Construction

Abstract Book
From the 1st Annual International Conference on Construction, 20-23 June 2011,
Athens, Greece.
Edited by Gregory T. Papanikos

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Preface

This abstract book includes all the abstracts of the papers presented at the ***1st Annual International Conference on Construction, 20-23 June 2011,*** organized by the Athens Institute for Education and Research. In total there were 34 papers and 37 presenters, coming from 12 different countries (Australia, Belgium, Canada, Finland, Hungary, India, Oman, South Africa, Sweden, Turkey, the United Kingdom, and the United States of America). The conference was organized into 10 sessions that included areas such as Sustainable Building Construction, Education & Training, Materials, e.t.c. As it is the publication policy of the Institute, the papers presented in this conference will be considered for publication in one of the books of ATINER.

The Institute was established in 1995 as an independent academic organization with the mission to become a forum where academics and researchers from all over the world could meet in Athens and exchange ideas on their research and consider the future developments of their fields of study. Our mission is to make ATHENS a place where academics and researchers from all over the world meet to discuss the developments of their discipline and present their work. To serve this purpose, conferences are organized along the lines of well established and well defined scientific disciplines. In addition, interdisciplinary conferences are also organized because they serve the mission statement of the Institute. Since 1995, ATINER has organized more than 100 international conferences and has published over 100 books. Academically, the Institute is organized into four research divisions and nineteen research units. Each research unit organizes at least one annual conference and undertakes various small and large research projects.

I would like to thank all the participants, the members of the organizing and academic committee and most importantly the administration staff of ATINER for putting this conference together.

Gregory T. Papanikos
President

FINAL CONFERENCE PROGRAM

Athens Institute for Education and Research
Arts & Sciences Research Division

1st Annual International Conference on Construction
20-23 June 2011, Athens, Greece
PROGRAM

Conference Venue: St George Lycabettus Boutique Hotel, 2 Kleomenous Street, Kolonaki, Athens

Organization and Scientific Committee

- Dr. Gregory T. Papanikos, President, ATINER.
- Dr. Nicholas Patricios, Professor of Architecture, University of Miami, USA.
- Dr. Nicholas Pappas, Vice-President of Academics, ATINER & Professor, Sam Houston University, USA.
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- Ms. Lila Skountridaki, Researcher, ATINER & Ph.D. Student, University of Strathclyde, U.K.
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C O N F E R E N C E P R O G R A M

Monday 20 June 2011

08:30-09:30 Registration

09:30-10:00 Welcome and Opening Remarks

- Dr. Nicholas Pappas, Vice-President of Academics, ATINER & Professor, Sam Houston University, USA.
- Dr. Gregory T. Papanikos, President, ATINER & Visiting Professor, University of Strathclyde, U.K.
  Opening Speech: *The Current Economic Crisis and its Impact on Greek Construction Industry*
- Dr. Nicholas Patricios, Professor of Architecture, University of Miami, USA.

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2. LaCoe, J., Assistant Professor, Pennsylvania State University, USA. Sustainable Design/Build Pedagogy: Materials Reuse.
3. *Tracada, E., Universisty Principal Tutor in Built Environment and Leader of the B.E.R.G., University of Derby, UK. Self Build Design and Construction Processes and the Future of Sustainable Design Education.
4. Cetiner Ozdemir, O., Researcher, Yildiz Technical University, Turkey. The Computer Use in Architectural and Urban Planning Training-An Example.
5. Wienand, N., Head, Department of Architecture & Planning, Sheffield Hallam University, UK. Architectural Technology. The Making of an Academic Discipline.

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Chair: *Tracada, E., Universisty Principal Tutor in Built Environment and Leader of the B.E.R.G., University of Derby, UK.

1. Snyder, V., Associate Professor, University of Texas at Austin, USA. Developed Surfaces: Construction Logic and Geometrical Control.
2. *Knowles, A., Ph.D. Student, University of New South Wales, Australia. High Profiling: Architects in Time Magazine.
3. Kapodistria, D., Postgraduate Student, University of Cambridge, UK. The Built-Form, the Environmental Performance and the Retrofit Potential of Urban Dwellings in Greece.

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2. Spiegelhalter, T., Professor, Florida International University, USA. Passive and Active Micro-Generation Building Systems for Coding, and Dehumidification in Hot and Tropical Climates.
3. Rosales, C., Associate Professor, Florida International University, USA & Shanti, M., Ph.D. Student, Florida International University, USA. Unique Design and Construction Challenges for a Solar Decathlon House.

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Chair: *Jetty, C.R., Associate Professor, M.S. Ramaiah Institute of Technology, India

1. Davis, M., Director, Synopsis Ltd, UK. Delivering "More for Less" with Integrated Project Insurance.
2. *Sarkar, D., Associate Professor, CEPT University, India. Formulation of Project Risk Management Model for Mass Rapid Transit System Project.
3. Luyten, L., Researcher-Instructor, Sint-Lucas School of Architecture, Belgium. A Design Language for Expressing Structural Concepts.
4. Roofigari-Esfahan, N., Graduate Student, Concordia University, Canada & *Moselhi, O., Professor, Concordia University, Canada. Project Schedule Acceleration Considering Risk.

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1. Ikotun, B.D., Lecturer, University of South Africa, South Africa. Effect of a Modified Zeolite Additive on the Alkali Silica Reaction of Mortar.
2. Yurdakul, E., Ph.D. Student, Iowa State University, USA, Taylor, P., Associate Director, National Concrete Pavement Technology Center, USA and Adjunct Assistant Professor, Iowa State University, USA, Ceylan, H., Associate Professor, Iowa State University, USA & Bektas, F., Research Assistant Professor, Iowa State University, USA. Investigating the Minimum Binder Content Requirement by using Class F Fly Ash in concrete Pavements.
3. Ioannou, S., Researcher, University of Bath, UK, Paine, K., Senior Lecturer, University of Bath, UK & Quillin, K., Associate Director, Building Research Establishment Ltd., UK. Resistance of Supersulfated Cement Concrete to Carbonation and Sulfate Attack.

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2. Aghaei Meibodi, M., Ph.D. Student, Lulea University of Technology, Sweden. Technological Advances in Design and Construction: Bridging the Gap between the Conception Stage and the Manufacturing Process.
3. Engincan Bol, P., Assistant Professor, Maltepe University, Turkey & Güner, D., Lecturer, Dokuz Eylul University, Turkey. Changing Typologies of Domestic Environment.
4. Uzun, T., Assistant Professor, Maltepe University, Turkey. Influance of Ancıent Greek Archıtectural Element In Istanbul.

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1. Taha, R., Professor, Sultan Qaboos University, Oman, Al-Kamyani, Z., Sultan Qaboos University, Oman, Al-Jabri, K., Sultan Qaboos University, Oman, Baawain, M., Sultan Qaboos University, Oman, Al-Shamsi, K., Sultan Qaboos University, Oman & Al-Futaisi, A., Sultan Qaboos University, Oman. Use of Waste Spent Catalyst in Construction.
2. *Forgues, D., Professor, Ecole of Technology Superieure, Canada & Iordanova, I., Researcher, Ecole of Technology Superieure, Canada. Toward an IDP-BIM Framework: A Sustainable Building Case Study.
3. *Jetty, C.R., Associate Professor, M S Ramaiah Institute of Technology, India, Venkatasubramani, R., Professor, V L B Janakiammal College of Engineering and Technology, India, Balakrishnaa Vasudevan, A., Professor, Prahar School of Architecture, India & Rangaswamy, R. S., Professor, V L B Janakiammal College of Engineering and Technology, India. Strategic Management of Architectural, Engineering and Construction Industry Challenges.

