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ROADBUILDING

GROWTH OF EXPENDITURES

IN THE United States, by far the largest single item in construction expenditures in recent years has been the construction and maintenance of roads, streets and bridges. In fact, during post-War years expenditures for this purpose have equaled or exceeded the aggregate amount expended throughout the country on all other types of public works.

TABLE 70
TOTAL EXPENDITURES ON ROAD AND BRIDGE CONSTRUCTION AND MAINTENANCE, UNITED STATES, 1923-1932
(in millions)

YEAR	CITY STREETS AND BRIDGES ¹	RURAL ROADS AND BRIDGES ²	TOTAL ROAD AND BRIDGE EXPENDITURES	ALL OTHER PUBLIC CONSTRUCTION	TOTAL PUBLIC CONSTRUCTION	PERCENTAGE ROADWORK IS OF ALL PUBLIC CONSTRUCTION
1923	\$207	\$784	\$991	\$1,132	\$2,123	47
1924	412	934	1,346	1,306	2,652	51
1925	363	968	1,331	1,481	2,812	47
1926	597	956	1,553	1,421	2,974	52
1927	1,057	1,066	2,123	1,583	3,706	57
1928	788	1,237	2,025	1,606	3,631	56
1929	690	1,248	1,938	1,617	3,555	55
1930	674	1,486	2,160	1,472	3,632	59
1931	511	1,301	1,812	1,255	3,067	59
1932	293	1,015	1,308	696	2,004	65

¹ Estimated on basis of F. W. Dodge Corporation figures for 14 cities.

² U. S. Department of Agriculture, Bureau of Public Roads.

Table 70 shows that between 1923 and 1927 the cost of building and maintaining roads and bridges in urban and rural areas more than doubled; between 1927 and 1930 total expenditures remained relatively constant, but declined sharply during the two years following. Throughout the

entire period, however, the percentage that roadwork constituted of all public construction steadily increased.

This very rapid growth of roadbuilding expenditures has been a relatively recent development brought about by the automobile. The radical transformation in means of transportation must be borne in mind in estimating the probable future persistence of this trend. Comparable figures are not available for pre-War years, but total rural road and bridge disbursements of all kinds by state and local authorities (including principal and interest payments on bonds, the cost of equipment, machinery, materials, rights-of-way and various overheads), which naturally exceed expenditures on construction and maintenance alone, increased from under \$60,000,000 in 1904 to \$240,000,000 in 1914, to \$1,182,000,000 in 1924, and \$1,991,000,000 in 1930.¹ Were similar figures of disbursements for city street and bridge purposes available they would probably aggregate nearly another billion dollars in 1929 and 1930.

Since 1927 expenditures for city streets and bridges have been declining, and this decline was especially rapid during the depression. Expenditures for rural roads and bridges, in contrast, fell off much less sharply in 1931 and 1932, doubtless in part as a result of the greatly increased Federal-aid grants and emergency funds made available to the states for their construction since 1930. Prior to the depression, of total expenditures for road- and bridgebuilding, about two-thirds on the average was spent on rural roads and bridges. During the depression, in consequence of the less rapid decline of expenditures for the latter, as compared with those for city streets and bridges, this proportion has correspondingly increased. Expenditures for the construction of rural roads and bridges have been about double those for maintenance (Table 71). Both declined during the depression

¹ Source: Bureau of Public Roads.

but, as might have been expected, the latter less sharply than the former.

TABLE 71

STATE AND LOCAL EXPENDITURES FOR CONSTRUCTION AND
MAINTENANCE OF RURAL ROADS AND BRIDGES,
UNITED STATES, 1923-1932¹
(in thousands)

YEAR	CONSTRUCTION	MAINTENANCE	TOTAL
1923	\$518,293	\$265,898	\$784,191
1924	637,030	297,179	934,209
1925	651,933	315,877	967,810
1926	616,941	338,853	955,794
1927	689,219	376,754	1,065,973
1928	818,609	418,632	1,237,241
1929	813,982	433,538	1,247,520
1930	1,009,711	475,912	1,485,623
1931 ²	916,620	384,441	1,301,061
1932 ²	644,279	370,594	1,014,873

Source: Bureau of Public Roads

¹ Includes expenditures from Federal-aid appropriations.

² Partly estimated.

