Athens Institute for Education and Research

CONSTRUCTION

Essays on Architectural History, Theory & Technology

Edited by
Nicholas Patricios
Stavros Alifragkis

Athens, October 2012

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Essays on Architectural History, Theory & Technology

An edited volume of a selection of papers presented at the 1st Annual International Conference on Construction and the 2nd Annual International Conference on Visual and Performing Arts organized by ATINER.

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Essays on Architectural
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First Published in Athens, Greece by the
Athens Institute for Education and Research.
ISBN: 978-960-9549-89-9

Printed and bound in Athens, Greece by ATINER

8 Valaoritou Street, Kolonaki
10671 Athens, Greece
www.atiner.gr

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Acknowledgments

Gregory Papanikos, President, ATINER, Greece & Visiting Professor, University of Strathclyde, UK

Compiling an edited volume of collected papers entails a lot of hard backstage work performed methodically away from the spotlight that should certainly not be unacknowledged. Hence, the editors would like to thank Fani Balaska, ATINER administrator, for her generous help and support with the logistics of the publication of this volume. Also, special thanks are due to our expert reviewers: Professor Bob Giddings from the School of the Built & Natural Environment, Northumbria University, Dr. Jian Zuo, Senior Lecturer at the School of Natural and Built Environments, University of South Australia, Dr. Linda Osman-Schlegel, Lecturer at the School of Architecture and Building, Deakin University, Dr. Mohammed Seddik Meddah, Research Assistant at the Faculty of Science, Engineering and Computing, Kingston Univeristy, and Dr. S. Jayakumar for their excellent and careful work on the blind, peer reviewing process. Their input and their valuable suggestions have contributed greatly to the production of a more fine-tuned and closely knitted selection of academic papers. Finally, we wish to thank the conferences' organising and scientific committees and the chair persons for their outstanding work and, most importantly, the contributors who have entrusted ATINER with their research and have been extremely patient with and committed to the editing process.

We trust that the final product of our efforts will be enjoyed by those involved in the conferences and appreciated by scholars with a keen interest in contemporary approaches to various but overlapping research fields in architecture and engineering. In addition, it is hoped that the coexistence of such diverse material in the limited space of an edited volume will contribute to furthering the exchange of experiences and methodologies between researchers with different academic backgrounds and generate osmosis between neighbouring fields of study, as an effective response to the much criticised model of compartmentalised production, circulation and consumption of knowledge. In this respect, we are confident that future conferences on Construction, Architecture and Engineering, and all ATINER events for that matter, will continue to provide a genuinely fertile common ground for a productive exchange of fresh ideas, novel research tools, current trends and potential futures along the programmatic framework of interdisciplinarity and will continue to attract quality studies both by young and established academics, students and professionals from all over the world.

Athens, June 2012

Foreword

Nicholas Patricios, Professor, University of Miami, USA

The recently established Architecture and Engineering Research Unit of the Athens Institute for Education and Research (ATINER) is proud to present an edited volume of a selection of papers presented primarily at the 1st Annual International Conference on Construction, held in Athens, Greece between 20 and 23 June 2011. These papers were complemented with studies presented at the 2nd Annual International Conference on Visual and Performing Arts, held in Athens between 6 and 9 June 2011, which display certain analogies of scope, content and techniques and illustrate eloquently the diversity of academic research currently performed in the disciplines of architecture and engineering. They represent original cutting-edge work on a wide range of subject matters, performed at various universities and established research centres around the world, while employing diverse but current methodological tools and approaches.

ATINER, now in its 17th year of presence in the field, is dedicated to organising high quality academic events on non-specific themes, but rather on research fields that inhabit the crossroads of different academic disciplines. To this end, ATINER has adopted a well-established and rigorous double-blind peer reviewing process to ensure consistency and monitor the production of coherent edited volumes. The editors of this volume have taken into consideration the feedback of our esteemed referees but also aspects of thematic affinity in order to produce the final selection of papers. As a result, genuinely interesting and original studies that have been submitted for reviewing and whose revision is pending, inevitably had to be excluded from this publication, primarily due to strict temporal limitations imposed upon the researchers by the tight publishing timetable. These papers may formulate the core of our forthcoming publication on Construction, Architecture and Engineering, pending successful peer review.

