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NYLON REINFORCEMENT CEMENT SHEET ON INDUSTRIAL BUILDING

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Abstract: **This paper investigated the study of Nylon Reinforced Cement sheets in civil engineering. Nylon has many exclusive properties that it makes suitable for combination with cement mortar. In this, nylon-reinforced cement sheet properties, nylon nets, specifications and construction procedures are studied. The purpose of this paper was to investigate the comparative study between sheets reinforced with nylon cement and regular asbestos sheeting. Because of its wide variety of unusual structures, nylon is excellent cement mortar additive. Nylon material has a high melting point, is chemically resistant, and is stable an alkaline area of mud. It also has a low price. In this process, nylon-reinforced cement sheets are cast, then under various tests, your results compared to those obtained using regular asbestos sheets. Nylon is a readily available non-reactive material that can be used in cement concrete as fiber amplification. This study shows a comparison of the effect of OPC and PCC as well as the use of nylon fiber on the improved durable condition, which was ultimately reflected in the lifetime of the structure. Have supplementary cementations materials, nylon-reinforced PCC exhibits better properties. In addition, electrical induction from the Rapid Chloride Penetration Test (RCPT) and chloride migration coefficient The Rapid Migration Test (RMT) is designed to obtain the optimum nylon fiber content.**

Keywords: **Nylon, Reinforced, Sheet.**

I. INTRODUCTION

Asbestos cement sheets and sheets are broadly used for roofing, industrial sheds, god owns and other structures. Asbestos cement sheets fail under the influence of impact. "The asbestos material used to make sheets is dangerous to human health. It causes diseases like asbestosis and lung cancer in people who work in sheet making. Therefore, it is restricted to many countries such as USA, Russia, France, Canada, etc. In India, asbestos sheets are banned, but for economic reasons, maximum our citizens choose to risk their lives, we consider giving our people a good alternative within their borders. Galvanized sheets are expensive and require constant care. The biggest problems with GI sheets are rust. During the summer the area under this roof is very hot and unbearable because of sun. Repairing these sheets is also very difficult as there is a tendency to break easily. Asbestos material needed for produce A.C. sheets. The community is indirectly affected as the same water can be used for drinking, falling on asbestos sheets. If you look at the above disadvantages of galvanized sheets and asbestos and review the current situation, it is necessary to develop a better alternative. A nylon sheet of cement made of nylon nets and concrete has replaced the asbestos and iron roof. In further discussions we will see how the sheets are made, the results of tests conducted on nylon sheets and similar economic feasibility

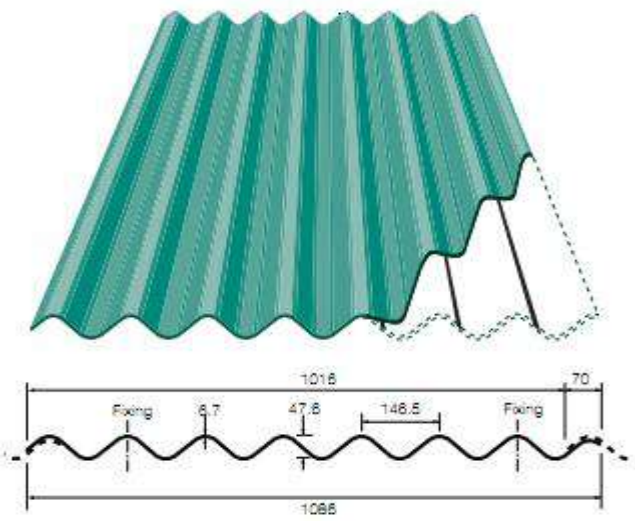

Fig 1. – Reinforcement Sheet

Protecting the marine environment is greatest & the most important issues this time around. Indiscriminate abandonment of fishing nets in the ocean, in addition to known causes of environmental degradation such as pollution, coastal congestion, uncontrolled fishing and coastal erosion, can lead to desertification of marine ecosystems. Last season's fishing