PURPOSE OF EXPENDITURES AND SOURCES OF INCOME FOR
STATE AND LOCAL ROAD WORK

Table 72 presents classified expenditures in recent years by state authorities for rural road and bridge work. On the average, expenditures for construction have been more than three times those for maintenance. In contrast, expenditures of county, town and district authorities for local road and bridge work (excluding expenditures on city streets and bridges) have been almost equally divided between these two purposes. Local road maintenance expenditures have somewhat exceeded state maintenance expenditures. The relative importance of state expenditures for construction purposes has, however, been markedly greater. As compared with the figures presented in Table 72, local road and bridge construction expenditures ranged between \$239,000,000 in 1923 and \$297,000,000 in 1930. During the depression state road construction expenditures also held up very much better

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TABLE 72

EXPENDITURES FOR STATE HIGHWAY AND BRIDGE WORK,
UNITED STATES, 1923-1932¹
(in thousands)

YEAR	CONSTRUCTION	MAINTENANCE	OTHER EXPENDITURES ²	TOTAL EXPENDITURES	ALL DIS- BURSEMENTS ³
1923	\$279,246	\$75,329	\$59,141	\$413,716	\$447,362
1924	381,080	104,807	71,726	557,613	605,665
1925	386,967	119,304	91,320	597,591	649,125
1926	351,222	125,617	93,152	569,991	621,744
1927	400,038	138,784	94,817	633,639	699,875
1928	536,294	158,879	69,475	764,648	827,550
1929	557,401	173,060	69,415	799,876	910,485
1930	713,117	191,683	75,198	979,998	1,139,677
1931	730,955	160,980	87,657	979,592	1,091,009
1932	551,446	169,479	95,840	816,765	955,446

Source: Bureau of Public Roads

¹ Under supervision of State Highway Departments.² Expenditures for equipment and machinery, interest on bonds and notes outstanding, and miscellaneous expenses.³ Including principal payments on bonds and notes, and transfers to counties and towns for local roads.

than local, as a result in large measure of increased Federal assistance. They rose markedly in 1930 and 1931, but declined about one-fourth in 1932. Between 1930 and 1932 estimated local road construction outlays, however, were reduced perhaps two-thirds.

Local roadbuilding probably held up fairly well in 1931 but dropped sharply in 1932 both as a result of the introduction of economy programs and because local units had depended so largely on real estate taxation for funds. The tax revenue drop experienced by the *states* was largely made up by the special grants of the Federal government, discussed below. In 1933 highway expenditures by counties and municipalities were reduced to little more than that sufficient for routine maintenance.²

² *Engineering News-Record*, February 8, 1934, p. 169. "State funds for roads, depleted by a diversion of about \$200,000,000 for direct relief and other non-highway uses, amounted to about \$276,000,000 less than in 1932. Naturally, only a minor part of the Recovery Act fund (of \$400,000,000), some \$75,-

Of the total funds available for state highway and bridge work (Table 73), a growing proportion, in recent years amounting to over one-half, has been derived from motor vehicle fees and gasoline tax receipts. In 1923 the yield from the latter was almost negligible. The receipts from both these sources of income held up fairly well during the depression years 1930-32. The other large item of income, Federal grants to the states for rural post roads, increased to well over twice its previous average in 1931, though it declined again the following year. The increase was largely due to the emergency funds made available by the Federal government. Receipts from borrowing, on the other hand, which had rapidly increased each year since 1927, declined very sharply. Of the smaller items, state road tax levies remained substantially unchanged during these years, but appropriations by the states and transfers from local authorities were in 1932 both cut to a third of their 1929 figures. It is clear that the enlarged state roadbuilding expenditures in 1930 and 1931 and their still substantial volume in 1932, which were the main factors in preventing total expenditures for road and bridge purposes throughout the country from declining more sharply during the depression, were made possible chiefly by increased Federal assistance and much augmented gasoline tax receipts. The aggregate income of local authorities, county, town and district, available for highway and bridge work, declined much more sharply in 1931 and 1932 than

000,000, actually went into payrolls of 1933; but considering half of the fund as nominally to be credited to 1933 roadbuilding, it falls far short of making up the decrease in state and local road funds. The significant fact of the year's roadbuilding . . . was . . . that this financial set-up greatly extended Federal control over state highway activities. . . . With the 1933 season the system of Federal aid to roadbuilding, as it was begun in 1917 and continued through 1932, ceased to exist through abandonment of the restriction of Federal funds to the trunkroad network. A large part of the year's special allocation was earmarked for use on secondary roads and municipal thoroughfares. This step may mark the beginning of absorption of the entire road system into a unified, Federally controlled network."