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1. Lewis, J.A., Researcher, University of Ulster, UK, Odeyinka, H., University of Ulster, UK & Eadie, R., University of Ulster, UK. A Methodology for Effecting Innovative Construction Procurement Selection through Application of Artificial Intelligence.
2. Ward, P., Lecturer, University of Newcastle, Australia. A UK and Australian Perspective of the Suitability of the SCL Protocol's Provision for Dealing with Float for Adoption and Use by the Australian Construction Industry.
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1. *Attard, T., Assistant Professor, University of Tennessee, USA & Dhiradhamvit, K., Researcher, University of Tennessee, USA. Sustainable Energy Dissipation and Evolutionary Viscous Damping in Wood-Frame Structures.
2. *Pierre, P., Researcher, University of Laval, Canada & Plante, J., Professor, University of Laval, Canada. The Opéra-palette, Québec City, Canada.
3. Olah, A.B., Scientific Assistant, Corvinus University of Budapest, Hungary. Radical New Possibilities in Building Statics.

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1. Atalan, O., Assistant Professor, Maltepe University, Turkey. Changing Process of the Coastal Settlement of the Bosphorus and Sustainability.
2. Marrier d'Unienville, M.E., Master of Design (Research), University of Technology, Australia. Residential Design and Regulations for Sustainable Development. An Australian Perspective.
3. Arslan, G., Associate Professor, Anadolu University, Turkey & Kivrak, S., Anadolu University, Turkey. Job Satisfaction of Civil Engineers: An Investigation in Public and Private Construction Industries in Turkey.

16:30-19:30 Urban Walk

20:00-21:00 Dinner

Wednesday 22 June 2011
Cruise: Departure at 07:10 Estimated Return Time: 20:30

Thursday 23 June 2011
Delphi Visit: Departure at 07:45. Estimated Return Time: 19:30

Mania Aghaei Meibodi
PhD Student, Lulea University of Technology, Sweden.

Technological Advances in Design and Construction: Bridging the Gap between the Conception Stage and the Manufacturing Process

Architecture has been a progressive encompassment of all building aspects. Tools as essential elements of human development together with materials allow for the realization of architecture. Historically tools were the extension of hands. The master builder by coordinating his mind, eyes and senses used these tools in order to transform material into unique artifacts. Industrialization, by mechanization and digitalization of the craft tools, led to mass production of repetitive objects.

The vast majority of products used today are standardized and mass-produced through NC (Numerical Control) machines. One product in particular is the prefabricated buildings and its components (logs, bricks). Prefabrication of buildings is the ability of fabricating buildings, its parts or units off-site under a controlled environment in factory. While prefabricated buildings achieve the economical efficiency, they lack the aesthetical, social and contextual aspects. In classical architecture all these aspects were integrated within the construction process.

During last decennium the building manufacturers have made attempts to reconcile architecture and the production process by using CAD (Computer Aided Design) software linked to the CAM (Computer Aided Manufacturing) tools, but the result was merely simplifying the data transformation and transition. In compare to the handicraft tools, the digital tools allow a different contact between the designer, manufacturer and the final product. This paper, by elevating and comparing the possibilities and limitations of the current tools being used in the fields of architecture and building manufacturing, suggests other parameters to be concerned by the respective fields. Building manufacturing must redefine other relations with architecture than simply regarding it as a component of the production process. All of these raise a central question: "What is the relationship between construction and architecture in digital age? Is building manufacturing something external from architecture or vice versa?"

Gokhan Arslan
Associate Professor, Anadolu University, Turkey.
Serkan Kivrak
Assistant Professor, Anadolu University, Turkey.

Job Satisfaction of Civil Engineers: An Investigation in Public and Private Construction Industries in Turkey

Job satisfaction is an affective reaction to one's job and can positively affect employee working performance. It can be affected by different factors such as salary, working hours, promotion prospects and job security. This study examines the job satisfaction of civil engineers working in public/private construction sectors in Turkey. The research was carried out with 100 civil engineers. Data were collected through a survey questionnaire that was administered during face-to-face interviews. The interviews took place between March and May 2009 and each lasted approximately 1 hr. Based on the results, more than half of the engineers like their jobs. Half of the respondents indicated that they would choose the same career again. Moreover, salary was considered as one of the most important factors influencing job satisfaction.

Ozlem Atalan
Assistant Professor, Maltepe University, Turkey.

Changing Process of the Coastal Settlement of the Bosphorus and Sustainability

On the Bosphorus shores beginning from the 17th century, an original kind of living was formed with its palace, yalı, grove, recreation site, fountain and mosque building. On the Bosphorus section between Ortaköy and Arnavutköy, beginning from the 17th century, many coastal palaces and coastal residences were built. This shore had especially been a host for the palaces of trhe dynasty family from the 18th century on. Many yali's was built by some famous architect. For example Nazime Sultan Yali's was built by famous Italian architect D'Aranco. And Hatice Sultan Yali's was built by Melling.

Yalıs located on the between Ortaköy and Kuruçeşme, especially from the beginning of the 19.century to the start of the 20th century, in various periods had been demolished, burned or had changed hands. The change of silhouette in the Bay of Kuruçeşme is seen clearly at the gravures, maps and photographs. From the gravures drawn by Fauvel and Melling at the beginning of the 19th century, from the photographs of Kargopoulo, Abdullah Freres, Sebah&Joaillier in mid 19th century and Miralay Ali Sami at the beginning of the 20th century, of these buildings only a few yalıs are left to our day. In this Bosphorus area, of the 60 yalıs that take place on the photos made at the beginning of the 20th century, till our day, only 8 had survived. With coastal road construction, fires of various periods, destructions, wrong uses and poor restorations, even the authenticity of the remaining 8 yalıs was harmed.

This parts of Bosphorus can be arranged open air museum and supported for public use.Therefore preservation of the area and an important Ottoman historical Yali''s and palace will be shown to the visitors.

Thomas Attard
Assistant Professor, University of Tennesse, USA.
Kittinan Dhiradhamvit
Researcher, University of Tennesse, USA.

Sustainable Energy Dissipation and Evolutionary Viscous Damping in Wood-Frame Structures

A new-generation advanced protection system has been developed to significantly reduce structural accelerations and displacements in wood-frame structures by combining high-strength with sustainable energy dissipation. A newly developed rubber-like "super-composite" - coined by the authors as CarbonFlex - is tightly wrapped around the exterior faces of wood frame structures to integrate an evolutionary viscoelastic behavior that transitions to a nearly purely viscous material through a new concept called "sustainable negative stiffness." CarbonFlex is a strong, flexible load-bearing wrap that provides sustainable energy-dissipation and large viscous-type damping during extreme seismic events that minimizes structural damage via a sustainable "energy-release valve." The properties of CarbonFlex are a function of chemistry-processing (*tc*) and volumetric (*hp*) parameters that establish quantifiable material properties that may be used in the performance-based design of earthquake-resistant wood structures.

Experimental and computational tests indicate that the tight-wrap synergy confines substrates and provides a continuous load path between the foundation of the wrapped wood-frame structure and its roof. In wood-frame structures, the interaction of the exterior tight-wrap and the frame replaces the interaction of the exterior wood sheathing diaphragm and the frame via fasteners as used in traditional wood structures. The integration of large viscous-type damping precludes reliance on the hysteretic damping of the shear wall fasteners, which may pull through or withdraw from framing during ground motions, or the minimal viscous damping that is ordinarily provided by structural and non-structural components.

Computational simulations show that CarbonFlex-wrapped wood structures include 13% viscous-type damping, resulting in a reduction of peak accelerations of 25% and 35% with respect to as-is woodstructures on the top and bottom stories, respectively. The standard deviations of the acceleration time histories were 39% and 47% smaller.

Olcay Cetiner Ozdemir
Researcher, Yildiz Technical University, Turkey.

