

TABLE 1-B—SHOWING TYPES OF STATE, COUNTY AND TOWNSHIP ROADS IN INDIANA ON JANUARY 1, 1926

COUNTY	Class of Road	TYPE OF SURFACE										Total by Class	Total in County	
		Wood Block	Brick	Cement Concrete	Bituminous Concrete	Bituminous Macadam	Surface Treated Macadam	Stone Traffic and Water Bound Macadam	Gravel	Gravel on Stone Base	Earth			Misc.
Adams.....	State.....		0.20	0.40		7.16		18.25					26.01	821.12
	County.....			3.85				679.26					683.11	
	Township.....									112.00			112.00	
Allen.....	State.....			35.87		8.40	1.28	31.20					76.75	1,457.50
	County.....			45.25		15.00		312.00	384.50				756.75	
	Township.....									624.00			624.00	
Bartholomew.....	State.....			9.80				2.50	28.02			0.10	40.42	786.82
	County.....			0.30		0.60		91.90	349.60				442.40	
	Township.....								220.50		83.50		304.00	
Benton.....	State.....		0.48	9.73				13.70	19.18		1.00		44.09	755.84
	County.....							223.00	253.00				476.00	
	Township.....							1.00	58.75		176.00		235.75	
Blackford.....	State.....		0.60	0.50				20.60	2.20				23.90	367.77
	County.....			3.50	3.00			125.63	129.12				261.25	
	Township.....								80.62		2.00		82.62	
Boone.....	State.....			16.76					47.97		4.67		69.40	898.14
	County.....								611.74				611.74	
	Township.....								200.00		17.00		217.00	
Brown.....	State.....								19.90				19.90	331.70
	County.....								81.80				81.80	
	Township.....										230.00		230.00	
Carroll.....	State.....		0.10		0.10	4.80	0.45	11.78	26.74				43.97	892.74
	County.....			1.50	0.65	10.75		42.35	514.26				569.52	
	Township.....										279.25		279.25	
Cass.....	State.....		0.19			7.23		15.03	17.57				40.02	1,015.44
	County.....		0.25	6.75	0.19	4.75	0.25	105.41	457.57				575.17	
	Township.....										400.25		400.25	

TABLE 1-B—Continued

COUNTY	Class of Road	TYPE OF SURFACE											Total by Class	Total in County
		Wood Block	Brick	Cement Concrete	Bituminous Concrete	Bituminous Macadam	Surface Treated Macadam	Stone Traffic and Water Bound Macadam	Gravel	Gravel on Stone Base	Earth	Misc.		
Clark	State			14.05			7.10	3.10					24.25	791.64
	County							289.89					289.89	
	Township							61.50	46.50		369.50		477.50	
Clay	State			10.20				13.40					39.94	810.95
	County		2.50	0.50	0.91	0.50		28.48	377.78	0.50			410.67	
	Township								0.75		359.59		360.34	
Clinton	State		1.04	5.72					54.03		1.16		61.95	949.61
	County		6.66	20.15				34.08	780.57		26.95		841.46	
	Township								19.25				46.20	
Crawford	State							23.75			13.25		37.00	475.36
	County							125.02					125.02	
	Township										313.34		313.34	
Davies	State			1.00					23.60	24.10	2.40		51.10	903.07
	County			4.63				63.94	308.25		475.15		376.82	
	Township												475.15	
Dearborn	State			1.25		2.85	3.40	30.05	5.53				43.08	744.87
	County			1.83				117.71	2.25				121.78	
	Township							75.25	2.00		502.75		580.00	
Decatur	State							36.00					36.00	675.90
	County		1.50	5.70		4.70		442.50	0.80				455.20	
	Township							3.80	32.00		148.90		184.70	
DeKalb	State		1.13	1.98		0.30			38.53				41.94	815.19
	County		1.00	2.75					197.00		23.25		224.00	
	Township										549.25		549.25	
Delaware	State		4.45	9.70		3.92		4.60	13.88				36.55	941.80
	County		22.20	13.00	28.60	1.50		53.60	457.60				576.50	
	Township								327.75		1.00		328.75	

