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# NON – LINEAR ANALYSIS OF REINFORCED CONCRETE BEAM AFTER CRACK TREATMENT

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# *ABSTRACT*


Reinforced Concrete (RC) beam behaves non-linearly when tensile cracks start to appear. These cracks upon treatment had proven to provide the necessary residual strength for the beams to function continually.

In this study, a non-linear finite element analysis will be adopted to seek the behaviour of RC beam after crack treatment using ANSYS 5.0 (Swanson Analysis System), which is a finite element analysis system. The beam will be modelled in three-dimensional (3-D) using SOLID 65 element types. The post-cracking strength will be measured in terms of load-displacement and stress-strain relationship.

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# 1.0 INTRODUCTION

## 1.1 General

The search for a way to represent the non-linearity of structure goes back to renaissance times and present theories of non-linear elastic and inelastic behaviour are the result of approximately two hundred years of steady development. But only recently has computer made it possible to put much knowledge to use in design.

The finite element method, simulated by rapid growing power of electronic digital computers, has strengthened its position in computer in computational mechanic from its early stage of performing linear analysis for simple problem into an era of conducting the more challenging task, such as non-linear, inelastic dynamic analysis and so on, for problem that are ten, hundred or thousand times more complicated than those ever attempted before. Nowadays, many people tend to view the finite element method as a well-established toll that can be readily applied to the solution of various non-linear problems. Experience has shown us that can be too optimistic in many cases, as the various phases involved a non-linear analysis are not as definite and straight forward as those of linear analysis.[Yang,Yeong-Bin,1954]

In this study, cracks had appeared at RC beam upon which might be due to support or loading conditions. The beam shown in Figure 1.1 will be analysed with non-linear routines of Finite Element Method (FEM) and idealised as in Figure 1.2.