TABLE 73

INCOME AND FUNDS AVAILABLE FOR STATE HIGHWAY AND BRIDGE WORK, 1923-1932¹
(in thousands)

SOURCE OF INCOME	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932
State road tax levy	\$24,348	\$18,283	\$21,489	\$18,279	\$18,770	\$11,956	\$11,431	\$11,182	\$12,935	\$10,885
Appropriation by state	37,462	20,084	33,391	29,868	30,795	42,468	60,306	32,136	22,503	20,703
State share of										
(a) motor vehicle fees	147,076	174,817	199,845	224,552	259,855	259,135	278,093	289,802	253,403	211,321
(b) gasoline tax receipts	15,873	47,811	89,328	134,303	169,818	234,164	287,258	411,109	386,183	363,368
Receipts from bonds and notes	88,187	101,653	141,402	103,846	90,979	121,484	161,229	222,288	130,614	104,650
Federal-aid post road fund	72,343	91,401	92,180	79,163	80,460	80,798	77,573	92,463	218,074 ²	136,857 ³
Transfers from local authorities	66,753	87,998	71,737	69,974	76,639	86,710	74,190	60,609	47,783	24,611
Miscellaneous income	15,498	13,350	15,052	13,224	12,470	12,612	11,727	17,084	21,144	25,922
Total income	467,541	555,397	664,425	673,208	739,785	849,327	961,807	1,136,673	1,092,637	898,318
Balance from previous year	138,834	156,827	115,657	133,479	182,714	186,160	232,968	286,490	275,334	275,259
Total funds available	\$606,375	\$712,224	\$780,081	\$806,688	\$922,499	\$1,035,486	\$1,194,775	\$1,423,164	\$1,367,970	\$1,173,576

Source: Bureau of Public Roads

¹ Under supervision of State Highway Departments.

² Includes emergency funds of \$62,730,000.

³ Includes emergency funds of \$25,448,000.

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state funds, the reduction in the receipts from bonds and notes being especially severe. In the building of local highways and bridges local road tax levies have been the largest single source of income, constituting over 40 per cent of the total funds available in recent normal years. Other important items are the local share of gasoline tax receipts and motor vehicle fees, receipts from borrowing and appropriations from general funds.

FEDERAL-AID FUNDS

Federal-aid payments to states for cooperative construction of rural roads, a form of public expenditure similar in principle to grants made for various public improvements by states to local governments, represent one of the most systematic of Federal public works programs.

These grants, made under the terms of the Federal Highway Aid Act of November 1921,³ which authorizes the Secretary of Agriculture to cooperate with the several states through their state highway departments in the improvement

³This Act provided that a system of highways, known as the Federal Aid Highway System, should be designated by the highway department of each state and approved by the Secretary of Agriculture. Such systems were limited by the law to 7 per cent of the total highway mileage in each state, and Federal aid could be allotted only to roads included in the systems. When provision had been made for the completion and maintenance of 7 per cent of the total, the state was authorized to add to the system of Federal-aid highways. Before any project could be approved by the Secretary of Agriculture, the state was required to make provision for state funds each year for the construction, repair and maintenance of all Federal-aid highways within the state. Standards of construction and of materials used were to be set by the Secretary of Agriculture, the work being subject to inspection and approval by him. Payments by the Federal government were limited to 50 per cent of the actual cost and were not to exceed \$15,000 per mile, except in the case of bridges and for roadbuilding in states having unappropriated public lands (procedure under Federal Highway Act of November 9, 1921, U. S. Department of Agriculture, Bureau of Public Roads).