The studies that constitute the final selection have been grouped into four distinct but interconnected categories according to the main research questions that they raise in their respective fields: 'Histories of Other Spaces', 'Design Approaches and Methodologies', 'Sustainable Design: Advances and Case Studies' and 'Novel Building Practices and Construction Techniques'. These groupings represent different ways of approaching the multifaceted phenomenon of construction today. They are meant to be perceived and appreciated as fluid arrangements that are bound together by ephemeral family resemblances, foregrounded by our authors' methodologies, which form a complex and dynamic network in a state of constant flux. In order to establish this, one would have to embark on an adventurous and ambitious undertaking; that of briefly outlying what the term 'construction', key to the conference

from which most of the present material is drawn, could suggest in a contemporary context, both as an applied field and, most importantly, as a theoretical concept.

Miami, June 2012

Chapter 1

Construction: An Introduction

Stavros Alifragkis, ATINER and National Technical University of Athens, Greece

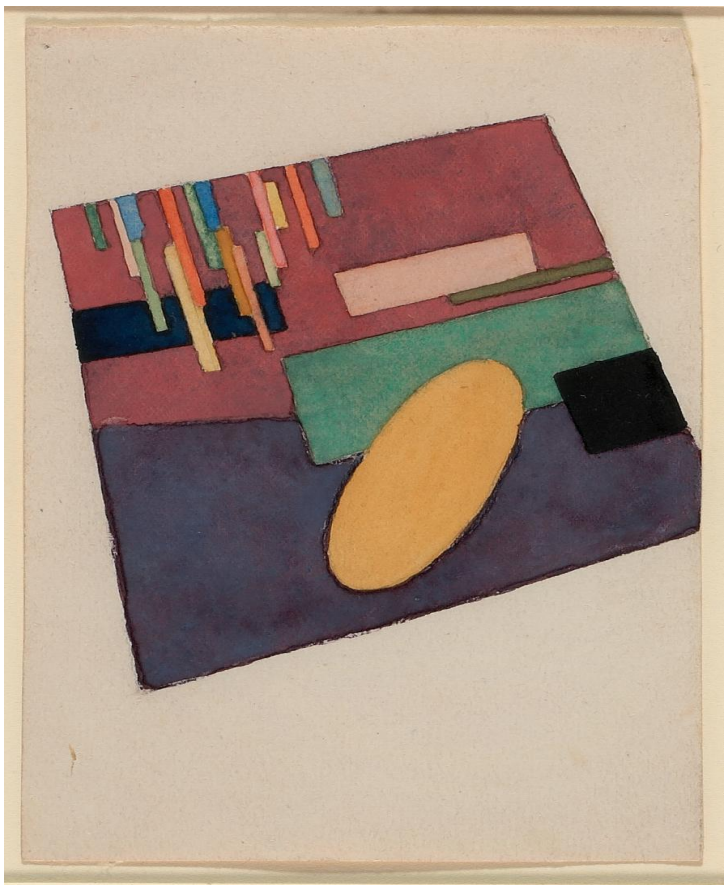
Almost a century ago, a select group of artists, architects and engineers sought to explore new aesthetic means and modes of expression by bringing about a distinct break with the past, tradition and history and introducing new ways of studying and, essentially, representing the world. Born amidst the cultural and social fermentations of European modernism, Russian Constructivism mediated between earlier artistic movements such as symbolism, cubo-futurism and suprematism on the one hand and the ambitious productivist program on the other hand, that comprised the great and extremely diverse cultural legacy of the Russian Avant-Garde. The Russian painter, theorist and prominent member of the movement Wassily Kandinsky (1866-1944) understood synthesis as a twofold phenomenon that consisted of inner artistic meaning or scope and the mediums and processes involved in materialising the idea (Kafetsi 1995: p.653). The latter introduced the notion of structure or construction as a crucial aspect of the artistic creation or, as the Russian artist and photographer Aleksandr Rodchenko (1891-1956) noted with reference to the expressive power of the line according to the art historian Gérard Conio, 'the material actualisation of an idea on the nature of mankind, a vision of the world' (Kafetsi 1995: p.619). The single structure that embodied the goals and ideals of the times more uniquely than any other edifice was the painter and architect Vladimir Tatlin's (1885-1953) emblematic Monument to the Third International, commissioned in 1919 by the Commissariat of Enlightenment but that was never realised. Tatlin's work distilled earlier, formal investigations into contemporary materials, volume and construction in a single unifying framework of artistic and utilitarian intentions (Kafetsi 1995: p.643). An important aspect of the experimentation dealt with technological advancement. Tatlin's tower was a daring project in itself that investigated the potential application of novel construction technologies. The art theorist Nikolai Punin (1888-1953) testified to this when, in 1920, he described the tower as 'an organic synthesis of architectural, sculptural and painterly principles, intended to provide monumental constructs of a new type combining purely creative form with utilitarian form' (Kafetsi 1995: p.643). Nevertheless, it was the engineer Vladimir Shukhov's (1853-1939) Shabolovka Radio Tower in Moscow that provided inspiration for many constructivist artists and architects,

