

# PROGRESSIVE STRUCTURAL COLLAPSE OF MULTI-STOREY BUILDING UNDER DYNAMIC LOADING USING ANSYS

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**Abstract** - Progressive Structural Analysis of Multi-storey Building with the effect of Dynamic Loading is analyzed using the general purpose finite element package ANSYS. A 3-D finite element model representing multi- storey building is built first . Shell elements and beam elements has been used to simulate the whole building incorporating non-linear material characteristics using the model.

Apart from ANSYS workbench, in additional I have used fusion 360 and R-Wind simulation environment also in my project whereas, I have used fusion 360 in order to design the 3d model extruded structure of my G+6 Multi storey building, and also to check parameters like draft and curvature analysis of the model which has been implied before the simulation process. R-wind simulation is used in order to obtain the wind load values like parameters of drag forces, streamlines, velocity and vibrational contours with the application of external loads. The models accurately displayed the overall behavior of the multi- storey buildings under the sudden loss of columns, which provides important information for the additional design guidance on progressive dynamic collapse. All those results has been obtained and then at final report previews of ANSYS and fusion 360 is to obtained to conclude my parameter values with pictorial and graphical representations and along with tabular values.

**Key Words:** Analysis, 3D model, ANSYS, fusion 360.

## 1.INTRODUCTION

Progressive collapse first attracted the attention of engineers from the structural failure of a 22-storey apartment building at Ronan Point, London, UK, in 1968. The terminology of progressive collapse is defined as “the spread of an initial local failure from element to element, eventually resulting in the collapse of an entire structure or a disproportionately large part of it’. In this paper, using the general purpose finite element package ANSYS, a 3-D model is first developed which enables the nonlinear progressive collapse analysis of high rise building. Two 3-D finite element models representing different storey buildings with different structural forms were built to perform the progressive collapse analysis. The models accurately displayed the overall behavior of the storey buildings under sudden loss of columns, which provided important information for additional design guidance on progressive collapse.

## 1.1 Objective

- To design RC multi storey structure using modelling software.
- To analyze the structure by Non-linear static analysis method.
- To perform analysis for the structure with removal of critical columns fully and partially.
- To determine the potential for progressive collapse and apply the dynamic loads to find out the responses from it.
- To give the preventive measures.

## 1.2 Scope

- Reduction of potential for progressive collapse in new and renovated Federal buildings.
- Potential of progressive collapse is assed using Non linear static analysis method since it gives economical design.

## 2. METHODOLOGY AND MODEL

### 2.1 Methodology

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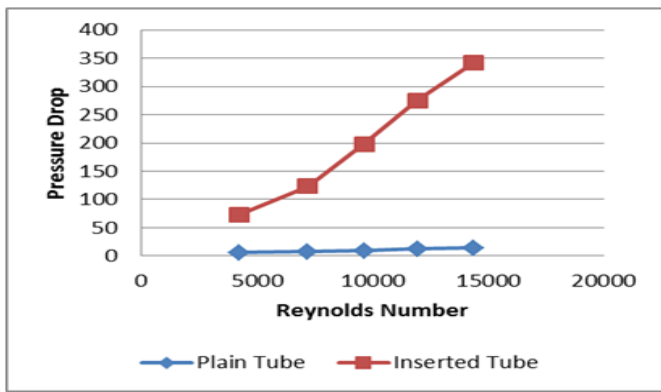
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### 3. RESULTS

### 4. CONCLUSIONS

- Analysing the multi-storey G+6 building to obtain its characteristics with different set of internal and external parameters.
- To use solidworks for the outer model structure and for the draft and internal structures using the space claimer for the completion of my model.
- To import my model in ANSYS to make analysis and simulation process.
- In ANSYS by selecting two methods to work through it, whereas by using those methods and applying set of parameters for the imported model as an input parameters.
- To apply these parameters and to get different set of output analytical results in structural and dynamic loads.
- The model is to be analyzed and get simulated to get my required outputs.

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