The Computer Use in Architectural and Urban Planning Training - An Example

New prospects to architectural realizations and also to architectural education are developed by the will of diversity in design and application, the rapid improvement of personal computers on the second half of the 20th century especially on the 80's and the use of computer as an important decision tool in all business fields.[1]

Today, in the faculties of architecture, computer is an imperative tool which became prevalent by the fast improvement of computer software and hard wares. All over the world, there is a rapid increase of computer use in the education programs of the design fields. It has been a compulsory necessity for the universities to take in control the computerized education during the university period, for the future professionals to use computers effective and efficient within their entire architectural profession. The computer use in architecture faculties realized by educational activities, academic researches, project realizations, constitution of the archives with other academic parties and data bank institutions.

It is aimed in this paper to examine computer use in educational programs of architecture faculties, to examine shortly the definition, the enclosure and the improvement of the use of computer aided design at the bachelor's degree of architectural education. In the sample, the studies held in Yıldız Technical University, 'Computer Based Architectural Design' (CBAD) laboratory and the development process of "the computer use in architectural training" is quoted.

Martin Davis
Director, Synopsis Ltd, UK.

Delivering "More for Less" with Integrated Project Insurance

Since year 2000 "movers and shakers" in the construction and insurance industries in the UK have been developing an innovative approach to risk management and insurance – with the primary purpose of liberating the construction process from the "silo mentality", the "blame and claim culture", and the huge embedded waste of time and money that traditionally result.

It has been accepted in UK Government reports that the future for the construction industry lies in integration and collaboration, as opposed to fragmentation and confrontation. Practice has however proved that the still prevalent lowest cost tendering and liability cultures inhibit such change.

Under a radical development of consortium/alliance contracting the project participants – who come together on a "no blame/no claim" basis (except in the case of fraud) – are covered by a single "integrated project insurance" under which rights of subrogation are waived. In lieu of provision for legal costs, the insurers are protected by independent technical (based on successful practice in Belgium) and financial risk assurance. At no expected increase in cost this policy replaces all All Risks, Public Liability and Professional Indemnity cover throughout the supply chain for the project, and additionally gives "first party" cover for overspend of the risk-assured cost plan and for latent defects. The policy excess is funded by pain-shares pre-agreed between the client and the integrated project team.

Leading companies across the breadth of the supply side have now put a proposition to Government, supported by the Chief Construction Adviser, that

- integrated teams selected under option (a) of Article 53 of the EU Procurement Directive 2004/18/EC,
- expect to reduce design and construction costs by 15% - 20% by cutting out wasteful processes
- making low carbon construction affordable, and
- offer insurance cover for the cost plan (net of these savings) with leading insurers.

Pinar Engincan Bol
Assistant Professor, Maltepe University, Turkey.
Deniz Guner
Lecturer, Dokuz Eylul University, Turkey.

Changing Typologies of Domestic Environment

As known sustainability which is one of the most important subjects of this century, is a dynamic concept, it changes according to the economic, social and cultural conditions in an historical perspective. At this juncture it is not so difficult to presume that in the future the mankind will be living in a world in which all the resources had been used up maybe not totally but approximately and global warming will be raised to a higher level. So in such conditions it is predictable that all the environment relations including domestic environment will be illustrated from the beginning for the new provision by means of design.

Thorough the new terms of living style, this study will examine the new ideas enhanced about domestic environment and housing typologies. For the last decade, it can be denoted that there are architectural searches and attempts about the subject: the new housing types of the century. In the paper these innovative approaches will be explicated in detail according to the life in the future.

Matt Fajkus
Assistant Professor, The University of Texas at Austin School of Architecture, USA.

Light and Building Envelope Construction: A Meeting Point for Architects and Engineers

In light of the fact that building envelope design and construction are critical for building performance as well as the fact that architects and engineers rarely collaborate in the early phases of the design process, the Thermal Lab at The University of Texas at Austin was established in late 2009. The Thermal Lab consists of a full-scale, single room space with a south-facing facade, which allows testing in the areas of daylighting, thermal exchange, ventilation, and the use of direct and indirect solar energy. The test box, with exterior dimensions of approximately 4m x 5m x 3m (w/d/h), is able to measure the effects of innovative cladding materials and shading systems, which will inform the field of experimental construction research as it relates to sustainable building. The scale of the Thermal Lab helps provide particularly accurate data, as the prediction of a structure's lighting and thermal behavior is inherently dependent on the use of real-scale testing facilities. Simultaneously, the data collected through experimentation with the Thermal Lab is used in the calibration of energy simulation software. A side-by-side comparison between the physical test box in a real-life environment and the virtual model in a simulated testing environment serves as a useful control mechanism to minimize error margins and to ensure the accuracy of simulation test results. The Thermal Lab offers the opportunity to develop an integrated approach to problem solving by an interdisciplinary team of architectural and engineering students as well as professionals. Initial façade construction design and mock-up experiments have yielded interesting qualitative and quantitative results, warranting a larger discussion about their implications toward the future of façade construction. No other university in North America has a similar experimental facility, thus its findings will be extremely valuable and influential in the design and development of building envelope technology.

Daniel Forgues
Professor, Ecole de technologie superieure, Canada.
Ivanka Iordanova
Researcher, Ecole de technologie superieure, Canada.

Toward an IDP-BIM Framework: A Sustainable Building Case Study

Integrated design process (IDP) and Building Information modeling (BIM) have been recognized as two approaches to address the problem of fragmentation in the construction industry. Adopting these process and tools nonetheless requires drastic changes in design practices. The article presents a reverse engineering approach to a high performance building: the House of Sustainable Development (HSD) in Montreal. The project included a research part which first aimed at studying the IDP and investigating the pertinence of the proposed sustainability strategies, second at replicating the design process using BIM technologies.

The IDP for the building included several *charrettes* (integrated design sessions). AutoCAD 2D was mainly used by the professionals. No particular simulation software was used during the *charrettes.* The paper presents the results of the second part of the research project, in which the process was reverse-engineered, based on the 2D drawings and the project documentation. Using this project as a case study, we are aiming at defining an optimal digital environment as well as a fluent workflow for integrated modelling. This way, a framework for integrated design can be structured and tooled (this was subject of other communications).

Looking for a holistic presentation of the project, we first created a BIM (Revit) model of the building. Then, tests for performance and interoperability were performed with software for programming; cost-estimation; for simulation of the construction process, as well as for clash-detection; for passive solar energy simulation; and for solar energy thermal and lighting simulations. Life-cycle analysis was alos taken into consideration. The results of this case study put light on the following aspects: usability of these software at the very beginning of the design process; interoperability and data exchange with the main BIM model; and consistency of the simulation results. Some recommendations were made to the designers of the HSD.

Bolanle D. Ikotun
Lecturer, University of South Africa, South Africa.

Effect of a Modified Zeolite Additive on the Alkali Silica Reaction of Mortar

The effect of a modified zeolite additive (PWC) on the alkali silica reaction (ASR) of mortar was investigated in this paper. The additive, a blend of selected alkaloids and zeolite, is commercially available and effectively used in soil stabilization for road construction. Previous study showed that PWC is a pozzolanic material and it increases late mortar flexural and compressive strength, decreases mortar permeability, decreases mortar sorptivity and reduces mortar expansion due to sulphate attack. However, its influence on the alkali silica reaction of mortar has not been documented. Mortar samples were prepared in this study by incorporating PWC and/or 30 % fly ash in the mixes. PWC was used in the proportions of 0 %, 0.4 %, 0.6 %, 1.0 %, and 2.5 % by weight of cement. Mortars of 0.4 water/cementitious ratio were subjected to alkali silica reaction test based on ASTM C227 for a period of 150 days. The results show that PWC is most effective in reducing ASR of mortar when used in the presence of fly ash.