Dubois.....	State.....		13.70				0.20	3.30	24.40			41.60	737.20
	County.....						131.85	17.55				149.40	
	Township.....									546.20		546.20	
Elkbar.....	State.....	11.21	35.43		2.68			3.13				52.45	1,021.33
	County.....	21.21	77.34		1.75	0.90		116.18				217.38	
	Township.....							23.00		728.50		751.50	
Fayette.....	State.....		5.45					14.15				19.60	406.05
	County.....		3.20					8.65				115.20	
	Township.....							103.35		26.50		271.25	
Floyd.....	State.....				9.90	4.90	11.80					26.60	341.95
	County.....				16.38		70.16					103.60	
	Township.....							17.06		211.75		211.75	
Fountain.....	State.....	1.26	22.76					15.73		0.60		40.35	775.92
	County.....	0.50			3.00		52.25	318.47				374.22	
	Township.....							214.50		146.85		361.35	
Franklin.....	State.....		1.30				7.80	29.78		3.87		42.75	773.81
	County.....						84.34	129.72				214.06	
	Township.....						13.00	186.50		317.50		517.00	
Fulton.....	State.....		0.31					13.49				13.80	831.82
	County.....	1.24	2.00				20.20	341.46				364.90	
	Township.....									453.12		453.12	
Gibson.....	State.....		23.00		0.40				20.10			43.50	1,014.23
	County.....		2.35		3.18		309.87	59.44				374.84	
	Township.....									595.89		595.89	
Grant.....	State.....		6.96	0.03	4.40		10.20	21.55				43.14	915.54
	County.....	5.25	3.50	5.75	20.20		99.70	593.00				727.40	
	Township.....						2.75	94.00		48.25		145.00	
Greene.....	State.....	0.50	0.90					34.60	24.50	1.00		61.50	1,053.60
	County.....			2.00			192.00	339.90				553.90	
	Township.....									458.20		458.20	
Hamilton.....	State.....		21.10					21.77				42.87	962.12
	County.....		28.63					762.62				791.25	
	Township.....									128.00		128.00	
Hancock.....	State.....	0.75	24.74					17.87				43.36	693.10
	County.....	0.25	0.90		0.50			480.18				481.83	
	Township.....							163.50		4.50		168.00	

TABLE 1-B—Continued

COUNTY	Class of Road	TYPE OF SURFACE										Total by Class	Total in County	
		Wood Block	Brick	Cement Concrete	Bituminous Concrete	Bituminous Macadam	Surface Treated Macadam	Stone Traffic and Water Bound Macadam	Gravel	Gravel on Stone Base	Earth			Misc.
Harrison.....	State.....					3.80	3.10	22.90					29.80	1,092.55
	County.....							242.00					242.00	
	Township.....							11.00	3.00		806.75		820.75	
Hendricks.....	State.....		1.06	18.83				8.62	14.32			42.83	841.20	
	County.....						32.29	152.58	232.71			417.58		
	Township.....								322.02		58.77	380.79		
Henry.....	State.....			19.61		5.30			13.45			38.80	805.75	
	County.....			0.50					468.20		0.44	468.70		
	Township.....								298.25			298.25		
Howard.....	State.....		0.90	7.72	0.56			6.15	15.47			30.80	705.35	
	County.....		1.00	4.50	5.00			57.53	537.05			605.08		
	Township.....										69.47	69.47		
Huntington.....	State.....							19.01	24.09			43.10	824.65	
	County.....			8.20	4.30	1.00		122.20	374.00			509.70		
	Township.....							38.35	155.00		78.50	271.85		
Jackson.....	State.....			26.25				8.30	20.50			55.05	821.67	
	County.....			11.32				4.60	558.51			574.43		
	Township.....										192.19	192.19		
Jasper.....	State.....							49.38	6.00			55.38	1,016.88	
	County.....							360.25	102.75			463.00		
	Township.....										498.50	498.50		
Jay.....	State.....		3.10	2.20		3.10		10.35	15.30			34.05	829.42	
	County.....		9.25	4.87				159.88	304.62			478.62		
	Township.....							27.00	229.37		60.38	316.75		
Jefferson.....	State.....					4.70		28.80	11.00	8.40		52.90	778.88	
	County.....						0.50	266.18	13.30			279.98		
	Township.....							26.00	20.00		400.00	446.00		

