

**Issues Surrounding the Federal-Aid Highways Program and the
Highway Trust Fund**

by

Vic Miller

Senior Fellow for Intergovernmental Finance

for

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You've asked me to comment on the Federal-Aid Highways program, in particular focusing on the Highway Trust Fund, its purpose and status. To begin, I'd like to look back a bit at the history of highway finance in the context of how government finance works in this country.

The Past as Prologue

The federal government was originally very weak fiscally, financing itself primarily out of customs revenue. This changed during the Great Depression and World War II. Today, the federal government is the dominant fiscal force in the U.S. The federal government collects almost two thirds of government revenue in this country, local governments about one-sixth, and states an increasing share approaching 20 percent.

Table 1. Governmental Shares of Receipts in the United States
(National Income and Product Accounts basis; calendar years)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Federal	65.4%	64.1%	63.6%	63.7%	64.0%	64.3%	64.9%	65.6%	65.8%	65.5%	65.7%	64.1%
State	18.2%	19.2%	19.6%	19.6%	19.5%	19.3%	18.9%	18.5%	18.2%	18.5%	18.5%	19.8%
Local	16.5%	16.7%	16.8%	16.6%	16.5%	16.3%	16.2%	16.0%	16.0%	16.0%	15.7%	16.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Unlike overall governmental revenues, highway user revenues are primarily collected by state and local governments. As seen in Table 2, about \$100 billion was collected in highway user revenues in calendar year 2000; of this state and local governments collect about two-thirds. The federal share varies from highs in Georgia (66%) and South Carolina of (54%) to lows in Hawaii (23%) and Maryland and New York (each 26%).

Grants-in-Aid

Grants from the federal government to states were few until the 20th century. It was the passage of the Federal-Aid Road Act of 1916 and the Federal Highway Act of 1921 that really initiated the current system of grants-in-aid. Until the introduction of major programs of Depression area grants for jobs purposes and supporting local tax bases, highway grants were by far the major state-federal fiscal interaction.

Federal-Aid Highways again became an important component of grants following World War II. In the 1950s it was the largest grant program, it is now second largest. As seen in Table 3, federal-aid highways spending has doubled each of the past two decades. It is, however, only about one-fifth the size of Medicaid, which has grown to dominate the system.

Table 3. Highways and Medicaid as Share of Total Grants
(fiscal years; outlays in \$ millions)

	1962	1972	1982	1992	2002	2008 1/
Federal-Aid Highways	\$2,752	\$4,562	\$7,590	\$14,884	\$29,833	\$32,425
Medicaid	0	4,301	17,391	67,827	147,650	252,498
Total Grants	7,926	34,375	94,704	178,065	351,550	482,278
Highways share	34.7%	13.3%	8.0%	8.4%	8.5%	6.7%
Medicaid share	0.0%	12.5%	18.4%	38.1%	42.0%	52.4%

1/ FY 2004 Budget projection.

Table 2. Highway User Revenues - 2000
(dollars in thousands)

