# Experimental and Computational Models of Bamboo Reinforcement

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Bamboo is a naturally available material that has high mechanical strength [1]. Bamboo reinforcement has emerged as a possible alternate material to steel reinforcement in the concrete element. However, bio-based materials utilized for the construction activity are normally questionable under their sensitivity to moisture conditions and durability. In order to understand and compare the long-term behaviour between bamboo reinforcement and standard industrial reinforcement, we conduct the present experimental study. Various methodologies of treatment were evaluated with the same physical and mechanical properties to assess their effectiveness in the treatment method. First, to improve their durability bamboo samples were treated to decrease the sensitivity to moisture. Different conditions of treatment process were tested: heating of bamboo, with and without chemical treatment. Then, a comparative experimental investigation was conducted on bamboo reinforced concrete beams, cubes and cylinders in order to find out the flexural strength, split tensile strength and bond strength. Results obtained from experimental investigation showed that some treatment methods could increase the compressive strength and durability with and without treatment of bamboo. The present experimental campaign will be used to calibrate current computational models under development. This is part of an ongoing research.

## References

[1] E.I Saavedra Flores, M.I. Friswell and Y. Xia: Variable stiffness biological and bio-inspired materials, *Journal of Intelligent Material Systems and Structures*, 24(5) (2012), 529-540.