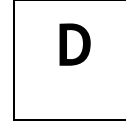


ROADS



2006 Report Card for Pennsylvania's Infrastructure

Pennsylvania is required to report road conditions to the Federal Highway Administration based on a roughness index. These statistics show that 27% of Pennsylvania's roads are rated mediocre or poor. For the nation as a whole, that number is 18%. An inevitable increase in number of trucks and axle loads will continue to degrade the roads more rapidly.

BACKGROUND

Road condition ratings are derived from the International Roughness Index (IRI) and the Present Serviceability Rating (PSR). States are required to report to the Federal Highway Administration (FHWA) IRI data for the Interstate system, other principal arterials, rural minor arterials and the National Highway System. Pavement rating data is not reported for local or rural minor collector functional systems. The IRI is calculated from the cumulative vertical vibrations along a smooth surface in inches per mile¹. The PSR is a subjective rating system based on a scale of 0 to 5 and is described in Table 1.

Table 1- Pavement Rating System²

PRS	DESCRIPTION
4.0-5.0	Only new (or nearly new) superior pavements are likely to be smooth enough and distress free (sufficiently free of cracks and patches) to qualify for this category. Most pavements constructed or resurfaced during the data year would normally be rated in this category.
3.0-4.0	Pavements in this category, although not quite as smooth as those described above, give a first-class ride and exhibit few, if any, visible signs of surface deterioration. Flexible pavements may be beginning to show evidence of rutting and fine random cracks. Rigid pavements may be beginning to show evidence of slight surface deterioration, such as minor cracking and spalls.
2.0-3.0	The riding qualities of pavements in this category are noticeably inferior to those of new pavements and may be barely tolerable for high-speed traffic. Surface defects of flexible pavements may include rutting, map cracking and extensive patching. Rigid pavements may have a few joint fractures, faulting and/or cracking, and some pumping.
1.0-2.0	Pavements have deteriorated to such an extent that they affect the speed of free-flow traffic. Flexible pavement may have large potholes and deep cracks. Distress includes raveling, cracking and rutting, and occurs over 50 percent or more of the surface. Rigid pavement distress includes joint spalling, faulting, patching, cracking and scaling, and may include pumping and faulting.
0.0-1.0	Pavements are in extremely deteriorated conditions. The facility is passable only at reduced speed and considerable ride discomfort. Large potholes and deep cracks exist. Distress occurs over 75 percent or more of the surface.

¹ M W Sayers. "On the Calculation of International Roughness Index from Longitudinal Road Profile." Transportation Research Record, Transportation Research Board (TRB), Washington, DC, No 1501, pp.1-12.

² FHWA. (2006). "Status of the Nation's Highways, Bridges, and Transit: 2004 Conditions and Performance"

Prior to 1993, all pavement conditions were evaluated using PSR values. The road conditions for Pennsylvania are based on the ratings of very good, good, fair, mediocre and poor. FHWA ranks “poor” roads as those in need of immediate improvement. “Mediocre” roads need improvement in the near future to preserve usability. “Fair” roads will likely need improvement. “Good” roads are in decent condition and will not require improvement in the near future. “Very good” roads have new or almost-new pavement. Table 2 defines these ratings with the relationship between PSP and IRI values.

Table 2 - Relationship Between IRI and PSR ³

Condition Term	PSR RATING		IRI RATING (inches/mile)	
	Interstate	Other	Interstate	Other
Very Good	≥ 4.0	≥ 4.0	< 60	< 60
Good	3.5 - 3.9	3.5 - 3.9	60 - 94	60 – 94
Fair	3.1 - 3.4	2.6 - 3.4	95 - 119	95 – 170
Mediocre	2.6 - 3.0	2.1 - 2.5	120 - 170	171 – 220
Poor	≤ 2.5	≤ 2.0	> 170	> 220

CONDITIONS

Based on the IRI and PSR data from 2004, Pennsylvania has the following percentages for the road condition categories: 3% (722 miles) very good, 20% (5,525 miles) good, 50% (14,138 miles) fair, 15% (4,295) mediocre, and 12% (3,306 miles) poor.⁴ The national percentages for these condition categories are as follows: 13% (115,637 miles) very good, 27% (249,259 miles) good, 41% (382,547 miles) fair, 11% (102,643) mediocre, 7% (68,354) poor.⁵

The statistics indicate the discrepancy between the national average and Pennsylvania’s roads; however, one should consider the following:

- Pennsylvania has some of the oldest highways in the nation (I-76 is advertised as the first interstate.)
- Pennsylvania has nearly the most lane miles of any other state that must deal with severe winters. Pavements are susceptible to cracking and expanding due to the temperature and weather changes (freeze/thaw cycles) in the state. Also, the salt used during snow/icy conditions decreases the life of a pavement compared to a southern state.

