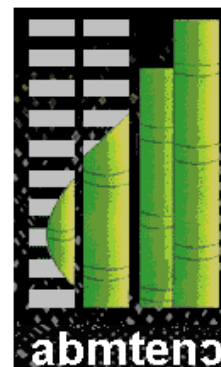


**13<sup>th</sup> International Conference on  
Non-Conventional Materials and Technologies**  
*“Novel Construction Materials & Technologies for sustainability”*  
**(13<sup>th</sup> NOCMAT 2011)**  
**22<sup>nd</sup>-24<sup>th</sup> September 2011**  
Changsha, Hunan, China



## Foreword

The 13<sup>th</sup> NOCMAT Conference was continuing the events which provide a forum for researchers, governmental and non-governmental agencies and introduce the research results on innovations in the field of low cost, energy saving materials and technologies which are renewable and locally available like bamboo, soil fibers, alternative cement technologies, new materials and technologies making use of the non-conventional materials like natural fibers, agricultural and industrial residues in a more cost-effective, durable, environment-friendly, energy efficient and sustainable construction. It is hoped that the NOCMAT to contribute in solving the existing need for housing and by creating jobs in the progress and help to eradicate extreme poverty which still afflicts a large percentage of the population around the globe. Further by using NOCMAT our world will become healthier and fairer. Another objective is the formation of global partnership for economic progress and social stability.

The 13<sup>th</sup> NOCMAT Conference was successfully held in Changsha, Hunan Province, China, following previous events in Cairo, Egypt (2010), Bath, England (2009), Hanoi, Vietnam (2002), Bhubaneswar, India (1997) and the first one in Rio de Janeiro, Brazil (1984). In NOCMAT conferences were also held also in João Pessoa, (2003), Pirassununga (2004), Rio de Janeiro (2005), Salvador (2006) and Maceio (2007) and in Colombia (2008). The 13<sup>th</sup> conference was very informative and interesting for all participants. Over 220 papers were received from all over the world. Innovations and sustainable use of novel technologies were presented and exhibited. Many non-conventional materials in the 21<sup>st</sup> century are rooted in traditional vernacular construction, including soil, lime and natural plant based materials, such as bamboo, straw and reeds. In order that non-conventional materials and technologies meet the demand of sustainable construction, significant research effort is under way. Industrial materials such as steel and concrete are being examined newly for sustainable solutions. Because of the different cultural backgrounds the wide range of research results presented might only stand for a regional approach but might easily transferred, copied and adapted to another regions. If we could fuse this new approach with the ancient ways of using for example bamboo, Kah-Gel (Soil- fibers) we could truly reach a superb material which could benefit many people around the globe and perhaps give the term “globalization” a new meaning.

With great pleasure, we present the selected papers in the proceedings of the 13<sup>th</sup> NOCMAT.

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