To Utilize Waste Casting Sand as a Partial Replacement of River Sand in Construction

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ABSTRACT

Concrete is a common material used in building things. River sand is a part of making concrete.. We are using too much river sand and its hurting the environment. This is causing problems like damage to river beds, erosion and animals losing their homes. To solve this problem we looked into using Waste Casting Sand (WCS) as a substitute for some of the river sand in concrete. WCS is a waste product from factories. Our main goal was to see if concrete made with WCS can be as strong as concrete. We tested mixes of concrete to compare how well they work. We want to make sure the concrete is strong. We also want to be kind to the environment. This research shows that using WCS can be a solution. It helps reduce waste and use natural resources. This supports building practices that're good for the planet. It also helps create an economy in the construction industry. We are trying to find a balance between making concrete and reducing harm to the environment. Using WCS in concrete can help achieve this balance. The construction industry can benefit from this eco- solution by reusing industrial waste and reducing its impact on the environment. The use of WCS in supports sustainable construction practices and encourages the development of a circular economy. This research is an attempt to find an eco- solution for the construction industry. Concrete made with WCS can perform well as conventional concrete. Waste Casting Sand can be used as a replacement for river sand, in concrete.

INTRODUCTION

Concrete is a choice for construction due to its strength, durability and versatility. River sand plays a role as a fine aggregate in concrete. However the high demand for river sand causes problems like riverbed degradation and damage to aquatic ecosystems. These problems show that we need to find alternatives. This study looks into using Waste Casting Sand, which's a waste from industrial processes as a partial replacement for river sand in concrete. The goal is to check its properties, especially compressive strength and compare them with regular concrete made from river sand. We want to see if Waste Casting Sand can

be a substitute for river sand in concrete This will help reduce the issues caused by river sand mining. The study aims to find out if Waste Casting Sand can be used to make concrete that's just as strong and durable, as conventional concrete.

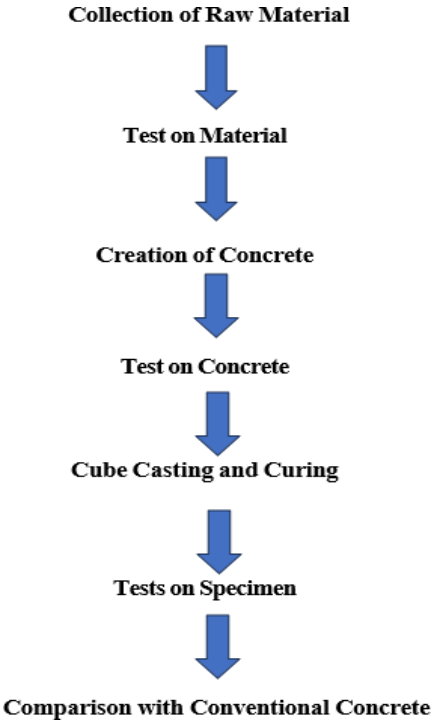
THE OBJECTIVE OF RESEARCH

- We want to find out how waste casting sand we can use to replace regular river sand and still get good results.
- We need to figure out the mixture we can make by using waste casting sand instead of some of the river sand and see how much weight it can handle.

IMPORTANCE OF THE STUDY

This project is important for helping the environment managing waste better and reducing pollution from building. We are using waste materials like Waste Casting Sand (WCS) to replace some of the cement in concrete. This helps make building more eco-friendly and reduces the need for sand which causes a lot of CO_2 emissions. Using waste materials also helps deal with waste and makes the concrete stronger more durable and easier to work with. This approach is cost-effective. Reduces the cost of making concrete. The goal of this research is to promote building and provide a sustainable plan for building infrastructure. If our new concrete is just as strong or stronger than concrete it could be a good alternative for future building projects. By solving performance problems our study offers a new solution that helps develop sustainable building materials. The use of Waste Casting Sand (WCS) and other waste materials can make a difference, in reducing pollution and making building more eco-friendly. This project shows that we can make concrete while helping the environment.