as it constituted 'one of the very first "modern" erections of post-Revolutionary years' (Cooke 1983: p.89). This 160-metre-tall, free-standing, steel, hyperboloid broadcasting mast, still in use as radio and television transmitter (Tsantsanoglou 2008: p.218), stands out not only for its structural boldness and the effective use of contemporary materials and techniques but also for associating, in popular culture, architecture and engineering with the radio and the moving image, two modern mediums of communication and artistic expression par excellence. Indicatively, the film-directors Mikhail Kaufman (1897-1980) and Ilya Kopalin's (1900-1976) symphonic movie entitled *Moscow* (USSR, 1927) featured the tower. Furthermore, it is believed that Shukhov's hyperboloid structures inspired the renowned Russian author Alexey Tolstoy's (1883-1945) science fiction novel *Engineer Garin's Hyperboloid* (1927), where a scientist uses similar construction technology to build a contraption that unleashes a deadly ray. Thus, these constructions, that were in consistence with the movement's programmatic declarations, were represented in a modern context of progress and prosperity, as symbols of the imminent fulfilment of the Socialist promise for drastic scientific, industrial and technological advancement that would affect all aspects of the Soviet life, from the sublime to the mundane. These two iconic structures from the 1920s exemplify the artistic and structural quests of the times that understood construction as a practical and economic spatial solution that resulted from the objective study and analysis of a system and the organisation of its structural elements and their properties as ideal expressions of functions and forms (Kafetsi 1995: pp.658-9).

The Russian artist and architect El Lissitzky's (1890-1941) 1929 manifesto entitled *Ideological Superstructure* understood reconstruction as a conscious attempt to discuss artistic creativity freed from the vagueness, the chaos and the mystic of individual artistic endeavour (Conrad 1971: pp.121-122). In order to substantiate this, he complemented his theory with an illustrated edition on architecture in the USSR. It demonstrated the breadth of scope of the building projects that were constructed under the auspices of the state in the 1920s and described in detail the urban structural vocabulary of the ideal Socialist city of the future (Lissitzky 1930). His call for a dialectical process that sought to foreground the useful and the functional reflected the work produced by the Union of Contemporary Architects, led by the Russian constructivist architect and city-planner Moisei Ginzburg (1892-1946). From 1925 onwards, Ginzburg consistently investigated objective and 'scientific' environment-forming mechanisms that are common for different design scales, from the construction of individual buildings or building types to town-planning. The 'scientific' urge was not alien to other forms of art. For example, the filmmaker Dziga Vertov's (1896-1954) montage of 'a "higher mathematics" of facts' (Michelson 1984: p.84) attempted to stir the traditional cause-and-effect storytelling devices of narrative cinema by reversing the linearity of the story, linking effects to causes and focusing on the explanation rather than the representation of everyday life in the USSR (Tsivian 2006: pp.85-110). Similarly, the Soviet film directors Lev Kuleshov's (1899-1970) cinematic

'creative geographies' (Levaco 1974) and Sergei Eisenstein's (1898-1948) ground-breaking montage techniques signify the arrival of novel, modern narratological mechanisms for coping with, representing –even better– reconstructing and, therefore, continuously reinventing the real world. This constitutes the rich legacy of construction for the urban landscapes of globalised economies and endangered ecologies of the present. It is a legacy that calls for the critical reappraisal of the means, the modes and the mediums of production –from cultural to industrial– and the constant sharpening of existing as well as the creation of new research tools for investigating plausible solutions for the city of tomorrow and contemporary architecture. Therefore, a discussion on construction, both as responsible professional practice and as ideology, informs the complex and multidimensional facets of contemporary architectural and engineering research, whether this involves environmentally conscious construction activity, the application of innovative technologies or design optimization. This edited selection of papers constitutes a valuable contribution to the on-going discussion by assembling twenty-one exemplary studies, classified in four themed groups that represent extremely popular and current research trends.

