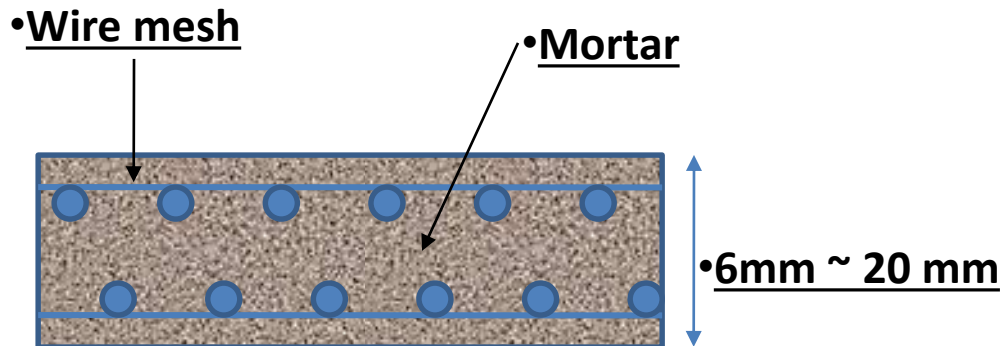


# **FERROCEMENT**

## Typical Section of Ferrocement



## Component Materials:

- \_Cement
- Aggregate (sand)
- Water
- Reinforcement

# Specifications of Materials as Per Bangladesh National Building Code, BNBC (1993)

## Cement:

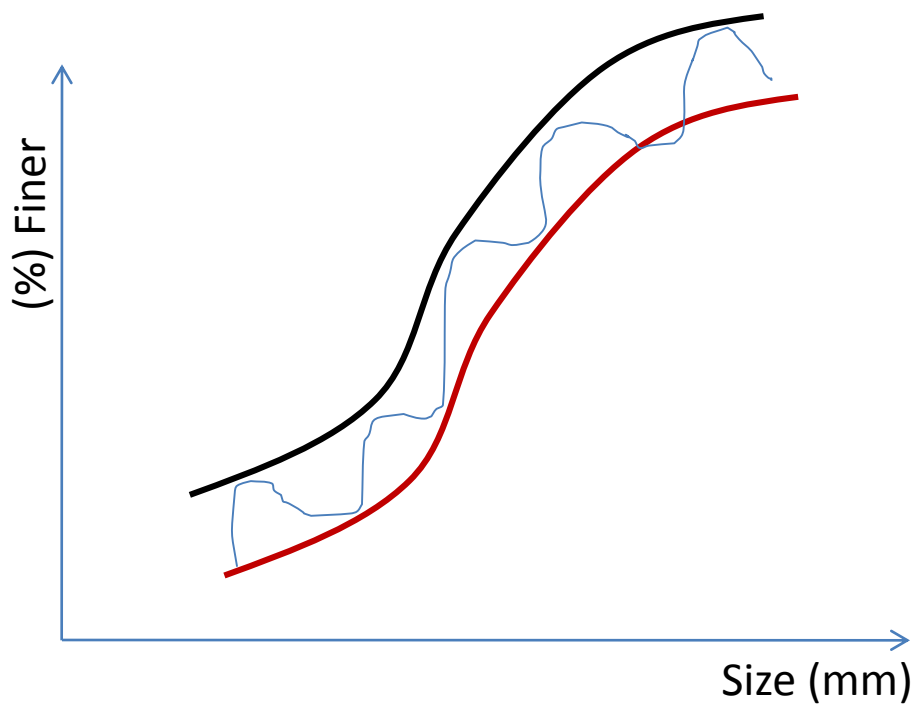
- shall comply with ASTM C150-85a , ASTM c595-85 or equivalent
- shall be fresh
- Shall be of uniform consistency
- shall be free from lumps and foreign matter
- shall be stored under dry conditions for as short duration as possible