Jennings	State						39.00	3.20				42.20	834.19	
	County		0.07				251.57	31.00				282.64		
	Township							33.00		476.35		509.35		
Johnson	State		0.80	15.42	1.25			4.60		4.30		26.37	615.42	
	County			1.20				415.20				416.40		
	Township							154.95		17.70		172.65		
Knox	State		4.10	17.30				25.50	23.40		0.10	71.40	1,035.36	
	County		6.27	9.89			63.10	541.64			2.16	623.06		
	Township									340.90		340.90		
Kosciusko	State		1.09	12.19		0.47		34.42				48.17	1,132.55	
	County		0.53	65.31		0.61	2.84	166.09				235.38		
	Township							595.00		254.00		849.00		
Lagrange	State		0.30	14.12				29.57				43.99	771.77	
	County			4.50				106.21				110.71		
	Township							230.88		386.19		617.07		
Lake	State			23.15	1.87	5.92		45.02			2.83	78.79	1,050.23	
	County		1.99	32.37	36.39	68.92	77.18	462.69				679.54		
	Township									291.90		291.90		
LaPorte	State			18.72	0.13	28.95	0.27	27.33			4.63	80.03	1,209.01	
	County		5.81	8.75	15.06	27.88	41.98	244.22	96.23			439.93		
	Township									689.05		689.05		
Lawrence	State			13.60		2.80	0.45	30.35				47.20	712.09	
	County		0.21	1.85		3.75		333.07	166.01			504.89		
	Township									160.00		160.00		
Madison	State			40.69	1.35			13.90				55.94	995.39	
	County		1.25	43.35	3.50		5.00	730.10				783.20		
	Township							156.25				156.25		
Marion	State	0.05	0.49	68.03	9.94	7.25		3.57				91.98	915.11	
	County		3.00	83.71	13.10	0.90		46.13			19.05	823.13		
	Township													
Marshall	State		2.56	8.40		0.93		9.41	27.80	2.62	1.55	0.33	53.60	956.00
	County				10.45			2.00	308.44				320.89	
	Township									581.51		581.51		
Martin	State			6.80				8.50	4.60	8.60		0.10	28.60	512.60
	County							104.10	7.30				134.10	
	Township									349.90		349.90		

TABLE 1-B--Continued

COUNTY	Class of Road	TYPE OF SURFACE											Total by Class	Total in County
		Wood Block	Brick	Cement Con-crete	Bitum-inous Con-crete	Bitum-inous Ma-cadam	Surface Treated Ma-cadam	Stone Traffic and Water Bound Macadam	Gravel	Gravel on Stone Base	Earth	Misc.		
Miami	State			16.26				1.75	22.15				40.16	844.06
	County		0.80	13.70	4.00			12.80	465.70				497.00	
	Township								111.10		195.80		306.90	
Monroe	State					10.67		34.15	1.30				46.12	640.92
	County							292.70	10.40				303.10	
	Township										291.70		291.70	
Montgomery	State			2.35		0.97			38.91				42.23	976.40
	County		3.70	8.20		8.10		60.63	524.59				605.22	
	Township							1.50	277.09		50.35		328.95	
Morgan	State	0.10	5.25	13.57		0.50		2.30	29.10		0.63		51.45	688.50
	County							16.60	284.70				301.30	
	Township										335.75		335.75	
Newton	State			1.86				47.83					49.69	743.94
	County					0.50		372.25					372.75	
	Township										321.50		321.50	
Noble	State		8.14	14.53					37.50		2.50		62.67	863.43
	County		2.03	36.59				6.02	166.98				211.62	
	Township								213.71		375.43		589.14	
Ohio	State				1.40			5.60	8.90				15.90	194.15
	County							53.75					53.75	
	Township							32.00	2.50		90.00		124.50	
Orange	State		1.60	2.70				43.20			5.20		52.70	692.99
	County							316.04	46.71				362.75	
	Township										277.54		277.54	
Owen	State				0.40			32.52	12.20	1.00		0.10	46.22	720.49
	County							258.94	10.37				269.31	
	Township										404.96		404.96	

