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PERFORMANCE OF MASONRY STRUCTUR -REVIEW

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ABSTRACT-*Masonry is the building of structures from which individual units laid in and bound together by mortar; the term masonry can also refer to the units themselves. The common materials of masonry construction are brick, stone, marble, granite, travertine, limestone, cast stone, concrete block, glass block, stucco, and tile. Masonry is generally a highly durable form of construction. Local sandstone and clay brick materials were used in order to obtain results representative with respect to local constructions. Aiming at a comprehensive material description, a set of displacement controlled experiments were carried out, both under monotonic and cyclic compressive loading. A study on the mechanical behaviour of brick masonry structures subjected to overloading phenomena is presented. Such structures suffer a very specific damage, represented by diffused thin cracks, which can lead to long terms effects up to a sudden collapse. The procedure adopted for testing is described and the results are discussed, namely material brittleness, intrinsic variability, energy dissipation and stiffness degradation*

I. INTRODUCTION

Masonry is one of the most antique structural systems in the world. However, it has been lost prestige with the advance of other structural systems such as reinforced concrete and steel. In load-bearing masonry buildings, walls are the main structural elements that assure the structural stability. Masonry structures are low-cost and construction practices are simple, so many people in developing countries live in such buildings. However, masonry structures are vulnerable to earthquakes. This paper deals with the analysis, design, and behaviour of load bearing masonry walls. These walls are often subjected to lateral loads from wind or, in zones of moderate, from seismic actions, meaning that structural systems have to be designed to resist these types of loading. Besides lateral loads, the walls are submitted to vertical loads since they constitute the main supports of slabs, vaults and domes, meaning that a complex stress state develops in masonry walls. In common masonry structures vertical forces due to dead and live loads as well as lateral forces due to earthquake loads are resisted by the structural walls. In masonry structures, besides the structural walls, partition walls are used for the separation of rooms having different functional purposes.

1.1. TYPES OF MASONRY WALLS

- Masonry walls with Reinforced Rods.
- FLY-ASH Bricks masonry.
- Stone masonry.
- Brick masonry.
- Inter locking brick masonry.

II. LITERATURE REVIEW

Paulo B. Lourenço et al., (2015) the results of this study are usually important for understanding the structural behaviour of the constructions. If the wall of the structure is not reinforced, the flexural capacity of the section below and above the slab is too low to activate the flexural capacity of the horizontal structural elements and if its reinforced, the structural wall behaves like a cantilever member, coupled with horizontal structural elements.

Vivek Tiwari et al., (2014) it can be concluded that Fly ash brick masonry has average comparative strength, which is approximately 1.3 times the strength of conventional brick masonry and these bricks are environmentally friendly. It can also be inferred that the strength of masonry is depend upon the strength of brick units. Usually compressive stress in the masonry is mainly governed by failure of bond and strength may be increased by improving bond strength.

S.Niruba et al., (2014) from this study, we understood that the infill wall the roof displacement of the structure reduces and the stiffness of the structure increases. The masonry infill wall is more significant in small structures and if the height of the structure increases the effect of masonry infill wall reduces. The effect of dynamic loading on the behavior of masonry infilled RC frame may be investigated to determine the infill characteristics with study and infilled frame with a soft ground storey, the shear forces acting on columns are considerably higher. This paper had conclude that calculation of earthquake forces by treating RC frames as ordinary frames without regards to infill leads to underestimation of base shear.

Aiko Furukawa et al., (2014) this paper deals with the city of Bam in south-eastern Iran was hit by a strong earthquake on December 26, 2003, where 43,200 people lost their lives, many due to the collapse of masonry buildings. The development of a numerical method that can accurately simulate the seismic behaviour of masonry structures is needed and there are two types of numerical simulation methods that can handle seismic behaviour. One is based on continuum modelling, and the other, on discontinum modelling.
Humberto Varum et al., (2014) the farm soil mixed with other materials, like straw or lime is to produce adobe bricks. These bricks are sun-dried. When its compare to other building materials like reinforced concrete, the adobe is costless, for this reason it is mostly used by families with low-incomes. In this study, the results of tests and numerical models are used to better understanding of the behaviour of adobes constructions under different loading conditions, which may help in designing economical and also for the rehabilitation and strengthening solutions for the existing constructions.

Diana Samoila et al., (2013) to investigate the problems of the infill characteristics and seismic behavior is the aim of this paper. The geometrical and mechanical characteristics of infill masonry are determined by the analytical methods. In this paper deals with different masonry structures like three one- bay, one- story frames, for which the diagonal strut width and the strength to different failure types are determined. Thus the result, effects of the masonry infill panels upon the seismic behavior of the frames structures are plotted by the capacity curves. This are obtained from the push-over analysis carried out on a series of concrete frames with different number of stories.

Freeda Christy C et al., (2012) from this study in inplaned behaviour masonry wall we determine the diagonal compression test and the shear–compression test. It is noted that unreinforced masonry walls showed sudden brittle failure and unable to maintain further load. This paper deals with the reinforced masonry with low cost and also improved properties of strength, especially for masonry structures in seismic areas. In this paper the experimental tests are to be conducted to determine the effectiveness of the reinforcement for strength and behaviour to the failure modes at the low cost. Instead of reinforcement the wire meshing may be used to prevent/delay brittle failure of masonry structures.
Mohammed A et al., (2012)the results show that in the compressive strength tests, masonry strength was observed to increase with increasing mortar strength under compression and it was also observed that, the M95 masonry tests gave higher results. The small masonry models could be used to investigate the effects on masonry strengths like mortar strength.
Luis moya et al., (2012) in this paper by using the shake table test on two specimen were the first specimen consists of c shaped specimen whose walls are connected only by their ends and the second specimen is the upper storey that the c shaped wall is connected at the top floor and the weight of that floor is suspended to determine the dynamic behaviour of unreinforced masonry wall. The test result shows the behaviour of each specimen. The first specimen is an out of plane failure mode govern and second specimen is a shear failure mode govern.

