

The sizing of RAP will help to refine its use in HMA. Having two or even three different size stockpiles of recycled material means greater flexibility in designing mixes for specific applications. For instance, in finer surface mixes, an increased amount of fine RAP can be employed, whereas a greater fraction of coarse sized RAP can be used in large stone mixes. Like any other material in HMA, RAP should be engineered into the mix, not simply dumped. Understanding the asphalt content and gradation will help the mix designer integrate the recycled material in the right proportion and adjust the virgin materials. If used in large quantities, it may be advisable to extract and test the binder to see if it is highly oxidized and brittle. If it is, then the virgin asphalt may be decreased by one grade to ensure that the resulting mix is not brittle.

If a mix using all virgin materials has a required binder content of 5.5 percent, then a 30 percent RAP mix, where the RAP contains 4 percent asphalt, will reduce the amount of liquid binder by 1.2 percent. This means you could reduce the quantity of liquid asphalt by 22 percent. On 10,000 tons of HMA, this means a reduction of 120 tons of liquid AC. At \$250/ton, this works out to a savings of \$30,000. Obviously, the savings with RAP go beyond just the savings on liquid asphalt, the aggregate in RAP provides just as much, if not more, money in your pocket.

High RAP content mixes may pose special problems in terms of workability and compactability. While this may be aided somewhat by the use of a reduced PG grade of virgin binder, consideration might also be given to the use of additives or processes that improve workability at high temperatures.

RAP has always been a valuable commodity, and its benefit to the industry and its customers is more evident than ever before.