Parke.....	State.....	0.06	0.10	24.69				41.88		1.20		67.93	896.68
	County.....						1.00	685.45				686.45	
	Township...							44.45		97.85		142.30	
Perry.....	State.....						10.90	20.90	1.50	12.00		45.30	750.89
	County.....						48.69	33.40				82.69	
	Township...									623.50		625.50	
Pike.....	State.....				0.80					29.80		30.80	729.56
	County.....						70.44	53.57				124.01	
	Township...									574.75		574.75	
Porter.....	State.....			23.48		8.15	26.15				0.79	58.57	793.73
	County.....			0.16		9.20	398.11					412.58	
	Township...									322.58		322.58	
Posey.....	State.....							38.80	2.10			40.90	805.75
	County.....							352.40				352.40	
	Township...									312.45		412.45	
Pulaski.....	State.....		0.62				2.00	19.22				21.84	940.58
	County.....						55.75	347.25				403.00	
	Township...									515.74		515.74	
Putnam.....	State.....		6.59	12.05			17.77	29.79				66.20	854.70
	County.....					1.03	350.89	333.89				655.81	
	Township...									102.69		102.69	
Randolph.....	State.....		1.10				4.85	37.23				43.18	971.02
	County.....		10.46	27.28		2.00	348.15	226.20				614.09	
	Township...						115.00	190.75		8.00		313.75	
Ripley.....	State.....		0.10	5.40			52.00					57.50	835.40
	County.....			3.60			300.20	5.70				309.50	
	Township...									468.40		468.40	
Rush.....	State.....		0.30	5.40			17.70	21.25				44.65	803.70
	County.....			0.08		9.40	147.07	198.50				355.05	
	Township...						20.00	354.00		30.00		404.00	
Scott.....	State.....		0.10	11.94			0.30	8.16	0.15	0.45		21.10	369.51
	County.....			0.50			30.30	131.36				162.16	
	Township...									186.25		186.25	
Shelby.....	State.....			16.05			9.10	7.26				32.41	820.36
	County.....			2.20			68.95	416.80				487.95	
	Township...							298.50		1.50		300.00	

TABLE 1-B—Continued

COUNTY	Class of Road	TYPE OF SURFACE											Total by Class	Total in County
		Wood Block	Brick	Cement Concrete	Bituminous Concrete	Bituminous Macadam	Surface Treated Macadam	Stone Traffic and Water Bound Macadam	Gravel	Gravel on Stone Base	Earth	Misc.		
Spencer	State			6.40					30.70	8.20		9.30	54.60	836.36
	County							156.66				156.66	156.66	
	Township										625.10		625.10	
St. Joseph	State		0.82	26.76	4.64				184.34			0.57	31.97	904.79
	County			89.16		26.15		0.41	129.00				300.88	
	Township										442.94		571.94	
Starke	State		0.21			3.62		43.49	11.57				58.89	724.38
	County							3.00	377.49				380.49	
	Township										285.00		285.00	
Steuben	State			9.74					24.41				34.15	593.88
	County								155.73				155.73	
	Township										404.00		404.00	
Sullivan	State		0.20	25.16				6.80		1.00	0.60	0.90	34.66	881.96
	County							185.57	370.73				556.30	
	Township										291.00		291.00	
Switzerland	State							8.70	14.10				22.80	435.05
	County							127.25	23.00				150.25	
	Township							20.25	0.25		241.50		202.00	
Tippecanoe	State		2.31	12.58					38.19				53.00	903.79
	County		2.00					10.63	648.93				661.56	
	Township								185.65		3.50		189.15	
Tipton	State			12.91					13.90				26.81	606.96
	County			2.00		1.25		18.05	555.35				576.65	
	Township										3.50		3.50	
Union	State			0.50					23.20				23.20	309.80
	County								95.80				101.60	
	Township								181.00		4.00		185.00	
Vanderburg	State			19.20						5.90			25.10	560.86
	County		1.75	10.70	5.50	23.25	24.75	191.15	62.65		1.25		321.00	
	Township								6.00		208.76		214.76	

