CHAPTER 2

LITERATURE REVIEW

2.1 GENERAL

A review of literature focusing on the optimal design of ferrocement roof slab, advantages of ferrocement hollow roof slab, the influence of fibres in the strength development and durability of ferrocement elements is presented in this chapter.

2.2 DESIGN AND FABRICATION

Syam Prakash et al (1995) developed optimal design formulation for ferrocement structural elements with identification of design variables, objective function and constraints. The double T and triple T elements considered for the formulation of optimal design consisted of skeletal steel bars of 6mm diameter in the flanges both longitudinal and transverse direction and in the webs along with layers of woven mesh. The transverse steel was placed over longitudinal steel in the compression flange. The width of roof slab panel was limited in between 600 mm to 1200 mm. This constraint was adopted to maintain the standardization and to ensure that it can be handled easily. The depth of the rib was limited to a maximum of one fifth of the width of flange to avoid too slender ribs and the inconveniences during erection.

Waliuddin and Ismail (1995) have designed an economical light weight ferrocement roofing system in which the precast L shaped tiles having
a section of 65 mm × 175 mm × 19 mm produces design of ribbed /waffle slab in the interior. The roof panels were anchored to the beams and to each other at the joints. The roof slabs were simply supported over load bearing walls to achieve economy. The roofing system is economical, lighter and its construction technique is also very simple. Since the roofing elements are made of thin sections, it consumes lesser amount of materials, lighter in weight and hence attracts lesser inertia force. A 2.65 m × 3.2 m roof was constructed by joining the precast ferrocement roofing elements of L shaped ferrocement tiles and ferrocement beams. A roof finish of 40mm thickness made of 1:5 cement sand mortar was laid over the roof and cured. When tested under 12 kN load as required by the recommendations of the ACI code 318-89 the midpoint deflection was 1.96 mm against an allowable value of 3.1 mm. No crack was observed at this load either in the LS tiles or in the ferrocement beams. Hair line cracks were observed at 16 kN load in some of the beams and the deflection was 2.76 mm at that load.

Hugo Wainshtok Rivas (1994) discussed the use of prefabrication technology in the fabrication of ferrocement precast elements. He made a comparative study on the technical and economical analysis of precast ferrocement elements with other systems. It was observed that ferrocement advanced favourably than other systems. He clearly states that in the prefabrication of ferrocement elements, quality and strength can be achieved by use of metallic moulds, small travelling cranes for lifting the elements, employment of vibrating table to achieve the right compactness of the mortar in the moulds and curing by immersion in pools. He has suggested that ferrocement construction system can be used for the urbanization of towns and cities combining it correctly with other systems, eradication of slums, emergency houses in case of natural disasters and the development of rural communities.
Al-Rifaie and Trikha (1990) have investigated the efficiency of various arrangements of hexagonal mesh reinforcement of 0.7 mm diameter in 500 mm × 500 mm ferrocement slabs of thickness 20 mm and 30 mm, tested under patch loads on simply supported condition over a span of 450 mm. The specimens were cast using cement sand mortar of 1:2 proportion and a water cement ratio of 0.45. It was found that the arrangement consisting of twin layers with two meshes orthogonally oriented and placed in contact is superior to the other arrangements of meshes unidirectionally oriented or alternative layers equally spaced with orthogonally oriented meshes. The load deflection behaviour was linear up to the first crack load. There was 16.7% increase in first crack load for 20 mm thick models and 11% to 24.4% increase for 30 mm thick models when compared to the other arrangements.

2.3 BENDING PERFORMANCE

Robles-Austriaco (2005) reviewed different papers on the researches and application of ferrocement in different countries with the objective to provide the trends and development outlook of ferrocement technology. It is emphasized that ferrocement technology has been established as environmental friendly low cost technology which can support sustainable development. The recent research undertaken in Singapore on the application of ferrocement in structural hollow sandwich panels considering the excellent tensile properties, thin walled nature and development of design charts relating the flexural moment capacity of ferrocement hollow sandwich panel system to the mortar strength, panel thickness and overall section depth are highlighted by the author.

