Effect of W/B ratios on pozzolanic reaction of biomass ashes in Portland cement matrix

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Source: CEMENT & CONCRETE COMPOSITES **Volume:** 34 **Issue:** 1 **Pages:** 94-100 **DOI:**10.1016/j.cemconcomp.2011.09.003 **Published:** 2012

Abstract: In this study, the effects of W/B ratios on pozzolanic reaction of by-product biomass ashes, namely rice husk bark ash (RHBA) and palm oil fuel ash (POFA), were determined. These biomass ashes were ground to the same fineness as that of Type I Portland cement (OPC) and partially replaced OPC at replacement levels of 10-40% by weight of binder. Water to binder (W/B) ratios of 0.50, 0.575, and 0.65 were used. The compressive strengths of mortars were compared to those of mortars made with OPC partially replaced with ground river sand of similar particle size. The results demonstrate that at the same cement replacement levels, the degrees of pozzolanic reaction of RHBA and POFA increase with W/B ratio. In addition, ground river sand with the same particle size of OPC can be used as a non-reactive material to replace OPC for determining the compressive strength due to pozzolanic reaction of biomass ash.

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