Socrates Ioannou
Researcher, University of Bath, UK.
Kevin Paine
Senior Lecturer, University of Bath, UK.
Keith Quillin
Associate Director, Building Research Establishment Ltd., UK.

Resistance of Supersulfated Cement Concrete to Carbonation and Sulfate Attack

Environmental concerns with the energy-intensive manufacture of Portland cement have been acknowledged in the last decades. The main approach followed by the cement industry towards reducing the embodied CO_2 emissions (eCO_2) of concrete is the incorporation of industrial by-products in the cementing component. As a result, Portland composite cements with lower carbon footprints have been developed, which are now widely used in structural concrete. Nevertheless, even greater savings in eCO_2 could be achieved in the longer term through use of alternative cementitious systems with inherently less eCO_2. An example of such cementitious systems are supersulfated cements (SSC), that have an eCO_2 at least 90% lower than that of Portland cement. However, to date concretes based on SSC have not been studied to a worldwide context.

This paper reports on durability aspects of concrete made from SSC compared to those of Portland cement and Portland composite cement concrete at different w/c ratios. Properties investigated were the carbonation resistance and the resistance to sulfate attack, as well as the compressive strength. Based on the results of the study, optimum mix designs were then developed for the concretes to meet given design requirements, and the corresponding eCO_2 emissions yielded were compared.

The results suggest that there are considerable eCO_2 savings if SSC is to be used in structural concrete applications, at least where compressive strength is a primary requirement. In addition, SSC concrete exhibited the strongest sulfate resistance which allows them to be adopted in sulfate-rich environment applications. Even though the carbonation resistance of the cements is poor, however, there is still potential for mainstream use through development of optimum mix designs.

Chandran Rekha Jetty
Associate Professor, M S Ramaiah Institute of Technology, India.
R. Venkatasubramani
Professor, V L B Janakiammal College of Engineering and Technology, India.
Balakrishnaa Vasudevan
Professor, Prahar School of Architecture, India.
R. Saravanan Rangaswamy
Professor, V L B Janakiammal College of Engineering and Technology, India.

Strategic Management of Architectural, Engineering and Construction Industry Challenges

Nature of AECI is a complex array of interdependent activities-best organized chaos introducing challenges not encountered in other industries. Work is often seasonal; Each project is unique; Often involves remote sites with access problems; Processes not as per predictions; Difficulty in applying automation; High potential for encountering unforeseen conditions; Costs vary according to conditions; Difficulty in managing/supply utilities and other resources; Technical innovations adopted slower; Success dependent upon the quality of its people; Very custom-oriented; Product-mind-boggling size, cost, and complexity; Work is not performed in controlled conditions, Highly impacted by weather and other environmental conditions.

AECI is characterized by adversarial practices, disjointed transient relationships between stakeholders than long term partnerships. AECI Projects represent a unique set of activities that must take place to produce a unique product. The success of a project is judged by meeting the criteria of cost, time, safety, resource allocation, and quality as determined by the owner. The KCSC work with unique product in each project; Project-organizations are reconfigured for each project. This results in mistrust between stakeholders of the project resulting in lack of integration, work as a disparate collection of separate organizations as un-unified team, with total unwillingness to share knowledge between the KCSC partners leading to poor knowledge flow along the PDLC. PM is focused to achieving goals and objectives through the planned expenditure of resources that meet the project's quality, cost, time, scope, and safety requirements, and CM controls, deflects, or mitigates the effects of any occurrence or situation that could affect project success.

Survey reveals that AECI faces several increasing & complicated construction/non-construction challenges that are direct results of

AECI Operations or results of indirect, peripheral activities stemming from management of IT-Network & BIMS, Innovation, KCSC, ICT, IGCT, ACM, OFM, DDDM, PM demanding realities in P&C of AECI operations and high risk implications, of these few are new and rest centuries old. This research categorizes the challenges into construction issues, peripheral pressures and others and explores affecting PDLC processes resulting in inefficiency and productivity loss, and suggests remedial measures to address these challenges in AECI processes.

Despina Kapodistria
Postgraduate Student, University of Cambridge, UK.

The Built-Form, the Environmental Performance and the Retrofit Potential of Urban Dwellings in Greece

This essay evaluates the environmental impact of constructional concrete in Greece. The compositional, structural and environmental properties of concrete are analysed, focusing on three key areas: the embodied energy, the operating properties and the final destination of the material. Aim of this essay is to produce a 'life cycle analysis' of concrete in the building construction industry that examines the environmental impact of structural concrete with respect to its own properties and in contrast to other materials more broadly known as ecological building materials. The comprehensive analysis of the life cycle assessment presents alternative solutions during the manufacturing, operating and demolition phase that can improve the environmental performance of concrete.

Alanya Knowles
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High Profiling: Architects on the Cover of Time Magazine

The late twentieth century has seen an increase in the presence of architects in the mainstream media, particularly in the United States of America. Architects have broken the boundary of trade journals and come to sustain a strong recurrence in both popular and news-oriented publications. Since the inception of TIME magazine in 1923, thirteen architects have graced its cover. The significance of Time magazine to the architectural profession as a source of discourse, communication and exchange with its readership is confirmed through the fact that the American Institute of Architects' headquarters in Washington DC display a copy of all Time magazine covers on which architects have appeared. As the world's most highly distributed weekly news magazine, TIME has typically reserved its cover for persons of political and economic power and, more recently, celebrities and entertainment personalities. The positioning of architects within this framework of fame and power signifies not only a shift in the presence of architects in the media, but an evolution of the interest and relevance of architecture to the general public. This paper provides an analysis of the thirteen TIME covers, and related profile articles, and contextualises them within the historical development of TIME magazine as a signifier, and solidifier, of fame.

Jodi LaCoe
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Sustainable Design/Build Pedagogy: Materials Reuse

In Cradle to Cradle: Remaking the Way We Make Things, William McDonough and Michael Braungart present the concept that, in natural processes, waste products of one organism are nourishment for other organisms. They present the case that people must adopt this attitude. Whatever we produce: it eats, and it shall be eaten.

The beginning design studio sequence tends to be the starting point for the skills which are necessary for later studio coursework. The skills themselves are intimately bound to the values which they embody. Each skill is not a neutral technique or tool to produce designs but rather predetermine an attitude toward design. Therefore, we are determined to introduce the skills of conservation and construction to the beginning design student. At it most fundamental, sustainable design requires this tangible experience to creatively conserve our resources.

Sustainable design and construction projects are not typically considered basic. Often extensive knowledge is necessary to employ complex technologies and interrelated processes leading to computational analysis. At Penn State, first year architecture students design and build structures on campus using reclaimed materials to remain within a very limited budget.

By requiring that students must glean their materials, an immediacy is achieved. Activities of demolition, material sorting and recovery, hazardous materials management, laborious reclamation processes, and the difficulties of disassembly give students valuable, foundational experiences from which to draw in their pending and future designs. Putting reclamation and reuse in the beginning lays the positive foundation for non-toxic, sustainable designs and constructions.

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Social Transformation for a Sustainable Built Environment: Problems and Prospect

Enlightened designers, manufacturers and contractors have embraced concepts of sustainability as a means of responsibly resolving complex problems in order to protect, nurture, and improve our environment. However, success is often hampered due to the fact that "sustainability" is a concept opposed to the prevailing world view. Traditional humanism has emphasized the nobility of man, the independence of man, indeed the greatness of man who is cut in the Protean mould. This conception of man went hand in hand with the idea of appropriating nature to the ends and needs of man. This is a world view of the necessity of personal acquisition and inevitable growth of the built environment. It has resulted in a social, economic and legal support network for current construction practices that must be changed if sustainability of resource use is ever to be achieved. The basic insight of sociology is that humans are fundamentally social creatures, and that there is a dialectical relationship between the individual and society. That is, our unique human individuality is constructed within a social context, even as we shape and reshape that context. At the same time, recursive social practices are sedimented into institutions, whose patterns channel behavior and shape ideological constructs. In this context, social change must be understood as a dialectic between the processes of institutionalization and socialization. Lasting change for a sustainable world can only be accomplished as a result of action on both levels. The current global economic and energy crises demonstrate the unsustainability of the current model of the built environment. The issue we pose is this: What key changes must occur at both the institutional and personal levels for a society-wide transformation to sustainability?

