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Recent advances and new technology

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The indiscriminate infrastructural growth is leading to rapid environmental Degradation. Steel, cement, synthetic polymers and metal alloys used for construction Activities are energy intensive as well as cause environmental pollution during their Entire life cycle. To address this issue, research on non-polluting materials and Manufacturing processes have been taken up in the recent years.

Structural and Engineered Bamboo Products: The investigation of natural products for use in construction continues to grow to fulfil the need for sustainable and locally available materials. Bamboo, being globally available and rapidly renewable, is an example of such a material. Structural and engineered bamboo products are comparatively low-energy-intensive materials with structural properties sufficient for the demands of modern construction. However, the lack of appropriate building codes and standards is a barrier to engineers and architects in using the material. This paper describes the existing national and international codes and looks towards the future development of comprehensive standards directly analogous to those in use for timber.

Self-Healing Concrete: These Concrete structures usually show some self-healing capacity, i.e. the ability to heal or seal freshly formed micro-cracks. This property is mainly due to the presence of non-hydrated excess cement particles in the materials matrix, which undergo delayed or secondary hydration upon reaction with ingress water. In this research project we develop a new type of self-healing concrete in which bacteria (Bacillus cohnii, Bacillus Halodurans and Bacillus pseudofirmus) mediate the production of minerals which rapidly seal freshly formed cracks, a process that concomitantly decreases concrete permeability, and thus better protects embedded steel reinforcement from corrosion.

Smart Materials: Smart materials are designed materials that have one or more properties that can be significantly changed in a controlled fashion by external stimuli, such as stress, temperature, moisture, pH, electric or magnetic fields. One of them is magneto rheological fluid (MR fluid) it is a type of smart fluid in a carrier fluid, usually a type of oil. When subjected to a magnetic field, the fluid greatly increases its apparent viscosity, to the point of becoming a viscoelastic solid. It has wide applications like in: mechanical engineering, military and defence, optics, automotive, aerospace and human prosthesis.

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