

40th IAHS World Congress on Housing Sustainable Housing Construction

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40th IAHS World Congress on Housing Sustainable Housing Construction

Book of Abstracts

Editors:

António Tadeu
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Vitor Abrantes



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PREFACE

This book contains abstracts of the papers presented at the 40th IAHS World Congress on Housing held at the city of Funchal from 16 to 19 of December 2014.

Under the theme “Sustainable Housing Construction” we have gathered a Scientific Programme which brings the broad scope of the International Association for Housing (IAHS) series of congresses to focus on today’s major concerns with energy efficiency and sustainability in the construction sector.

The success of this Conference, as evidenced by the contents of this book is a demonstration of the interest shown by different researchers in the recent advances and future trends on housing sciences. This is a multi-disciplinary field attracting architects, engineers, planners, physical scientists, sociologists and economists, all of them showing their expertise towards developing houses better suited to the future of humankind.

The Editors are grateful to all authors for their excellent contributions, as well as to the members of the International Scientific Committee and other colleagues who helped select the studies included in this book.

The Editors
Funchal
2014

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BIOCLIMATIC SOLUTIONS EXISTING IN VERNACULAR ARCHITECTURE - GEOTHERMAL CLIMATIZATION

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Keywords: Sustainability, Bioclimatic Rehabilitation, Geothermal Climatization

Abstract *The traditional architecture is founded as a defining element of the identity of a region, and its essence should be preserved and conserved by means of maintenance and recovery actions. Thus, the best solutions and proposals for intervention should be looked for but this doesn't imply a back to back on both innovation and construction processes.*

This work is part of the BIOURB project, a cross-border project between Portugal and Spain, which intended to contribute to the change of the current constructive model towards a more sustainable bioclimatic model, both environmentally and economically, reducing buildings energy consumption and raising the value of bioclimatic heritage along the border region. This paper includes the description of a series of tasks in order to perform buildings maintenance and rehabilitation, dignifying the built heritage and enhancing the use of traditional materials and techniques, with a view to economic and environmental sustainability. It is intended to provide a set of relevant information for those who have the responsibility or the concern to extend the life of buildings and disclose among users, current and potential, good and bad, options for the conservation and rehabilitation as well as anomalies that currently affect buildings.

Geothermal climatization is one of the eight bioclimatic solutions identified using renewable energies. This climatization system takes advantage of the thermal characteristics of the in depth ground which presents constant temperatures throughout the year (also, temperature increases with depth). These steady temperatures are easy to find when one get into buried spaces of buildings by checking that they are cooler in summer and have warm temperatures in winter. Taking advantage of the ground characteristics is reflected a bit everywhere in buried constructions that are therefore more protected from the weather. Buried spaces without any day lighting, excavated in earth and stone, were the most often used for preserving food and wine. The main purposes of this work are to analyse this type of bioclimatic solution, to provide conservation, preservation and rehabilitation techniques, as well as to cope with the benefits of the principles of traditional architecture that should integrate and inspire the bioclimatic construction.

EXPERIMENTAL ASSESSMENT OF IAQ IMPROVEMENT IN NATURALLY VENTILATED EDUCATIONAL BUILDINGS

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Keywords: air change rate (ACH), classrooms, indoor air quality (IAQ), indoor environmental quality (IEQ), natural ventilation protocol

Abstract *Indoor environmental conditions in classrooms, in particular temperature and indoor air quality, influence students' health, attitude and performance. In recent years several studies regarding indoor environmental quality of classrooms were published and natural ventilation proved to have great potential, particularly in southern European climate.*

This research aimed to evaluate indoor environmental conditions in 8 schools and to assess their improvement potential by simple natural ventilation strategies. Temperature, relative humidity and carbon dioxide concentration were measured in 32 classrooms.

Ventilation performance of the classrooms was deeply characterized by tracer gas measurements of the air change rate assuming different windows related boundary conditions. A total of 110 tracer gas measurements were made. The complete characterization of the classrooms ventilation performance was relevant for the definition of the ventilation protocol since air change rate helped to pinpoint the best ventilation strategy for each case study.

The results of the ventilation protocol implementation were very encouraging and, globally, a significant decrease on the CO₂ concentration was observed without modifying the comfort conditions.

This paper presents and discusses the main conclusions of the measurements campaign performed in the referred classrooms.



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