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Henry Odeyinka
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Robert Eadie
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A Methodology for Effecting Innovative Construction Procurement Selection through Application of Artificial Intelligence

The construction industry in the UK and Ireland has long been accused of being low tech, averse to funding research and development, and reliant on other sectors allied to construction for innovative improvements. One area has been championed as reflecting change especially post Latham and Egan, and that is construction procurement. The last few decades has witnessed a proliferation of procurement systems and sub-systems. This paper proposes a methodology to identify and discover if these changes are indeed innovative and provide a method of selecting appropriate procurement systems incorporating these innovations through artificial intelligence. The methodology has three main phases; firstly the planning and development phase, followed by the empirical phase and thirdly; the final quasi-experimental phase. After a detailed literature review in the planning stage, the empirical phase includes a pilot study to ascertain the precise nature of innovation within building procurement in the UK and establishment of an appropriate knowledge acquisition model. This model will be utilised within the main survey to populate a database of relevant innovative procurement case histories. In the final quasi-experimental phase; a fuzzy hierarchical case-based reasoning (CBR) platform will be software engineered as an innovative procurement selection mechanism, this will be validated and verified through a Delphi process to ascertain its effectiveness and appropriateness. This is a mixed method approach resulting in both quantitative and qualitative data, with surveys carried out using online questionnaires and semi-structured interviews through non-random purposive sampling of experienced construction professionals from a range of relevant disciplines in the UK and Ireland. The outputted fuzzy hierarchical CBR mechanism will be beneficial to the construction professional seeking innovative procurement selection ideas in the consultation stages of a project.

Xiaoshu Lu
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A Case Study in Analysis and Improvement of Energy Efficiency in Data Center

As the data-driven market is growing faster and more competitive than ever, the demand for energy usage for data centers is being spurred. Effectively maximizing energy efficiency and reducing greenhouse gas emissions is becoming pervasive for data centers. There is a pressing need to reduce the energy consumption for cooling as it contributes a substantial portion of the energy use of data centers. This paper presents an investigation and simulation of overall energy consumption and the energy efficiency of cooling system for a data center in Finland as a case study. Several different energy performance metrics are used to evaluate the performances of the power, cooling and energy consumption characteristics and operation condition of facilities in the data center. Key energy efficiency measures including problems and cooling saving opportunities are identified and further solutions for improving the performance of cooling systems are suggested. Potential energy cost savings are proposed and simulated. The results obtained can help prioritize efforts at design and modification of cooling operations for efficient cooling solutions in order to improve energy efficiency and cut electricity costs in data centers.

Laurens Luyten
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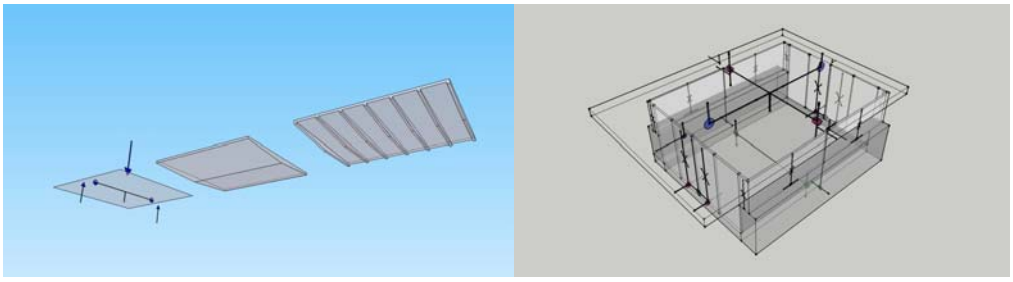
A Design Language for Expressing Structural Concepts

The presented research in this paper is part of the doctoral work of the author on the communication and collaboration of architect and structural engineer early in the design process. In this action research, the author uses more than fifteen years of his own experience in structural education and engineering practice.

This paper presents a design language developed for expressing structural concepts during design workshops in the early phase of the architectural design process.



The language operates as a communication tool between structural engineer and architect, by expressing the engineer's design aims of the structural proposition through the load path(s) and the structural function(s) of the elements. It filters the large amount of structural information in function of the architectural design paradigm in the early phase of the design process. In order to be used in a design workshop, this 3D language contains a limited amount of basic symbols that are easy to draw and intuitively understandable.

Within the structural design process this language provides propositional drawings of structural concepts, in order to take distance from and reflect upon the structural design proposition. It provides the ability to express the structural function of an element (i.e. surface or line) as a concept without having to define its configuration of structural typologies (e.g. beam, plate, tie, etc.), and as such enables to easily develop and evaluate structural propositions.

By expressing the design aims of the structural engineer, these drawings support the design negotiation during the collaboration, and enable the architect to modify the presented structural model according to these aims.

This language has been tested with architecture students for its validity as structural language and its ability to provide insight in the alteration of structural models.

Marie Elise Marrier d'Unienville
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Residential Design and Regulations for Sustainable Development. An Australian Perspective

This paper will focus on the Australian residential building sector and critically review its current regulations and assess their potential to reduce environmental impacts. In conjunction with this exploration it addresses recent criticism that sustainable regulation tools have a primarily anthropogenic agenda. This position is of concern as anthropogenic theories consider that natural resources should be utilised to ensure comfort and continued development for current and future generations of human beings.

A number of questions are raised by the discovery of this theoretical perspective in current environmental regulations: What are the ethics of social responsibility for the unsustainable impacts of development? Who are the key players that benefit from regulations with a limited scope? In addition, if sustainable regulations are repositioned towards a more holistic theoretical basis could this be translated into a reduction of impacts? This paper will explore these notions and present the development of a "best practice model" for environment regulations in the Australian residential sector, with the intent to inform a future approach of addressing the building sector's impacts.

As the state of the environment declines due to resource use and waste production, solutions are being sought to address the current damage and to prevent future harm. The building sector is a large impact offender as the production of buildings is intrinsically linked to consumption and waste producing activities. In addition after construction is complete, buildings create additional environmental harm due to their heavy reliance on energy and clean water supplies during their operational period (Birkeland 2008). Therefore this paper will address the vital need to assess the building processes of residential buildings to determine what kind of sustainable tools should be implemented for the necessary change that is required.

Andras Bela Olah
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Radical New Possibilities in Building Statics

By now buildings have nearly reached their greatest possible size, limited only by the physical attributes of the structural materials. Further back the usage of steel as a structural material resulted in the sudden growth of the height of buildings. However, today the physical attributes of steel set limits to any further growing. The trivial solution would be to find a new structural material with far better attributes, but even this way the problem would stay the same, only the height limit would change.

There is a radical new possibility in solving this problem, but in order to understand it, it is essential to return to the basic problem: the gravitational force is the main force which needs to be balanced. Up till now it was balanced by using mechanic constraint forces (holding devices). Good static qualities had become necessary as the constraint forces are peripheral, while the gravitational force is volumetric.

The essence of the solution is that instead of mechanic constraint forces the gravitational forces are balanced by another volumetric force. This way there is no need for materials with outstanding static structural attributes any more, and the building can be almost arbitrary high.