METHODOLOGY



TEST PERFORMED ON MATERIAL

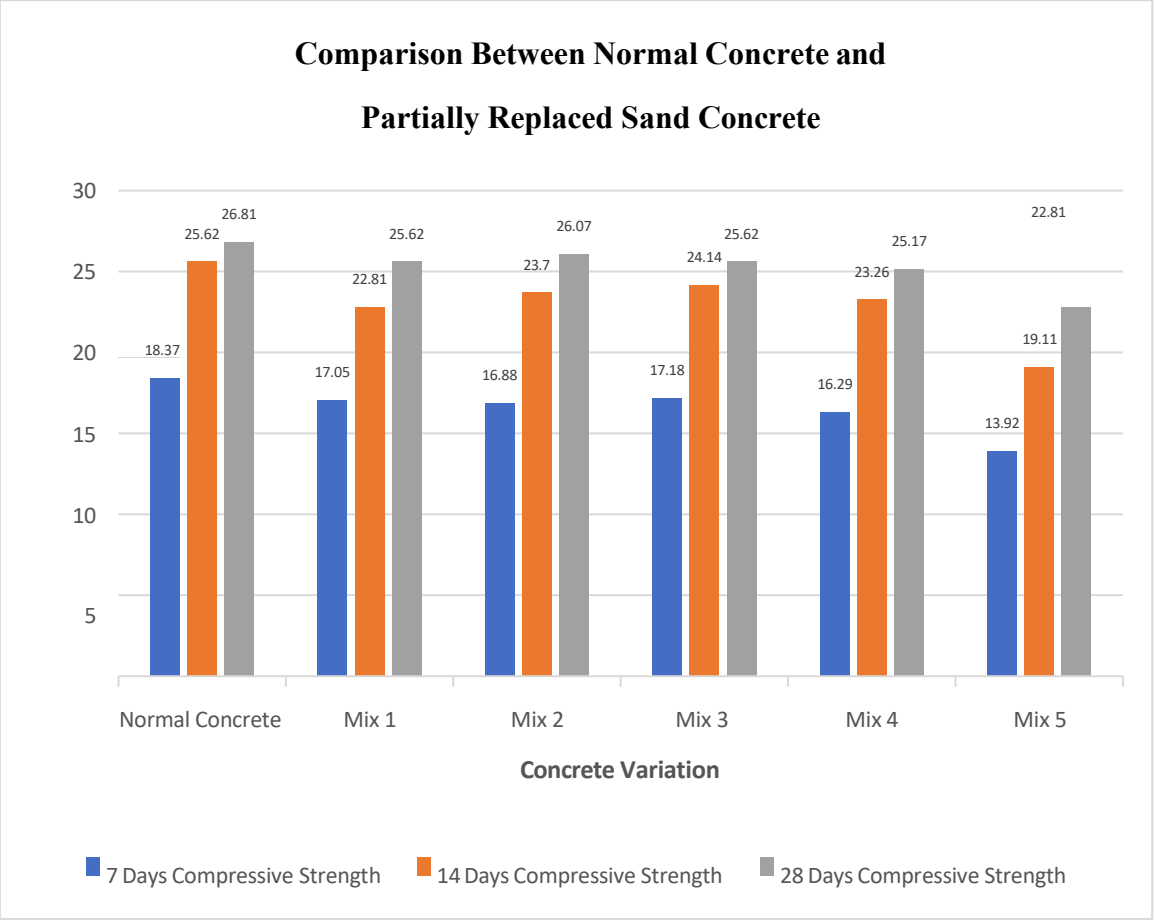
Sr. No.	Material	Test	Result	IS Standard Limit	IS Code
1.	Aggregate	Specific Gravity Test on Coarse Aggregate using Pycnometer.	G = 2.83	2.5 to 3.0	IS 2386 (Part 3) 1963
2.	Aggregate	Specific Gravity Test on Fine Aggregate (Natural Sand) using Pycnometer.	G = 2.68	2.6 to 2.7	IS 2386 (Part 3) 1963
3.	Aggregate	Specific Gravity Test on Fine Aggregate (Waste Casting Sand) using Pycnometer.	G = 2.5	2.39 to 2.55	IS 2386 (Part 3) 1963
5.	Aggregate	Impact Test on Aggregate	6.86 %	< 10% Exceptionally Strong	IS 2386 (Part- 4) 1983
6.	Aggregate	Water Absorption of Aggregate	1.47 %	0.1% to 2.0%	IS 2386 (Part 3) 1963
7.	Aggregate	Flakiness & Elongation Index Test	25.19 %	30% to 35%	IS 2386 (Part 1) 1963
8.	Cement	Initial and Final Setting Time Test using Vicat Apparatus			IS 12269: 2013
		1. Initial setting time	38.33 min.	> 30 min.	
		2. Final setting time	420 min.	< 600 min.	

TEST PERFORMED ON CONCRETE

1. Slump Cone Test- IS 1199

Sr. No.	Type of Concrete	Slump Value (mm)
1.	Normal Concrete	100
2.	Partially Replaced Sand Concrete	83

RESULT AND DISCUSSION



DISCUSSION ON GRAPH

The graph shows us the strength of concrete and concrete with sand that is partially replaced with waste casting sand. We look at the strength after 7 days, 14 days and 28 days. Normal concrete is the strongest. It has a strength of 18.37 MPa after 7 days, 25.62 MPa after 14 days and 26.81 MPa after 28 days. The concrete with waste casting sand is a little weaker than concrete.. It is still pretty strong. We see that Mix 2 and Mix 3 concrete with waste casting sand have strength, especially after 28 days. They have a strength of around 26 MPa and 25.62 MPa. This means we can use waste casting sand to replace some of the sand in concrete.

Mix 5 concrete with waste casting sand is the weakest. This tells us that if we replace much of the natural sand with waste casting sand the concrete might not be as strong.

So, the graph tells us that waste casting sand can be used to replace some of the sand in concrete. Concrete, with waste casting sand is still strong long as we do not replace too much of the natural sand.

CONCLUSION

The study on using waste casting sand of natural river sand in concrete shows that waste casting sand can be used to make concrete. The results show that normal concrete was the strongest at 7, 14 and 28 days.. The concrete with waste casting sand was also strong. Mix 2 and Mix 3 were stronger than the others after 28 days and they were almost as strong as the normal concrete. This means that using some waste casting sand of natural sand is okay and it does not make the concrete weaker. If we use too much waste casting sand like in Mix 5 the concrete is not as strong. So the study says that we can use waste casting sand to replace some of the natural river sand, in concrete. This helps because we use natural sand and we can reuse the waste from factories to build things. Waste casting sand is a thing to use in concrete. It helps the environment because we do not need to use as much natural river sand.

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