State	Fuel and Vehicle Taxes		State/Local	Total	Federal Share
	Federal	State/Local	Tolls		
Alabama	\$722,022	\$795,790	\$0	\$1,517,812	47.6%
Alaska	75,170	69,864	15,900	160,934	46.7%
Arizona	662,811	839,587	0	1,502,398	44.1%
Arkansas	466,842	521,899	0	988,741	47.2%
California	3,473,608	7,554,477	450,378	11,478,463	30.3%
Colorado	491,847	836,082	27,119	1,355,048	36.3%
Connecticut	356,977	781,821	136	1,138,934	31.3%
Delaware	91,220	200,269	146,627	438,116	20.8%
DC	38,737	95,450	0	134,187	28.9%
Florida	1,777,038	3,254,862	614,959	5,646,859	31.5%
Georgia	1,346,084	679,852	21,497	2,047,433	65.7%
Hawaii	80,116	265,366	0	345,482	23.2%
Idaho	201,390	333,559	0	534,949	37.6%
Illinois	1,239,405	2,341,302	390,002	3,970,709	31.2%
Indiana	884,744	1,284,492	85,325	2,254,561	39.2%
Iowa	411,910	770,011	0	1,181,921	34.9%
Kansas	393,883	524,601	61,198	979,682	40.2%
Kentucky	651,574	1,210,267	13,572	1,875,413	34.7%
Louisiana	597,609	671,606	34,554	1,303,769	45.8%
Maine	184,989	253,242	58,496	496,727	37.2%
Maryland	618,074	1,641,212	148,909	2,408,195	25.7%
Massachusetts	626,054	951,183	229,267	1,806,504	34.7%
Michigan	1,234,337	1,892,363	32,646	3,159,346	39.1%
Minnesota	503,790	1,281,743	0	1,785,533	28.2%
Mississippi	483,839	540,028	0	1,023,867	47.3%
Missouri	856,187	961,340	860	1,818,387	47.1%
Montana	157,969	267,948	0	425,917	37.1%
Nebraska	274,504	389,165	1,470	665,139	41.3%
Nevada	248,625	553,999	0	802,624	31.0%
New Hampshire	157,381	393,275	60,213	610,869	25.8%
New Jersey	987,834	1,173,185	711,611	2,872,630	34.4%
New Mexico	306,042	501,968	0	808,010	37.9%
New York	1,428,411	2,193,452	1,987,071	5,608,934	25.5%
North Carolina	1,051,899	1,365,157	1,590	2,418,646	43.5%
North Dakota	114,684	161,986	0	276,670	41.5%
Ohio	1,348,720	2,085,499	177,310	3,611,529	37.3%
Oklahoma	564,833	927,994	132,344	1,625,171	34.8%
Oregon	434,244	751,763	3,469	1,189,476	36.5%
Pennsylvania	1,405,543	2,559,311	534,789	4,499,643	31.2%
Rhode Island	94,226	241,772	11,385	347,383	27.1%
South Carolina	628,273	536,069	0	1,164,342	54.0%
South Dakota	117,590	183,119	0	300,709	39.1%
Tennessee	859,392	1,008,491	32	1,867,915	46.0%
Texas	2,929,099	6,886,299	376,313	10,191,711	28.7%
Utah	283,997	397,894	197	682,088	41.6%
Vermont	80,438	202,230	0	282,668	28.5%
Virginia	988,578	1,854,916	112,944	2,956,438	33.4%
Washington	675,071	1,473,561	97,914	2,246,546	30.0%
West Virginia	248,809	551,554	56,271	856,634	29.0%
Wisconsin	687,774	1,206,884	57	1,894,715	36.3%
Wyoming	167,143	149,444	0	316,587	52.8%
Total	\$34,711,336	\$58,569,203	\$6,596,425	\$99,876,964	34.8%

Source: Highway Statistics 2001; Federal Highway Administration

Trust Funds

What is a trust fund? A trust fund in the federal budget is a system of earmarking revenues for a set of purposes.

...a type of account, designated by law as a trust fund, for receipts and offsetting receipts earmarked for specific purposes and the expenditures of these receipts.

The only three trust funds financing major federal grant-in-aid programs are the Highway Trust Fund (highways, mass transit), the Airports and Airports Trust Fund (airports and airways) and the Unemployment Trust Fund (federal share of state unemployment insurance administrative expenses).

The creation of a trust fund earmarks revenues but does not guarantee spending for a program. Some trust fund legislation, such as that for Social Security and Medicare, contains an appropriation in the authorizing legislation—*such sums as may be necessary* for the program are automatically appropriated from trust fund balances. Moneys held by the U.S. Treasury in trust funds are borrowed for the general purposes of government.

The Highway Trust Fund does not contain its own appropriation. Its spending authority comes from periodic authorizations (currently the Transportation Equity Act for the 21st Century -- TEA-21) and annual appropriations action by the Congress.

The Highway Trust Fund

The Federal-Aid Highway Act of 1956, coupled with the Highway Revenue Act of the same year, substantially increased the size of the federal-aid highway program and created the Highway Trust Fund. At present, the Highway Trust Fund receives the following revenues.¹

Gasoline	18.4	cents per gallon
Diesel	24.4	
Gasohol	13.0	
Special fuels:		
General rate	18.4	
Liquefied petroleum gas	13.6	
Liquefied natural gas	11.9	
M85 (from natural gas	9.25	
Compressed natural gas	48.54	cents per thousand cubic feet
Tires:		
0-40 pounds		No tax
Over 40 to 70 pounds	15	cents per pound in excess of 40
Over 70 to 90 pounds	\$4.50	plus 30 cents per pound in excess of 70
Over 90 pounds	\$10.50	plus 50 cents per pound in excess of 90
Truck and Tractor Sales	12	percent of retailer's sail price for tractors and trucks Over 33,000 pounds gross vehicle weight (GVW) and Trailers over 26,000 pounds GVW

¹ Each of these taxes, with the exception of 4.3 cents per gallon of the motor fuel taxes expires after September 30, 2005.