Figure 1. *Ivan Vasilyevich Kliun (Kliunkov) (1873-1943), Study for 'Three Dimensional Construction' (Undated), State Museum of Contemporary Art - Costakis Collection, Thessaloniki, Greece.*

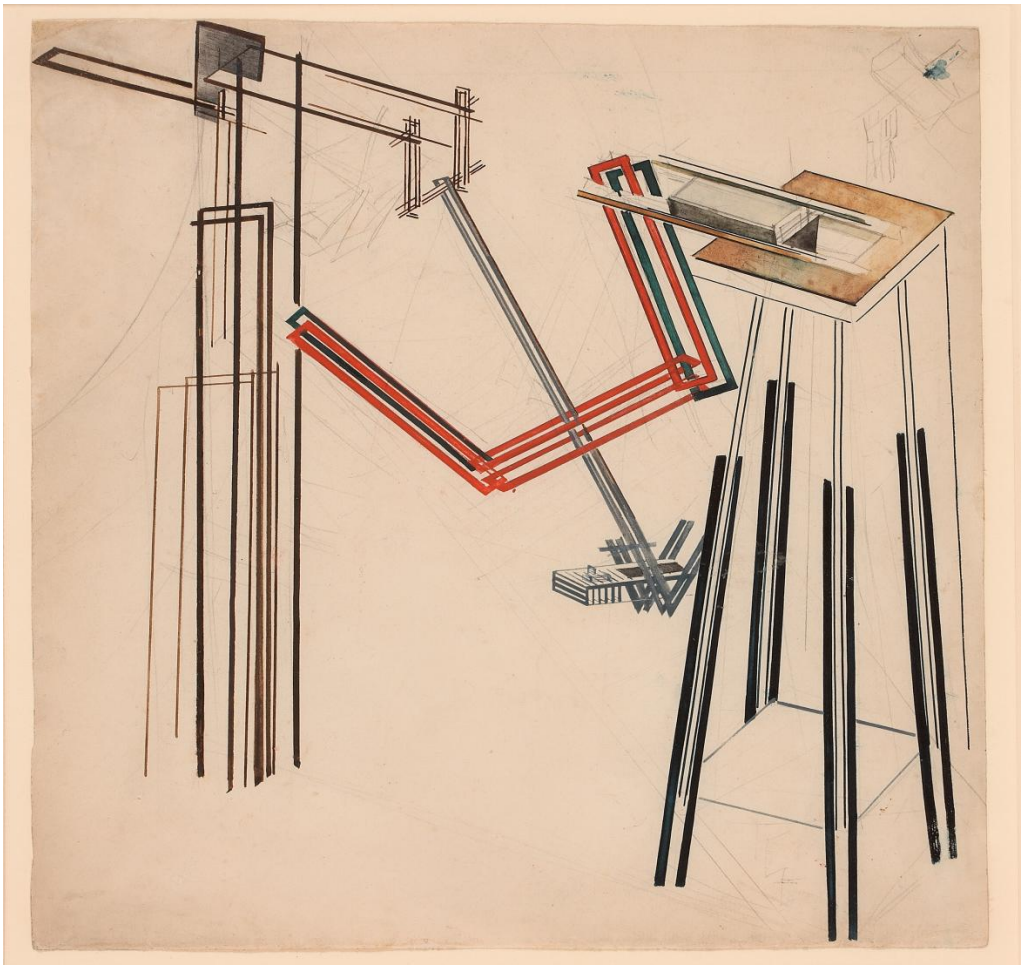


Histories of Other Spaces

The group of papers that introduces the theme of construction is entitled 'Histories of Other Spaces' with direct reference to the French philosopher Michel Foucault's (1926-1984) pivotal notion of 'heterotopias' (*les hétérotopies*), briefly sketched in a lecture entitled 'Des Espace Autres' presented to the Circle of Architectural Studies (Cercle d' Études Architecturales) in 1967, then run by the French architects Jean Dubuisson (1914-2011) and Ionel Schein (1927-2004) (Faubion 2000: pp.175-185; Dehaene & De Cauter 2008: p.13). Foucault's heterotopias are 'real places, actual places, places that are designed into the very institution of society, which are sorts of actually realized utopias in which the real emplacements, all the other real emplacements that can be found within the culture are, at the same time, represented, contested, and reversed, sorts of places that are outside all places, although they are actually localizable' (Faubion 2000: p.178). Spatial reconstruction of experiences, idealised landscapes, spatial representations of power and mythical images are some of the uncommon characteristics of these places, which provide a unique narrative thread that weaves together the different lines of inquiry that comprise this group of papers. In particular, Christos P. Kakalis, in 'Place Experience of the Sacred: The Topography of Mount Athos' explores the dynamic interrelation between space, time and individuality in the formation and representation of place through the embodied experience. Kakalis challenges the communicativeness of traditional, 2D representational techniques – i.e. cartography – in reconstructing the essence of extraordinary networks of places such as the topography of Mount Athos. In order to achieve this, Kakalis proposes two kinds of embodied experiences, that of participating in the rituals of a place and that of flânerie as a means of effectively mapping the Athonian topography. Burkay Pasin, in 'Fantasies of Bathing: Hotel Hamams as Orientalized Stereotypes' examines the cultural landscapes of the hamam both as a social space, a valued extension of the public sphere, and as an architectural form, whose building program has evolved gradually over time in response to social or cultural changes. Pasin complements his work with a detailed study of suggestive case-studies that demonstrate how age-old bathing cultures have been appropriated by the practices of modern tourism industry in Turkey. These practices appear to rely heavily on fantasies stereotypically associated with hamams without investing in the social and cultural restocking of the local bathing culture, thus rendering its future role in society extremely difficult to predict. Nicholas N. Patricios, in 'British Civic Architecture in the United States of the Ionian Islands' provides invaluable insights to a building tradition that has been overlooked by contemporary research, that of the architectural idiom of the Ionian Islands of Greece during the Protectorate period (1815-1864). Corfu, Paxos, Lefkas, Cephalonia, Ithaca, Zakinthos and Kithira were graced with civic projects and public buildings in British Neo-Classic style and private mansions in Venetian Renaissance style. These imported creative renderings of classical antiquity stirred the construction of an idealised landscape for the Ionian Islands.

