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## **The Effect of High Density Polyethylene Additives on the Mix Design Parameters of Asphalt Mixtures**

*In previous studies, the effect of different types of polyethylene on the performance of asphalt mixtures has been investigated. In this research, the mixing design of asphalt mixtures containing high density polyethylene has been analyzed and modeled based on the conventional and the response surface methods for limestone and granite aggregates. For this purpose, the volumetric and strength behavior of laboratory-made samples have been measured and statistically analyzed. In the optimization process, the optimal amount of binder and polyethylene has been extracted according to the criteria of the asphalt pavement regulations for Iranian roads and with the desirability approach. Experimental results show that the optimal conditions for limestone aggregate are 6.1% binder and 4% polyethylene with a desirability of 0.909. However, these values for granite aggregate are 5.9% binder, 4% polyethylene with a desirability of 0.962. The polyethylene additive increases the Marshall Strength and specific weight of the samples for both materials. The higher percentage of additive has the greater effect on these parameters. Analysis of variance shows that polyethylene percentage has a significant effect on Marshall Flow. By increasing the amount of additive from zero to four percent, the flow value decreases.*

**Keywords:** High Density Polyethylene, Mixing Design, Optimization, Analysis of Variance .

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