A Historical Perspective of Hot Mix Recycling

Charles F. Potts
CEO
Heritage Construction & Materials

- The concept of recycling reclaimed asphalt concrete (RAP) pavement is not new.

- The interest in the use of RAP has always been tied primarily to its economic value.

- In the early 1970’s the Florida Department of Transportation found the cost involved in removing sections of pavement and crushing for reuse was not cost competitive with virgin materials.

- In 1974 cold milling began to be developed in the state and the economics of reclamation started to change.

- The Florida DOT began to adopt contractor quality control requirements and transferring mix design responsibilities to the contractor.
- This resulted in the industry being more informed and more focused
- As quality control programs were implemented at the aggregate quarries, it became easier to utilize drum mix plants.
- The development of drum mix plants made it easier to introduce higher percentages of RAP and to better control mix temperatures.
- Plants produced higher volumes and operated much more efficiently, it was obvious the hot mix industry was positioned to enter a new era.

- In mid-1980 the Florida Department of Transportation began state-wide implementation of hot mix recycling as a standard design alternative to be included as a consideration for all rehabilitation projects.
- Numerous technical reports were produced by the Florida Department of Transportation Bureau of Materials and Research.
- One report was entitled “Guidelines for Hot Mix Recycling of Asphalt Pavements,” developed for use in Florida were reproduced and distributed nationally.

“An Overview of Recycling - Florida’s Experience”

- March 20 – 21, 1985
- Recycling Institute Meeting
- New Orleans, LA

- Cost of the project was 15 – 30 % less than the conventional paving approach and the energy demand measured in terms of BTU’s is reduced by 25 – 45 % when compared to the conventional method.

TABLE 1 - Savings When Compared to Conventional Process/Mixtures

Year	RAP TONS	ASPHALT TONS	% RAP	LANE MILES	BILLION BTU'S	ASPHALT GALLONS	AGG TONS	COST $
1979	75,098	n/a	n/a	67.1	20.7	529,441	37,548	591,960
1980	9,077	n/a	n/a	19.2	2.5	63,993	4,539	71,549
1981	120,964	n/a	n/a	95.2	33.3	852,796	60,482	953,499
1982	288,461	3,088,739	9.3	246.6	79.2	2,032,584	144,084	2,271,484
1983	545,461	2,886,000	18.9	340.6	150.2	3,845,500	272,731	4,299,596
1984	1,771,311	3,721,950	47.6	1,876.4	487.1	12,487,742	885,656	13,962,359
Totals	2,810,109	9,696,689	75.8	2,645.1	773.0	19,811,966	1,405,040	22,150,447

- Hot mix recycling cannot be approached as a means of using a waste product but rather from the standpoint that a paving mixture of equal or superior quality will result.

- Mix temperature at time of discharge at plant was 240°F to 300°F.

- The same general gradation requirements and design properties should be used when specifying recycled asphalt concrete mixtures.

- Design strength equivalencies used in the pavement design process should be the same as those that would be assigned to the same standard mix produced by conventional processes.

- Recoveries of the asphalt cement from recycled asphalt concrete mix should be made at the plant site at regular intervals during the production process. Viscosity measurements should be performed at 140°F (60°C) at 4,500 ± 1,500 poises.

- Placement and compaction requirements should not deviate from standard construction requirements used in conjunction with normal asphalt paving projects.

- No lower limit should be placed on the percentage of salvaged material incorporated into the final design; however, an upper limit of 60 % is suggested. This limitation permits more design latitude and uniformity of the mix during production.

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