Unfortunately, this exceptional architectural bequest is now lost mainly due to the catastrophic earthquakes that struck the Ionian Islands in the early 1950s. This constitutes Patricios' study even more vital as it contributes greatly to the solid documentation of an architectural paradigm that is almost extinct and, consequently, to the preservation of an important feature of the Greek cultural heritage. Finally, Alanya Drummond, in 'High Profiling: Architects on the Cover of *Time* Magazine' investigates the topical phenomenon of stardom in the architectural profession by studying the covers of *Time* magazine. Drummond explores the implications of the presence of architects in the mainstream media in terms of their careers and in terms of the relevance of architecture to the general public. In doing so, Drummond looks closely into the case of Frank Lloyd Wright's (1867-1959) cover of *Time* magazine from 1938 and examines the various journalistic techniques that have been employed to construct the architect's mythical image. These techniques inform a more wide-ranging discussion that concerns, according to Drummond, the systematic 'celebrification' of architects in the popular media.

Figure 2. *Gustav Gustavovich Klutsis (1895-1938), Construction (1921-1922), State Museum of Contemporary Art - Costakis Collection, Thessaloniki, Greece.*



Design Approaches and Methodologies

The second thematic group, entitled 'Design Approaches and Methodologies' deals with an increasingly important aspect of construction, that of conceptual design and planning, and the fine line that exists between these processes and the various intricate mechanisms involved in implementing the final products of architectural synthesis. In particular, the second half of the twentieth century witnessed the proliferation of theoretical frameworks and respective tools for investigating those essential qualities that are associated with conceptualisation, design and implementation, and for tracing their potential overlap. Their ephemeral convergence or deviation has been subject to changes in the discipline but also extrinsic phenomena such as technological advances in the engineering design and construction industry in general, and computer-based design techniques in particular. The limit that separates the different phases of the design process is understood here as a boundary with fluctuating spatial attributes from which, according to Martin Heidegger (1889-1976), 'something begins its essential unfolding' and not as the place 'at which something stops' (Farrell Krell 1978: p.332). The fluid and dynamic space delineated by the abovementioned flexible boundary becomes the fruitful shared ground from which six extremely compelling studies depart, following intertwining paths of inquiry. Norman Wienand, in 'Architectural Technology. The Making of an Academic Discipline' presents an impressive overview of the fairly recently established discipline of architectural technology, as it developed from a taught and researched subject in universities to an accredited profession, in four intermediate steps: attempting to define the field, sketching its relation to the profession, discussing architectural technology as a taught subject in the United Kingdom and, finally, outlining potential areas of research. Wienand acknowledges that, as far as the case of the United Kingdom is concerned, the institutional structures supporting an already considerable body of academic research have not fully matured as yet, but stresses that the productivity of the field suggests the emergence of a dynamic academic discipline. A specific application of this general theoretical framework is presented by Matt Fajkus, in 'Light and Sustainable Building Envelope Construction: A Meeting Point for Architects and Engineers'. Fajkus examines the cross-disciplinary area between architects and engineers where the quantitative understanding of aspects of design, such as the correlation between shading and daylighting in building envelope design, can improve the efficiency of qualitative design processes. This pioneering research is performed at the Facade Lab of the University of Texas at Austin. The originality of the paper lies equally on the effectiveness of the proposed application, corroborated by rigorous experimentation, and the fact that the Lab's quest for innovative building components is based on an integrated approach that combines advanced computer simulation modelling with physical full-scale testing. Similarly, Mania Aghaei Meibodi, in 'Technological Advances in Design and Construction: Bridging the Gap between the Conception Stage and the Manufacturing Process' foregrounds yet another area