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net was made of perishable materials such as cotton and linen and is now made of plastic. Plastic fishing nets are usually resistant to spoilage, so it is very important to improve recycling to eliminate waste and reduce product costs. It is worth noting that recent studies have shown that the construction industry can use large amounts of waste productively to produce cheaper non-building materials. In fact, research on cement mortar has focused on developing materials suitable for repairing and refurbishing existing buildings. Polypropylene (PP) and Polyamide (PA) fibers reduce shrinkage, improve material strength and impact resistance, and absorb capacity, with studies focused on the impact of synthetic fibers (glass, nylon, and polypropylene). Used in cement materials to improve. With mortar mechanical structure. Such industrial plastic fibers can guarantee superior mechanical performance than recycled plastics. However, they lead to high energy consumption and waste of energy. According to the method proposed by the Intergovernmental Panel on Climate Change (IPCC) in 2007, it is estimated that 1.91 kg of CO2 conversion is required to produce 1 kg of nylon. Among there cycled plastics, cement reinforcement with recycled polyethylene terephthalate (R-PET) fiber has received particular attention in the technical literature. Several authors have shown that R-PET fiber can replace pure plastic fiber in eco-friendly concrete and provide excellent mechanical and chemical strength for storage materials. Recently, R-PET reinforcement of cement mortar has also attracted attention in the literature. However, it should be pointed that the using of recycled materials in cement mortar is still under investigation. The same applies to the use of nylon yarn as a stabilizer. Another recent study explores the recycling of nylon fibers from used textile carpet waste and their use to reinforce concrete.

II. PROPOSED ALGORITHM

Using Nylon Fabric Concrete that nylon fiber is not natural and should be disposed of properly. Fibers improve strength, strength, stamina. When used in concrete, it reduces nylon to loss and makes it more environmentally friendly concrete. The performance of concrete decreases as nylon absorbs water thus reducing decay. It provides excellent power when used with 1% nylon fire. Strength also increases by 60- 70% in the high amount of nylon fiber making it useful in areas where low stress is expected to prevail such as temperature stress, crawling etc.

Objective of Study:

1. Nylon cement sheet has low costing than other roofing.
2. Substitutes.
3. It is non-hazardous for humans as well as form environment aspect.
4. The materials available in the local market can be used for sheet making.
5. Skilled jobs are not required to make a sheet.
6. It gives better strength.
7. No heavy machinery is need for casting sheet.

8 When it obsolete it can be recycled.
9. It creates employment opportunity.

III METHODOLOGY

1. Proportioning of material: -

Initially we decided that the material would be used to spread the sheet, and acropeingly we determined the scale. The sludge value of the cement sand was determined by 1: 2 and the correlation of water to cement was also reduced to 0.35. Then the dimensions of the nylon were determined by the dimensions of the member. Nylon cutting size was measured with measuring machines; was 110 gm. at 1.5 sr.m.

2. Preparation of formwork:-

To cast a sheet of iron we use Asbestos cement filled with tin as a form from both sides. Water was sprayed on the asbestos sheet to prevent water absorption from the sheet .The polythene sheet was placed on the asbestos sheet to easily remove the dispersed sheet and provide a good finish.

Fig 2 – Preparation of nylon sheet.

3. Mixing of material:-

All the well-weighed items were assembled and shipped by us in the mix. The sand and cement were thoroughly mixed. Then water is added slowly while mixing the mortar. Mortar mixed with the assist of a shovel.

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Fig 3. – Mixing of binding materials.

4. Placing of mortar:-
First we set the 0.75mm dia Nylon net. In the Asbestos sheet, the net was placed too low on the sheet to prevent the net from hardening after the concrete has been placed. Then we put the mortar on a sheet of 8mm thick sheet. It was ensured that the net under the mortar would not come out.

Fig 4 – Placing of Mortar.