L. Avila et al., (2012) this paper deals with the combination of a series of structural and economic advantages like the high capacity to resist, the simple and easy method of construction, comfort properties and structural performance given for the new masonry structures. In this we analysed an innovative solution for the construction of low to medium residential masonry buildings. The aim of this paper is to providing further guidelines for its design and construction to resist earth quake. This paper present deal under seismic loads process related to the experimental mechanical validation of the constructive system based on concrete block masonry buildings.

A. Figueiredo et al., (2012) this research is on the development of repair techniques, it conclude that some of the types of damage typically found in adobe constructions can be easily repaired through rehabilitation techniques. To study the behavior of adobe structure under cyclic loads such are those induced by earth quake a real scale adobe wall was built and tested under cyclic horizontal loads.

Vladimir G. Haach et al., (2010) in this present study the connections are usually critical regions in structures. The transmission of stresses between structural elements is the issue and it is common in load-bearing masonry structures to build the intersections of walls through the interlocking of units. The aim of this paper is to evaluate the behavior of masonry walls intersections built with two different blocks configurations by applying only ordinary concrete blocks with two cells and applying special concrete blocks with three cells. The specimens subjected only to vertical loads and specimens subjected to the combination of vertical and horizontal loads.

D.V. Oliveira et al., (2005) this present paper deals with an experimental research concerning the uniaxial compressive behaviour of stone and brick specimens, as well as masonry wall and to obtain results representative with respect to local constructions. A set of displacement controlled experiments were carried out, both under monotonic and cyclic compressive loading. The procedure adopted for testing is described and the results are discussed.

Maria Rosa Valluzzi et al., (2005) this paper is to determine the mechanical behaviour of brick masonry structures subjected to overloading phenomena is presented. That type of structures suffers a very specific damage, represented by diffused thin cracks, which can lead to a sudden collapse. This paper also deals with the strengthening technique, based

on the insertion of steel bars in the bed joints. By the experimental tests and numerical analyses shows that the presence of the bars allows to control the cracking phenomena, keeping the structure in the safety conditions. Two case studies recently carried out and also discussed. As the result the application of the strengthening technique to two masonry structure is briefly described.

Z. Celep et al., (2005) this paper deals with the masonry buildings in turkey by using local materials. The buildings are often constructed by using reinforced concrete without proper design. Those buildings are considered as masonry buildings. In Turkey the AAC blocks are used to produce masonry walls with the reinforced concrete frames and additionally AAC panels and slab elements are used as prefabricated structural elements and masonry buildings are constructed. In the present paper observations on performance of the buildings made of conventional masonry material and AAC products during the Marmara Earthquake are discussed comparatively.

Sorin Marginean et al., (2004) in this paper the influence of masonry infill on reinforced concrete frame structure behavior .The paper deals with the experimental program results concern. The frame with one span and one level without masonry infill; the frame with coupled masonry of solid bricks and bricks with vertical hollows; the frame with uncoupled masonry of bricks of cellular concrete are constructed and tested. The presence of this paper that the masonry infill of the structure is constructed by reinforced concrete structures will increase the lateral load, the stiffness and the ductility.

K S Jagadish et al., (2003) this paper deals with the variety of masonry structures damage during the Bhuj earthquake. The traditional masonry structures had no earthquake resistant features and considerable damage. This study is to evaluate the behaviour of masonry structures based on the type of masonry used in places were earth quake appeared. Some masonry buildings had used earthquake resistant features like lintel bands and corner reinforcements. The cracking and failure patterns of such buildings have also been observed and discussed in this study.

M Beak et al., (1994) This paper deals with both masonry and reinforced concrete panels undertaken to examine the failure of panels under loads. The strength of the panels was calculated by traditional yield line theory. The failure pressure of the panels under dynamic load did not compare well with the failure pressure from the static tests or the yield line calculations. The result of this paper that using static tests and quasi-static load approximations for determining the response of the panels to a dynamic load is not appropriate. The panel could underestimate the load bearing capacity of masonry and concrete panels subjected to lateral loads.

Vernon B Watwood et al., (1994) in this paper the seismic behaviour of two three storeys with plain and reinforced masonry wall had determined. If the masonry walls are not reinforced, the flexural capacity of the section below and above the slab is too low to activate the flexural capacity of the horizontal structural elements and masonry structure is reinforced, the structural wall behaves like a cantilever member, coupled with horizontal structural elements.

F.Aboul Ella et al., (1993) in this paper, the analysis, design, and behaviour of load bearing masonry walls was determined. Load bearing masonry is a cost-efficient building system. In this study they comparing reinforced and unreinforced masonry sections, the reinforced wall with 20 cm is preferable than the unreinforced 30 or 35 cm walls. The result of this paper is reinforcement increases the ductility of the wall and hence its resistance to cracking.

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