In this study a research of the magnetic force (which is volumetric) and such a solution will be introduced, which uses the phenomena of magnetic levitation. By combining the results of several other fields of physical research (ultracapacitor, flywheel) this solution can also be practically used by building structures. This offers a real alternative in the case of skyscrapers and the only alternative for reaching greater building heights.

Pascale Pierre
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The Opéra-palette, Québec City, Canada

The project described below proposes the transformation of a banal, ubiquitous object—the shipping pallet—into a temporary, open air performance space for opera. The pallet is envisioned as a total architectural artefact, serving as building material, structural system and stage set. Its use is a kind of journey: from factory to stage and back. The project is located in Quebec City, in the courtyard of the Conservatoire, next to the city's principal theatre. The courtyard has remained underused since it and the Grand Théâtre were built in 1970, following an international design competition won by Victor Prus. The Opéra-palette will be built in the summer of 2011 for the Quebec International Opera Festival.

Description of the project

The pallet is the most widely manufactured object of the post-war period, not only in North America, which is its birth place, but all over the world. It is also the most anonymous object. At first, it was designed with a side of 1.2 m so as to cover without loss the whole area of a train wagon, much as Japanese homes are designed according to the standardized dimensions of tatami mattresses. Later, cardboard boxes were introduced to cover each pallet according to different assemblies. Finally, the fork-lift truck was introduced, making it possible to quickly move and stack pallets. Nowadays, steel containers have taken the place of train wagons. They are designed according to the dimensions of these same pallets. Pallets are now produced with different designs and degrees of sturdiness—not only in wood, but also in plastic, steel and recycled materials.

The Opéra-palette project originates in a recurring concern of the designers with the re-use of industrialized objects in a creative artistic context. This project will consist in taking the pallet—this anonymous and useful, common and universal object, assembling it in innovative and surprising ways, and using it to create an ephemeral opera house. The pallet will be used as architecture, as structure and as stage, for lighting, stage sets and signage, and turned into opera. In fact, the project is about the design of an immense architectural, aesthetic, and acoustic sound box, produced not only by stacking, but by a process of tectonic assembly related to the materiality of its architectural and structural elements.

The concept of this project is to use the pallet as it is (in its form, dimensions and materials), to reinterpret it in an innovative and aesthetic manner in the context of a temporary installation (the Opéra-palette), and finally to return it to the manufacturer for re-use. The project is designed around three distinct "acts." The first act consists of virtual and video design in a laboratory; the second act, of spatial, technical and technological experimentations and validation, also in a laboratory; the third act, of an actual in situ realization (at this point in time, the designers are in the middle of the second act).

Kyriakos Pontikis
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On the Art of Making: Generative and Sustainable Building Design and Construction Processes

The "Art of Making" is defined by the author as "the unified building process of designing and making structures with humane and sustainable qualities". This unified building process is similar to the one used by traditional master-builders and their craftsmen who actively participated in building production and created well-adapted spaces, details and ornament that had a high degree of wholeness and spirit. This contemporary building process needs to also be supported by a 21st century building construction technology which embraces efficient and inexpensive methods of production and fabrication in order to create well-adapted spaces and refined details and ornament to fit the whole. In this paper the author will first discuss the conceptual framework of the "Art of Making" and its principles, which include: 1) a project pattern language, 2) three dimensional modeling and mock-ups, 3) generative site and building design, 4) flexible and adaptable construction technology, 5) sustainable materials, and 6) handcrafted detailing and color. Then the author will present how these principles were applied for the design and construction of his building projects in the United States and Cyprus. This work supports that the more integrated design and construction are, the higher the building quality will be. At the same time, this work merits further research, testing and experimentation because of issues relating to affordability, building permitting, time and cost control, building contracting, and other building process challenges.

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Project Schedule Acceleration Considering Risk

Accelerating project schedules is frequently needed process by contractors and owners of engineering, procurement and construction (EPC) projects. Contractors resort to schedule compression to recover delays encountered during construction and avoid related contractual penalties. Owners also may order accelerated delivery of their constructed projects to address market demands and meet other financial requirements. None of the schedule compression methods (also known as time-cost trade-off analysis) that are available in the literature considers the risk associated with the process of project schedule acceleration. They may have considered risk in the initial planning phase of the project, but not necessarily in what is considered as time-cost trade-off analysis. This paper presents a new method for project schedule compression taking into account the risk associated with such process of acceleration. The developed method accounts for the additional direct cost required to compress each activity one unit of time, the risk associated with that added cost, the risk associated with the availability of resources needed to speed up the work on the activity being compressed and the risk associated with the complexity of executing the work needed to compress the activity at hand. The Analytical Hierarchy Process (AHP) is used to quantify the joint impact of these parameters on setting the priorities for activity crashing. Upon setting these priorities, the developed methodology integrates commercially available scheduling software to perform iterative scheduling for each compressed unit of time of the activity being crashed. The developed methodology is coded using visual basic and provides dynamic linkage to MS-project to facilitate the execution of iterative scheduling. A numerical example drawn from literature is analysed in order to demonstrate the use of the developed method and to illustrate its essential capabilities. The developed methodology generates a number of execution plans for project compression that are practical and doable in view its capacity to model factors that could give rise problems in the acceleration process.

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M. Shanti
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Unique Design and Construction Challenges for a Solar Decathlon House

Florida International University (FIU) was selected by the U.S. Department of Energy as one of twenty teams in the world to design and build a solar powered home. The house will be on display at the National Mall in Washington DC as part of the 2011 Solar Decathlon competition. Teams will compete in 10 categories including architecture, engineering and energy performance. Decathlon houses must be built in the locality of each university and then shipped to Washington for contests and exhibition.

The FIU Solar Decathlon studio considered unique challenges of design and construction: the house must satisfy two drastically different climate zones, it must be built for tropical Miami (Florida), and also meet requirements of temperate Washington DC. The house has to satisfy two different building codes, the strict code of hurricane-prone Florida, and the building code of the District of Columbia. The house also needs to adapt to various possible uses after the competition.

The TRANSTROPIC HOUSE has been envisioned as an open and flexible pavilion that transacts with its climatic circumstances and transforms itself according to the environmental conditions of its use. A contemporary interpretation of traditional tropical architecture, the TRANSTROPIC HOUSE has movable external shutters that adapt to solar positions by allowing various levels of enclosure. The adjustable perimeter louvers, shade the interior and also close tightly as hurricane shutters. Ample sliding glass doors help with cross-ventilation while superior insulation protects the house from heat gain and loss. Innovative building-integrated photovoltaic and solar thermal systems provide the highest levels of comfort for visitors with minimal impact on the environment.

Modular construction will ease assembly in Florida, transportation to Washington, erection at the National Mall, and moving the house back to Miami where it is intended to be reused as a visitor's center for the FIU natural preserve.

Debasis Sarkar
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Formulation of Project Risk Management Model for Mass Rapid Transit System Project

This paper deals with the methodology for formulation of project risk management model for a mass rapid transit system project like construction of underground corridor for metro rail operations. Project risk management primarily comprises of cost and schedule uncertainties and risks associated with each activity of the project network. For infrastructure transportation mass rapid transit system project like construction of an underground corridor for metro rail operations, large number of risks and uncertainties are involved in all phases of the project. These risks can be assessed or measured in terms of likelihood, impact and consequences. Finally, as risk is a component which cannot be eliminated, suitable risk mitigation measures are to be suggested which will enable to reduce the identified project risks. In this paper, discussion is made about a method of measurement of project risks, based on expected value method (EVM). The major risk sources have been identified and quantified in terms of likelihood, impact and severity. A case study of underground metro rail corridor in a metro city of an emerging economic nation of South East Asia has been considered for this research work. The methodology for this work was the response from the experts associated and involved in this project and with similar type of projects in metro rail construction. Risk analysis for determination of risk cost, risk time, expected cost and expected time of the project has been carried out by expected value method. Based on this study it was found that, due to occurrence of risks and uncertainties in the project, the expected project cost overrun and time over run can be about 22.5 % and 23.4 % respectively if we use expected value method. These figures are very near to the maximum permissible limits of cost overrun (25%) and time overrun (30 to 50%) as per the basic assumptions of this model. The project authorities should formulate the risk mitigation measures and carry out risk response planning accordingly, failing which the probability of successful completion of the project within stipulated time and cost frame will reduce drastically. Monte Carlo simulation has also been applied to make the proposed model more realistic.