5. Vibration of sheet:-
The sheet was kept in a table vibrator polythene paper was placed in the mortar and another sheet was placed on top of it. Then the vibration started and continued for 1min. Then the top sheet is detached and the thickness is measured with the assist of a gauge marker and the finish is checked again. The thickness was about 8mm. The sheet was rescheduled and the vibration was continued for 2min. And the sheet was removed and the thickness was checked to be 8mm and correct.

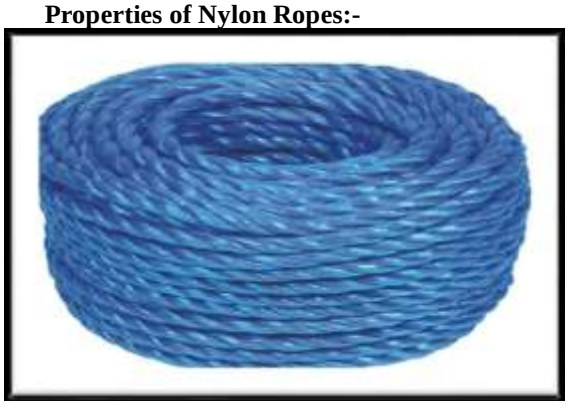
6. Finishing of casted sheet:-
Using a table vibrator and polythene paper a smooth finish was obtained on the surface, but the voids became visible on one boundary of the sheet so we eliminated the voids with the assist of a trowel. The sheet was cut to dimensions when the mortar was green with the assist of a trowel.

Fig 5– Finished casted sheet

7. Curing of sheet:-
We performed a sheet healing after 24 hours removing the sheet. Distribute gun bags on sheets .Therefore the healing was done with a little water and the soil remained moist for a long lasting time.

Fig 3.5: –Sheets for curing

- **Properties of Nylon Ropes:-**



1 Know Your Nylon Requirements:-
The right size is important. Using a thin rope causes unnecessary strain on the rope. Choosing the right string size

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is the key to getting full use and longevity in your rope. In addition to size, other factors such as type of lay and special fiber treatment will determine the choice of thread. Many rope access industries regularly select specific types that are suitable for specific tasks. In some cases, special ropes are designed to meet specific needs. Generally, the right size and type of rope can be specified in your previous experience and your supplier's recommendations.

2 Rope construction:-

Production can make 3- Strand, 4- Strand, or 8- Strand Plaited Ropes according to requirements. 3-Strand ropes are preferred in many systems because of their flexibility, knot capacity, and easy handling. They come in an easy way to split in half; however it can be instructed to comply with certain flexibility requirements or be flexible. 4-Threaded ropes have a stronger line and provide a circular rope with more outer space and more pulling on the sheaves and matter to be twisted or held. It is accessible in a variety of basic building materials depending on how the thread works. 4-Strand Manila ropes is about 7% heavier than 3-Strand and have a breaking strength of about 5% less.

8-Threaded ropes consist of four strands placed on the left and four strands placed on the right, tied together and woven together. Widely used for marine systems, its neutral (or limited) construction provides excellent hock ling resistance. Available in 5 "To15" circumference (or 1-5/8 "to5" diameter).

3 **Treatment:-**

All Natural Fiber Ropes are coated with water impermeable that is resistant to moisture, carbon dioxide, and rot. Lubrication also protects against internal flare-ups and aging. Upon request, the ropes are chemically treatment given by Copper Napthanate, Tar; Graphite impregnated, or Tallow treatment. These treatments are usually more effective in protecting the fibers from rot and mildew.