Under an amendment to this law by Section 304 of the Emergency Relief and Construction Act of 1932, state highway departments were authorized, with the approval of the Secretary of Agriculture, to increase the original 7

of highways, were at the rate of \$75,000,000 annually after 1925. By act of Congress, April 1930, Federal authorizations for each of the fiscal years ending June 30, 1931, 1932 and 1933 were raised by \$50,000,000 to \$125,000,000. The additional allowance, immediately apportioned, was available at once for new projects. Furthermore, with the purpose of affording through Federal-aid road work the greatest possible measure of relief consistent with the limitations of existing authorized appropriations, the Secretary of Agriculture apportioned the appropriation authorized for the fiscal year 1932 on September 1, 1930, three months earlier than usual. Finally, on December 20, 1930, Congress appropriated another \$80,000,000 to be apportioned among the states in the same manner as Federal aid and to be used by them in lieu of an equal amount of state money in matching regular Federal-aid funds. The fund was made available only for expenditure on work actually completed by September 1, 1931, and virtually the entire amount was spent by that date. The Act provided for the reimbursement of the Federal treasury by deductions from future Federal-aid apportionments over a five-year period beginning with the fiscal year 1932-33.⁴ It was an emergency measure to supply deficiencies of state revenue and make possible increased employment on road work during the early roadbuilding season of 1931.

1929-1930: The virtual doubling of Federal-aid grants and their earlier availability resulting from these three separate actions taken in 1930 made it possible for the states in time to put through the largest Federal-aid construction program until then

per cent mileage of the Federal-aid system by the addition of not more than 1 per cent of the total mileage of their respective states when provision had been made for the completion and maintenance of 90 per cent of the original 7 per cent system, and thereafter to make like increases in the mileage under similar conditions.

⁴ *Annual Reports*, 1930 and 1931, Bureau of Public Roads.

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recorded. During the fiscal year ending June 30, 1930, however, Federal funds disbursed on all active road and bridge projects, amounting to \$75,880,863, were about \$6,200,000 less than for 1929 (Table 74) and the mileage improved with Federal aid was lower than in any year after 1924. "The decline was antici-

TABLE 74
FEDERAL-AID FUNDS APPORTIONED TO THE STATES, OBLIGATED
BY THE STATES TO PROJECTS, AND PAID TO THE STATES,
1923-1933
(in thousands)

FISCAL YEAR	APPORTIONED ¹	OBLIGATED	PAID ¹
1923	\$48,750	\$77,462	\$69,677
1924	63,375	89,867	79,217
1925	73,125	87,294	95,750
1926	73,125	79,609	87,755
1927	73,125	77,453	81,371
1928	73,125	88,922	80,802
1929	73,125	70,429	82,097
1930	73,125	102,498	75,881
1931	121,875	157,953	133,341
1932	121,875	83,794	127,367
1933	106,034 ²	46,689 ³	101,266 ⁴

Source: *Annual Report, 1933, Bureau of Public Roads*

¹ The excess of total payments over total apportionments for these years was possible because from 1917 to 1922 inclusive the apportionments exceeded the payments by more than equal amounts.

² Apportionment of \$121,875,000 less deduction of one-fifth of the emergency advance funds paid to the states. In addition there was an emergency construction apportionment of \$120,000,000.

³ In addition \$116,742,000 was obligated during the fiscal year from the emergency construction appropriation of \$120,000,000.

⁴ In addition \$62,132,000 was paid to states during the fiscal year, and \$23,122,000 had been earned by the completion of work and was due to be paid on the receipt of vouchers, from the emergency construction appropriation of \$120,000,000.

pated and was the natural result of the contraction of the program to a \$75,000,000 basis, necessitated by the authorization of that annual sum for several years and the final absorption of the unobligated balances of funds appropriated for the earlier years."⁵ On the other hand, although the increase in the appro-

⁵ *Annual Report, 1930, Bureau of Public Roads*. Although the amount of the appropriation provided for each year since 1925 has been the same (\$75,000,000), it was found possible to carry on road construction at a more rapid rate

priations authorized by Congress for the fiscal years 1931, 1932 and 1933 was not made until April 1930, less than three months before the close of the fiscal year, the immediate response of the states resulted in the obligation of \$102,498,084 to definite projects during this year as compared with \$70,428,896 obligated during the fiscal year 1928-29.

1930-1931: This large increase in funds obligated was followed during the succeeding year by a considerable enlargement of expenditures. Federal-aid funds actually paid to the states were three-quarters larger than in 1929. The amount obligated during the year reached the unprecedented total of \$157,952,903, a sum almost twice the average amount obligated annually, 1923-29, and more than \$55,000,000 greater than the amount obligated during the fiscal year 1930, which was the largest sum obligated in any year up to that time.

