Plasphalt: An Engineered Application for Plastic Waste in Asphalt

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This experiment was done to help protect the environment from plastic waste in the landfills and oceans. Plastic waste is becoming a huge problem for the wildlife in the oceans and even for humans because it takes centuries to decompose. Type 2 plastic (HDPE) was used in this experiment because it has a high melting point and it is one of the most common used and recycled plastic. This experiment was done by adding small plastic particles into premade asphalt in the percentages of 5, 10, 12 and 20. First the asphalt was heated to 300° Fahrenheit, and then the plastic was heated to around 250° Fahrenheit. The Marshall Test method was used to determine the density of the plastic modified asphalt and the data results were compared to the data of two control samples. The plastic modified asphalt samples were 2, 1.9 and 1.8. However, one of the five percent plastic modified had similar data to those of the control samples. The amount of water in the air voids was 4.2 for the five percent plastic modified asphalt sample as opposed to the control samples. The amount of water in the air voids was 4.2 for the five percent plastic modified sample as opposed to the control sample's amount of 1.8 and 2. This is noteworthy because all the other plastic modified asphalt samples were above 14. Future plans may include adding plastic into road construction by putting it into the aggregate base, as a replacement of aggregate as done in this experiment, or even putting it into the bitumen. When further testing is done and shows this is a usable solution, then at 5 percent, it would use approximately 90 tons of plastic waste per mile of 2-lane highway being constructed. By adding the plastic into asphalt it creates an area to store the plastic, where it cannot harm wildlife.

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