Lara and Bolander (2004) reported the experimental study on the effect of strength and cracking performance due to various positioning of reinforcement in specimens of size 305 mm × 76 mm × 12.7 mm with two
layers of welded wire square meshes. The panels were tested under four point bending and during testing the tension face of the slab were monitored and the sequence of cracking was observed in relation to load level. After the peak load but prior to reinforcement rupture, the specimen were unloaded, sectioned using diamond blade saw and the wire positions on the cross section were determined through image analysis. It was observed that larger depths to the reinforcement centroid resulted in higher moment capacities. Hence it was recommended that skeletal steel and additional mesh layers be provided to ensure that reinforcement runs close to both faces of the member and nearly the full section depth is utilized for resisting moments. The location of first cracking is not strongly influenced by the position of reinforcement except where the reinforcement is near the surface and acts as crack initiator.

Bhattacharyya et al (2003) explored the application of ferrocement structural hollow sandwich panels in view of its excellent tensile properties. The advantages of the light weight, easy fixing by bolting the panels with one another and passing the services such as electricity cables, water pipe lines and gas lines through the hollow portion were highlighted. They derived an expression for flexural moment capacity of ferrocement hollow sandwich panel system. Charts relating flexural moment capacity to the volume fraction of wire mesh for different mortar strength, steel strength, panel thickness and depth of section were established. It was observed in general that the flexural moment capacity increase with the volume fraction of reinforcement.

Seshu (2001) conducted experiments on fibre reinforced concrete beams of size 120 mm × 200 mm × 2200 mm confined with ferrocement in addition to stirrups at critical zone of formation of plastic hinge under flexure. The beams were tested under two point loading on a simply supported span of 1700 mm. Specially fabricated curvaturemeter was used to measure the curvatures in the central zone of the beam. It was used to obtain the complete
profile of moment curvature behaviour especially in the post ultimate region. A theoretical procedure was developed from the characteristic equation of the stress strain curve for ferrocement confined reinforced concrete for generating complete moment curvature diagrams of the sections. The validity of the theoretical procedure was verified by experimental results of 30 specimens of reinforced concrete beam confined with ferrocement in addition to stirrups at critical section. There was good agreement between the analytical and experimental ultimate moments but the correlation between experimental and analytical ultimate curvatures was not so good as that of ultimate moments and the average ratio of experimental to analytical curvature was 0.756. He concluded that the provision of ferrocement made the reinforced concrete sections to behave in a ductile manner and the moment curvature diagram of FCRC section can be idealized to a bi-linear form.

Train Onet et al (1996) explored the specific aspects concerning the behaviour of ferrocement in a short time bending. Based on the test results they concluded that the ferrocement elements have a good behaviour under working load due to the fact that the width of cracking appears to be very small than in reinforced concrete. Consequently the permeability, stiffness and durability of the ferrocement element are much improved.

Walker (1995) summarizes the experimental and theoretical work undertaken to study the behaviour of ferrocement elements in flexure. The theoretical model for moment curvature response of ferrocement beams from initial condition through to ultimate moment used the principles of strain compatibility and equilibrium and incorporating the stress strain properties of constituent materials. The theoretical model for moment curvature upto cracking was determined using elastic transformed properties and modulus of elasticity of mortar. The method allows the prediction of moment, curvature, deflection and crack width and it was validated by the results observed in
testing six ferrocement beams of size 1000 mm × 200 mm × 25 mm rectangular sections. A combination of 3 mm to 4.5 mm diameter mild steel weld mesh and galvanized mild steel hexagonal woven chicken wire mesh were used as reinforcement. The theoretical value of first cracking moment was close to the experimental values but the ultimate moment were under predicted which may be attributed due to the absence of post maximum stress phase in the stress strain relationship of mortar used in analysis. However, the prediction of the method is satisfactory at service loads.

Al-Rifaie and Hassan (1994) conducted experiments on nine numbers of channel type folded plate models of different spans and width. The models were subjected to two different loading conditions. The experimental results of load deflection curves upto first crack load were compared with theoretical deflections calculated by nodal section method. The investigation show the suitability of ferrocement for the construction of elements of a horizontally spanning unit for one way bending and ferrocement can undergo large deflections before failure and this may be mainly attributed to the reinforcements which are distributed uniformly throughout the section. The failure of some of the models were due to widening of cracks in the flexure zone accompanied by splitting sounds due to snapping of wires of the mesh across the wider cracks. While cracks appeared in the webs of the models due to increase in the loads beyond the first cracking load, the flanges remained uncracked.

Basunbul et al (1991) have investigated the flexural behaviour of ferrocement sandwich panels. The parameters considered in the experimental investigation were number of mesh layers, the skeletal steel, and the web mesh reinforcement. It was observed that the number of ribs and the presence of web mesh reinforcement play an important role in developing full moment
capacities. Increasing the number of wire mesh layers improves stiffness and rigidity in the cracked region and not in the uncracked region.

