The Future of the Construction Industry

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There are a number of factors that assured producers and users that there will be adequate supply of asphalt cement. **We (HMA industry) have been continually assured by refinery groups that there will be supplies of asphalt cement (binder).** With more and more sour crudes being forced upon the refineries, there is a greater and greater supply of heavy residuals, including asphalts. Removal of the sulfur is an added expense to all refining operations and, with the current environmental controls, it is necessary to remove more sulfur from all burnable fuels.

There have been some ridiculous comments offered by some concerning asphalt and hot mix asphalt (HMA) pavement. The fact that asphalt is not burned and the fact that an environmentally regulated amount of sulfur is beneficial to asphalt cement (binder) properties permit the refineries to use the asphalt cement with some sulfur allowance. Should the refineries not produce asphalt, they are required to go to the additional expense of coking material. Not all refineries are disposed to install cokers in the first place because of the expense and secondly, there is a limited market for coke. All these conditions, therefore, point to the fact that there will be a supply of asphalt cement.

It is rather interesting that the production of asphalt cement actually physically permits some refineries to operate; because if they did not have asphalt cement, they would be unable to fully utilize the petroleum distillation process and therefore would have to cut back on the refining throughput.

Practicality vs. Fiction vs. Fear

About 94 percent of the paved roadways in the U.S. have bituminous surfaces. These pavements are a very important part of the nation's network, which is very essential for defense, economy, safety and quality of life in our country. A badly deteriorated system would require major reconstruction to restore the facilities' usefulness to the public. [Hopefully, the Minnesota public will support passage of the Motor Vehicle Sales Tax (MVST) Constitutional Amendment on the November 7, 2006 ballot].

Since both asphalt cement and portland cement costs are related to energy, a relationship between the two and allocations can also be expected. The price of both cements (asphalt and portland) may be stable or volatile, depending upon our global energy situation. It seems equitable to assume that the price of both asphalt and concrete pavement, as with other things, can be expected to fluctuate in the future as

Table 1. Asphalt Pavement & Concrete Pavement Prices***

2006	From Price Trends of FHWA		Price per Sq. Yd. Inch of Depth		Ratio Asphalt to Concrete
	Concrete per Sq. Yd. @ 9" Thick*	Asphalt per Ton**	Concrete	Asphalt	
Annual Average	$37.94	$55.25	$4.22	$3.04	0.72

*Does not include costs for reinforcing steel nor joints.
**Influenced by virgin aggregate & virgin binder materials.
***Note: Table updated Feb. 20, 2007

political and global energy concerns may also vary.

Pavement Costs

FHWA's "Price Trends for Federal Aid Highway Construction"[1] provides average bid prices for concrete and asphalt pavement on federal aid projects. Currently, the price for concrete is weighted for a thickness of 9 inches, but it does not include the cost of the reinforcing steel nor the joints. The price of the asphalt pavement is per ton. Neither price is weighted for size of job or pro rata amounts of items such as mobilization, field laboratory, etc.

Based on the FHWA Price Trends for Federal-Aid Highway Construction data available at the time of this article (July 2006), Table 1 shows the cost for an asphalt and concrete pavement per inch of pavement. The average ratio of the price of asphalt per inch compared to the price of pcc per inch is 0.68; thus, asphalt is still the best buy.

A formal survey was sent to all State DOT members of the AASHTO Standing Committee on Highways in March of 2006 and the results[2] were released at AASHTO's spring meeting. In summary of responses to AASHTO's Survey in Construction Cost Increases and Competition, 44 states responded to the survey. The average cost increase reported by the states was 18 percent for asphalt, 22 percent for concrete, and 26 percent for steel, proving that a dollar spent on asphalt pavements goes farther than a dollar spent on pcc pavements. It is also interesting that many states are breaking up big dollar projects into smaller projects in an effort to create more local competitive bids.

Life Cycle Costs

Life cycle costing deals primarily with identifying and then assessing the economic impacts of various alternatives over time. One must deal with both present and future costs in a way that will relate the two as a basis for making decisions. Today's dollar is *not* equal to tomorrow's dollar, and the procedure[3] deals with initial costs, inflation, present-worth, time frames, sensitivity, maintenance, discount rate, salvage value, benefit-cost, etc., and is another subject for more detail explanation beyond the scope of this article.

The taxpayers of Minnesota are fortunate to have in-place Minnesota Department of Transportation (Mn/DOT) specifications that allow permissive, contractor option, and material usage (virgin vs. recycle). Some of the more prominent areas are: 1) Mn/DOT Combined 2360/2350 Plant Mixed Asphalt Pavement, 2) Mn/DOT 3138 Aggregate for Surface & Base Courses, and 3) Mn/DOT 3149 Granular Material.

When evaluating alternatives with unequal useful lives during the economic life cycle period, a residual value must be established. The residual value is the estimated value of the system or component at the end of the economic life cycle or study period. This is commonly referred to as the salvage value of one alternative over another. The value of the system at the end of its useful life is normally equal to its scrap value less the cost incurred for its removal or disposal. This can be a positive or negative value.

The Asphalt Pavement Alliance (APA)[4] has reported that asphalt pavement is the largest recycled material in the U.S., about 80 million tons per year, compared to steel, newspaper, concrete, glass, aluminum cans, plastic, etc. Therefore, HMA overall has a positive salvage value and is a controllable means for reducing costs in pavement decisions. The APA estimates only 3.3 million tons of pcc are recycled annually. In-place fracturing of the pcc pavement such as rubblization and overlaying with HMA is not currently classified as pcc recycling.

Summary

There has been much speculation and conversation about the future cost of materials for construction. Many of the factors we (buyer and seller) have no control over. The following is a summary regarding the petroleum industry.

1. Refinery groups will continue to supply fuel and binder materials for the construction industry.

2. Not all refineries have cokers, a limited market exists for coke, and there will be asphalt cement (binder) for hot mix asphalt (HMA).

3. The future market, global competition for energy, war in Iraq, politics, hurricanes, etc. will continue to cause fluctuations in availability and cost of construction materials.

4. Annual economic factors will continue to provide support for petroleum products on a national and local basis. At this time, asphalt demand is expected to remain strong due to increased Federal funding levels.

5. Since about 94 percent of the paved roadways in the U.S. have bituminous surfaces, the use of HMA provides a fast, efficient and economically competitive product for the specifiers with unsurpassed life cycle versatility.

6. The Federal Highway Administration data continues to show, even with the global energy price structure, a dollar spent on asphalt pavements goes farther than a dollar spent on concrete pavements.

7. Hot mix asphalt (HMA) remains the cost-effective choice because it still has a lower initial cost than concrete per square yard inch of depth at a ratio of 0.65, as supported by FHWA data.

8. Due to lower initial cost, maintenance capabilities, positive salvage value, versatility and life cycle costing, HMA will continue to dominate in Minnesota and most likely nationally as the preferred pavement type for most applications. ■

1. "Price Trends for Federal-Aid Highway Construction," Federal Highway Administration, U.S. Department of Transportation (published quarterly).
2. AASHTO's survey on Recent Construction Cost Increases: http://fs1.hotmix.org/jay/AASHTOconstructioncostsurvey.pdf.
3. "Life Cycle Cost Analysis in Pavement Design," Federal Highway Administration, U.S. Department of Transportation, Sept. 1998.
4. Asphalt Pavement Alliance (APA) website: www.asphaltalliance.com.