



## Trucks and infrastructure maintenance costs

Heavy vehicles are a major cause of pavement damage. The pavement damage attributable to a specific vehicle depends on a number of factors including the weight and axle configuration of the vehicle, and the design of the roadway. However, by all accounts heavy truck traffic results in pavement damage many times that of traffic by passenger vehicles.

A recent Congressional Budget Office report identified pavement damage caused by trucks as a significant issue facing departments of transportation:

Current fuel taxes also generate insufficient revenues to pay for the costs that users impose on the system. Vehicles do more much more damage to pavement and bridges the heavier they are. A four-axle, single-unit truck weighing 60,000 pounds causes six times as much pavement damage as a comparable truck weighing 40,000 pounds.

Estimates of pavement damage by trucks, the largest per-mile external cost of truck use, range from about 5 to 55 cents per mile depending on the weight of the truck, the number of axles over which its weight is distributed, and where it operates—making those vehicles another significant source of external costs, even taking into account that truck travel represents less than 10 percent of miles traveled.

*Congressional Budget Office, Economic and Budget Issue Brief: Spending and Funding for Highways (January, 2011): [http://www.cbo.gov/ftpdocs/120xx/doc12043/01-19-HighwaySpending\\_Brief.pdf](http://www.cbo.gov/ftpdocs/120xx/doc12043/01-19-HighwaySpending_Brief.pdf)*

Researchers at Texas A & M University investigating the feasibility of investment in a West Texas intermodal facility calculated uncompensated pavement costs of nearly 88 cents per mile on rural collector routes:

After consideration of federal and state fuel taxes (44.4 cents per gallon) and an estimated 5.5 miles per gallon fuel efficiency, the uncompensated marginal costs per loaded truck-mile were estimated for an 80,000 pound, five-axle truck on the (1) interstate (\$0.059), (2) principal arterial (\$0.259), (3) minor arterial (\$0.359), and (4) collector (\$0.876) roadways.

*Fraire, F., S. Fuller, J. Robinson, S. Vadali (2011). Feasibility of Containerized Transport in Rural Areas and its Effect on Roadways and Environment: A Case Study. Agribusiness, Food, and Consumer Economics Research Center (AFCERC) Commodity Market Research Report No. CP-03-11. <http://afcerc.tamu.edu/publications/Publication-PDFs/Cotton%20FINAL%20VERSION%20FOR%20CENTER%206-14-2011.pdf>*

The FHWA's Highway Cost Allocation Study, revised in 2000, estimated the marginal costs per mile for a variety of vehicles on urban and rural Interstate highways. While the study is now 10 years old and construction costs have increased, the relative costs attributable to each vehicle type remain valid.

<b>2000 Pavement, Congestion, Crash, Air Pollution, and Noise Costs for Illustrative Vehicles Under Specific Conditions</b>						
<b>Vehicle Class/Highway Class</b>	<b>Cents per Mile</b>					
	<b>Pavement</b>	<b>Congestion</b>	<b>Crash</b>	<b>Air Pollution</b>	<b>Noise</b>	<b>Total</b>
Autos/Rural Interstate	0	0.78	0.98	1.14	0.01	2.91
Autos/Urban Interstate	0.1	7.70	1.19	1.33	0.09	10.41
40 kip 4-axle S.U. Truck/Rural Interstate	1.0	2.45	0.47	3.85	0.09	7.86
40 kip 4-axle S.U. Truck/Urban Interstate	3.1	24.48	0.86	4.49	1.50	34.43
60 kip 4-axle S.U. Truck/Rural Interstate	5.6	3.27	0.47	3.85	0.11	13.3
60 kip 4-axle S.U. Truck/Urban Interstate	18.1	32.64	0.86	4.49	1.68	57.77
60 kip 5-axle Comb/Rural Interstate	3.3	1.88	0.88	3.85	0.17	10.08
60 kip 5-axle Comb/Urban Interstate	10.5	18.39	1.15	4.49	2.75	37.28
80 kip 5-axle Comb/Rural Interstate	12.7	2.23	0.88	3.85	0.19	19.85
80 kip 5-axle Comb/Urban Interstate	40.9	20.06	1.15	4.49	3.04	69.64

NOTE: S.U. = Single Unit, Comb. = Combination; Air pollution costs are averages of costs of travel on all rural and urban highway classes, not just Interstate. Available data do not allow differences in air pollution costs for heavy truck classes to be distinguished.

Pavement costs represent the contribution of a mile of travel by different vehicles to pavement deterioration and the costs of repairing the damage. Congestion costs reflect the value of added travel time due to additional small increments of traffic. Crash costs

include medical costs, property damage, lost productivity, pain and suffering, and other costs associated with highway crashes. Air pollution costs are measured in terms of the cost of premature death, illness, and other effects of various highway-related emissions. Noise costs reflect changes in the value of adjacent properties caused by motor vehicle-related noise.

*Department of Transportation, Federal Highway Administration, "Addendum to the 1997 Federal Highway Cost Allocation Study" (May 2000):*

<http://www.fhwa.dot.gov/policy/hcas/addendum.htm>