Inevitable increases in the number of trucks and axle loads on the roads will continue to degrade the roads more rapidly. Deterioration of the pavements is to be expected, but it can be monitored. Proactive response is necessary to improve the riding quality of the pavements in the state.

³ FHWA. (2006). “Pavement terminology and Measurements.” Conditions and Performance Report.

⁴ less than 1% not reported for interstate roads

⁵ less than 1% not reported for interstate roads

POLICY OPTIONS

The key to a successful infrastructure program is to have funds to support roadway construction, rehabilitation and emergency situations. These three key aspects make possible the goals of accessibility, structural integrity and safety that are needed for Pennsylvania's roads.

The following table summarizes the highway funding for the state of Pennsylvania since 2000-01⁶.

Transportation – Key to Pennsylvania Growth and Opportunity

	Total Pennsylvania Highway Funding					Flexed Funds for Transit	
	(Dollar Amounts in Millions)					(Dollar Amounts in Millions)	
	State Funding	Federal Funding	Total Funding	Dollar Change	Percent Change	Standard Federal	"Crisis" Federal
2000-01	\$2,943	\$1,112	\$4,055	–	–	\$46	–
2001-02	\$2,940	\$1,272	\$4,212	\$157	3.9%	\$36	–
2002-03	\$2,949	\$1,265	\$4,214	\$2	0.0%	\$31	–
2003-04	\$2,966	\$1,205	\$4,171	(\$43)	–1.0%	\$59	–
2004-05	\$3,124	\$1,081	\$4,205	\$34	0.8%	\$48	\$74
2005-06	\$3,518	\$1,424	\$4,942	\$737	17.5%	\$25	\$202
2006-07	\$3,758	\$1,436	\$5,194	\$252	5.1%	\$25	\$138

Even after "flexing" some additional federal transportation funds to keep the state's 13 transit agencies operating, Pennsylvania highway spending is still growing substantially, with an anticipated \$252 million increase in total funds in 2006-07. Part of that increase is an additional \$130 million in state funds for the Commonwealth's highway and bridge infrastructure, including \$100 million for the Smoother Roads and Bridges program, \$20 million for the Bridge Preservation program and \$10 million for the Emergency Highway and Bridge Maintenance Repair program. Pennsylvania highway spending in 2006-07 is 23 percent, or \$980 million, higher than when Governor Rendell took office.

Additional Funding for 2006-2007

Accessibility, structural integrity and safety are priorities set forth for the roads and bridges in the state of Pennsylvania. The Safe, Accountable, Flexible, Efficient Transportation Act, A legacy for Users (SAFETEA-LU) program is a federal law that created a dedicated funding source for states' highway safety improvement programs. It is recommended to increase the Highway Maintenance Safety Projects appropriation by \$5 million as a state match for a projected \$34 million grant from this federal program.

In order to meet the priorities listed above, the 2006-2007 budget for the state of Pennsylvania allots \$130 million of additional new investment into smoother roads and safer bridges. The money will be spent in the following ways⁷:

- **Smooth Roads and Bridge Priority.** \$100 million, which is a 200% increase in the budget, will allow for highway maintenance and resurfacing of 550 miles of roadway in 2006 and 530 miles in 2007.
- **Bridge Preservation.** \$20 million, to repair 200-250 additional bridges and to further increase the bridge restoration program.

⁶ PA State Budget 2006-07. "Transportation: Key to Pennsylvania Growth and Opportunity." Pp. 23-24.

⁷ PA State Budget 2006-07. "Transportation: Key to Pennsylvania Growth and Opportunity." Pp. 23-24.

- **Emergency Highway and Bridge Repair.** \$10 million, which is a 54% increase in the budget, will be set aside to have the capability to handle 20-25 emergency repair situations such as sink holes, storm repair and slide conditions.

RECOMMENDATIONS

ASCE's Pennsylvania Sections offers the following recommendations:

- Set a state goal that only 10% of the state's roads be classified as "mediocre" by 2016.
- Set a state goal that only 5% of the state's roads be classified as "poor" by 2016.
- Continue to increase dedicated funds for road maintenance/replacement.
- Encourage the use of life-cycle cost analysis principles to evaluate the total cost of projects.
- Encourage the use of cost-benefit analysis principles in evaluating projects.
- Support environmental streamlining of transportation projects.
- Develop creative financing strategies for high priority projects.

SOURCES

Federal Highway Administration (FHWA)

- "Status of the Nation's Highways, Bridges, and Transit: 2004 Conditions and Performance," 2006
- "Pavement terminology and Measurements," Conditions and Performance Report, 2006

Pennsylvania State Budget 2006-07, "Transportation: Key to Pennsylvania Growth and Opportunity"

Transportation Research Board (TRB), Transportation Research Record, "On the Calculation of International Roughness Index from Longitudinal Road Profile," No 1501



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