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PERFORMANCE AND ANALYSIS OF MECHANICAL PROPERTIES OF FIBRE REINFORCED CONCRETE IN FLAX FIBRE

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ABSTRACT:- *This paper report the results of experiments evaluating the use of flax fibre for used in ordinary Portland cement in concrete. The chemical composition of the M sand booster and compressive strength, split tension, flexural strength of the cement concrete was determined. The cement concrete of mix proportion M20 in flax fibre added 0.5%, 1%, 1.5%, 2% by weight of cement. The compressive strength, split tension, flexural strength was determined at curing ages 7days and 28days.There was a sharp decrease in compressive strength, split tension, flexural strength above 1% strength decrease .In this direction an experimental investigation of compressive strength, split tension, flexural strength was undertaken to used in flax fibre reinforced concrete.*

Keywords: Flax fibre, M sand booster, Sem analysis, Fibre Reinforced concrete.

1. INTRODUCTION

Concrete is the most important and widely used construction material in the world. Among its many important qualities, concrete's universal popularity credited to its ability to carry loads when applied in compression. However, a plain concrete system has nearly no ability to carry loading in tension, once cracking of its cement matrix begins. This makes it essential to add reinforcement to concrete, in order to restrain tensile cracking, and prevent failure of the system. Flax is grown extensively on the Canadian prairies, primarily for the purpose harvesting its oilseed. The straw of the flax fibre is not used for many purpose, and is typically destroyed after the oilseed is removed. Flax straw contains a significant tensile strength. One study has shown that the resistance to plastic shrinkage cracking in a flax fibre – reinforced concrete member. The efficiency of fibre reinforcement in a composite material is determined

2. LITERATURE RIVEW

1. **J.E Fevnandez 2002**(Flax fibre reinforced concrete a natural fibre bicomposite for sustainable bulding materials) increase in the shear strength of structural member composed of the flax fibre reinforced concrete offers strategies that may lead to substantial saving in construction materials.

2. **j.Andersons2005** (strength distribution of elementary flax fibre) this necessitates study of the flax fibre strength distribution and efficiency experimental methods for its determination .Elementary flax fibre of different gauge lengths are tested by single fibre tension in order to obtain the stress strain response.

3. **R.Joffe 2009** (uniformity of filament strength within aflax fibre batch) The strength distribution of elementary flax fibre has been determined at several fibre length by standard tensile tests.

4. **Krishnan jayaram2014** (flax fibre and its composites) the tensile properties of flax fibre have been reviewed. Secondily, the effect of fibre configuration (i.e. fabric, mate, yan, roving and monofilament).

3. MATERIAL COLLECTION

Fig-3: Material collection

3.1 CEMENT

Cement material is generally poweder form can be made in cement paste adding in water and then moulded or poured will set in a solid form. The cement used should be **IS** specification. In **opc43** grade used for study .the properties of cement test according standard specification of IS

1269:1989. The chief raw materials is a mixture of high calcium limestone known as cement rock clay shale

3.2 FINE AGGREGATE

M-sand specific gravity 2.59, M-sand are used in construction industry mainly of concrete mortar mix. This is mainly crushed fine aggregate produced form of strength, durability and shape characterstics. Moste cost effective then river sand due to low transportation cost and consistency in available.

3.3 COARSE AGGREGATE

Coarse aggregate are stone used in concrete. The commercial stone is quarried crushed and graded. The crushed stone are usually consisted rock and is broken with sharp edge. The size of stone is 5mm massive concrete aggregate.

4. MIX DESIGN

M25-1:1:2

Description	Cement	sand	Aggregate	Water ratio
Proportion	1	1	2	0.5
Volume per m^3/(kg)	0.0013	0.00595	0.0244	_

5. TEST SPECIMEN

5.1 COMPERSSIVE TEST

Fig-5.1: compressive test specimens of conventional concrete cube

Test specimens of concrete cube having dimensions 150mm x 150mm x 150mm in 4 nos. of cubes were casted for each replacement. They were demoulded after 24 hours and kept in curing tank for curing. They allowed for 28 days. At the end of curing period specimens were taken out and surface water was wiped off from specimens. After that cube specimens were tested using universal testing machine. The cubes are placed in the compression testing machine in such manner that the load is applied to the opposite sides of the cube as cast. Universal test was carried out on the specimens after 7th and 28th of curing.