Mathews et al (1991) reported the analytical and experimental investigations of cracking load, ultimate load, deflection, crack spacing and crack width of a hollow ferrocement roofing system. The system consists of top and bottom flanges connected by webs thereby leaving hollow spaces in-between. The test results confirmed that the system has adequate strength, stiffness and other serviceability requirements for residential applications. The theoretical values of cracking load, ultimate load, deflection and cracking width at working load showed good agreement with experimental values.

Mansur and Alwis (1988) investigated the behaviour of two way simply supported ferrocement slabs of size 1.1 m × 1.1 m. The load deflection curves were linear up to about the cracking load. After cracking the curves deviated from linearity. Although nonlinear, the post cracking portion of the curves was approximated by a straight line but of reduced slope. Near the ultimate load, the curves became almost horizontal indicating large deflection associated with a small increase in load. This continued until the slab finally collapsed by the formation of a mechanism. At failure well developed cracks were formed on both faces of the slabs.

Kaushik et al (1986) recommended ferrocement hollow slabs for roofing and flooring because of smaller self weight, ease of construction and requirement of lighter supporting systems and foundations. They conducted experiments on hollow slabs of different core shapes and numbers, varying the mesh layers and peripheral reinforcement. They had proposed analytical procedure for determining the deflection in the uncracked and cracked range which was validated by the experimentation on twelve ferrocement cored slabs. The parameters that were varied were the number of cores and the width of the specimen, shape of cores, amount of the reinforcement in terms
of layers of wire mesh. It was observed that the values were close enough with a maximum variation of 15% and the proposed method was adequate. The load deflection curves of the slabs show that the theoretical procedure for determining deflection at any loading stage is adequate. It was also observed that the specimen satisfy the limiting crack width criteria laid down by IS 456, 1978.

Paramasivam et al (1985) have investigated the flexural behaviour of one way ferrocement slabs cast with cellular mortar matrix. A foaming agent was added to the mortar which produced discrete air bubbles during mixing. The volume of the mix increased resulting in decrease in density of the mortar. The test was conducted on 2.5 m long and 0.4 m wide slab specimens with various thicknesses of 90 mm, 75 mm and 50 mm under third point loading over a span of 1.8 m. Galvanised woven wire mesh was provided varying the number of layers from 2 to 6. The mesh layers were tied together and placed with clear covers of 5 mm and 10 mm. Steel fibres about 1% to 2% were added as secondary reinforcement. The slabs behaved in elastic manner at early stages of loading. The stiffness of the slab decreased with decrease in mortar density. The curves then deviated from linearity after the first crack. With increasing load, they again became straight lines similar to the initial portion but of reduced slope. It was observed that there is an increase in cracking moment with increase in mortar density. Also it was found that the inclusion of discrete fibres in the mortar improved the cracking strength of the panels. The conventional reinforced concrete theory with a tensile stress block to include the effect of fibres, provides a good estimate of the ultimate moment capacity of the panels.

Sulaiman et al (1985) conducted experiments on ferrocement hollow box roof slab and tested under flexure upto failure. Nine slabs were constructed with one, two and three pre-cast box/skin element assemblies in
single direction to investigate the contribution of the slabs to the flexural strength. Hexagonal wire meshes and 5mm wire diameter skeletal steel bars were used for the precast box / skin element. No skeletal steel was used in boxes with expanded metal mesh. Also two slab models with two way box / skin assembly (2 m × 2 m and 2 m × 4 m) were constructed to study their behaviour under service load. Steel bars of 13 mm diameter were placed both ways in the ribs of both these slabs. It was observed that the hollow ferrocement roof slab behaves monolithically. The load carrying capacity increases with increased depth of hollow section keeping the number of layers of wire mesh the same. Also for the same number of layers of wire mesh, the hollow slab yields higher strength than solid slab depending on the depth of the hollow slab. The hollow slab designed is 50% lighter than a reinforced concrete slab of same depth. It is concluded that the slab is economical, effective and labour intensive compared to ordinary reinforced concrete roof construction.

