**Investigation of Concrete Quality using Discrete Element Method (DEM)**

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**Abstract.** This study describes the pattern of concrete damage to compressive and tensile strength on various of concrete quality using DEM (Discrete Element Method). Concrete was design as a uniform material in the three-dimensional analysis. Sphere particle is used to simplified the complex analysis. Laboratory testing is carried out to validate the performance of the DEM in the macroscopic model. Each variant has two specimens, the specimens consist of three different compressions, and the Brazilian splitting tensile test was 20MPa, 25MPa, and 30MPa. The test results show that the DEM analysis can model crack behavior under loads. The model was capable of predicting the performance of plain concrete with different qualities. The stress-strain curve, damage particle, velocity, and mechanical parameter of concrete quality were obtained. Finally, the uniform of spherical particle material is an alternative that can be proposed in the concrete laboratory-scale test modeling.

**Keywords:** DEM, Compressive strength, Brazilian splitting tensile test