## Aggregate (sand):

- shall comply with ASTM C33-86 requirements (for fine aggregate) or equivalent
- shall be clean
- shall be inert
- shall be free from organic matter and detrimental substances
- shall be relatively free of silt and clay (particles passing #200 sieve)
- Max particles size should be less than #16 (1.18mm)
- Grading of sand should comply with the following Table

## Table: Guidelines for Grading of Sand

<u>Sieve Size</u>	<u>(%) Passing by Weight</u>
#8 (2.36)	80-100
#16 (1.18)	50-85
#30 (0.60)	25-60
#50 (0.30)	10-30
#100 (0.15)	2-10

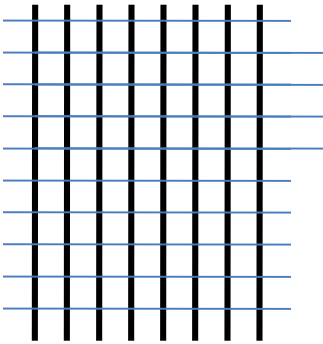


## Water:

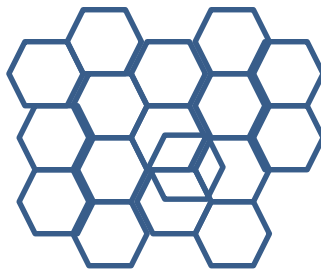
- shall be fresh, clean and potable
- shall be relatively free from organic matter, silt, oil, sugar, chloride and acidic material.
- Salt water is not acceptable
- shall have a  $\text{pH} \geq 7$  (non-acidic)

## Reinforcement:

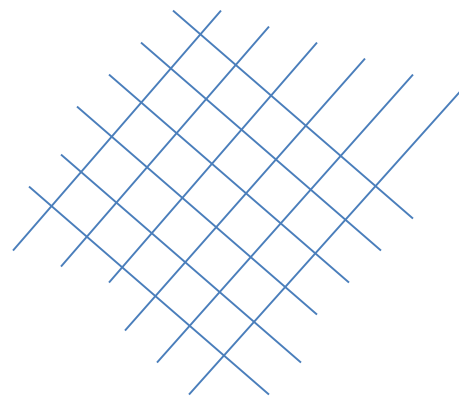
- shall be clean and free from deleterious materials such as dust, loose rust, coating of paint, oil or similar substance



**SQUARE**



**HEXAGONAL**



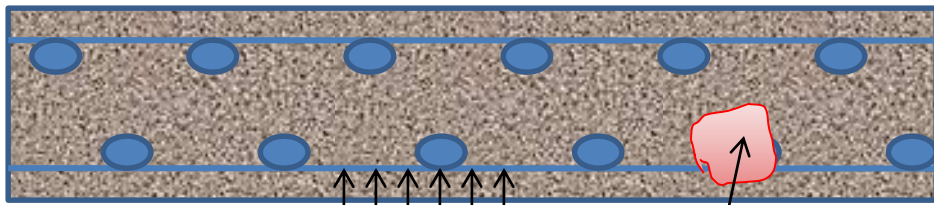
**EXPANDED MESH**

**Appendix E**  
**Common Types and Sizes of Steel Meshes used in Ferrocement**

Type	Shape	Fabrication	Mesh * Size	Wire * Gauge	Wire Spacing (mm)	Wire Diameter or Sheet Thickness (mm)
Wire mesh	Square	Woven or welded	$\frac{3}{4} \times \frac{3}{4}$	No. 16	19.0	1.60
			$2 \times 2$	No. 19	13.0	1.00
			$3 \times 3$	No. 22	8.5	0.72
			$4 \times 4$	No. 23	6.4	0.64
		Welded	$1 \times 1$	No. 14	25.0	2.00
	Rectangular	Welded	$2 \times 1$	No. 14	50×25	2.00
Hexagonal	Twisted	1	No. 18	25.0	1.20	
		1	No. 20	25.0	0.88	
		$\frac{1}{2}$	No. 22	13.0	0.72	
Expanded metal mesh	Diamond	Slit and drawn	18 N/m <sup>2</sup>			0.58
			Gauge No. 18			1.00
			Gauge No. 20			0.76

\* American wire gauge.