Vince Snyder
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Developed Surfaces: Construction Logic and Geometrical Control

Constructional, climatic, and cultural demands may simultaneously influence architectural design processes. A specific architectural project--The Omaha Nation Cultural and Interpretative Center (ONCIC)--is presented in depth to illustrate discoveries of convergence between these contexts and to investigate the role and appropriateness of various techniques of precision to be determined as either generative or refining modes of application within an interactive design and construction process.

The expressive nature of synthetic realities between concept and construction are augmented by the program of the project examined. The primary purpose of the ONCIC is to provide a home for a sacred living being called Umonhonti, also known as "the Sacred Pole". He, and 250 other ancestral items, has been repatriated to the Omaha after a century of "protective custody" by the Harvard Peabody Museum. Additionally, the clients' primary concerns are for an expressive building that is uniquely "Omaha", alluding to a proud, powerful past while anticipating a promising future.

The techniques of precision demonstrated are both physical and conceptual; from construction modulations and assemblies to specific limitations of geometry and mathematics that establish complex relationships through seemingly restrictive constraints that ultimately serve to amplify cultural certainties and ambiguities.

While the main structural systems of the primary container of the ONCIC are poured-in-place concrete augmented with a steel beam and column system, the highly figurative elements are geometrically rationalized *developed* shapes and therefore are able to be constructed from either the same concrete system or by a framework of linear steel elements.

Recent non-orthogonally based architectures tend to resist traditional 2-d analyses.

However, most digital modeling programs required by these non-traditional architectures possess rapid numerical analyses. Such mathematical necessities provide real possibilities for efficient identification and/or production of geometrical and mathematical convergences and resonances within non-orthogonal constructions.

Thomas Spiegelhalter
Professor, Florida International University, USA.

Passive and Active Micro-Generation Building Systems for Coding, and Dehumidification in Hot and Tropical Climates

The worldwide fast growing request for AC has imposed a significant increase in demand for primary energy. Electric utilities have their peak loads in hot and humid seasons, and are often faced with power outages, barely capable of meeting the demand, because of the extensive use of electrical air-conditioning systems.

The resulting nonrenewable energy use and CO2 emissions are expected to increase continuously. However, the fact that peak cooling demand in summer are associated with high solar radiation offers an excellent opportunity for planners to exploit the use of combinations of passive climate design mitigation strategies with building integrated PV and Solar Thermal Energy Micro-Generation Systems that can reduce heat loads and match heat-driven space cooling strategies. Urban areas are of particular interest where adverse outdoor conditions of high outdoor pollution and the urban heat island effect, encourage the use of air-conditioning with a direct negative impact on peak loads.

Suitable energy efficient building integrated technology such as solar assisted cooling and heating, decoupled dehumidification and air supply systems can help alleviate the problem as it is already increasingly practiced in the US, Europe and parts of Asia.

This paper will assess from the architect's point of view the main research results of European, Asian, and US innovative projects of passive cooling design strategies with passive and active building integrated solar air conditioning and micro-regeneration systems for combined production of electricity, heating and cooling of large scale commercial (20-100 kW) and small scale kits for residential (5-20 kW) applications.

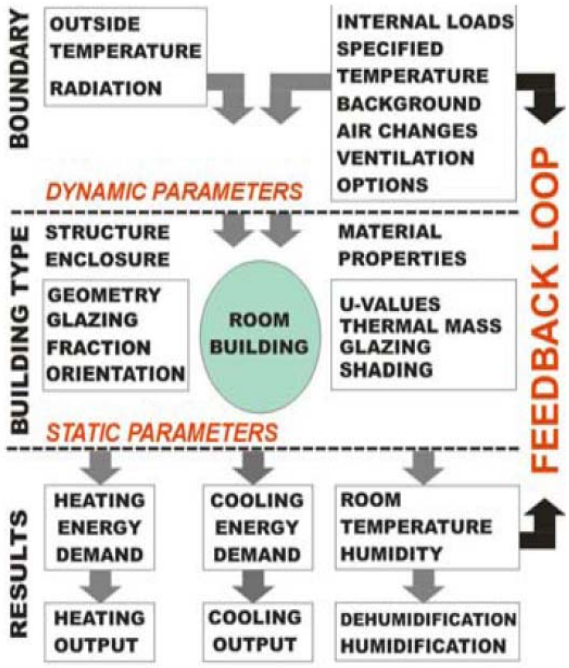

Fig. 1, Design Feedback Flow Chart for **Passive and Active** Space Conditioning Processes (Diagram: Thomas Spiegelhalter)

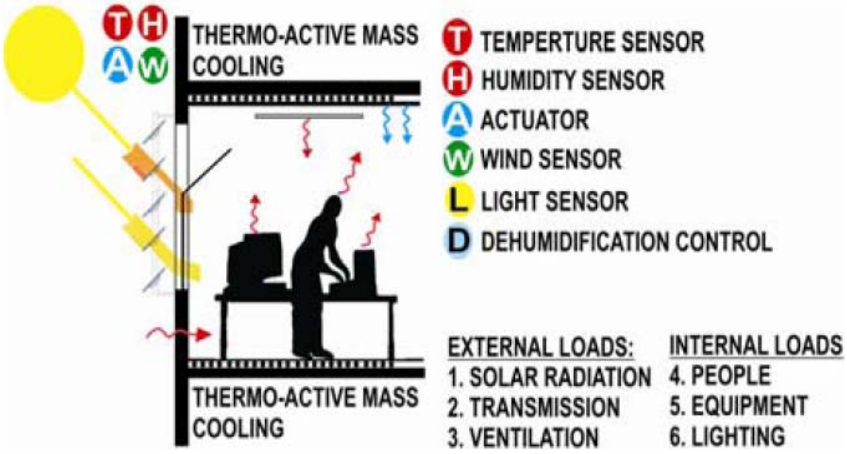

Fig. 2, Intelligent Hybrid Façade Systems (Section: Thomas Spiegelhalter)

ACKNOWLEDGMENTS

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Use of Waste Spent Catalyst in Construction

Waste spent catalyst is generated in Oman as a result of the cracking process of petroleum oil in the Mina Al-Fahl and Sohar Refineries. Essentially activated alumina is used for removal of chloride from HC/H_2 gas and the generated spent catalyst is classified as a waste material, consisting primarily of silicates, aluminates and other secondary elements. The disposal of spent catalyst is of a major concern to oil refineries. More than 20 tons per day of spent catalyst, in a powder form, are generated by the Sohar Refinery alone. The spent catalyst was evaluated for use in road construction as a replacement for aggregates in the subbase and base layers and as a partial replacement for Portland cement in masonry blocks manufacturing. For use in road construction, spent catalyst was stabilized with Portland cement, cement kiln dust or a combination of the two binders. Compaction and unconfined compressive strength tests were performed on the stabilized mixtures. For use in masonry construction, blocks were tested for unconfined compressive strength at various curing periods. Results indicate that the spent catalyst has a promising potential for use in road construction and masonry blocks without any negative environmental impacts.

