Figure 6: Test Setup

Figure 7: Testing of slab FP-FT 01

Figure 8: Testing of slab FP-FT 02

2.4. Testing of Specimens

The slab was tested under loading frame. The load was applied by means of a Load Cell of 50 ton capacity. The specimens were tested by simulating simply supported conditions. The load was applied as two symmetrically arranged concentrated line loads. Loading is applied using a Hydraulic Jack and LVDT was fixed at central bottom to measure the deflection. The slabs were painted using whitecem to help in tracing the cracks. The test setup is shown in figure (6). The load is applied in small increments and simultaneously the deflection at the center of the panel was recorded during the loading process up to failure. The deflection at the mid span is measured by LVDT. Cracking pattern was carefully checked throughout the loading process and the corresponding cracking load is also noted.

Table 1: Mix proportions

S. No.	C/S Ratio	W/C Ratio	Super Plasticizer (%)	Compressive Strength (N/mm2)
1	1.3	0.3	1	42.50
2	1:2	0.3	1	47.25
3	1:1	0.3	1	52.16

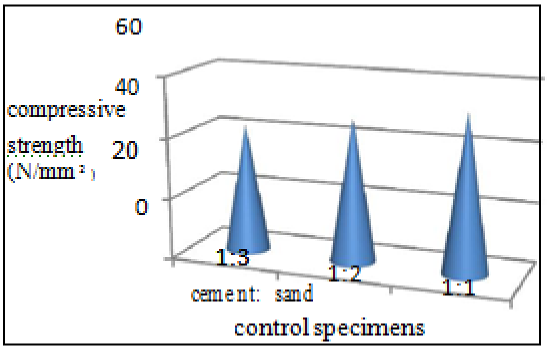

Figure 9: Compressive strength of control specimens

Table 2: Experimental Results

Specimen ID	*Cracking*		*Ultimate*	
	Load (kN)	*Deflection (mm)*	*Load (kN)*	*Deflection (mm)*
FP-FT 01	1.00	1.9	1.9	28.6
FP-FT 02	1.90	13.6	2.8	27.5

3. Results and Discussion

The parameters that have been investigated in this study is the effect of the geometry of the panels and number of wire mesh layers on the cracking load and ultimate flexural strength and the plot of load deflection curve for panel. The test results are presented in the below table (2) in which cracking and ultimate load for the tested ferrocement panels are summarized. The gain in the ultimate strengths with the increase in the number of wire meshes layers for the panels. The failure load increased from 1.9KN for FP-FT01 to 2.8KN for FP-FT02.

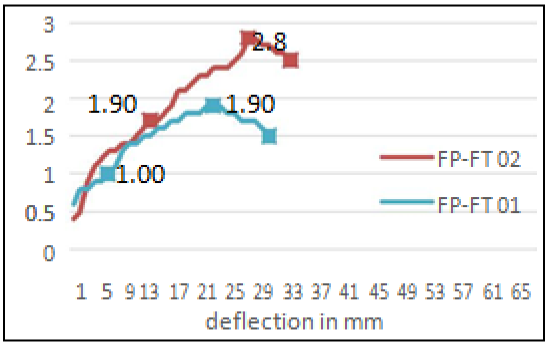

Figure 10: Load- Deflection Curves flat panels

Figure 11: (a) Crack Pattern (FP-FT01)

Figure 12: (b) Crack Pattern (FP- FT02)

3.1 Cracking Behavior

The failure of the slab specimen's results from the yielding of wire mesh reinforcement is followed by the crushing of mortar. Initially fine flexural cracks appeared at the bottom of the specimen. With further increase in the load, regularly spaced vertical cracks were observed and they extended from the bottom of the specimen towards the top (Figure11).The load was increased up to ultimate stage and cracking pattern were observed.

4. Conclusions

Based upon the experimental test result of the flat panel, the following conclusions were made:

- The cracking load was not significantly affected by the number of the wire mesh layer particularly for the flat panel.
- From the experimental results, the flexural strength of flat panel with single wire mesh layer is 81% lower than trough panel and 91% lower than folded panel.
- And flat panel with double layer wire mesh is 77.95 % lower than trough panel and 89% lower than folded panel. And the deflection is reduced by 56.36% and 2 % respectively when compared of trough panel and folded panel.
- Finally increasing the number of layers of wire mesh from single and double layers increases the ductility in both types of the panel.

References

[1] S.Abdullah, K.Takiguchi, K.Nishimura, and S.Hori, "Behavior of ferrocement subjected to missile impact", 17th International Conference on Structural Mechanics in Rector Technology (SIRT), Prague, Czech republic, pp.26.1997.

[2] T.Chandrasekhar Rao, T.D. Gunneswara Rao,and N. V. Ramna Rao, "An Experimental study on ferrocement channel Units under flexural loading,International Journal of Mechanics and Solids, Vol. 3, no.2, pp.195-203,2008.

[3] M.Jamal sh.annag ,Tareq bin ziyyad "Flexural response of ferrocement with Fibrous cementations matrices", Construction and building materials-2007

[4] B.Kondraiventhan, Balupradhan "Effect of Ferrocement confinement on behavior of concrete",constructio and building materials 2009.

[5] Mohana Rajendran, Nagan Soundarapandian "An Experimental Investigation on the Flexural Behavior of Geopolymer Ferrocement Slabs" Journal of Engineering And Technology, Jul-Dec 2013, Vol 3, Issue

[6] MohamadN.Mahmood,Sura.Majeed, "Flexural Behavior of Flat and Folded Ferrocement Panels' AI-Rafidain Engineering, Vol.17, No4, August 2009.

[7] P.SaranyaBanu, S.Dharmar. "Experimental Investigation on Flexural Behavior of Trough shape Ferrocement panels.

[8] R.Vincent prabakar,S.Dharmar . "Experimental Investigation on Flexural Behavior of Folded shape Ferrocement Panels", 2nd National Conference- Recent Advancements in Civil Engineering (RACE'14) .March2014.

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