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# Cover Spalling in Reinforced Concrete Columns

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**Abstract :** A numerical strategy formulated using a plasticity approach is presented to model spalling of the concrete cover in reinforced concrete columns. The stage at which the concrete cover within reinforced concrete column spalls has a direct bearing on the load capacity. The concrete cover can prematurely spall before the full cross-section can be utilized if the concrete is very brittle under compression such as for very high strength concretes. If the confinement to the core is high enough, the column can achieve a higher peak load by utilizing the core. A numerical strategy is presented to model spalling of the concrete cover. Various numerical strategies are employed to model the behavior of reinforced concrete columns which include: (1) adjusting the material properties to incorporate restrained shrinkage; (2) modifying the plastic dilation rate in the presence of the tensile pressure; (3) adding a tension cut-off failure surface and (4) giving the concrete cover region and the column core different material properties. Numerical comparisons against experimental results are carried out that shown excellent agreement with the experimental results and justify the use of the proposed strategies to predict the axial load capacity of reinforce concrete columns.

**Keywords :** spalling, concrete, plastic dilation, reinforced concrete columns
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