Heavy Vehicle Use	Annual Tax: Trucks 55,000 pounds and over GVW, \$100 Plus \$22 for each 1,000 pounds (or fraction thereof) in Excess of 55,000 pounds (maximum tax \$550).
Fines	Proceeds from fines and penalties imposed for violation of Motor carrier safety requirements.

What Highway Trust Revenues Finance. The Highway Trust fund has two accounts within it, a highway account and mass transit account. In FY 2001, the highway account financed \$33 billion in new funding for highways, motor carrier safety and highway traffic safety, and \$5 billion in new funding for mass transit. While most highway funds flow to state governments, most transit funds flow to local governments. Table 4 displays the breakout of receipts by major source and Trust Fund account.

**Table 4. Highway Trust Fund Receipts for Fiscal Year 2001
(dollars in billions)**

Gross Receipts	Highway Account	Mass Transit Account	Total Trust Fund
Gasoline	\$16.9	\$3.1	\$20.1
Gasohol	1.5	0.6	2.1
Diesel and special motor fuels	7.2	1.0	8.1
Tires	0.3	0.0	0.3
Trucks and trailers	1.5	0.0	1.5
Heavy-vehicle use	0.6	0.0	0.6
Other	*	*	*
Subtotal	28.0	4.7	32.7
Refunds and Tax Credits	-0.9	-0.1	-1.0
Transfers to Other Funds	-0.2	*	-0.2
Net Receipts	\$26.9	\$4.6	\$31.5

Budget authority. The 1921 Act gave the federal government a new form of authority called “contract authority.” While the Constitution requires the passage of an appropriation before funds may be drawn from the Treasury, no appropriation is necessary to permit the *obligation* of funds. The 1921 Act gave the Federal Highway Administration the right to enter into constitutionally protected contracts, making the appropriation a vehicle for providing what is termed “liquidating cash.”

Most federal-aid highway projects continue today to be funded through such contract authority. This authority is established in multi-year authorizing legislation such as the TEA-21. In essence, then, it has been the authorizing legislation more than annual appropriations legislation which has driven the level of highway grants in most years. In

most years, an annual obligation limitation limits the ability of states to fully use their apportioned funds.

In addition to funds *apportioned* by the authorizing legislation, a small amount of what are called *allocated* funds are provided in the annual appropriation. This allocated budget authority include funds for the federal administration, territories, and “discretionary” funds earmarked in the appropriations process.

What is the Status of the Highway Trust Fund

While the establishment of a trust fund earmarks revenues for a specific purpose, it can also have the effect of limiting the amount available for that purpose. Balances in the funds have declined under TEA-21 (Table 5). Three specific features of TEA-21 have contributed specifically to that decline—the elimination of interest paid on balances, the diversion of 2.5 percentage points from gasohol taxes to the general fund and the creation of revenue adjusted budget authority (RABA).

**Table 5. History of the Highway Trust Fund under TEA-21
(federal fiscal years; dollars in billions)**

	1998 1/	1999 1/	2000	2001	2002	2003 2/
Receipts	28.6	39.3	35.0	31.5	32.6	33.4
Budget Authority	29.4	33.6	35.1	41.3	41.1	37.2
RABA Adjustments to						
Contract Authority	N/A	N/A	1.5	3.1	4.5	0.0
Enacted obligation						
limitations	24.0	30.1	32.7	35.2	37.9	N/A
End-of-Year Balance	18.6	29.0	31.1	27.7	22.2	15.3

1/ Receipts affected by Taxpayer Relief Act of 1997, which permitted about \$6 billion in what would have been 1998 receipts to be paid in 1999.

2/Congressional Budget Office baseline estimate.

RABA. Federal-aid highway budget authority (BA) in TEA-21 was based on estimates of Highway Trust Fund (HTF) receipts made at the time TEA-21 was enacted. To better tie actual apportionments to receipts, the new legislation contained an adjustment provision. This revenue adjusted budget authority (RABA) can increase or decrease TEA-21 funding levels.

RABA is the net of two calculations. The first looks backward and adds or subtracts budget authority to the upcoming fiscal year to adjust for differences between projected and actual trust fund receipts in a prior year. The second calculation looks forward and adds or subtracts BA based on the differences between the projections on which TEA-21 was based and updated projections.

