ABSTRACT

Name of student: Ajay Kumar Meena Roll no: 20103015

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Name of Thesis Supervisor: Dr. Animesh Das

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The determination of saturated surface dry (SSD) condition is a critical component for estimating the specific gravity of aggregates. Coarse aggregates are easy to identify and inspect for SSD condition because there are large sizes. However, the current methods for fine aggregates (such as the cone-slump method, colorimetric techniques, and visual comparisons) are prone to differences due to subjectivity and uncertainty of shape-related characteristics, and inspection times associated with such studies. In the present study, a set-up is developed for observing the fine aggregate drying process utilising two distinct measures, weight-based and image-based, to detect the commencement of SSD state in a semi-automated way. These techniques are based on the idea that at least two drying regimes exist, indicating their periods when moisture evaporation takes place from the aggregates surface and from the pores when the surface has already dried. A changepoint detection algorithm can locate structural breaks in the two proposed metrics that indicate these regimes. In this study, six distinct sizes of fine aggregates are used. The results reveal that various drying regimes exist. Both approaches (weight-based and image-based) can independently detect SSD changepoints in close proximity to one another, indicating consistency across the

measurements. The results are also compared with the existing techniques for determining SSD state.

Keywords: Saturated surface dry condition, fine aggregates, changepoint detection, image processing