

Development of Construction Standard for Semi-Rigid Pavement Construction

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Abstract

The drawbacks of the conventional Asphalt and concrete pavement mixtures such as rutting, cracks formation in modern construction practices have been given the tendency to discover an excellent composite mixer that achieves the required properties to increase the life cycle of the roads due to continuous loading. This research mainly focuses on developing construction standards to prepare a project specification to comply with every stage of the preparation of the mixtures up to laying the mix at the site. The report involves the literature review on the research, all material selection, and their methodology to prepare the proper gradations and grout mixture, data collection, and analysis of pavements mixtures properties, compressive strengths of cement grout, and comply the results. Here, two paving tests were conducted subjected to different gradations and different site environmental conditions. Paving operations were observed closely with the different rolling patterns to monitor the range of Air voids of 20%-30% under certain conditions. The data were kept finalizing the temperature ranges, both mixing and paving, no of roller passes and type of roller specified, compaction factor, etc. The final results of the experimental studies were tabulated in the graphs, especially with the field density vs. passes, void in field sample vs. passes. Then it compared the difference of gradation in field samples and design and their impact on void and other parameters of specific limits, which have to be incorporated into the final specifications. As laboratory experiments, the marshal mixtures were conducted with 20 No of blows of compaction as many researchers done, to obtain the density, voids to compare with field data. Here, the air voids calculations were done by applying the formula of $V_r = \frac{W_s}{G_s V} - \frac{W}{G_c V}$ as cylindrical volume calculation for core samples and as well as using the Core lock method, which gives more accurate values for void ratio than depending on the other current calculation process. The grout was prepared using 150mg Silica fume, 0.45 water/cement ratio, and 2.58ml/kg admixture to adhere to the semi-rigid mixture design criteria. Also, this approach involves not only technical evaluation but also the study of the possibility to adapt to the local construction field, which gives more benefits to the country economy such as reduce the cost of mixed production and paving, time-saving and locational demands of optimal usage, mitigation of environmental impact, increases durability, etc.

Keywords: *semi rigid pavement, voids ratio, aggregate gradation, density calculation, plant adjustment, compressive strength*

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