Mansur et al (1984) conducted investigation on the composite behaviour of one way slab reinforced with precast ferrocement deck. The slabs were tested by third point loading under uniformly distributed load. The load deflection curves were linear up to about the cracking load. After cracking, the curves deviated from linearity and gradually became almost horizontal for each specimen showing a long plateau before failure. That indicated the slabs had considerable ductility and behaved in a composite manner throughout the extreme loading process. The failure of the slab occurred by yielding of steel followed by crushing of the concrete. It was found that the slabs could carry higher intensity of ultimate loads than normal loading for building. For smaller load intensity the slab span can correspondingly be increased.
Kaushik et al (1984) investigated the behaviour of 24 ribbed slab elements of size 910 × 910 mm and 1820 mm × 1820 mm under simply supported condition tested under uniformly distributed load and reported the functional and the limit state behaviour. The ribbed slabs were cast with galvanized woven wire meshes of different sizes and hexagonal wire mesh. It was found that the average enhancement of ultimate load over the first crack load was about 2.2 for ribbed slab as a result of the ductility available due to micro reinforcement in the elements. The central deflection satisfy span/250 and crack width is less than 0.2 mm for all the units at service load. The permitted crack width in different codes are achieved at 40% of the ultimate load for specimens with hexagonal meshes. The moment curvature curve was trilinear. A theoretical analysis based on the orthotropic plate theory was carried out to determine the curvatures at the critical load stages of the ribbed slab. For hexagonal mesh reinforcement the predicted curvatures at the first crack load were higher than the test values by about 10%. It was also found that the ribbed ferrocement slab offers an economy of about 30%.

2.4 FIBRE REINFORCED FERROCEMENT

Naaman (2008) classified the cement based composites reinforced with discontinuous fibres according to their tensile response as strain softening or strain hardening composites. He has also clearly explained the stress strain curve of strain hardening composite and strain softening fibre reinforced concrete composite in tension.

Naaman (2005) reviewed different papers on the application and technologies of ferrocement and thin fibre reinforced composite. He explained that short discontinuous fibres are used to improve energy absorption. The addition of fibres or micro fibres as secondary reinforcement in the cement mortar matrix to improve its performance makes ferrocement a hybrid composite. New reinforcing materials such as polymeric meshes and fibres
and mechanized production process can lead to achieve the goal of reducing the cost of both the reinforcements and labour. It is likely that a combination of discontinuous fibres and continuous meshes will provide the most effective composite, for a given level of desired performance, termed as hybrid composite. He has also included that the attractive feature of ferrocement compared to reinforced concrete is that it has isotropic properties in two directions and provides equal resistance under normal and reversed loading. It is accepted that the performance of ferrocement in tensile strength, ductility, toughness and impact is higher than that of fibre reinforced concrete for an equal volume fraction of reinforcement.

Wang et al (2004) conducted experiments on ferrocement thin plates reinforced with expanded steel mesh and Kevlar FRP mesh as well as synthetic discontinuous short fibres, namely Spectra and PVA fibres. They have proved that the bending stiffness is significantly higher prior to mesh yielding by placing all the reinforcement in the extreme layers than distributing evenly throughout the depth of the specimen. They have also shown that the addition of discontinuous fibres to the matrix of ferrocement can effectively increase the moment of resistance and significantly reduce the average crack spacing and width at ultimate loading. The fibres can be very effective in preventing the spalling of the mortar cover at ultimate load. It also improves the compressive strain at failure of the matrix and the shape of the stress strain curve in compression, thus leading to significant improvement in composite ductility even when over reinforced. An increase in toughness and energy absorption to failure by up to 250% was also observed when a ductile fibre reinforced matrix was used with the FRP meshes. The addition of polymeric fibres whose modulus of elasticity is low does not noticeably influence the composite bending behaviour before yielding of the mesh. However with the increase of crack opening, the contribution of the bridging force due to the fibres becomes significant. They have also provided
equations to account for the bridging force contributed by the fibres in the tensile zone. The moment capacity is given by

\[ M = A_f f_y (d - a/2) + \sigma_{fc} (h - c) b (h/2 + c/2 - a/2) \]  

(2.1)

where,

\[ a = \beta_a \frac{\sigma_{fc} b h f_y + f_y A_t}{0.85 \beta_f f_y b + \sigma_{fc} b} \]  

(2.2)

Ramesh et al (2003) presented an experimental investigation on the behaviour of hybrid ferro fibre concrete which is a combination of fibre reinforced concrete and ferrocement. Concrete prisms of size 150 mm × 150 mm × 300 mm were tested under strain controlled rate of loading. They have shown that the use of ferrocement shell, around the fibre reinforced concrete prism, comprising of cement mortar with steel fibres and galvanised woven wire mesh improved the ultimate strength, strain at ultimate strength and the ductility of reinforced concrete which is required for structures designed for seismic resistance. It was observed that there was no severe spalling in HFFC specimen until the load dropped by about 20% to 25% of peak load. The report shows that HFFC has not only increased the strength and ductility but also improved the integrity of concrete. The improvement in strain was more pronounced compared to the improvement in strength.