Vermillion.....	State.....	0.39		3.56					37.11				41.06	488.54
	County.....		5.75	12.17					359.41				377.33	
	Township.....								24.00		46.15		70.15	
Vigo.....	State.....		4.02	24.22					5.25				33.49	819.42
	County.....		25.93	47.68	7.75				485.82				567.18	
	Township.....										218.75		218.75	
Wabash.....	State.....		0.31		3.56				43.89				47.76	882.46
	County.....			8.20	15.90	6.50	3.50	78.60	448.10				560.80	
	Township.....								119.40		154.50		273.90	
Warren.....	State.....			2.64					18.30				20.94	641.54
	County.....			2.60				3.85	449.17				455.62	
	Township.....								27.30		137.68		164.98	
Warrick.....	State.....			10.10		10.60			1.80				22.50	1,000.05
	County.....			0.75		3.20		8.75	12.60				130.80	
	Township.....		0.70								104.80		846.75	
Washington.....	State.....							22.77	6.90	4.00	2.00		35.67	905.18
	County.....							260.65	125.61				386.26	
	Township.....								32.75		450.50		483.25	
Wayne.....	State.....		0.20	21.20		12.17	2.70		7.15		0.70		44.12	799.82
	County.....		0.25	19.45			15.75		708.75		11.50		755.70	
	Township.....													
Wells.....	State.....		1.17			10.81			11.40				23.38	840.58
	County.....		0.75	1.00			3.00	265.77	534.68				805.20	
	Township.....								2.00		10.00		12.00	
White.....	State.....							29.14	14.17				43.31	966.31
	County.....		2.00					254.00	241.50				497.50	
	Township.....										425.50		425.50	
Whitley.....	State.....			23.39				10.04	7.18		1.60		42.21	674.47
	County.....		0.62	2.20		1.00	0.75	5.00	289.69				299.26	
	Township.....								16.00		317.00		333.00	
TOTALS.....	State.....	0.60	68.63	933.78	26.03	172.75	23.65	999.71	1,439.50	190.27	60.88	20.19	3,935.99	73,131.25
	County.....		149.43	796.74	162.05	267.03	235.33	11,296.35	24,581.35		79.91		37,568.69	
	Township.....							448.40	6,327.54		24,850.63		31,626.57	
GRAND TOTALS.....		0.60	218.061	730.52	188.08	439.78	259.48	12,744.46	32,348.39	190.27	24,991.42	20.19	73,131.25	

Compiled by the INDIANA STATE HIGHWAY COMMISSION, Division of Maintenance, January 1926.

There is a tendency for the counties to take over more, if not all, of the township roads. While one of the incentives for this is to get a greater portion of the gas tax, this transition will no doubt result in better and more economical road maintenance in many of the counties.

The state should no doubt take over more miles of county roads. The Federal Highway Law permits Federal Aid on 7% of the roads of the state. Our new compilation of all roads of the state shows a total of 73,111 miles. This would permit Federal Aid on 5,118 miles. Certainly this is the minimum that should be in the state system. However, the larger the mileage that is maintained, the less the paving that could be contracted each year. This factor **must** be recognized in considering the greater mileage.

