

Recent advances and uses of roller compacted concrete for pavement construction in the United States

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ABSTRACT

Roller compacted concrete (RCC) is a no slump concrete that is placed by an asphalt paver and compacted with vibratory rollers similar to asphalt pavement construction. RCC has long history of good performance as a pavement for ports, container yards, and manufacturing plants.

RCC continues to be used with good success on interstate highway shoulders, subdivision streets, and collector/arterial roads in the United States with a definite increase in the number of projects in the latest decade. The paper documents the application of RCC on many of these applications, highlighting the projects where RCC was used to rapidly reconstruct local roadways and open back to traffic soon, and where RCC was used on heavy industrial facilities carrying large forklift traffic, tractor trailers and container storage. One of the highlighted projects will be the construction of Washington and Atkison Boulevards in Roseville, California where the existing asphalt had failed and was milled up and filled with an RCC pavement. The construction process paved through intersections and a traffic control plan was established to keep traffic flowing. The final surface textures included both a diamond ground and a trowelled and broomed surface.

The paper will document the three traditional final surfaces used for RCC - natural, diamond ground, and asphalt. Many projects are now incorporating the diamond ground surface, allowing RCC to be placed as smooth and quiet as asphalt or conventional concrete pavements at a lower initial cost. The use of diamond grinding began in the early part of the current decade and has accelerated in the past 3 years. The paper will highlight the recent advancement of trowelling aids for the purpose of providing a broom finish to the RCC, making it appear similar to conventional concrete.

The paper will also document the recent advances in RCC mix design, production, and construction techniques such as incorporating admixtures in the mix design to increase the working time of the mix for up to two hours. The paper will also document our new understanding of aggregate and sand shape impact on the workability and compaction characteristics of the mixture.