


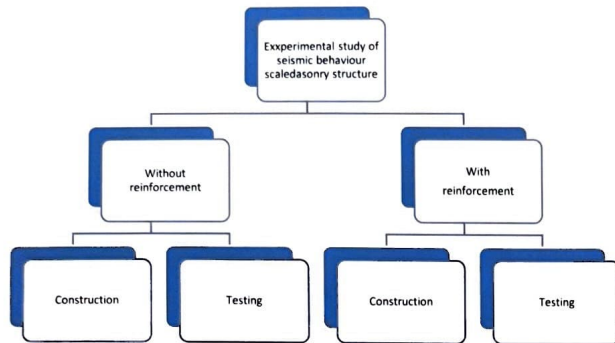
Department of Civil Engineering

Final Year Project Exhibition: 2022 - 2023

GROUP No.: - 01		BATCH No.: - 02	
PROJECT TITLE :-Experimental Study Of Seismic Behaviour On Scaled Masonry Structure			
STUDENTS		GUIDE	
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ABSTRACT			
<p>The experimental approach based on shake table test was adopted in this work, to study the seismic behaviour on scaled masonry structure based on concrete block masonry with and without horizontal mesh aiming at validating its seismic behaviour. Having a dimension of 3ft x 3ft .The scaled masonry structure of different typology, unreinforced, reinforced masonry was tested under the cyclic loading in seismic testing manner to study the seismic performance in both structure. Among 2 tests are conducted, with and without horizontal reinforcement. With same initial features. The observations made on the test data collected were different damages. This gives the acceleration, velocity and displacement with respect to time in both structures. These experimental results shows that acceleration velocity displacement is higher in reinforced masonry compare to unreinforced masonry structure.</p>			
OBJECTIVES:			
<ol style="list-style-type: none"> 1. To Scale the masonry structure and construct the same (model 1) without reinforcement on the shake table. 2. To Scale the masonry structure and construct the same (model 2) with placing the horizontal mesh in the mortar joints as a horizontal reinforced on the shake table. 3. To test both scaled masonry structure (with and without horizontal mesh) to find the seismic behavior properties like acceleration, velocity and displacement with respect to time. 4. To Study the seismic behaviour by comparing the results of both with and without horizontal mesh scaled masonry structure. 			
METHODOLOGY:			
<ul style="list-style-type: none"> • Methodology of objective 1: Scaling the regular masonry structure of size 3m x 3m and constructing the scaled structure (model 1) (size 3 ft x 3 ft) without reinforcement on the shake table using normal solid concrete blocks with the mortar proportion 1:3. • Methodology of objective 2: Scaling the regular masonry structure of size 3m x 3m and constructing the scaled structure (model 2) (3 ft x 3 ft) with horizontal reinforcement (horizontal mesh size 3mm thick 25x 25mm size) in the mortar joints on the shake table using normal solid concrete blocks with the mortar proportion 1:3 • Methodology of objective 3: After constructing the scaled model on the shake table (model 1 and model 2) with and without horizontal reinforcement. The different earthquake intensities will be applied on the scaled structure and with the help of sensors the seismic behavior properties of the structure like Displacement, acceleration and velocity will be found with respect to time. 			

Methodology of objective 4: The test results of both scaled model structures with and without horizontal reinforcement will be compared to know the seismic behavior.

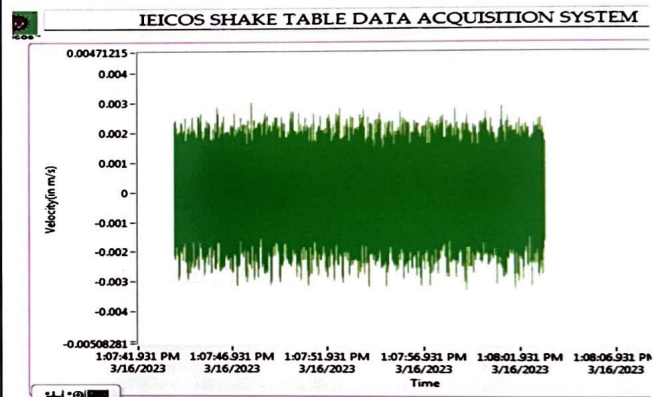
BLOCK DIAGRAM / FLOW CHART



SNAPSHOTS OF RESULTS

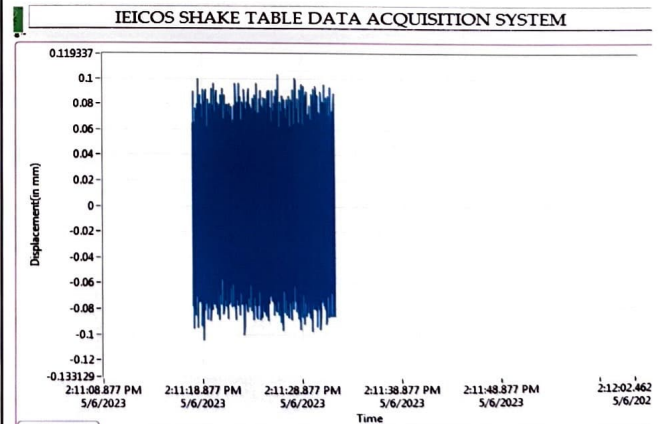
Without Horizontal mesh masonry structure result