Table 6 displays historical RABA adjustments to the highway obligation. As can be seen, RABA substantially increased highway funding for federal fiscal years 2000-2002. Table 6 also displays initial estimates of the impact of RABA on the FY 2003 obligation limitation. Rather than the FY 2004 impact of +\$4.5 billion, the FY 2003 RABA impact would have been -\$5.0 billion, a differential of over \$9 billion.

However, a series of appropriations actions during the previous session of Congress virtually eliminated any cutback. The net impact of RABA was therefore to allow substantially more access to the Trust Fund than originally planned, with a very substantial impact on the balances in the fund.

**Table 6. Revenue Aligned Budget Authority (RABA) Calculation Worksheet
under the Balanced Budget and Emergency Deficit Control Act of 1985 (BBEDCA)
as Amended by TEA-21 and the TEA 21 Restoration Act
(federal fiscal years; dollars in millions)**

Fiscal Year	"Look Back" Calculation under § 251(b)(1)(B)(ii)(I)(aa) BBEDCA*		"Look Ahead" Calculation under § 251(b)(1)(B)(ii)(I)(bb) BBEDCA		RABA
FY 2000	1998 actual Highway Account receipts	\$23,135	2000 est. Highway Account receipts from 2000 President's Budget	\$28,551	
	less: 1998 TEA-21 est. Highway Account recei	22,164	less: 2000 TEA-21 est. HA receipts	28,066	
	less: look-ahead result for 1998	0			
	<i>Total</i>	<i>971</i>	<i>Total</i>	<i>485</i>	<i>\$1,456</i>
FY 2001	1999 actual Highway Account receipts	33,815	2001 est. Highway Account receipts from 2001 President's Budget	30,368	
	less: 1999 TEA-21 est. Highway Account recei	32,619	less: 2001 TEA-21 est. Highway Account receipts	28,506	
	less: look-ahead result for 1999	0			
	<i>Total</i>	<i>1,196</i>	<i>Total</i>	<i>1,862</i>	<i>3,058</i>
FY 2002	2000 actual Highway Account receipts	30,334	2002 est. Highway Account receipts from 2002 President's Budget	31,732	
	less: 2000 TEA-21 est. Highway Account recei	28,066	less: 2002 TEA-21 est. Highway Account receipts	28,972	
	less: look-ahead result for 2000	485			
	<i>Total</i>	<i>1,783</i>	<i>Total</i>	<i>2,760</i>	<i>4,543</i>
FY 2003	2001 actual Highway Account receipts	26,900	2003 est. Highway Account receipts for Final Sequestration Report	27,974	
	less: 2001 TEA-21 est. Highway Account recei	28,506	less: 2003 TEA-21 est. Highway Account receipts	29,471	
	less: look-ahead result for 2001	1,862			
	<i>Total</i>	<i>-\$3,468</i>	<i>Total</i>	<i>-\$1,497</i>	<i>-\$4,965</i>

Notes: BBEDC is the Balanced Budget and Emergency Deficit Control Act of 1985.
Actual receipts are net tax receipts (excluding fines and penalties) after deduction of transfers and refunds.
Forecasts of tax receipts to the Highway Account of the Highway Trust Fund for the president's budget and other analyses are made by the Office of Tax Analysis in the Department of the Treasury.
References to TEA-21 estimates are to the estimates of Highway Account receipts in TEA-21 § 8101(d)(2). These estimates were made by the Congressional Budget Office (CBO).

There are, of course, other events contributing to the declining balance in the fund. As states know, a slow-growing economy contributes to depressed receipts. Conversely, an unexpected reduction in state and local drawdowns of grants has added somewhat to the balance in the Fund. As seen in Table 7, both Medicaid and Highway grants have been affected by the inability of states to match available federal funds.

**Table 7. Recent Growth of Federal Medicaid and Highway Grants
(federal fiscal years)**

	2000	2001	2002	2003 1/
<i>Percent growth from previous period:</i>				
Medicaid	9.1%	9.8%	14.1%	6.8%
Federal-Aid Highways	9.4%	9.6%	10.2%	-6.5%

1/ October-May FY 2003, growth as compared to the same eight months in FY 2002.

Directions for Policy

The federal-aid highway program is up for reauthorization this year. Given the multitude of other issues in front of the Congress, it would not be surprising if the decision were not delayed until next year. This would require a short-term extension of TEA-21, the procedure followed in both the previous reauthorizations.

In any case, provision will have to be made to either reduce the level of highway and mass transit programs or to generate additional funds. The following are some of the alternatives which have been presented.