Specifications of Nylon Multifilament Ropes

Nylon Multifilament Ropes			
Diameter in (mm)	Breaking strength in Kgs	Runrage in Meter per kg	Wt. per coil of 220 mtr in kgs
4	320	95.65	2.30
6	750	44.40	4.95
8	1345	25.00	8.80
10	2088	16.20	13.60
12	2995	11.20	19.60
14	4095	8.20	26.80
16	5300	6.30	35.00
18	6695	5.00	44.00
20	8300	4.10	54.00
22	10000	3.30	66.00
24	12000	2.80	78.00
26	13950	2.40	92.40
28	15800	25.10	107.00
30	17755	1.80	122.10
32	20000	1.60	139.00
36	24900	1.25	176.00
40	30000	1.00	218.00
44	35800	0.80	264.00
48	42000	0.70	312.00

Table 1 – Nylon Multifilament Ropes

1. Weight are subject to a +/- 5% variation.
2. All values listed are as per results confirmed in accordance to test procedures of IS 7071 Part 1- 4 Standards.
3. All specifications pertain to regular laid ropes and are applicable to new rope.

- **Behaviour of Nylon Fibers in a Cement Matrix**

This study is focused on concrete reinforced concrete, so it is very important to understand how nylon fibres behave in a cement composite matrix. The study of this machine helps to model the behaviour of compounds in the real world environment. The behaviour of the FRC under load can be understood from Figure. The empty concrete structure is split into two poles where the structure is under high pressure and cannot withstand additional load or rotation. Fibre-reinforced concrete structure does not break at the same peak load. The area below the curve reflects the energy soke up by the FRC when under pressure.

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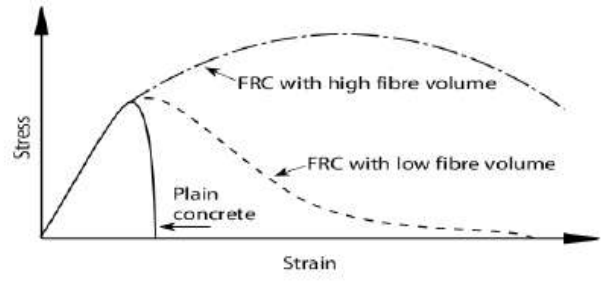

Fig 3.11: – Behaviour Of Nylon Fibers

The real advantage of adding fibers is when the fibers close this crack and enter the suction processes, so that the conversion can proceed only by adding additional power from the loading source. The reinforcing strands are much wider than concrete under load. Therefore, a fiber-reinforced concrete system is thought to work as if it has not been reinforced until it reaches its „„original cracking capacity "". From this point where the reinforced fiber picks up and holds the concrete together. For reinforcement, the maximum load capacity is controlled by strands that pull out of the compound (Hannant, 1978). The reinforcing straps do not have a deformed area unlike the large steel reinforcement bars, which have a smooth surface, which helps with mechanical binding. This condition limits working in a region much lower than the fiber production capacity itself. This is important because some fibers release more easily than others when used as reinforcement and will interfere with the durability of the concrete product on which it is placed. Strength is based on all the strength absorbed before competitive failure. The main factors influencing the durability and high loading of fiber-reinforced concrete are based on the type of fiber used, the percentage of fiber volume, aspect ratio and fiber structure in the matrix (Naaman, 2003)

Concrete and matrix, the bond strength in the midway of the fibers and the matrix. The chemical properties of fiber in terms of their absorption or re-environment play a prime role in determining the binding properties of fiber and composite as they may or may not occur from the chemical bond in the midway of the fiber and the matrix. The behaviour of the FRC when placed in different locations has been understood to alter the structures of nylon fibers during the time when they are under the same locations and affect the binding features of the matrix wires. The natural effects from nylon fibers used for reinforcement need to be studied in order to understand the functional changes in the loaded conditions of the FRC (Craig, 1984).

III. EXPERIMENT AND RESULT

1. Tests on Cement:-

1. Standard consistency test:-

Percentage of water needs to make a standard concentration (Pn) paste = 31%

2. Initial and Final Setting Time:-

- The initial setting time: 100 minutes
- The final setting time:240 minutes

2. Tests on Sand:-

1. Bulking Of Sand:-

Maximum bulking of sand is 10.5% and it occurs at 3% of water.

