

minimum requirements imposed by Brazilian technical standard, even if conventional materials were replaced by solid waste, minimizing the raw material extraction.

Keywords: Sustainable, industrial solid waste, construction.

#### ARCH028 (054)

##### A REVIEW FOR CHARACTERISATION OF FRP COMPOSITE IN CONCRETE STRUCTURES

<sup>1</sup>Mohammad Panjehpour, <sup>2</sup>Abang Abdullah and <sup>3</sup>Raizal Saifulnaz  
<sup>1,2,3</sup>Department of Civil Engineering, Faculty of engineering,  
UPM University, Kuala Lumpur, Malaysia  
e-mails: <sup>1</sup>mdpanjehpour2006@yahoo.com, <sup>2</sup>aaaa@eng.upm.edu.my  
and <sup>3</sup>raizal@eng.upm.edu.my

#### ABSTRACT

**Problem Statement:** Since the presentation of fibre reinforced polymer (FRP) reinforcement in the concrete structures, the utilisation of non-ferrous reinforcement has been increased rapidly. Although numerous researches have been done in the world, the development of practice codes containing advanced materials has its limitations in the wider range of application. Nowadays, the market for externally bonded FRP has a dynamic situation. Several types of manufactures are working in this market part, while researcher and institutes are trying to obtain design guidelines for FRP. The ranges of FRP applications in civil structures are very wide. In this regard various difficult projects have been done, such as tripling the bearing capacity of a floor slab in Belgium, strengthening of silos in Sweden, seismic strengthening in Greece and Italy, etc. In this review paper, FRP advantages and disadvantages, its manufacture, different form of FRP, causes of deterioration of FRP, FRP durability and also prestressed FRP will be probed.

Keywords: FRP fatigue fracture, freeze-thaw resistance, prestressed FRP, sustainable structures, FRP durability, FRP manufacture.

#### ARCH029 (058)

##### COMPARATIVE AND ANALYTIC STUDY OF PLASTER-MOLDING IN ISFAHAN GAJARIAN HOUSES

<sup>1</sup>Zahra. fanaie, <sup>2</sup>S.Ali. Mojabi and <sup>3</sup>Habibollah. Ayatollahi,  
<sup>1</sup>instructor, Najafabad Branch, Islamic Azad university  
<sup>2</sup>Assistant Professor, Najafabad Branch, Islamic Azad university  
<sup>3</sup>Assistant Professor, Shahed university  
e-mails: <sup>1</sup>Z\_fanaie@iaun.ac.ir, <sup>2</sup>researchmanager@iaun.ac.ir and <sup>3</sup>habib-ayat@yahoo.fr

#### ABSTRACT

**Problem Statement:** Isfahan's Qajar (Gajar) houses can be discussed and studied from different angles including the decoration used in them. All these houses are aristocratic, and

To this end, a number of these houses with the most architectural decorative kinds of plaster-moulding have been studied and compared. **Results:** Different plaster-moulding motives such as geometrical, floral, European and traditional in these houses and that display grandeur of Qajarian architecture, artifice and artists in this era. **Conclusion:** Unlike the claims which were made about architectural decorations in the Qajar era, they show the pinnacle of art in the time. Coloured sash-windows, latticed-work windows, plaster-moulding and elegant wall paintings, tile-work, carving, and finally the type of wonderful houses arouse admiration of every spectator.

Keywords: Qajar houses, Isfahan, decorations, architecture, plaster-moulding

#### ARCH030 (076)

##### LOW COST HOUSING USING BAMBOO: FROM PYRAMID TO DIAMOND

<sup>1</sup>Rakesh Kashyap and <sup>2</sup>Vivek Namdev  
School of Architecture and Landscape Design  
Shri Mata Vaishno Devi University Katra, Jammu-182301, INDIA  
e-mails: <sup>1</sup>rakeshsmvdu@gmail.com and <sup>2</sup>viveknamdev12@gmail.com

#### ABSTRACT

**Problem Statement:** Shortage of housing for the economically weaker sections of society (in both urban and rural areas) is a universal problem. The problem is acute in the developing nations of South-East Asia. This paper aims to use low cost techniques to construct houses not only at a much affordable rate but also efficient and sustainable structures using bamboo which is widely available in this region. **Approach:** This study analyses the structural and mechanical properties of bamboo to use it as a replacement for brick. Traditionally bamboo has been used in parts of South-East Asia as a building material. But its use is limited to certain rural areas. This study aims at using the proposed technique in housing schemes for urban and urban poor namely the Indira Awas Yojna (Indira Housing Scheme) and WAMBAY (Housing for Urban poor in India) and providing dwelling units at half the cost compared to the allotted budget at present. **Result:** The proposed technique introduces the use of sustainable eco-friendly materials but also helps in providing twice the target every year within the allotted budget since the overall cost reduction. **Conclusion:** The problem of providing low cost housing to the shelterless using sustainable materials instead of high-energy materials is being addressed. A solution is being proposed keeping in mind that the idea does not remain confined to books and journals.

Keywords: Low cost housing, bamboo, sustainability, housing schemes, IAY, V