A Review Paper on Failure of Non Structural Component during Earthquake

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Abstract: The Masonry buildings are widely used for housing construction not only in India but in many other countries of the world. Past earthquake disasters shows that destruction of masonry infill wall. At the time when earthquake effect on buildings it was seen that there is highly non-linear inelastic behaviour and there is interaction between masonry infill panel and surrounding frame. The behaviour of single-story, single-bay reinforced concrete infill frame with masonry panel subjected to lateral force was studied using two models first RC frame with infill masonry wall and second RC frame without infill masonry wall. Found that increase in stiffness with masonry infill wall with RC frame subjected to lateral force compare with RC bare frame.

Keywords — Deformation, infill wall, lateral force, modulus of elasticity, RC frame with infill wall, RC frame without infill wall, stiffness, storey-drift

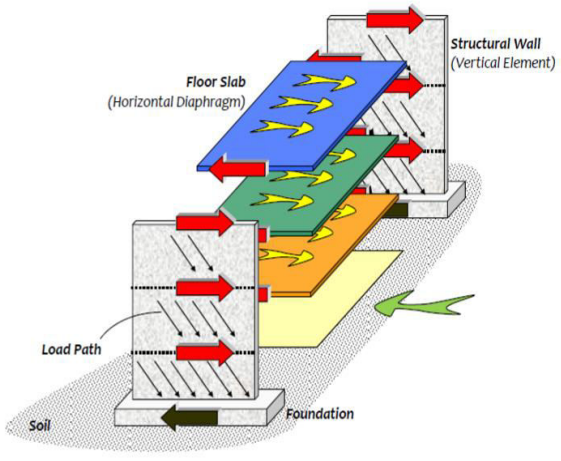
I. INTRODUCTION

A Building considered as safe in earthquake ground motion occurring at base, only when people and content of building is safe.

When ground shakes Inertia force is induced in building at all location where mass is present then it flows through various mass points through horizontally and vertically oriented structural members to the foundation this chain is call as load path.

Member of building that carries inertia force to the ground are structural elements. Some elements assumed as Non-Structural but they take part in seismic behavior of building by lateral force transfer. A panel of steel or concrete frame. Panels are separated from surrounding frame by a gap are termed as isolated infill. Masonry placed within RC frame is nothing but infill.

Basically there are two types of behavior occurs in infill masonry wall during earthquake. First is in-plane behavior and second is out-of-plane behavior. In this structure out-of-plane behavior does not take part in dissipation of energy created during earthquake in X and Y direction. But in in-plane behavior infill wall contributes resistance to the lateral forces created during earthquake. After application of earthquake diagonal stresses will be generates accordingly two zones i.e. compression zone and tension zone. Compression zone resists lateral force and act as diagonal strut member. Tension zone creates cracks and causes failure. In-plane behavior of infill wall take part in dissipation of energy created during earthquake.

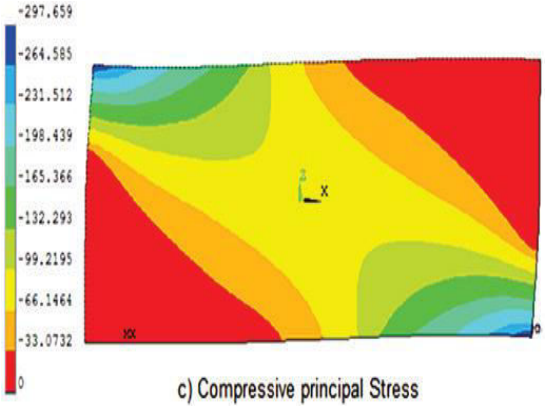


II. NON-STRUCTURAL ELEMENTS

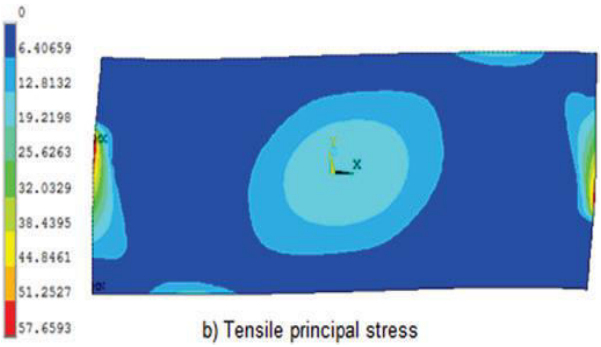
Elements which are supported by structural members whose inertia force is also carried by structural elements are called as non-structural elements. Basically unreinforced masonry infill wall considered as non-structural element. When lateral force occurs due to earthquake ground motion URM Infill takes part to resist lateral force.

III. TYPES OF FAILURE

Masonry structure fails under various ways under action of lateral force such as: (1) In-plane Failure, (2) Out of plane Failure, (3) Connection Failure, (4) Failure due to opening in wall. In this in-plane failure plays important role to resist lateral force and creates stresses. Diagonal stresses are in compression zone and other part is in tension zone. Tension zone will create crack.



c) Compressive principal Stress

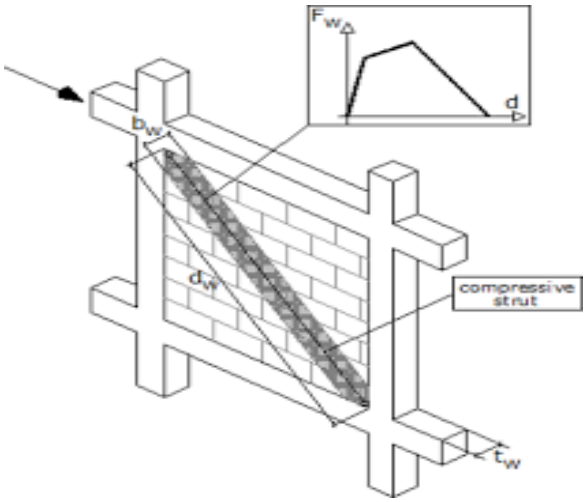


b) Tensile principal stress

IV. METHOD OF ANALYSIS

For determination of resistance to lateral response by URM infill there are two methods for analysis (1) Equivalent Diagonal Strut Method, (2) 2-D Finite Elemental analysis using ANSYS software.

The concept of equivalent diagonal strut was presented by polyakov. From this concept wall is replaced by diagonal strut. Connection at both ends is pin jointed.



V. EFFECT OF NON STRUCTURAL ELEMENTS ON STRUCTURAL SYSTEM

Non-structural elements are not taken into account while designing structures. Buildings contain non-structural elements which affects structural behavior during earthquake. Natural period of the structural system may be reduced at some extent. Story shear distribution in column can contain more lateral force. Unsymmetrical arrangement of non structural walls may cause torsion in system.

VI. CONCLUSION

In this research the review is based behavior of non structural elements during an earthquake after detailed study it is seen that. Fully infill RC frame structures have higher stiffness than RC bare frame structure.

The effect of infill wall in RC frame provides more lateral resistance to the RC frame. Deformation is decreases with consideration of RC frame with masonry infill wall.

There is also reduction in shear force and bending moment because of consideration masonry infill wall in reinforced concrete frame when it is subjected to lateral force.

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