Yet these figures do not fully measure the extent of the Federal government's monetary contribution to the states for road work during the year. To them must be added \$76,777,000 of advance funds obligated to projects from the \$80,000,000 emergency appropriation made at the end of 1930. Though these funds were not appropriated until December 20, 1930, \$20,296,000 were actually paid for work done during the last six months of the fiscal year 1930-31, and virtually all were expended for labor performed and materials supplied by the end of August.⁶

1931-1932: The apportionment of the Federal-aid appropriation authorized for the fiscal year 1932 was \$121,875,000 (\$125,000,000 less 2.5 per cent deduction for administration). Table 74 shows

because a balance of funds authorized and appropriated for the earlier years and not expended within the year for which they had been intended was available (see note 1 to Table 74).

⁶ *Annual Report*, 1931, Bureau of Public Roads, Tables 1 and 2. "The reason for this emergency advance appropriation was the knowledge that because of the depletion of their funds a number of states could not match the Federal aid available at the end of the calendar year 1930 and that initiation of new work would be retarded for this reason. The immediate result of the appropriation was largely to increase the obligation of regular Federal aid funds." These obligations were quickly reflected in the amount of active construction work.

that though the amount obligated during this year, \$83,794,000, was little more than half the sum obligated during 1931, yet the amount actually expended was only slightly less.

1932-1933: In the apportionment of the appropriations of \$121,875,000 authorized for the fiscal year 1932-33, the sums due the several states were reduced by the amount of the first of the five annual deductions on account of the emergency advance of \$80,000,000 provided by the act of December 1930. The balance available for apportionment was \$106,034,000. This amount, added to nearly \$40,000,000 unobligated at the beginning of the fiscal year 1932 increased the sum available for allotment to projects during 1932-33 to \$146,000,000. Table 74 indicates that though Federal-aid funds obligated during the year were only a little more than half the sum obligated during the preceding year, the amount paid to the states was only about a fifth less, and was exceeded only by expenditures during the two preceding years. The amount of Federal funds allotted was 70 per cent greater, because the allotment included nearly \$100,000,000 of emergency construction funds.

Under the provisions of the Emergency Relief and Construction Act of July 21, 1932, \$120,000,000 were made available for emergency construction work on the Federal-aid highway system. The Act required apportionment of the appropriation among the several states in accordance with the regular Federal-aid formula, to be used as a temporary advance, and in lieu of state funds, to match the regular annual Federal-aid funds available to the states. It was provided that the sums advanced should be reimbursed to the Federal government by deduction from future Federal-aid appropriations over a period of ten years beginning with the fiscal year 1938.

The construction season of 1932 was far advanced when these funds became available. Consequently the rate of expenditure was at first considerably slower than it would have been had the appropriations been provided earlier in the

year. With the object of ensuring prompt expenditure and quickly increased employment the Act stipulated that the money should be advanced only for work performed before July 1, 1933, but the time of availability was later extended to January 1, 1934.

As shown in Table 74, actual disbursement of these funds to June 30, 1933, the original terminal date, amounted to over \$62,000,000. An additional sum of \$23,000,000 had been earned by the completion of work, and payment only awaited the receipt of vouchers from state highway departments. Of the total appropriation only \$3,258,000 remained unobligated at the end of the fiscal year. The increase in mileage of the active construction program at the close of the year over that of the preceding year is attributable to the appropriation of \$120,000,000 made by the Emergency Relief and Construction Act of 1932.

The combined effects of increased authorizations of funds, their earlier availability, and emergency appropriations dur-

TABLE 75

TOTAL MILEAGE OF FEDERAL-AID HIGHWAYS
INITIATED, MONTHLY, 1927-1933¹

MONTH	1927	1928	1929	1930	1931	1932	1933
January	654	600	594	285	879	409	1,273
February	708	713	404	291	1,376	463	1,092
March	693	530	350	562	1,821	566	1,010
April	670	763	333	673	1,801	637	653
May	508	647	406	696	1,436	605	293
June	532	686	578	661	1,050	667	86
July	580	566	656	700	799	641	106
August	588	575	628	669	636	762	147
September	532	535	526	606	437	756	130
October	571	428	439	621	396	1,171	75
November	606	500	436	649	398	1,445	...
December	742	541	304	683	421	1,472	...