where technological advances, in this case computer aided design, empower professionals from different academic backgrounds to bridge the gap between distinct phases of construction –predominantly conceptualisation and manufacturing– in the prefabricated building industry. Aghaei Meibodi dives into the rich and fascinating recent history of the Information Age, only to emerge again with stimulating remarks about contemporary digital architectural environments and novel shape formation mechanisms. These, in turn, inform a more far-reaching discussion on parametric design and the various approaches to the fabrication of physical 3D models as a bidirectional conceptualising process. The latter links directly to the work presented in 'Developed Surfaces: Construction Logic and Geometrical Control' by Vincent Snyder. Snyder demonstrates how traditional expressive tools, such as sketches and physical models, and more recent design methodologies afforded by digital technology, such as 3D digital models and printing, aid contemporary architects to incorporate more successfully the palimpsest of constructional, climatic and cultural premises of a given project and, subsequently, introduce a welcome degree of complexity in their designs. This happens by presenting in depth a rather unique architectural project, the Omaha Nation Cultural and Interpretative Center (ONCIC); distinguished not only for its sculptural morphology but also for its effective function on a symbolic level. Luis Alfonso de la Fuente Suárez and Antonio Millán Gómez, in 'Experience and Illusion: Architecture as a Perceptual Catalyser' examine how our perception of architectural spaces is conditioned by Gestalt psychology processes and visual cues such as colour and lighting. The authors introduce the composite term of architectural perceptual catalysers in order to describe the various factors that influence our perception. At the same time, they argue that the study of the way illusions affect our experience of spatial constructions, buildings and –if one were to extend this rationale to different design scales– the city, is a potent tool for understanding and appreciating architecture and producing more engaging design. De la Fuente Suárez and Millán Gómez's well-documented study of architectural space as a space that invites sensorial explorations and interpretations, essentially as a narrative space that acquires its meaning through embodied experiences – movement in particular – highlights an interesting analogy between architecture and narrative cinema, where visual cues are utilised consistently in order to steer audiences' emotional reactions to filmic narration. This analogy describes a promising area of interdisciplinary research that brings together experiences and tools from the visual arts and the construction industry and could be explored more consistently in future ATINER conferences. Finally, Eleni Tracada in 'Self Build Design and Construction Processes and the Future of Sustainable Design Education' examines yet another manifestation of the global economic crisis that deals with the substantial decrease of public expenditure in higher education. Current unfavourable fiscal environments have prompted a broad reconsideration of architectural programs and their relation to the construction industry and a welcome opportunity to challenge accepted views about the user's input in the design and construction process. Tracada draws from

valuable experience with the School of Technology at the University of Derby in the United Kingdom and the Giovanni Michelucci Foundation in Tuscany, Italy to report on the outcome of the School's initiative to provide high standard training on the extremely topical subject of self-build design.

Figure 3. *Ivan Kudriashev (1896-1972), Construction of Rectilinear Motion (1925),State Museum of Contemporary Art - Costakis Collection, Thessaloniki, Greece.*