2.5 DURABILITY

Al-Rifaie and Al-Shukur (2001) investigated the effect of drying and wetting cycles on the strength and stiffness of ferrocement under flexure. About 216 ferrocement specimen of size 380 mm × 10 mm with varying thickness and number of wire mesh layers were tested after 28 days moist curing and then subjected to 10, 30, 60, 90, 120, 150 and 180 cycles of alternate drying and wetting. The specimens were loaded at third points over a span of 300 mm and the central deflection was monitored. It was observed
that within the duration of exposure tests the ferrocement composite retained its stiffness and ultimate strength. There was improvement in the first crack strength by about 14% to 33% depending upon the thickness and number of layers. This may be attributed to the increase in the maturity of the mortar component. The ultimate strength was not affected by the drying and wetting cycles and was found to fall within ±2% to 4.5% of the mean value for different layers and thicknesses. Also the ultimate strength increased as the number of layers increased. This implied that within the period of the durability test, the steel reinforcement was not affected by the drying and wetting cycles. In this investigation it was stated that an increase in the number of layers of more than four may tend to decrease the first cracking strength especially after larger number of wetting and drying cycles. It was concluded that the decrease in the number of layers to less than four may avoid the decrease in the first cracking strength. Stiffness at first cracking strength was marginally affected by the alternate drying and wetting cycles. The marginal variation in stiffness may be attributed to an increase in maturity of the mortar component of ferrocement. It can also be seen that the ductility of the ferrocement after the first cracking strength was insignificantly altered by the drying and wetting cycles.

Ramesht (1995) studied the effect of corrosion on flexural behaviour of ferrocement. In his paper he has quoted that the two phenomena that aggravates corrosion are remarkably thin cover to the mesh and the small diameter of mesh wires. He subjected ferrocement test specimen to alternate drying and wetting cycles for 12 weeks duration and studied the flexural behaviour. He concluded that the effect of corrosion in reducing the strength of ferrocement specimens with ungalvanised wire meshes, is greater than its effect on specimens with galvanized wire meshes.
Mathews et al (1993) conducted experiments on durability aspects of ferrocement specimens in marine environment. Hexagonal steel mesh of diameter 0.559 mm was used as reinforcement in the test specimen. Laboratory tests and field tests were carried out on ferrocement tensile specimens. The laboratory tests were alternate heating and cooling test and alternate soaking and drying test for about 90 cycles with 12 hours of each condition. In the alternate heating and cooling test the percentage reduction in strength varied from 25.86% to 1.34% depending on the water cement ratio. In the alternate soaking and drying test, maximum strength reduction was 28.64% and minimum was 9.47% which showed that the strength of the specimen were very much affected within the test period. The degree of corrosion was determined by comparing the tensile strength of the specimens before and after exposure. Similarly field test was carried out by exposing the specimen in atmospheric, splash and immersion zones at Madras Port trust and the tensile strength was compared before and after exposure. It was observed that the tensile strength reduction in the specimens exposed to the atmospheric zone was not appreciable and therefore the ferrocement roofing units are durable in marine environment as they are mostly exposed to that zone only. The amount of chloride, sulphate content and pH values were determined by chemical analysis and the chloride content was found to be also minimum in the atmospheric zone.

2.6 CRACKING IN FERROCEMENT

Al-Kubaisy and Jumath (2005) investigated the effect of using ferrocement layer in the tension zone of reinforced concrete slabs and beams on crack control. It was observed that the use of ferrocement cover to reinforced concrete slabs resulted in considerable reduction of crack width at first cracking, service and near ultimate load and a consequent increase in crack number. The average number of cracks at service load doubled in slabs
with ferrocement cover compared to control specimens whereas near ultimate load the average number of cracks increased by 75% in slabs. It was observed that the first crack load for slabs with ferrocement cover varied between 1.16 to 1.83 times the cracking load of control specimen and the ultimate load improved by 21%.