Source: U. S. Department of Agriculture, Bureau of Public Roads

¹ Three-month moving average of data adjusted for seasonal variations.

ing the depression are reflected in the record of mileage of new roads initiated from month to month presented in Table 75.⁷

ROAD CONSTRUCTION IN NATIONAL FOREST SYSTEM AND NATIONAL PARKS

Not only was cooperative highway construction accelerated by means of enlarged Federal-aid grants to the states, but the highway building program for the national forests was also more than doubled during the fiscal years 1931-33 through a Congressional appropriation of \$5,000,000 for each year in addition to the amount appropriated annually (\$7,500,000) in recent years. Another \$3,000,000 were appropriated by the act of December 20, 1930 for the purpose of increasing employment. Subsequently for the construction of forest highways \$5,000,000 were appropriated by the Emergency Relief and Construction Act of 1932, to be available for expenditure during the fiscal year 1933 (later extended through the fiscal year 1934).

Appropriations authorized by Congress for the construction and improvement of highways in the national parks were also increased. For the fiscal year 1931 the amount of the regular appropriation was raised to \$5,000,000, as compared with an expenditure of \$3,500,000 authorized for the preceding year. Moreover, the emergency act of December 20, 1930 provided an additional \$1,500,000 for further relief of unemployment. For both fiscal years 1932 and 1933 appropriations of \$7,500,000 were authorized.

⁷This series was obtained from the two published series of highways under construction and completed, respectively, by taking the first differences between successive monthly figures of the former and adding the new mileage completed at the end of each month.

HIGHWAY CONSTRUCTION UNDER THE PWA

The fiscal year 1933 ended, for the first time in seventeen years, without definite provision by Congress for the continuance of the program of Federal-aid road construction. In place of the usual authorization, provision was made in the National Industrial Recovery Act, approved June 16, 1933, for the construction of highways as a means of providing employment during the fiscal year 1934. For this purpose \$400,000,000 were appropriated under Section 204 of Title II for expenditure on Federal-aid roads and their extension into and through cities, and on secondary and feeder roads in all states. An additional \$50,000,000 were appropriated under Section 205 for forest and park roads and roads in Indian reservations and through public lands. As no Federal-aid appropriation had been authorized for the fiscal year 1933-34, the total sum which under existing legislation was available as Federal aid during this year amounted to little over \$15,000,000.

Section 204 provided that no part of the funds apportioned to any state need be matched by the state and that the funds might also be used in lieu of state funds to match unobligated balances of previous apportionments of regular Federal-aid appropriations. It further required that all contracts involving the expenditure of such grants should contain provisions establishing minimum rates of wages to be paid skilled and unskilled labor. In the expenditure of such amounts the limitations of the Federal Highway Act of 1921 upon highway construction within municipalities, and upon the payments per mile that might be made from funds, were removed. The labor provisions of the Act (Sec. 206) required that, as far as practicable, no individual directly employed should be permitted to work more than thirty hours per week and that the maximum of human labor should

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be used in lieu of machinery "wherever practicable and consistent with sound economy and public advantage".

The status of this program of road construction, as of December 31, 1933, is presented in Table 76. All but 1.5 per cent of the total \$400,000,000 made available had been assigned by the end of 1933, but only a relatively small portion had been spent—probably not more than \$50,000,000. Inevitably, however, the program was not started until late in the

TABLE 76
STATUS OF ROAD CONSTRUCTION, AS OF DECEMBER 31, 1933,
UNDER THE NRA PUBLIC WORKS PROGRAM¹
(values given in thousands of dollars)