Sustainable Design: Advances and Case Studies

The 'Sustainable Design: Advances and Case Studies' group presents an excellent array of studies on the tremendously topical theme of sustainability and environmental management. This fine collection of papers considers both the theory and the contemporary practices of sustainable development. Moreover, it points to potential incompatibilities between the principles of environmentally conscious design and modern modes of production and consumption. The latter raise serious practical as well as ethical considerations about the challenges facing today's sustainable development in view of the recent food, climate, real estate and economic crises. A significant body of literature claims that these crises undermine –each in different ways and

extent– the relevance and effectiveness of the aims and scope of sustainability. Other studies maintain that sustainability development policies and practices could very well provide the only viable solutions to the current political impasse, economic stagnation and social unrest. Either way, sustainable design and green architecture constitute a vital facet of the more general and complex phenomenon of sustainable development. Their growing role in the construction industry have led to legislative initiatives towards the protection of the environment, the emergence of sustainable building technologies and, more importantly, the education of a new generation of citizens that learn to be more environmentally conscious. Matthew Kubik, Patrick J. Ashton and M. Regina Leffers in 'Social Transformation for a Sustainable Built Environment: Problems and Prospects' raise the crucial question of what social and institutional transformations are required if a lasting change towards a sustainable world is to be achieved. According to the authors, social transformations may include, among others, density, mixed use, accessibility, diversity and investing in the social and educational role of public spaces. They should be complemented by new ways for measuring corporate performance and success and novel models of economic growth. In this respect, changes on an institutional level should affect the various stakeholders involved in construction: designers, those who construct, local and central government and those who finance the development of the built environment. The authors are confident that the construction industry has an important role to play in the future founding of a more environmentally conscious world. Marie Else Marrier d' Unienville in 'Residential Design and Regulations for Sustainable Development. An Australian Perspective' looks into the residential building sector in Australia so as to explore how existing regulations mitigate its environmental impact. Marrier d' Unienville surveys previous and existing relevant legislation that informed the formulation of a potent on-line tool for assessing the degree of compliancy of a given structure. This tool marks a shift towards a dualistic perspective of sustainable development, a perspective that seeks to maintain a balance between the preservation of nature and the needs of human beings and that presents, according to the author, a viable model of future regulations, methodologies and practices. Despoina Kapodistria, in 'The Built-Form, the Environmental Performance and the Retrofit Potential of Post-war Urban Dwellings in Greece: The Case of Thessaloniki' examines how retrofitting the out-dated building stock of Thessaloniki will affect energy consumption of heating, cooling and hot water production. Kapodistria performs a series of computer-based simulation studies for two typical apartment building types, corner and central type, which represent the vast majority of residential building blocks in Greece. The goal is to design a tool for assessing proposed retrofit interventions on the basis of cost-effectiveness, along the requirements of the EU and national regulations on the energy performance of buildings. Kapodistria's rigorous study counterbalances the lack of relevant data that could compromise the success of the state-subsidised retrofitting program. Pulling the focus from managing data on energy consumption to discussing energy consumption for data centres per se, Xiaoshu

Lü, Tao Lu and Martti Viljanen, in 'A Case Study in Analysis and Improvement of Energy Efficiency in Data Center' investigate how cooling systems can become more efficient. The authors draw our attention to the importance of minimising the impact of data centres on the environment and demonstrate how this can best be achieved by simulating the potential for energy saving for a particular case-study, a data centre in Helsinki, Finland. The results of the experimentation and analyses highlight problems with the energy efficiency of existing cooling systems and propose possible solutions for cutting down on electricity costs. To continue in this vein, Thomas Spiegelhalter, in 'Passive and Active Micro-Generation Building Systems for Cooling and Dehumidification in Hot and Tropical Climates' investigates the impact that passive cooling strategies and active micro generation system applications for commercial and residential use have on energy saving and carbon neutrality. Power shortages in tropical climates that occur as a result of heightened seasonal demand for cooling and dehumidification show how pressing the demand for energy efficiency is. Spiegelhalter presents an impressive array of integrated design solutions for energy efficient buildings that adapt well to the tropical climatic environment and secure remarkable results both in the short and in the long run. Finally, Camilo Rosales and Mohammed Shanti in 'Unique Design and Construction Challenges for a Solar Decathlon House' present Shanti's proposal for the design and construction of a solar powered home, the Transtropic House, for Florida International University's entry to the U.S. Department of Energy Solar Decathlon biennial competition. The proposed prototype attempts to provide agreeable living conditions for its inhabitants at two dramatically different climatic zones: Miami, Florida and Washington DC. Rosales and Shanti demonstrate how the creative reinterpretation of traditional architectural elements can enrich existing passive energy-efficient building design techniques and approaches. Shanti's proposal integrates the latter with active systems and prefabrication to achieve the best possible results. Although these have not been validated by extensive testing as yet, the experiment has potential in so far as it establishes that traditional and contemporary building solutions jointly can produce constructions that are extremely adaptable to different environments.

