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Introduction: The useof composites started centuries ago with the use of natural fibers. Clay wasreinforced with straw to build walls in the ancient Egypt. However, theinterest on the natural fibers reduced in the further times as more strongmaterials like metals were introduced. The rise of composite materials beganwhen glass fibers were introduced with a possibility of combining them withtough resins to produce strong composites 1.

Advanced polymeric composites thatuse high strength fibers like graphite, aramids, glass, etc. gained moreimportance in the decades that followed due to their high strength and low-densityproperties in comparison with metals and these are gradually replacing themetals. These composites were initially developed for aerospace industry andnow they are being used in variety of applications like automotive parts, sportinggoods, structural and infrastructure applications. However, in spite of theirstrength and versatility, the major problem associated is their degradability andthe replenishibility of the sources. Since the products are mainly derived frompetroleum products, these are not sustainable and their disposal after theiruseful life is a major issue concerning the amount of waste generated fromdifferent end uses and the cost of processing the waste and landfills which inturn leads to pollution.

The growing environmentalconcern in the current times has led to a renewed interest in the use ofnatural fibers and resins as a substitute of synthetic fibers and in thecomposite materials. The fact that naturalfibers are sourced from plants which are renewable in origin and the fact thatthey can be easily biodegraded has encouraged more research into this field. Fully green

composites can be developed from both natural fibers and resinsthat are derived from natural, sustainable and renewable sources. Commercially availableforms of fibers such as loose fibers, yarns, woven and knitted fabrics or non-wovenmats make it possible to combine them in different layers and engineer them forvaried applications. The composites can be manipulated according to themechanical properties of the fibers used. Furthermore, high strength cellulosicfibers, protein fibers and bio based resins have been developed that haveexcellent properties and can be used as reinforcements 2.

This paper aims to review the use of fully green compositesin structural and infrastructure applications. Whilelarge multistoried structures or bridges need the high strength and stiffnessof advanced composites to be used as structural elements, smaller structuressuch as single room cabins, temporary housings or shelters, etc., may not needcomposites with such high strength.

For such structures composites withmoderate mechanical properties, comparable to wood, would work well. Further, non-load- bearing components such as walls, ceilings, etc., may also usecomposites with moderate mechanical properties. Some of the structural elementsof single houses/ cabins would still need somewhat higher strength, particularly if light weighting of the structure (e. g., for transportationease) is desired. While wood is considered as sustainable, one of its biggest disadvantagesis that it can only be harvested after the trees are grown to their maturity, which, depending on the variety, can take 20 to 30 years.

However, plant-derived fibers (e. g., jute, hemp, sisal, ramie, banana, pineapple, henequen, flax, kenaf, etc.), which can be used as reinforcement, as well asresins (e.

g., plant-based proteins and starches) are yearly renewable. Composites made using plant-derived fibers and resins can be engineered toobtain properties better than those of wood and would be excellent for smallerstructures. Furthermore, if high strength fibers are used along with the sameresins, advanced green composites having high mechanical properties may befabricated.

These advanced green composites can be used as primary structuralelements for construction. In addition to their good mechanical properties, therich variety of sensorial properties possible in green composites due to thenatural fibers, gives this material family a great advantage in comparison toits oil- based predecessors and many other panelized materials on the market, such as fiber cement and aluminum 2. Themain impetus in pursuing the use of green composites instead is the ecologicalbenefit: natural composites offer the potential to create large volume, biodegradable structural components using only renewable resources, resultingin reduced quantities of embodied energy. Using materials like naturalcomposites that reduce construction waste and increase energy efficiency wouldprovide a solution to immediate infrastructure needs while promoting theconcept of sustainability 3.