	CLASS I	CLASS II	CLASS III	
	PROJECTS ON FEDERAL-AID HIGHWAY SYSTEM OUTSIDE OF MUNICIPALITIES	NATIONAL RECOVERY MUNICIPAL HIGHWAY PROJECTS ²	PROJECTS ON SECONDARY OR FEEDER ROADS	SUMMARY OF CLASSES I, II AND III
Funds assigned	\$186,552	\$112,580	\$94,869	\$394,000
Roads completed				
Total cost	\$8,006	\$2,714	\$1,051	\$11,772
National recovery funds	\$7,384	\$2,662	\$1,040	\$11,086
Regular Federal aid	\$374	\$31	. . .	\$406
Mileage ³	1,294	89	152	1,536
Under construction				
Estimated total cost	\$101,114	\$23,494	\$34,967	\$159,575
Funds allotted	\$91,343	\$22,687	\$33,234	\$147,264
Regular Federal aid allotted	\$5,230	\$331	. . .	\$5,561
Percentage completed	26.3	20.3	18.7	23.7
Mileage ³	5,764	402	4,338	10,504
Approved for construc- tion				
Funds allotted	\$41,520	\$26,259	\$25,660	\$93,439
Mileage ³	2,764	472	2,371	5,607
Balance of funds avail- able for new projects	\$46,305	\$60,973	\$34,934	\$142,212

Source: Bureau of Public Roads

¹ As provided in Title II, Sec. 204, NIRA.

² On extensions of the Federal aid highway system into and through municipalities.

³ Actual amounts (not in thousands).

year. In Table 77 the sharp increase of employment in October and November is evidence of the accelerated highway con-

TABLE 77

COMMITMENTS, EXPENDITURES AND NUMBER EMPLOYED
ON FEDERAL AND FEDERAL-AID HIGHWAY CONSTRUCTION,
MONTHLY, 1933¹
(in thousands)

MONTH	CONTRACTS AWARDED AND OTHER WORK		EXPENDITURES	DAILY AVERAGE NUMBER EMPLOYED ³
	STARTED ²			
January	\$11,775		\$13,181	75,325
February	8,324		11,269	78,009
March	6,748		13,418	95,133
April	7		15,891	120,101
May	. . .		18,252	139,253
June	3,911		25,804	150,835
July	15,841		21,544	127,441
August	52,604		19,228	108,758
September	4,417		13,126	77,774
October	64,084		12,870	146,534
November	49,613		17,529	177,011
December	49,828		16,792	156,576

Source: Federal Employment Stabilization Board

¹ Including public land roads, forest highways and national park roads.

² Including force accounts.

³ The slight discrepancy between these figures and those of Table 78 is explained by the omission here of certain minor items, such as roads and trails of national parks in the Department of the Interior.

struction under the NRA public works program. The failure of the expenditure figures to increase correspondingly, however, would appear to indicate that the employment figures also in some measure reflect the increasing utilization of hand work. (For subsequent progress under the PWA see Ch. V.)

The development of roadbuilding under PWA grants was hindered by the economy programs of local units, both state and municipal, mentioned above, for engineers and other experts had been discharged and it was not possible to extend plans for increased roadbuilding without their aid. As a result, about 25 per cent of the PWA money was

being spent at the end of 1933 on secondary roads, which were built without plans, and by force account, with the engineers one jump ahead of construction.

NUMBERS EMPLOYED ON FEDERAL AND STATE ROAD WORK

The greatly augmented authorizations and expenditures in 1931 had the effect of materially increasing the number employed on highway construction.

Virtually complete reports of labor employed on the various classes of road work under the supervision of Federal and state agencies, available from January 1931, show that the average number employed on all Federal and Federal-aid road construction, including national forest and park work, increased by 124,000 between January and June 1931; the gain in employment in state and state-aid roadbuilding during the same period was only 90,000 (Table 78). The figures in Table 78 do not

TABLE 78

NUMBER EMPLOYED DIRECTLY ON ALL FEDERAL AND FEDERAL-AID HIGHWAY CONSTRUCTION AND ON ALL FEDERAL AND STATE HIGHWAY CONSTRUCTION AND MAINTENANCE, MONTHLY, 1931-1933
(in thousands)

MONTH	FEDERAL AND FEDERAL-AID HIGHWAY CONSTRUCTION ¹			FEDERAL AND STATE HIGHWAY CONSTRUCTION AND MAINTENANCE ²		
	1931	1932	1933	1931	1932	1933
January	31	30	75	149	229	266
February	38	27	78	172	218	255
March	55	28	96	205	212	279
April	98	42	122	264	246	300
May	127	59	140	311	260	330
June	155	72	152	363	281	360
July	165	81	127 ³	385	305	...
August	151	89	109 ³	390	333	...
September	116	122	78 ³	357	374	...
October	89	124	147 ³	330	373	...
November	62	130	177 ³	289	372	...
December	36	98	156 ³	245	290	...