# USE OF FERROCEMENT FOR REPAIRING NON-STRUCTURAL DISTRESSES

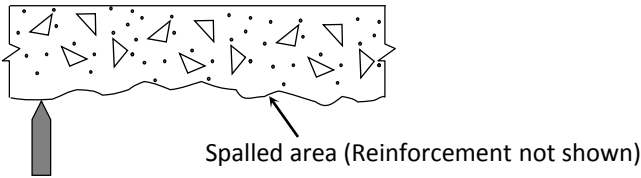


Air ( $O_2$ ) enters through porous concrete + Fe =  $Fe_3O_4$  (Rust)

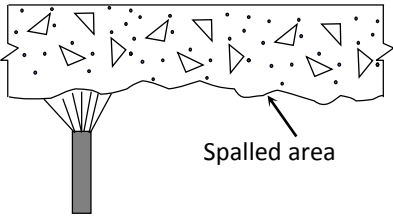


Increased volume of  $Fe_3O_4$  exerts swelling pressure on the surrounding concrete and pushes it to fall apart. This is called **Spalling of Concrete**. This opens up concrete against weather effect so that corrosion of reinforcements is accelerated. Eventually the structural element (slab, beam, column etc.) becomes vulnerable to collapse.

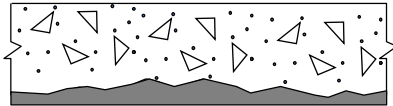
# REPAIR OF SLABS WITH SPALLING USING FERROCEMENT



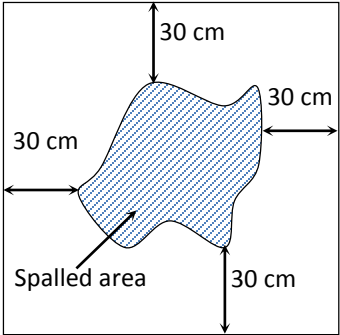
**Stage - 1** Use chisel for chipping loose plaster, concrete etc.



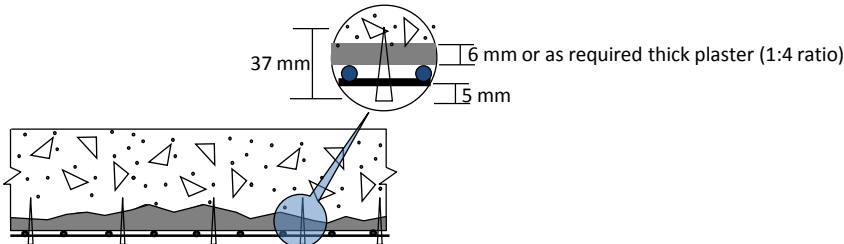
**Stage - 2** Brush off the debris from the chiseled surface



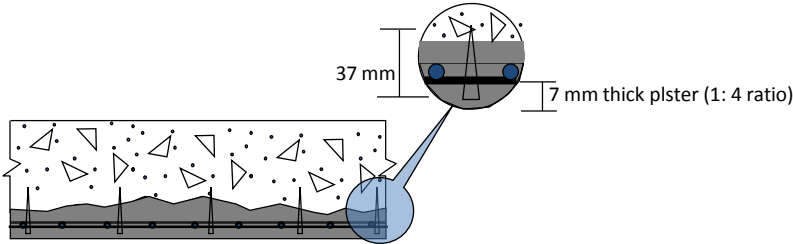
**Stage - 3** Apply 6mm thick or as required (1:4) plaster and prepare levelled surface