Activities and Responsibilities of the Division of Maintenance

The activities of the Division of Maintenance are many and varied. One who thinks casually of road maintenance seldom realizes the great variety and classes of work carried on today in maintaining a state-wide system of highways, in safe and suitable condition for traffic all seasons of the year. Of course, the larger part of the work consists in keeping the road surface smooth and suitable for traffic. However, some of the other work is quite as important, if not on such an extensive scale.

The gravel and stone roads must be coated with metal and systematically dragged; the cracks and joints in the concrete and brick roads must be filled with bituminous material; small holes and depressions in these two types of roads are patched with the same kind of material; parts that are broken through to the base must be replaced with new concrete; the bituminous roads are patched with bituminous material and maintained with surface treatments; shoulders and ditches must be sodded and maintained; ruts along the edge of the pavement filled with stone, slag or gravel; weeds and grass must be cut; snow must be removed from the surface to make them passable for winter use; the drainage systems, both surface and underground, must be kept free from obstructions so they will operate; old and narrow culverts must be extended or new ones of proper length installed; and the old steel bridges must be refloored and repainted from time to time. As features of safety, to take care of modern traffic, guard rails must be built and maintained; these, together with headwalls and other obstructions along the road, should be painted white, or white-washed from time to time; narrow fills must be widened; sharp curves reduced; and, last but not least, an effective system

of signs and markers installed to guide traffic and aid in preventing accidents.

No small part of the responsibilities of road officials is keeping the right-of-way clear of undue encroachments by the property of public utilities, such as poles, tracks and other obstructions which are frequently erected so close to the traveled way as to be a great source of danger. A constant warfare must be waged against oil pumps, filling stations, "hot dog" counters and fruit stands, which are continually installed too close to the traveled way. They are a source of great danger because of insufficient space in front of them to accommodate parked machines without interfering with traffic.

It will thus be seen that the work of a highway maintenance organization is not merely the dumping and spreading of gravel, as one high official ignorant of road work, one time expressed himself. If the road maintenance organization is doing its duty, it must function in all the above features. While it is all the time looking in one direction, fighting for its rights which are rights of the citizens, it must at the same time be looking in the other direction, showing a glad hand and a friendly smile to that ever-complaining class of citizens who think the highways are not in such good condition as they should be even though they themselves have never done a single act in all their lives that contributed to the provision or upkeep of a better road.

The responsibilities of the County Highway Superintendents, in maintaining a system of county roads, involve not much less difficulty than the maintenance of a system of state roads.

Accidents on State Highways

The Maintenance Division attempts to make a report on a blank form for this purpose, of all accidents occurring on the state highway system. These accidents are reported for statistical purposes with a view of learning, so far as possible, the cause of accidents. It is hoped that every means possible may be used to reduce them. The following table shows as nearly as our field forces can secure the information, the data concerning these accidents. We do not permit these accident reports to be used in damage suits. We believe that our men would hesitate to furnish their best opinion of the cause of accidents if they knew their statement would be subject to public inspection and possible legal action against them if they were not able to prove their statement.

The following is a summary of the accident reports for the past five years:

COLLISIONS

COLLISIONS	March 1, 1922 to Sept. 30, 1922	Oct. 1, 1922 to Sept. 30, 1923	Oct. 1, 1923 to Sept. 30, 1924	Oct. 1, 1924 to Sept. 30, 1925
Total number accidents reported.....	157	332	370	654
Collisions with other machines.....	49	109	160	302
Collisions with Railroad trains (Steam).....	4	16	6	19
Collisions with guard rails.....	5	14	15	17
Collisions with bicycles.....	1	0	0	1
Collisions with culvert headwalls.....	7	9	11	14
Collisions with telephone poles.....	7	21	12	33
Collisions with wagons.....	2	11	6	7
Collisions with electric cars.....	1	6	5	11
Collisions with fences.....	8	12	12	21
Collisions with animals.....	2	7	8	5
Collisions with bridges.....	5	20	30	40
Collisions with miscellaneous objects.....	20	48	14	22