5.2 SPLIT TENSILE TEST

Fig-5.2: split tensile test specimens of conventional concrete prism

Test specimens of concrete cylinder having dimensions150mm diameter and 300mm length in 4 nos. of cylinders were casted for each replacement. They were demoulded after 24 hours and kept in curing tank for curing. They allowed for 28 days. At the end of curing period specimens were taken out and surface water was wiped off from specimens. After that cylinder specimens were tested using universal testing machine. The cylinders are placed in the universal testing machine in such manner that the load is applied to the cylinder. Split tensile test was carried out on the specimens after 7th and 28th of curing.

5.3 FLEXURAL TEST

Fig-5.3: Flexural test on conventional concrete

Test specimens of concrete prism having dimensions 150mm x 150mm x 700mm in 4 nos of prism were casted for each replacement. They were demoulded after 24 hours and kept in curing tank for curing. They allowed for 28 days. At the end of curing period specimens were taken out and surface water was wiped off from specimens. After that prism specimens were tested using universal testing machine. The prism are placed in the flexural strength machine in such manner that the load is applied to the opposite sides of the prism as cast. Universal test was carried out on the specimens after 7th and 28th of curing.

6. RESULT AND DISCUSSION

6.1 COMPERSSIVE TEST

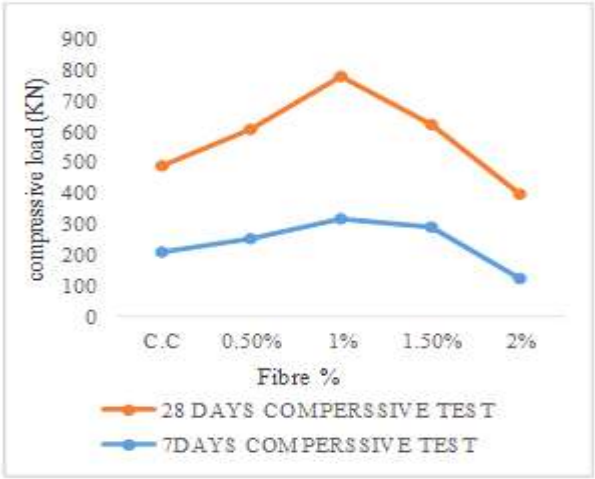


Chart-6.1:- Line chart for compressive test on conventional concrete

6.2 SPLIT TENSILE TEST

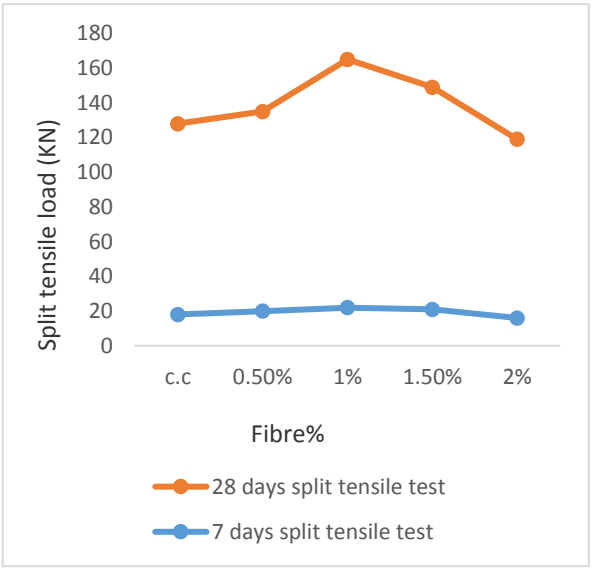


Chart-6.2:- line chart inducing in split tensile test

6.3 FLEXURAL TEST

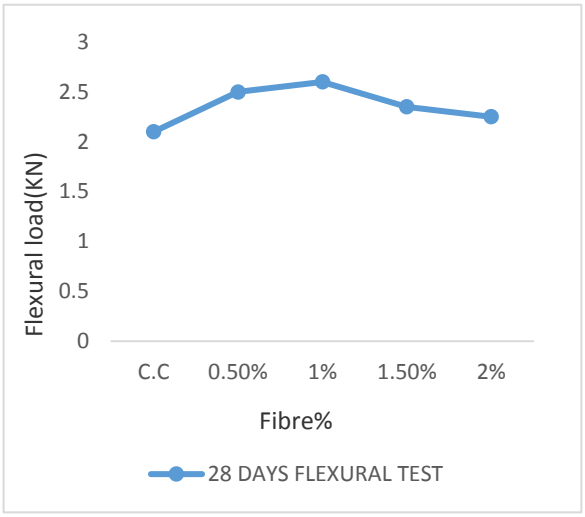
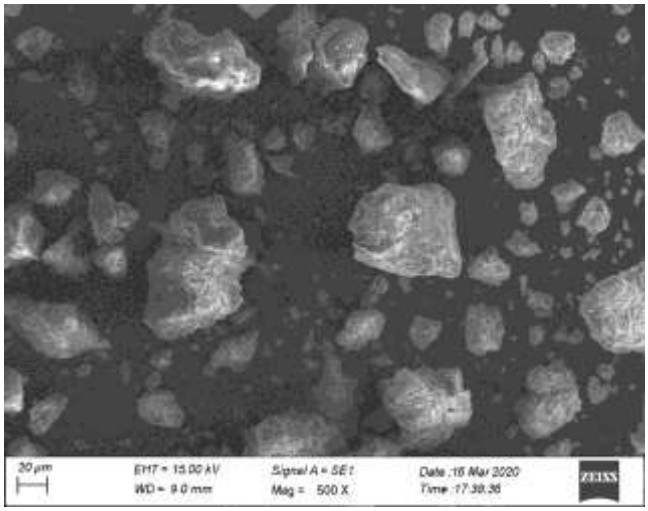


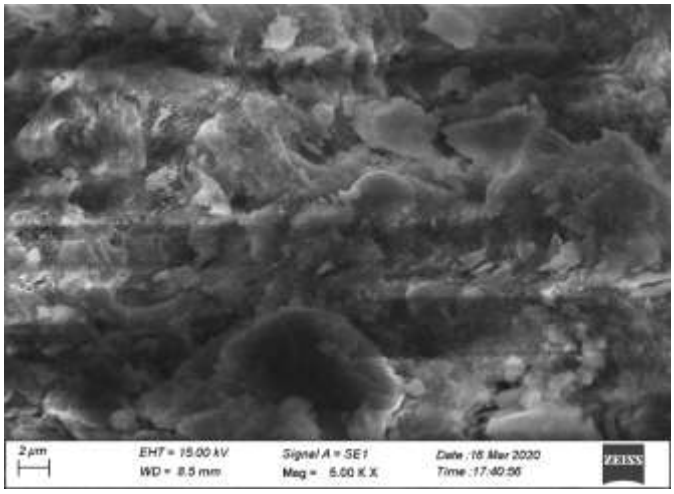
Chart-6.3:- line chart inducing in split tensile test

6.4 SEM ANALYSIS

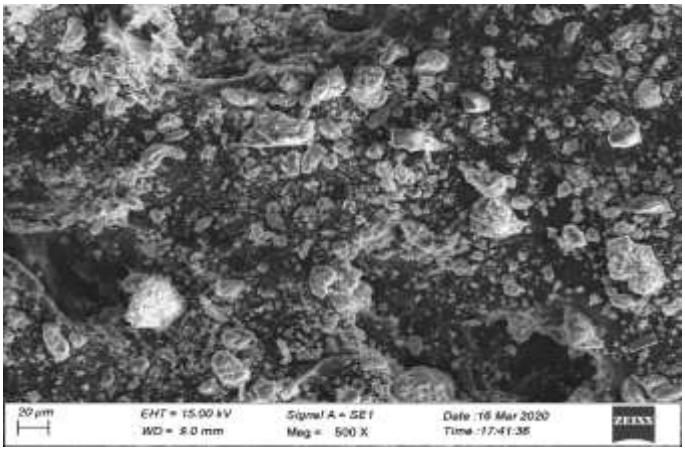
Sem analysis are microstructure and strength properties mixed on the hydration 28 days sample are inducing the fibre content are 1% above brittle failure on conventional concrete in our result