1. The Administration proposal.

- The Administration proposes to extend highway-user taxes at the already enacted rates through September 30, 2011. It would further extend the partial exemption from the gasoline tax for gasohol and other alcohol fuels through September 30, 2014.
- In general, the authority for deposit into the Trust Fund is also extended through September 30, 2011. The Mass Transit Account would continue to receive its current portion of receipts (2.86 cents per gallon, lesser amounts from liquefied petroleum gases, liquefied natural gas, and methanol from natural gas).
- The Highway Account of the Highway Trust Fund would receive the balance.
- Beginning October 1, 2003, the 2.5 cents per gallon of the gasohol tax currently deposited in the General Fund would be redirected to the Highway Account of the Highway Trust Fund (about \$4.2 billion over five years).
- Reduce the annual obligation limitation from a current level of \$31.6 billion to \$29.3 billion.

Table 8 illustrates the impact of the proposed shift.

Table 8. Highway Trust Funds Receipts as Proposed by the Administration
(fiscal years; outlays in \$ millions)

	2003	2004	2005	2006	2007	2008
Current Law:						
Highway Account	\$28,144	\$29,476	\$30,409	\$31,470	\$32,416	\$33,287
Mass Transit Account	4,671	4,793	4,928	5,054	5,170	5,281
<i>Total Receipts</i>	<i>\$32,815</i>	<i>\$34,269</i>	<i>\$35,337</i>	<i>\$36,524</i>	<i>\$37,586</i>	<i>\$38,568</i>
Increase from prior year:						
Highway Account	---	4.7%	3.2%	3.5%	3.0%	2.7%
Mass Transit Account	---	2.6%	2.8%	2.6%	2.3%	2.1%
Total Receipts		4.4%	3.1%	3.4%	2.9%	2.6%
Proposed Law:						
Highway Account	\$28,144	\$30,119	\$31,109	\$32,191	\$33,146	\$34,018
Mass Transit Account	4,671	4,793	4,926	5,050	5,164	5,270
<i>Total Receipts</i>	<i>\$32,815</i>	<i>\$34,912</i>	<i>\$36,035</i>	<i>\$37,241</i>	<i>\$38,310</i>	<i>\$39,288</i>
Increase from prior year:						
Highway Account	---	7.0%	3.3%	3.5%	3.0%	2.6%
Mass Transit Account	---	2.6%	2.8%	2.5%	2.3%	2.1%
Total Receipts		6.4%	3.2%	3.3%	2.9%	2.6%

Source: FY 2004 Budget documents.

2. Bond proposals.

The Senate Finance Committee recently asked the Congressional Budget Office (CBO) to comment on the use of possible financing mechanisms to borrow earmarked funds for the use of highway program. Under one proposal, a government-sponsored enterprise could be created to issue bonds on which the net return would consist of tax credits against federal income taxes. A parallel proposal would create special tax-credit bonds for transit programs. Finally, an alternative has been presented to issue conventional federal debt earmarked for transportation purposes. The resulting CBO analysis dated June 2003 concludes that financing the programs through these structures would be more expensive to the federal government than conventional means of financing.

3. Increase highway taxes.

While there appears to be little budgetary interest in Washington in increasing any taxes, there is clearly interest among supporters of transportation finance in adding revenues to expand the Highway Trust Fund. Of course, how you raise taxes determines the yield.

An increase of one cent in the gas tax across-the-board is estimated to raise about \$8 billion over five years.

4. Pay interest again on balances of the Trust Fund.

This yields very little by itself. There are low balances, and extremely low levels of interest paid. This might yield \$350 million the first year, and decline from there.

5. Reduce program levels.

The experience with RABA during the FY 2003 appropriations cycle shows that there is also little interest in reducing spending for Highway Trust Fund programs.

Concluding Observations

It is clear that current revenue structures feeding the Highway Trust Fund are insufficient to maintain current program levels through another five-year reauthorization of the program. While there seems to be little interest in tax increases, transportation proponents may be able to generate support in this area.

The Administration's proposal to credit gasohol taxes to the Trust Fund has received support. By itself, though it will not generate sufficient revenues to support the current spending level.

It is unusual that federal-aid highway funding is declining this year as governments at all levels attempt to manage a declining economy. As noted in Appendix A, highway spending has a high macroeconomic multiplier, and has frequently been *increased* during weak economic periods as a valuable economic stimulant. But such an increase simply is not possible under the current funding mechanisms and the steadily declining balances in the Trust Fund.

Regardless of any decisions, it is clear that state and local governments will maintain their position as the primary source of highway finance in the U.S.