CAUSES OF ACCIDENTS

Fast driving.....	99	140	181	335
Steep grade.....	8	14	21	28
Sharp curve.....	41	51	33	78
Lack of guard rail.....	8	26	21	22
Wet surface.....	3	13	16	28
Deep ditch.....	5	15	13	27
Intoxication.....	23	25	40	66
Glaring headlights.....	9	17	25	54
Narrow roadway.....	29	59	41	45
Obstructed view.....	9	29	24	47
Miscellaneous causes.....	25	37	14	37

Deaths and Injuries from these accidents were reported as follows:

Accidents reported.....	157	332	370	654
Deaths.....	30	38	50	103
Injuries.....	133	196	255	529

Every effort is being made by the highway commission to eliminate from the state highways those physical conditions which contribute to accidents. This past year, the Maintenance Division alone has eliminated 12 grade crossings with railroads, by relocating the highway. The importance of eliminating these crossings on our heavily traveled roads is demonstrated when we learn, that of the 103 accidental deaths on the state highways this last year, 37 deaths, or over one-third, were caused by accidents at grade crossings. Frequently it is found that a grade crossing can be eliminated by relocating the highway for a much less expense than building a subway or an overhead. Many times the only opposition to such elimination comes from the few residents who live along the old location. It is desired that every county official will use his moral influence, although his county may not be able to help financially, in bringing about the elimination of grade cross-

ings. Certainly no road official should be guilty of lending aid to the perpetuation of this form of murder, for such it might be called, when the crossing can be eliminated at a nominal expense.

Work Accomplished by the Division of Maintenance in 1925

The work of the Maintenance Division is distributed over about 4,000 miles of road and is continuous over this mileage throughout the year. Hence, this work is so scattered that the average citizen does not realize that the total aggregate of work done is so large. This is best brought home to us when we examine a summary of the work done, materials used, etc.

Our records show that during the past year, besides maintaining the entire 4,000 miles of state roads and bridges thereon, this division completed the construction of 24.9 miles of bituminous macadam, 19.9 miles of stone road on an earth foundation, 9.3 miles of gravel road on an earth foundation, rebuilt 18.3 miles of old road as a new gravel road, and rebuilt 66.6 miles of old road as a new stone road.

In the regular routine of maintenance work 106.5 miles of road were given a surface treatment of bituminous material.

During the year this division constructed 61 new bridges, installed 474 new pipe culverts, 48 box and slab top culverts, and 231 pipe culverts were extended. Nearly 4½ miles of guard rail was constructed, eighty temporary bridges aggregating a length of nearly a half mile were built to accommodate traffic around bridges under construction.

During the year the division used nearly 1½ million tons of stone and gravel, 7/8 of a million feet of lumber, 1¼ million gallons of bituminous material and 3¾ miles of culvert pipe.

Expenditures

The following is a statement of the expenditures incurred by the Division of Maintenance since its creation:

SUMMARY OF TOTAL EXPENDITURES FOR SIX YEARS ENDING SEPTEMBER 30, 1925

YEAR	Miles Maintained	Paid Out During Fiscal Year		Total
		For Maintenance	For Construction	
1920	3,200	\$836,380.20	\$836,380.20
1921	3,200	2,361,300.19	\$1,809,499.60	4,170,799.79
1922	3,280	1,641,761.44	824,247.90	2,466,009.34
1923	3,819	2,096,048.29	863,043.36	2,959,091.65
1924	3,916	2,579,251.92	1,356,729.49	3,935,981.41
1925	3,944	2,127,774.09	1,647,617.83	3,775,391.92
Average for six years	3,560	\$1,940,419.35	\$1,083,523.03	\$3,023,942.38