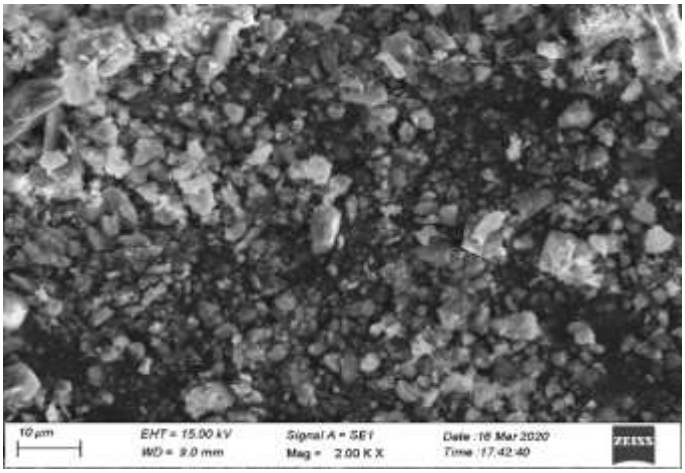
FLAX FIBRE 0.5% :



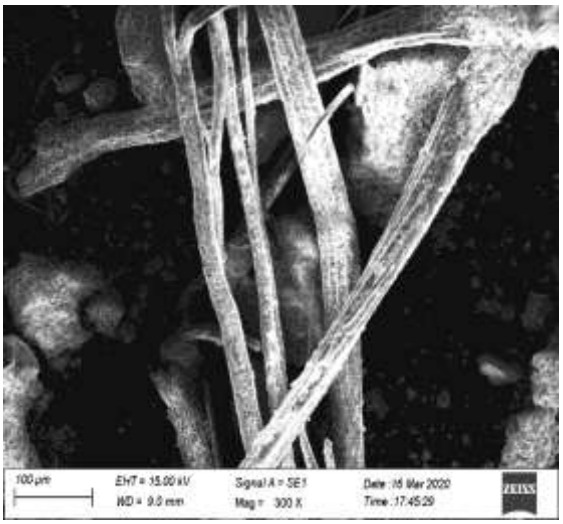


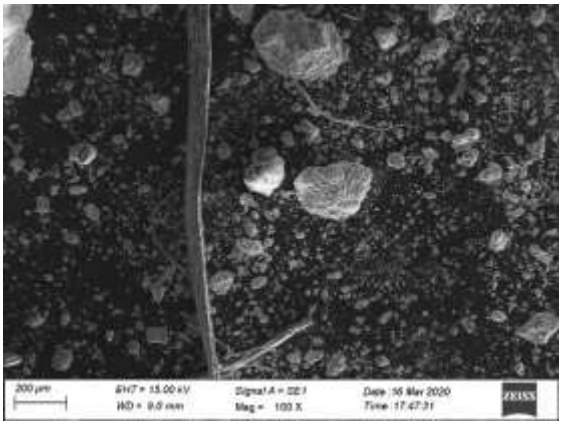
FLAX FIBRE 1% :





FLAX FIBRE 1.5% :





6.5 DISCUSSION

Fax fibre reinforced concrete consiste on a below 1% increase in fibre concrete. Two types of flax fibre treated and un treated fibre .in the report are used in untreated fibre in the result of report above 1% decrease

7. CONCLUSIONS

1. Flax fibre reinforced concrete was subjected wet dry inducing.

2. Themechanical properties as a result of the weathering cycles.

3.Two types of flax fibre treated and un treated fibre.

4. flax fibre reinforced concreate (FFRC) test are induce compressive test, split tensile test, flexural test.

5. These test are conducted both before and after 7 and 28 days wet dry cycling was conducted.

6. The flexural toughness strong bond between the fibre and cement past, which created a brittle failure. Compression and flexural performed specimen in cube and prism respectively fibre and cement are capable of toughness of the concrete.

7. Fibre are analysed in (SEM) scanning electron microscope image and energy dispersive x ray analysed flexural cracks surfaces had a length 0.1to0.2 mm size. The presence of flax fibre effect does not long term performance of concrete

8. Fibre reinforced concrete (FFRC) are conducted in cube, cylinder and prism are test in below 1% are increased in strength, above 1% are decreased fibre strength. They are three test are conducted compression test, split tensile test, flexural test

8. REFERENCES

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