Two Pavement System

Competition Between Industries can Lower Unit Costs and Allow Highway Agencies to do More With Their Budgets

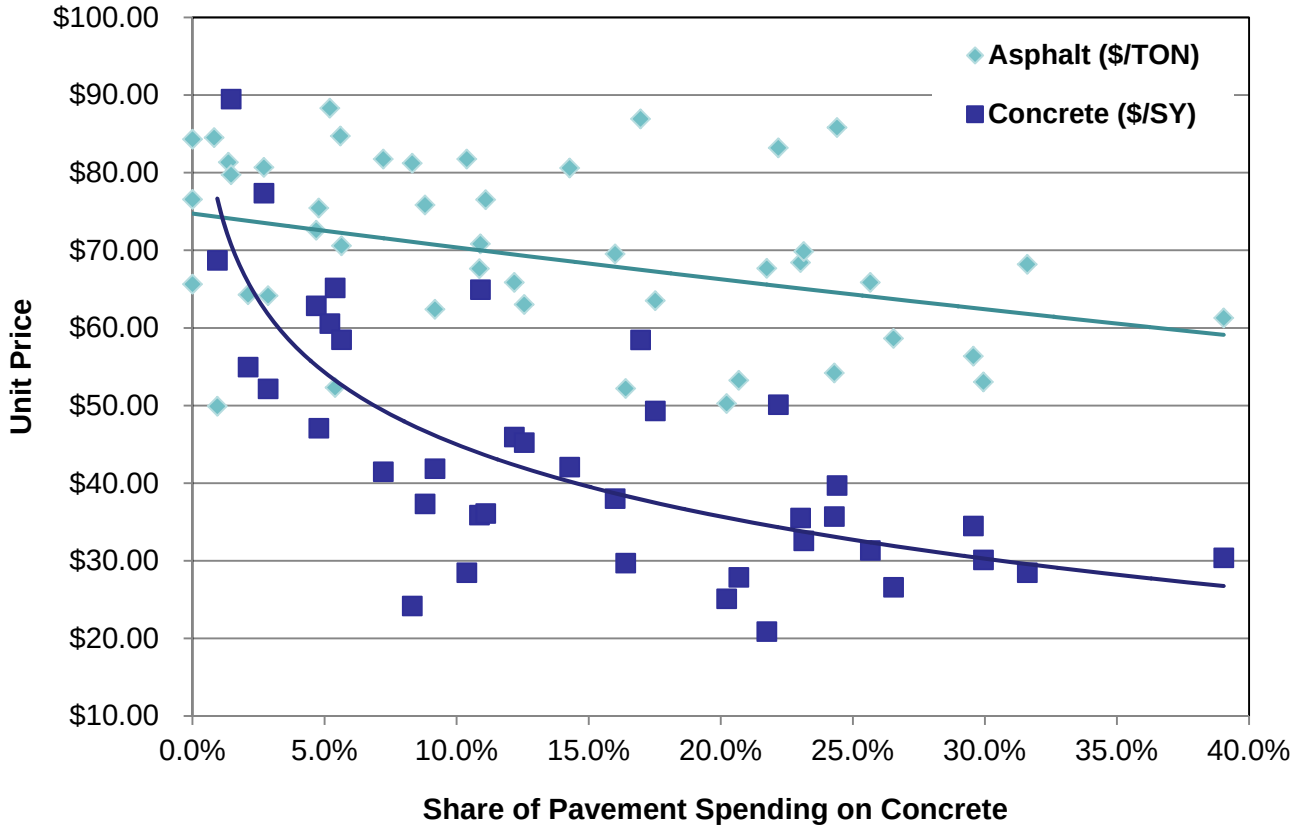
Construction cost inflation and eroding resources has forced agencies to look hard at both their pavement design and pavement type choices. One proven way an agency can address material cost inflation is to instill more competition in their area, stimulating lower bid prices.

Average five-year state cost data (Oman Systems) confirms that states which use a stronger balance of pavement types (asphalt and concrete) get a bigger "bang for the buck" than those who use only one pavement type (asphalt).

In states where both pavement types are specified on a regular basis healthy industries with skilled personnel develop. Construction quality improves and risks decline, bringing about more cost efficient pavement construction and significant savings. Competition between industries also spurs innovation. Competition between contractors that construct different pavement types adds a dimension to the competitive environment that is not achieved where only one pavement material is used regularly.

Figure1 illustrates that in markets that are more balanced, the average unit costs for both concrete and asphalt pavements are lower. The additional competition fostered by the agency, allows the agency to extend its currently available budget, do more, and add long-life pavements to their system. The fact that long-life pavements benefit the system's remaining service life is an added bonus.

Figure 1. 2011 weighted unit costs versus five-year average balance of state pavement type usage (based on publicly available data in Oman Systems bid tabulation database).



Breakeven Analysis

One way to use this information is to perform a breakeven analysis to find out what happens with varying levels of balance in use of concrete and asphalt pavements. Table1 illustrates the benefit.

For example, assume a state spends $200 million per year on pavement items, and 100 percent of their pavement dollars are spent on asphalt. At this level, with no competition between the industries, the asphalt would cost approximately $74.80 per ton. Thus the state can purchase a little under 2.7 million tons of asphalt for their $200 million budget.

Now suppose the state instills more competition by using concrete pavement or adopting alternate bidding. Assume the state plans to spend the same $200 million, but this time 15% of their budget is spent on long-life concrete pavement. The additional competition drops the asphalt unit cost to $67.84 per ton and one might expect to pay $39.56 per square yard for the concrete pavement. For the same $200 million budget, the state still gets about the same tonnage of asphalt as before, but they also get 750,000 square yards of concrete pavement.

If 30% of the budget is spent on long-life concrete pavement, then the asphalt unit cost falls to $61.53 per ton and one might expect to pay $30.28 per square yard for the concrete pavement. The state agency can get about two million square yards of concrete pavement.

Instilling competition is just better business practice for a state highway agency. There are no downsides to fostering two healthy industries to compete for state highway projects. The state benefits in terms of cost efficiency, innovation from contractors and network health, the industries benefit in terms of programs that support a quality work force to build quality pavements, and the public benefits from it all.

Table 1. Break-even analysis for $200 million per year budget for pavements

Budget	Concrete Portion of Budget	Expenditure on Asphalt ($)	Asphalt Unit Price per Figure 1 ($)	Tons of Asphalt	Expenditure on Concrete ($)	Concrete Unit Price per Figure 1 ($)	Square Yards of Concrete
$200 M	0%	$200 M	$74.80	2,673,797	--	--	--
$200 M	5%	$190 M	$72.40	2,624,148	$10 M	$54.29	184,210
$200 M	10%	$180 M	$70.09	2,568,287	$20 M	$45.00	444,468
$200 M	15%	$170 M	$67.84	2,505,856	$30 M	$39.56	758,257
$200 M	20%	$160 M	$65.67	2,436,484	$40 M	$35.71	1,120,151
$200 M	25%	$150 M	$63.57	2,359,778	$50 M	$32.72	1,528,148
$200 M	30%	$140 M	$61.53	2,275,329	$60 M	$30.28	1,981,752
$200 M	35%	$130 M	$59.56	2,182,709	$70 M	$28.21	2,481,335

Sources

- Oman Bid Tabulation Data, http://www.omansystems.com
- PCA Market Report, Quarter 4, 2011
- "Two Pavement System", Special Supplement to Southeast Construction, 2006

PAVEMENTS 4life .com