CHAPTER 12

SUMMARY OF CONCLUSIONS

Based on the present investigations, it was observed that the slurry infiltrated fibrous ferrocement can be adopted as a building material in special situations. It exhibits increased strength properties and increased durability properties as compared to ferrocement and fiber reinforced concrete. The effectiveness of steel fibers, GI fibers and polypropylene fibers in slurry infiltrated fibrous ferrocement in strength enhancement, durability improvement and ductility improvement have been well established by the results obtained. Therefore authoritatively it can be said that the slurry infiltrated fibrous ferrocement can act as high performance construction material.

Based on different experimental investigation, following broad conclusions are drawn

1. Slurry infiltrated fibrous ferrocement with 1% steel fibers or GI fibers or polypropylene fibers can exhibit higher compressive strength and remarkable improvement in impact strength. More than 1% fibers in slurry infiltrated fibrous ferrocement result in decreased compressive strength and impact strength. This property can be made use of where the structures are subjected to impact loads. On the contrary, it is observed that the flexural strength and ductility go on increasing as the fiber percent go on increasing.
2. Performance of slurry infiltrated fibrous ferrocement with steel fibers is more pronounced than slurry infiltrated fibrous ferrocement with GI fibers or slurry infiltrated fibrous ferrocement with polypropylene fibers. Therefore the steel fibers are recommended where strength is the criteria.

3. Slurry infiltrated fibrous ferrocement produced with lower aspect ratio of steel fibers or GI fibers or polypropylene fibers yield a higher compressive strength, flexural strength, toughness characteristics and impact strength. Therefore lower aspect ratios of fibers are recommended.

4. Slurry infiltrated fibrous ferrocement produced with 15% cement replacement by flyash or 6% cement replacement by silicafume or 10% cement replacement by metakaolin exhibit a notable performance with steel fibers, GI fibers or polypropylene fibers. It is observed that the compressive strength, flexural strength, impact strength and toughness characteristics are at peak with the above mentioned replacement of cement with different pozzolonas. Thus slurry infiltrated fibrous ferrocement produced with the replacement of cement either by flyash or silicafume or metakaolin is recommended where higher strengths are required.
5. Performance of slurry infiltrated fibrous ferrocement when subjected to freezing and thawing is found to be satisfactory with 0.8% addition of steel fibers or GI fibers or polypropylene fibers. 1.4% addition of steel fibers or GI fibers or polypropylene fibers have shown to improve the flexural strength and toughness characteristics when subjected to freezing and thawing. Thus slurry infiltrated fibrous ferrocement can be recommended where the structure is subjected to freezing and thawing. The concrete pavements, retaining walls, bridge decks and railings are likely to be damaged due to frost action in cold regions. With the development of multiple cracks, with reduced crack widths, the slurry infiltrated fibrous ferrocement is relatively impermeable.

6. Behaviour of slurry infiltrated fibrous ferrocement with the combination of admixtures such as (SP + AEA + A), (SP + AEA + R), and (SP + AEA + WPC) is found to be satisfactory. Therefore in few special occasions, slurry infiltrated fibrous ferrocement can be used with the above mentioned combination of admixtures to solve few special problems.

7. Performance of slurry infiltrated fibrous ferrocement when subjected to sustained elevated temperatures of 100°C, 200°C and 300°C is found to be good with the use of 1% steel fibers or GI fibers or polypropylene fibers. The spalling of concrete at high temperature can be eliminated with the use of slurry infiltrated
fibrous ferrocement. Therefore it can be recommended in the construction of the structures subjected to high temperature.

8. Even with alternate wetting and drying, the slurry infiltrated fibrous ferrocement has shown better performance with 1% addition of steel fibers or GI fibers or polypropylene fibers. The strength aspects are found to be higher when slurry infiltrated fibrous ferrocement is subjected to alternate wetting and drying. Therefore it can be used where there is a fury of alternate wetting and drying and can be recommended in the construction of water retaining structures, bridge piers, canal linings etc.

In general, the performance of slurry infiltrated fibrous ferrocement is definitely superior to that of either ferrocement or fiber reinforced concrete. The various strength properties like compressive strength, flexural strength and impact strength can be remarkably enhanced by the use of different fibers in slurry infiltrated fibrous ferrocement. Even toughness characteristics of slurry infiltrated fibrous ferrocement are excellent. Ductility characteristics and resistance to sustained elevated temperatures have been found to be excellent for slurry infiltrated fibrous ferrocement. With these observations, the slurry infiltrated fibrous ferrocement can very well be called as high performance construction material.