Frequency		Velocity (m/s)	Displacement (mm)	Acceleration (g)
Frequency 5	Ch1	0.0126	0.42	0.41
	Ch 2	0.0146	0.601	0.550
	Ch 3	0.0030	0.141	0.115
	Ch 4	0.0119	0.410	0.4
Frequency 10	Ch1	0.0016	0.104	0.1
	Ch 2	0.0079	0.144	0.5
	Ch 3	0.00156	0.042	0.160
	Ch 4	0.0024	0.090	0.380
Frequency 15	Ch1	0.0010	0.0501	0.456
	Ch 2	0.0049	0.0668	0.600
	Ch 3	0.0009	0.0140	0.124
	Ch 4	0.0016	0.0450	0.350



With horizontal mesh masonry structure result

Frequency		Velocity (m/s)	Displacement (mm)	Acceleration (g)
Frequency 5	Ch1	0.035	0.10	0.100
	Ch 2	0.0180	0.462	0.480
	Ch 3	0.048	0.120	0.089
	Ch 4	0.0121	0.355	0.354
Frequency 10	Ch1	0.0068	0.025	0.0421
	Ch 2	0.0088	0.123	0.059
	Ch 3	0.0028	0.026	0.108
	Ch 4	0.0060	0.0359	0.1256
Frequency 15	Ch1	0.0048	0.010	0.090
	Ch 2	0.0062	0.048	0.450
	Ch 3	0.0014	0.0101	0.095
	Ch 4	0.004	0.01258	0.125



Conclusion

The conclusion for the current research as per the tests conducted and results obtained are as follows:

1. From the test results it is observed that the compressive strength of mortar for 1:3 for 7 days 20.50 N/MM² And for 28 days 40 N/MM² this gives the mortar strength.
2. The scaled masonry structure of different typology, unreinforced, reinforced masonry was tested under the Cyclic loading in seismic testing manner to study the seismic performance in both structures. Among 2 tests are conducted, with and without horizontal reinforcement.
3. Seismic test was conducted on scaled masonry structure without reinforcement (horizontal mesh) and curing Was done for 28 days

The test results has shows that

The maximum velocity for

- The Frequency 5 in CH1 is 0.013, CH2 is 0.0148, CH3 is 0.0029, and CH4 is 0.004
- The Frequency 10 in CH1 is 0.0068, CH2 is 0.0095, CH3 is 0.0015, and CH4 is 0.00153
- The Frequency 15 in CH1 is 0.0049, CH2 is 0.006023, CH3 is 0.001, and CH4 is 0.001253

The maximum displacement for

- The Frequency 5 in CH1 is 0.4, CH2 is 0.505, CH3 is 0.090, and CH4 is 0.125
- The Frequency10 in CH1 is 0.104, CH2 is 0.144, CH 3 is 0.026 , and CH 4 is 0.0359
- The Frequency 15 in CH1 is 0.0501, CH 2 is 0.0668, CH3 is 0.0101, and CH 4 is 0.01258

The maximum acceleration for

- The Frequency 5 in CH1 is 0.41, CH2 is 0.480, CH3 is 0.0899, and CH4 is 0.354.
- The Frequency10 in CH1 is 0.0421, CH2 is 0.059, CH 3 is 0.108, and CH 4 is 0.1256.
- The Frequency 15 in CH1 is 0.456, CH 2 is 0.6, CH3 is 0.095, and CH 4 is 0.125.

4. Seismic test was conducted on scaled masonry structure without reinforcement (horizontal mesh) and Curing was done for 28 days

The test results has shows that

The maximum velocity for

- The Frequency 5 in CH1 is 0.035, CH2 is 0.0180, CH3 is 0.048, and CH4 is 0.0121
- The Frequency 10 in CH1 is 0.10, CH2 is 0.462, CH3 is 0.120, and CH4 is 0.355
- The Frequency 15 in CH1 is 0.100, CH2 is 0.480, CH3 is 0.089, and CH4 is 0.354

The maximum displacement for

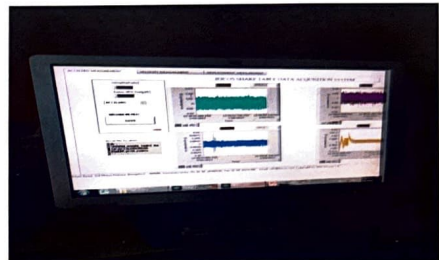
- The Frequency 5 in CH1 is 0.0068, CH2 is 0.0088, CH3 is 0.0028, and CH4 is 0.0060
- The Frequency10 in CH1 is 0.025, CH2 is 0.123, CH 3 is 0.026 , and CH 4 is 0.0359
- The Frequency 15 in CH1 is 0.0421, CH 2 is 0.059, CH3 is 0.108, and CH 4 is 0.01256

The maximum acceleration for

- The Frequency 5 in CH1 is 0.0048, CH2 is 0.0062, CH3 is 0.0014, and CH4 is 0.004.
- The Frequency10 in CH1 is 0.010, CH2 is 0.048, CH 3 is 0.0101, and CH 4 is 0.01258.
- The Frequency 15 in CH1 is 0.090, CH 2 is 0.450, CH3 is 0.095, and CH 4 is 0.125.

5. With comparison between both results we can easily identify that with reinforcement structure has Maximum sustain capacity in seismic action.
6. The reinforcement structure also have a good stiffness and strong bonding and high resistance capacity of Seismic action compare to normal masonry structure.

Casting process without reinforcement



Casting process with reinforcement

