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PHYSICAL NONLINEARITY OF PRECASTING REINFORCED GEOPOLYMER CONCRETE BEAMS

Silva, F.J.(1); Pires, E.F.C.(2); Marinho, F.J.V.(2); Darwish, F.A.I.(2);
Instituto Federal de Educação, Ciência e Tecnologia do Rio de Janeiro(1); Universidade Federal Fluminense(2); Universidade Federal Fluminense(3); Universidade Federal Fluminense(4);

Precasting reinforced concrete enclosing a special category of building materials that runs toward to economy, quality and cost-effective. The geopolymer cements are being identified as a new class of low environmental impact materials, eco-efficient or eco-friendly, by the simple fact of not emitting CO₂ in its manufacture, unlike what happens with Portland cement. Its application in reinforced concrete requires high quality control of its constituents, basic requirement in the precast industry. This paper presents a pioneering analysis of the mechanical behavior of precast beams of reinforced geopolymer concrete (RGC) and the comparison with their replicas, of reinforced Portland cement concrete (RPC). The goal was to create an application precedent in this civil engineering field and find out if the mechanical behavior of RGC fits any criteria of physical nonlinearity developed for the RPC. To this aim, four models were compared, Branson, Ghali & Favre, Bischoff and the of Brazilian Standard NBR 6118. The results showed that RGC presents the same three classic stages on Moment-Curvature relationship of that the RPC, with reasonable approach to Ghali & Favre and of Bischoff models.