

## Constitutive Modeling of Different Types of Concrete under Uniaxial Compression

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**Abstract :** The cost of experiments on different types of concrete has raised the demand for prediction of their behavior with numerical analysis. In this research, an advanced numerical model has been presented to predict the complete elastic-plastic behavior of polymer concrete (PC), high-strength concrete (HSC), high performance concrete (HPC) along with different steel fiber contents under uniaxial compression. The accuracy of the numerical response was satisfactory as compared to other conventional simple models such as Mohr-Coulomb and Drucker-Prager. In order to predict the complete elastic-plastic behavior of specimens including softening behavior, disturbed state concept (DSC) was implemented by nonlinear finite element analysis (NFEA) and hierarchical single surface (HISS) failure criterion, which is a failure surface without any singularity.

**Keywords :** disturbed state concept (DSC), hierarchical single surface (HISS) failure criterion, high performance concrete (HPC), high-strength concrete (HSC), nonlinear finite element analysis (NFEA), polymer concrete (PC), steel fibers, uniaxial compression test

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