2. Fineness Modulus Of Sand:-

Fineness modulus of a sand is 5.42

3. Tests Carried On Nylon Reinforced Sheets:-

1. Visual Inspection Test -

In that test we observed that the Nylon Cement sheet is nearly square, some minor hair cracks observed and also surface is slightly rough due to hand made

2. Water absorption test :-

Nylon Reinforced Cement sheet is immersed in the water for 12 Hrs. then it doesn't absorbed water more than 10% of its self-weight.

3. Impermeability test :-

No any water drops shows below the sheet afteplacing the water over it.

4. Acid Resistance Test:-

The result was reported in terms of gms of acetic acid per square meter of area of the specimen & this value was calculated from the fall in concentration, assuming that 1ml of 0.5N sodium hydroxide solution hydroxide solution is equivalent to 0.030g of acetic acid as follows:

Mass in g of acetic acid used per m2 = 0.030 x 370 (x-y)

10A

= 1.11 (x-y)

A

5. Load Bearing Capacity:-

As per Indian standard load bearing capacity of Nylon Cement sheet more than 5 N/mm2. But we get load bearing capacity of Nylon sheet is 35.15 N/mm2

IV.CONCLUSION

First, it is necessary to understand nylon fibers provide an isotropic reinforcement system. This means the nylon fibers are 3- dimensionally distributed throughout the mortar portion of the concrete. These reinforcement systems is similar to a network of cables that take fixed or partial pressure and distribute it to a larger mass of concrete than would otherwise be possible for a plain concrete or a concrete with a single plain of reinforcement (i.e. welded wire fabric-WWF). Impact strength, resistance to shrinkage and testing of rebar rebor or exit are common tests of those tests used to measure the contribution of synthetic fiber reinforced material compared to plain concrete.. Nylon fiber reinforced concrete had improved

ductility an increased the rebar pull-out strength which reflects the bond in the midway of the mortar matrix and steel rebar. Nylon nets being used for various applications thus, implemented and experiment uses nylon nets in casting sheets so as to explore the using of nylon nets.
The enhanced bonding of nylon fibers due to the moisture retention properties of the nylon can be quantified. With the increase in the bond comes an increased „Life cycle index" meaning greater durability and reduced maintenance cost when compare to other forms of secondary reinforcement. Remember that ACI defines secondary reinforcement as that reinforcement benefited to fix the concrete jointly after it spilt up. Nylon fibers provide an isotropic reinforcement that adds long term durability for equal.
Nylon nets being used for various applications thus, by our project we have implemented and experiment using nylon nets in casting sheets so as to explore the utilize of nylon nets. We have use nylon nets in mixing with cement mortar. It was our attempt to replace the conventional asbestos cement sheets,

We concluded following:-
1. Nylon Cement Sheet can replace A .C .Sheets.
2. Nylon Sheets can be locally manufactured on sites and can use for economical housing, small shades, industrial shades, god owns, storage houses etc.
3. The recommended spacing between purlins for laying panels is up to 1.4m is taken.
4. Cost of Nylon Sheet is Rs.156.8/- for 1m2 and that of the A.C.Sheet is Rs.175/- for 1m2

Nylon nets are used for different applications, our project has helped us to utilize and test the use of nylon nets in turning sheets to investigate the utilize of nylon nets. In addition to using cement mortar, we have been using it nylon net. It was our attempt to find a place for the asbestos cement sheets, and we came to the following conclusion:
1. It is possible to use nylon cement sheets instead of AC sheets.
2. Cement Sheets Nylon can be produced locally and can be used for cheap applications.
3. Housing, small cattle stalls, industrial stalls, residences, warehouses, etc. are all included in the cost.
4. The recommended maximum distance between purlins when laying sheets is 1.4 m.
5. Cement sheet. Nylon is more economical than other roof changers.
6. It is not damaging to human fitness and the environment.
7. The material available on the local market can be used for sheet making.
8. fulfills the requirement of IS.
9. If it is out of date it can be recycled.
10. Creates job opportunities.

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