Eleni Tracada
Universisty Principal Tutor in Built Environment and Leader of the B.E.R.G., University of Derby, UK

Self Build Design and Construction Processes and the Future of Sustainable Design Education

In recent years the global economical crisis did not only hit several sectors of productivity, but also several higher education institutions saw their future to be unsure because of it. In several countries, funds in learning and teaching in Higher Education, if not completely axed, were reduced to almost a quarter of previous expenditure. Most institutions, as it happened in UK, are now striving to find other means of external funding; the entire output of academic research is going to be also validated about its impact on both economical growth and recovery and social influences.

On the other hand, most design and architectural courses are now seeking more links mainly with the private sector in construction industry. The public sector needs to create new urban fabric urgently to cater for the public demand on housing. But, the public sector has also suffered by large financial cuts. We can see now a binary crisis unfolding between private and public sector, whilst thousands of people are without homes or in a long waiting list for public housing. Construction of new homes has decreased for the last few years and also retrofitting to regenerate the existing housing stock was setback by rising fuel and energy costs and lack of innovation in manufacturing of building products.

However, there are in course some initiatives in the academic world to revisit widening participation not only in education, but also in design and building industry. In our University, we have got the tradition to attract a number of students from the so-called most vulnerable parts of local communities; young people are particularly anxious about their uncertain futures in employment and the housing market. There have been locally moves towards self build activities to resolve problems with occupancy, but the entire process needs more co-ordination from an educational institution to provide affordable and guaranteed trade training. Between the researchers in our Built Environment Research Group, we have got experts not only able to deal with training of vulnerable young people in specific short courses to self build, but also we are trying to restore confidence in entire abandoned districts close to centres of towns. Our purpose is to provide valuable support for economical growth of self sustained communities, capable to identify materials to be used as recycled and eventually be recyclable in the future to come at the same time. We practically try to

create a flexible educational and productive relationship between construction industry and urban integration in a real humanized way.

Turkan Uzun
Assistant Professor, Maltepe University, Turkey.

Influence of Ancient Greek Architectural Element in Istanbul

Istanbul is a city has contain many cultural affect. İstanbul has many building Which was references from Byzantium Empire. Survival of the building the ınfluence of this building get an affect of another building in İstanbul. So I would like to examine for Ancient and Greek influance on architecture of Istanbul by the way of searching Facade some buildings in İstanbul.

Within the boundaries of the Ottoman Empire, there were communities of very different ethnic roots. These communities built social structures like churches, schools and hospitals. In Istanbul as is understood from various archive documents; Rum [Turks of Greek origin] architects produced important buildings that make up the city's architecture.[1] The names of the architect, craftsman and builder of these structures are known from the documents of the Prime Ministry's Ottoman Archive, official correspondence, community member registers (Gavroglu, K., 2010), official registry lists of architects in architectural journals (Arkitekt, 1931) and inscriptions on buildings.

In this article only some buildings have been chosen for examination. The reasons why these structures have been chosen is that they were built in Istanbul by Rum architects or builders, they serve an important public function and most importantly they are buildings in which Greek architecture and art are observable in a concentrated form. The buildings chosen are the following: Ayia Triada Church from the religious buildings; Zographion Lycee from the educational buildings; Cite de Pera from the passages; Minerva Han from the office buildings; and Frej Apartments from the apartment buildings.

[1] This information additionally appeared in the project undertaken by the University of Athens and in the exhibition entitled "The Documentation, Plans and Analyses of the Istanbul Rums' Living Spaces and Buildings."
See: http://www.latsis-foundation.org/gr/32/anazhthsh_arxeiou_meleton.html
and also see: the book of the exhibition is "Greek Architects of Istanbul in the Period of Westernization"

Peter Ward
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A UK and Australian Perspective of the Suitability of the SCL Protocol's Provision for Dealing with Float for Adoption and Use by the Australian Construction Industry

During the negotiation and resolution of delay and disruption disputes on construction projects, the use and misappropriation of float, and the question of float ownership, are considered to be a major concern to those involved. Most practitioners and authors are of the opinion that it is an issue that should be clearly defined and addressed within the provisions of the contract. However, the terms "float" or "ownership of float" are rarely mentioned (if at all) in most of the standard forms of Australian construction contracts, giving little guidance to those involved as to how this issue should be addressed. In October 2002 the United Kingdoms Society of Construction Law (SCL) published a Delay and Disruption Protocol (the Protocol) that contains a suggested approach to the issue. The aim of this research was to obtain a comparative opinion of those involved in the drafting of the Protocol's provisions and an Australian perspective of the suitability of the SCL's Delay and Disruption Protocols suggested approach to the issue of float and ownership of float for use by the Australian construction industry. Qualitative interviews were carried out with members of the SCL protocol's drafting committee and Australian construction industry experts experienced in the administration, negotiation, and resolution of delay and disruption disputes to obtain their opinions of the suitability of the SCL's proposed approach. Initial results indicate general agreement concerning the potential benefits of the SCL's proposed approach, with the identification of a number of issues that would need to be addressed should the approach be adopted.

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Architectural Technology. The Making of an Academic Discipline

The subject area of Architectural Technology is one that sits somewhere between architecture, engineering and construction. In the United Kingdom it is represented by the Chartered Institute of Architectural Technologists (CIAT) who advocate that

"*The Chartered Architectural Technologist, MCIAT, will be able to analyse, synthesise and evaluate design factors in order to produce design solutions, which will satisfy performance, production and procurement criteria. This will be achieved through the design, selection and specification of material, components and assembly and the management, coordination, communication, presentation and monitoring of solutions which perform to the agreed brief and standards in terms of time, cost and quality*".

(http://www.ciat.org.uk/)

The subject is well established at degree level and taught in a number of UK universities with counterparts around Europe and a comprehensive accreditation programme run by CIAT. The proposed paper seeks to examine the emergence of Architectural Technology as a taught subject and the identification of a cogent body of research that supports the subject in its passage to become an established academic discipline.

A key aspect of this study will be an analysis of the relationship between the professions as holding a 'body of knowledge' and the concept of academic disciplines as having to be a subject that is taught and researched. Central to this process is the identification of a discrete subject that can and is being taught. Equally, it will be necessary to recognise a significant body of research that can also be identified as pertaining to Architectural Technology.

The paper will endeavour to demonstrate the significance and validity of Architectural Technology as a profession in the modern construction process together with the requisite academic underpinning determining its position as a formal academic discipline. The resultant benchmarking will be of interest to the allied professional disciplines of architecture, engineering and construction.

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Investigating the Minimum Binder Content Requirement by using Class F Fly Ash in Concrete Pavements

Many concrete specifications impose minimum cementitious contents that may be in excess of that required to achieve the desired durability and strength, leading to increased costs and increased carbon loading on the environment. However, a minimum cementitious requirement hinders development of performance-based mixtures, and in many situations may lead to poor performance such as cracking due to high level of shrinkage. Therefore, minimizing the cementitious amount will not only reduce the cost but also lead to a more sustainable method of constructing concrete pavements. The primary focus of this study is to develop guidelines, through laboratory testing, on the amount of cementitious content needed to achieve given strength, durability, and workability requirements in a concrete mixture.

This paper will present an experimental program that consists of testing of 64 concrete mixtures with varying water-to-binder ratios (w/b) and cementitious contents. The purpose of this laboratory study is to investigate the minimum cementitious content that can be used in concrete without sacrificing the performance (i.e., strength and durability). Sixty-four concrete mixtures with w/b ranging from 0.35 to 0.50 and cementitious content ranging from 400 lb/yd^3 (237 kg/m^3) to 700 lb/yd^3 (415 kg/m^3) were prepared and tested. Sixteen mixtures were prepared using Portland cement and 48 contained supplementary cementitious materials, namely class F fly ash, class C fly ash and slag as Portland cement replacement at levels of 20%, 20% and 40%, respectively. Compressive strength, chloride penetration and air permeability were determined and will be discussed.