**(a) Area to be repaired**



**Stage - 4** Lay single layer 18 gauge wire mesh of 12mm x 12mm opening. Insert 37 mm long screws @ 200 mm c/c



**Stage - 5** Apply 7 mm thick plaster (1:4 ratio)

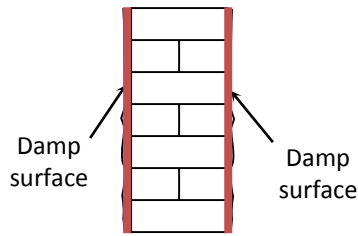
**(b) Repair technique to be adopted**

## **WHAT DOES FERROCEMENT REPAIR DO?**

- Such repair with ferrocement increases the tensile stress capacity of concrete.
- Therefore, no further micro cracks can occur in concrete under normal loading on the slab.
- As this reduces the possibility of further ingress of air through micropores of concrete, the chances of spalling of concrete becomes remote.

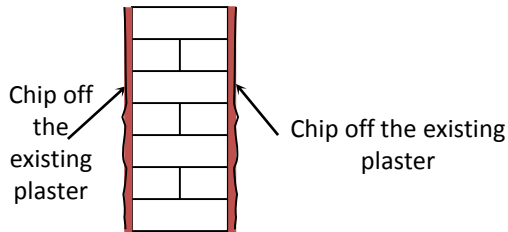
# REPAIR OF WALLS WITH DAMPNESS

**Probable present condition**

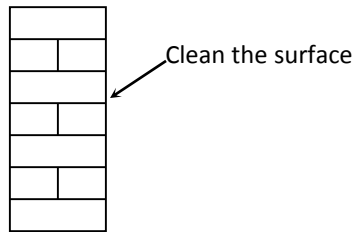


**Repair technique**

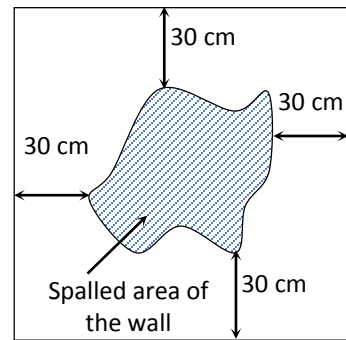
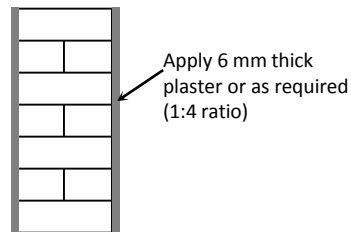
**Stage - 1**



**Stage - 2**

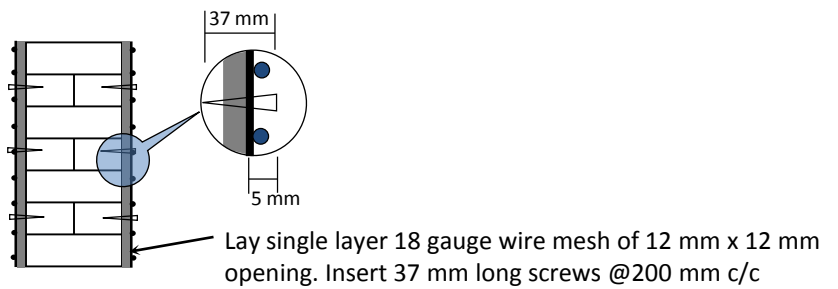


**Stage - 3**

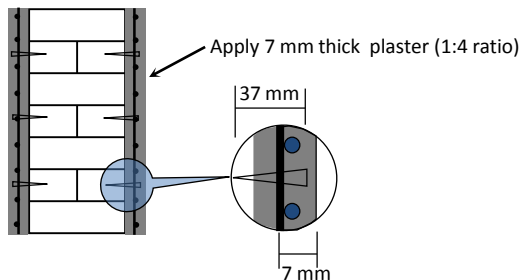


**(a) Area to be repaired**

**Stage - 4**



**Stage - 5**



**(b) Repair technique to be adopted**