



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

Name(s) Jemimah Khan	Project Number J1312
Project Title Comparing Bamboo and Plastic in Criss-Cross Patterns to Create Reinforced Concrete	
<p style="text-align: center;">Abstract</p> <p>Objectives The objective of this experiment was to find out whether bamboo or plastic would reinforce concrete better for constructing earthquake resistant buildings. The hypothesis was that concrete blocks reinforced with bamboo will have a higher tensile strength compared to those with plastic. The materials used were quick mix concrete mix, water, plastic food containers, weights, bamboo sticks, plastic bottles, and two tables. One half of concrete mix was poured into the plastic containers with either bamboo or plastic placed in the middle in a Criss cross pattern and covered with the other half. Once fully dry, the blocks were tested to compare the tensile strength. The blocks were placed between the 2 tables and weights were hung with a metal hook. That did not break the block, so it was placed under a piston attached to a car jack that produced 4 tons of pressure. It did not crack the blocks therefore, they were made again into longer and thinner blocks (17.78 cm). The tensile strength of the blocks was tested by placing the block in between two tables (15.24 cm) apart. The average amount of weight to break the block with bamboo was 47.05kg, whereas for plastic it was 36.88 kg, and control (no reinforcement) was 1.47kg. The hypothesis was correct. An error could be that the Criss cross pattern was not uniform when the top layer was poured. In the future, this project will be done with more concrete blocks made of different recyclable materials.</p> <p>Methods First, take the concrete mix and combine it with the required amount of water. Next, pour the concrete mix into a mold and measure half the stick by 8.89cm. Place the bamboo stick of 7.62cm in a criss-cross pattern. Then, pour the other half of concrete mix to cover the criss-cross pattern completely. Repeat the same procedure with the recycled plastic strips of 3inch by 1inch. Once fully dry, test the tensile strength. Place the block in between 2 tables 15.24cm apart. Place weights onto the brick with a metal hanging rod. Once full tested, document the results. The materials used were concrete mix, containers, tables, weights, and bamboo and plastic.</p> <p>Results The results were that concrete reinforced with bamboo gave most tensile strength to the concrete block. The second averaged tensile strength result was concrete reinforced with plastic. The block that withstood the least amount of pressure was the control or concrete not reinforced.</p> <p>Conclusions The importance of this project is that it helps in the construction industry. Construction workers or engineers can look to a recyclable and biodegradable way to reinforce structures. Using bamboo and plastic as</p>	
Summary Statement This project is about comparing the tensile strength that concrete reinforced with bamboo and concrete reinforced with plastic will provide.	
Help Received Zeeshan Khan, Kavitha Satya	