Reinforced Concrete buildings; From deterioration to demolition

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Abstract
Every structure is designed for a specific life period. The existence of the structure after the service life period is very dangerous to its occupants and surrounding buildings. Therefore, it's necessary to consider the factors affecting deterioration that make some possible improvement in the structure or maybe demolate it. This article has been tried to answer what is the solution for repair or deconstruct the RC buildings and reduce its hazard's. Deconstruction has strong ties to environmental sustainability. In addition to giving materials a new life cycle, deconstructing buildings helps to lower the need for virgin resources and construction industrial.

Keywords: deterioration; analytical modelling; deconstruction; progressive collapse; structure demolition.

Introduction

These Reinforced concrete structures designed according to present building codes as moment resisting space frames, shear-walls, coupled shear-walls or any combination thereof to withstand strong earthquake motions are expected to deform well into the inelastic range and dissipate the energy input by the base motion through stable hysteretic behavior of structural components. Ideally these models should be based on an accurate representation of material behavior taking into account the controlling states of stress or strain and identifying the main parameters which influence the hysteretic behavior of each critical region in order to predict the behavior up to failure of any structural component during the nature's disasters response like earthquake, flood, fire &heating and etc.

In order to formulate an analytical model describing the hysteretic behavior of R/C members with due account of cyclic bond deterioration between reinforcing steel and concrete, the region of the member undergoing inelastic action is divided into a number of subregions at locations where cracks form. In members subjected to severe moment reversals with low shear stresses, cracks run almost vertically through the depth of the cross-section. The positions where cracks are expected to form are not known a priori and can be established in the course of an analysis by determining the sections where the concrete tensile strength is first exceeded. In the present model for reasons of simplicity the cracks have been assumed to run vertically across the section and form at pre-determined locations. This is, strictly speaking, true only at beam-column interfaces of interior and exterior joints. The hysteretic response of each subregion is determined by satisfying the equilibrium of horizontal forces and bending moments at both end sections and by establishing the stress transfer between steel and concrete within the region. Bond deterioration in both subregions adjacent to a crack contributes to crack opening and to the associated relative rotation of crack surfaces and has to be accounted for.

Model for hysterical behavior of RC members

When medium or high rise reinforced concrete moment resisting frames are subjected to severe seismic. Excitations, the behavior of members in the lower parts of a building is controlled by lateral forces. In a typical lower story the combined action of high lateral loads and relatively small gravity forces gives rise to the moment distribution shown in Fig.2.1d. In order to gain some insight into the mechanical behavior of RC members subjected to moment reversals with low shear stresses and motivate the analytical solution to be developed in this chapter, an interior beam/column joint is chosen as a representative example (Figs1.1 &2.1).

For instance the model of a single reinforcing bar embedded in concrete, a portion of a single reinforcing bar between two adjacent cracks is depicted in Fig.3.1a&b. In the present study the contribution of concrete to the relative slip in Eq. (1.1) is neglected. Uncertainties exist in assigning accurately an effective concrete area in order to compute concrete stresses and consequently strains. Moreover attention is focused on the post-yield behavior of members and notably on large inelastic excursions. In this case the deformations due to concrete strains contribute very little to the relative slip and can be neglected. The following equations result at this point specification of the shape functions becomes necessary. The choice of functions is constrained by the requirement that they render Eqs. (2.1) and (3.1) integrable, in fact