Source: *Annual Reports*, 1932 and 1933, Bureau of Public Roads

¹ Includes national forest roads and national park roads.

² Includes state aid roads.

³ Figures of Federal Employment Stabilization Board.

include workers engaged upon road and street construction and maintenance under the administration of city, county and township authorities, and are only for those directly employed upon road construction and maintenance work of the Federal and state governments.

The low level of employment in January 1931 was due primarily to the exhaustion of state highway revenues during the preceding active construction season and to the non-availability, in many states, of revenues for the new year. The effect of the emergency advance of \$80,000,000 of December 1930, which was designed to correct this condition, is reflected in the rapid increase of employment on Federal work to a peak of 165,000 in July 1931. In very large part the rapidly increasing employment on Federal-aid construction in the spring and early summer of 1931 was financed with regular Federal-aid funds and the Federal funds advanced to match them. The effect of the time limit set upon the utilization of funds advanced is manifest in the decline in Federal-aid employment after July 1931, a drop which continued throughout the winter of 1931-32. But while employment on Federal and Federal-aid work was considerably less during this winter and spring than in the corresponding seasons a year previous, the states were able until June to maintain employment on independent state work considerably above the level of the preceding year. Their ability to do so was an indirect consequence of the Federal advance which made possible the saving of state funds for later expenditure than usual.

The effect of the exhaustion of this emergency appropriation is clearly shown in the comparative figures for the months up to August in 1931 and 1932 respectively. From March to August employment on Federal projects during 1932, when regular Federal-aid appropriations were the only funds available, was about half the amount it had been in 1931. The difference between the two years in both Federal and state construction together is less marked.

The availability of the emergency appropriation of \$80,000,000 terminated on September 1, 1931. The new emergency

appropriation of \$120,000,000 under the Emergency Relief and Construction Act of 1932 was made available on July 1, 1932. Federal employment, which had fallen off sharply after August 1931, began to increase markedly in September 1932. In every month thereafter the effect of this appropriation is clearly indicated by the excess of employment over the corresponding month of the preceding year, when no emergency appropriation was available, the average increase on Federal and Federal-aid work being reflected in an increase in total employment. Federal and Federal-aid work gave employment throughout the winter of 1932-33 to more than twice as many men as had been employed on the same kind of work during the preceding winter.⁸

The course of employment on roadbuilding under the PWA program, 1933-35, has been traced in Chapter V (see especially Tables 18 and 26).

The Bureau of Public Roads has estimated that for every person directly employed on road work proper two others are employed on the average in the manufacture and transportation of road materials and equipment.⁹

⁸ "From the sharp increase in Federal employment in September 1932, less than two months after the passage of the Emergency Relief and Construction Act, it is apparent that the benefits of the emergency funds were very quickly felt by labor" (*Annual Report, 1933, Bureau of Public Roads*).

⁹ Thomas H. MacDonald, chief of the Bureau of Public Roads, has described the large number of workers who indirectly participate in the distribution of road funds as follows: "Direct labor costs on the simplest grading work may run to more than 80 per cent of the total expended, but for the types of road which are being built to meet the actual needs of traffic the average payment to labor directly on the work would be between 20 and 30 per cent. This does not, however, represent the value of the road dollar to labor.

"Although it is exceedingly difficult to analyze, because of the wide variations in types of work and all other conditions, there is a very general agreement among highway executives that upwards of 85 per cent of the road dollar goes eventually for labor and personnel employment. The road dollar spreads back through stone quarries, sand and gravel plants, cement factories, petroleum fields and refineries, mines, engages rail and water transport facilities, and keeps the wheels of equipment and accessory factories turning. Labor and personnel employment in all of these receive a part of the road dollar" (address before the annual meeting of the American Association of State Highway Officials, September 29, 1931, reported in press release of U. S.

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Department of Agriculture; see also *Annual Report*, 1933, Bureau of Public Roads, pp. 39-40).

The Bureau of Public Roads no longer applies the estimate of two indirectly employed for each one directly employed, as it is considered that the increased use of hand labor on the roads under the NRA provision has destroyed this proportion.