Somayaji and Shah (1984) conducted experiment to determine tensile response of ferrocement and explained the three stages of the composite stress strain curve in tension. Stage I is upto which there is elastic response due to full bonding of reinforcement with mortar. The second stage initiates with the occurrence of first crack followed by increase in number of cracks with only slight increase in crack width. During this multiple cracking stage there is progressive decrease in the contribution of matrix. For specimens reinforced with higher volume fraction of longitudinal wires along with wire meshes, the composite stress during the multiple cracking stage increases. During the third stage the contribution of matrix is negligible. The crack width keep increasing but the number of cracks remain the same. It is clear that average crack width can be maintained at low levels as long as the stress in reinforcement is less than the stress corresponding to the beginning of stage III and less than the yield stress.

Balaguru (1981) presented simple equations to predict average and maximum crack width for ferrocement beams reinforced with wire meshes with rectangular openings. The crack width is expressed as a function of crack spacing and projected average strain in the extreme tension face of the beam. Specific surface and curvature of the beam are the major controlling parameters of crack spacing. The proposed equations compare well with two sets of experimental results.
2.7 COST COMPARISON

Mathews et al (1994) discussed the planning aspect of houses by following the principles of modular coordination and suggested that the ferrocement elements should be planned to have a simple form keeping in mind its adaptability for prefabricated construction to achieve mass scale production in an industrialized method. They developed multipurpose ferrocement elements by applying the principles of modular coordination such as double T and triple T elements which can be used as wall and roof elements. The cost of construction between double T ferrocement roof elements and conventional reinforced concrete slab was compared and it was found to be more or less the same. They have detailed that the cost of construction for ferrocement will be less due to the reduction of construction cost involved in the construction of foundation for ferrocement housing.

Anwar (1993) discussed the advantages and construction techniques of ferrocement to be used for the structural housing components, wall and roof. He performed an economic analysis on ferrocement and reinforced concrete roofing and reported that the ferrocement roofing unit was 40% cheaper than reinforced concrete roofing units. Also the ferrocement wall panels were 43% cheaper than the brick masonry walls. He also emphasized that the use of ferrocement will help economically challenged people to build houses.

2.8 NUMERICAL ANALYSIS

Nazrul Imam et al (2002) simulated deflection and stress behaviour of nine different types of roofing elements by finite element technique and the results are compared with the experimental values. Various shapes used in the analysis are trough shape, inverted V-shape, double T-shape, channel shape. On the basis of cost analysis, it is found that the shell element is the most
economical shape as a roofing element and also the principal stresses are less in this shape.

Tavarez (2001) discusses three techniques that exist to model steel reinforcement in finite element models for reinforced concrete the discrete model, the embedded model, and the smeared model. The reinforcement in the discrete model uses bar or beam elements that are connected to concrete mesh nodes. Therefore, the concrete and the reinforcement mesh share the same nodes and concrete occupies the same regions occupied by the reinforcement. A drawback to this model is that the concrete mesh is restricted by the location of the reinforcement and the volume of the mild-steel reinforcement is not deducted from the concrete volume. The embedded model overcomes the concrete mesh restrictions because the stiffness of the reinforcing steel is evaluated separately from the concrete elements. The model is built in a way that keeps reinforcing steel displacements compatible with the surrounding concrete elements. When reinforcement is complex, this model is very advantageous. However, this model increases the number of nodes and degrees of freedom in the model, therefore, increasing the run time and computational cost.

2.9 CRITICAL REVIEW

In the earlier investigations, the behavior of ferrocement hollow slabs was studied by conducting experiments on hollow slabs of different core shapes and numbers and by varying the mesh layers and peripheral reinforcement. Such hollow slabs were recommended for roofing and flooring because of lesser self weight, ease of construction and requirement of lighter supporting systems and foundations. In addition, analytical procedure for determining the deflection in the uncracked and cracked range have been proposed. The parameters that were varied were the number of cores and width of the specimen, shape of cores, amount of the reinforcement in terms
of layers of wire mesh. Though the observed values were close enough with a maximum variation of only 15% and the proposed method was adequate, no specific work has been done on fibre reinforced ferrocement hollow slabs. Naaman (2008) has suggested that a combination of discontinuous fibres and continuous meshes will provide the most effective composite improving the ductility and energy absorption capacity.

2.10 CONCLUSION

A critical review of the literature presented above indicate that investigation on ferrocement hollow slab has been done under monotonic loading. As it is important to know the performance of the slab under seismic or other variable loading conditions, it was attempted to study the behaviour under cyclic loading. The study on the effect of alkali resistant polyester fibres in the performance of the hollow slabs is novel. Also, the durability studies under cyclic loading was undertaken as it covers the application in earthquake prone areas.