Introduction to JOBMOD

A Federal-aid Construction Spending Income and Employment Estimation Model

The FHWA is frequently asked to estimate employment effects of Federal-aid program expenditures. Such requests often occur during periods of legislative activity and periods of economic recession.

Interest in employment impacts of construction spending during periods of economic distress reflects the widespread belief that highway and other public works investment can be an effective economic stimulus mechanism. Highway construction spending directly affects industries hit hardest by recession, notably heavy construction, building materials, and durable goods manufacturing. It is also frequently noted that Federal initiatives may counter the pro-cyclical budgetary tendencies of other levels of government. Historically, supplementary Federal highway spending programs were enacted by the Congress in response to economic recessions in 1960-1961, 1969-1970, 1973-1975, and 1981-1982.

Evaluations of these programs performed in the 1970s and 1980s provided the basis for employment estimates supporting passage of ISTEA and contributed to the later development of a direct construction employment model called Highway1, which was used to address TEA-21 legislative concerns. More recently, a new and improved employment estimation model called JOBMOD (ver.1.1) was developed for the FHWA at the Boston University Center for Transportation Studies. The JOBMOD model is available in electronic form to assist transportation professionals and policy makers concerned with the economic effects of Federal-aid construction expenditures.

JOBMOD is an economic input-output model based on the U.S. Commerce Department's Benchmark Input-Output Accounts of the United States modified to specifically reflect labor and materials usage on federal-aid highway construction projects. It estimates, for example, that an across the board increase in Federal-aid highway construction spending of \$1 billion combined with a state matching fund ratio of 20% (yielding total expenditures of \$1.25 billion), could be expected to generate:

- A first-round of employment benefits in the highway construction industry and materials supplying industries totaling 19,585 person-years. These jobs generate more than \$570 million in worker incomes. JOBMOD estimates 12,453 jobs occur in the highway construction sector and 7,132 jobs occur in equipment and materials supplying industries. In addition to the substantial numbers of Construction jobs, first-round employment impacts are particularly large in

Transportation and Warehousing, Business and Professional Services, Stone and Clay Products, Petroleum Refining, Wholesale Trade, Fabricated Structural Metal Products, and Non-metallic Minerals Mining.

- A second-round of employment and income benefits can be expected to occur in the production sector because of the additional demand for inputs needed to expand output in industries that supply highway construction materials. An additional 6,939 person-years of indirect employment generates incomes totaling \$215 million. Indirect employment is distributed across a much wider array of industry sectors than first-round effects. In addition to employment gains in Business Services, Transportation and Warehousing, and Wholesale Trade, relatively large numbers of jobs also occur in Primary Iron and Steel Manufacturing, Finance Insurance and Real Estate, Automotive Repair Services, Machinery and Equipment, Crude Petroleum and Natural Gas, Chemicals, and Rubber Products.
- Overall, the dollar value of first and second-round goods and services produced by the additional highway construction spending is \$2.93 billion. This implies a combined direct and indirect spending multiplier of 2.34.
- When direct and indirect employment incomes are spent, a third-round of employment and income benefits ripple through the economy. This is frequently termed “induced” employment and reflects producer’s response to an increase in consumer demand for all types of goods and services. The total number of person-years of employment generated by this additional spending is 21,052. Third round employment income is estimated at \$528 million. The largest employment gains occur in the service sector, including Wholesale and Retail Trade, Business Services, Health Services, Restaurants and Amusements, Educational and Social Services, and Finance Insurance and Real Estate, and Communications. However, large induced employment effects are also observed in Textiles and Apparel, Construction, Agriculture Forestry and Fisheries, Food and Kindred Products, Printing and Publishing, Electric Equipment and Electronic Components, Motor Vehicles and Parts, Paper and Allied Products, and Rubber Products.
- The dollar value of goods and services produced across all sectors of the economy as a result of the \$1.25 billion increase in total highway construction expenditure is \$6.097 billion, implying an overall spending multiplier of about 4.87. Employment income from first, second, and third-round effects total \$1.313 billion and the number of person-years of employment generated is 47,576.

Of course this is only one example of JOBMOD income and employment estimation results. The magnitude of income and employment impacts can be expected to change with the level of Federal-aid highway construction spending and the amount of State and local matching funds. The incidence of benefits will also vary with Federal-aid program composition since different types of highway capital improvements have different labor and materials intensities. JOBMOD is a national level model that provides industry level employment estimates. It clearly demonstrates important relationships between highway construction spending, employment and business activity.