Novel Building Practices and Construction Techniques

Last, but certainly not least, the group of papers entitled 'Novel Building Practices and Construction Techniques' deals with the dynamic and diverse fields of project management and construction technology. Both have grown to such extent as to become areas of substantial development where considerable financial, material and human resources have been invested to ensure lasting positive changes in existing building practices and construction techniques. Both represent high-end research and innovation laboratories that determine how buildings and our cities are designed and produced. In this respect, they constitute vital players in the formulation of new architectural paradigms. The

group includes five current and thorough studies that are indicative of the ever growing body of literature on new building materials but also on optimizing the working environments and the developed methodologies for the construction industry. Osama Moselhi and Nazila Roofigari-Esfahan, in 'Project Schedule Acceleration Considering Risk' describe a new model of carefully estimating schedule compression methods by taking into consideration the extremely crucial parameter of risk, alongside the added cost which, unlike existing time-cost trade-off analyses, becomes a critical factor in determining which project activities are scheduled for compression and in which order. Building on existing research, Moselhi and Roofigari-Esfahan put forward a reliable and comprehensive computational tool for quantifying the risk involved in crashing activities for delayed projects. The numerical example utilised proves how effective the tool is in generating practical and realistic execution plans. Likewise, Peter Ward, in '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' investigates whether the Society of Construction Law (SCL) Delay and Disruption Protocol – introduced in the United Kingdom in 2002 – that comprises a solution to float and float ownership, is suitable for the Australian construction industry. Ward combines extensive literature review on the subject with semi-structured qualitative interviews with construction practitioners and members of the SCL protocol drafting committee in order to draw valuable conclusions about the Protocols pertinence to the Australian construction industry norms. Kittinan Dhiradhamvit and Thomas L. Attard in 'Sustainable Energy Dissipation and Evolutionary Viscous Damping in Wood-Frame Structures' tackle the particularly current and extremely significant topic of structural damage during seismic events with regard to wood-frame structures. They introduce CarbonFlex, a recently developed, flexible, load-bearing 'supercomposite', that can be used as a viable alternative to typical wood shear walls in wood-frame structures by using an evolutionary viscous 'tight-wrap'. Extensive experimental and computational testing of individual members and structures has produced remarkable results and demonstrates that the potential for the seismic protection is impressive. Socrates Ioannou, Kevin Paine and Keith Quillin, in 'Resistance of Supersulfated Cement Concrete to Carbonation and Sulfate Attack' report on the initial results of a wider study on the improvement of the mechanical properties of supersulfated cements in view of newly instituted lower carbon footprint policies for cement production. The ensuing in-depth literature review, testing and discussion substantiate not only that supersulfated cements correspond to lower eCO_2 emissions but also that their mechanical, durability and microstructural properties are significant compared to other commercially available cements. This suggests that supersulfated cements could present a sustainable and low carbon alternative to existing practices in European cement industries. Similarly, Bolanle Deborah Ikotun, in 'Effect of a Modified Zeolite Additive on the Alkali Silica Reaction of Mortar' researches the effects of a commercially available additive consisting of a blend of selected alkaloids and zeolite on the alkali silica

reaction of mortar which results in the expansion and cracking of concrete and, eventually, in structural deterioration. This highly specialized study focuses on a less documented area of expertise and presents compelling evidence that the additive can be particularly effective when combined with fly ash.

The excellent papers of this edited volume on 'construction' represent current and extremely rigorous research in different but overlapping areas. Moreover, they are characteristic of the richness and diversity one comes across in contemporary research agendas in architecture and engineering. The quality and the relevance of the work presented in the edited book of papers is symbolic of ATINER's vision to organize events so as to create an informal but productive environment where academics, researchers and practitioners from all over the world can meet, exchange ideas and discuss the developments in their respective disciplines. This environment nourishes and nurtures interdisciplinarity; it is a forum that facilitates the coming together of specialists from different areas or fields of study. In this respect, the forthcoming 2nd Annual International Conference on Architecture, Engineering and Construction, organized in Athens in June 2012, is expected to attract an equally fascinating array of contemporary studies on design, history, theory and architectural technology.

Figure 4. *Mikhail Matiushin (1861-1934), Painterly-Musical Construction (1918), State Museum of Contemporary Art - Costakis Collection, Thessaloniki, Greece.*

List of References

Conrad, U. (ed.) 1971 [1964]. *Programs and Manifestoes on 20th - Century Architecture*. Cambridge, Massachusetts: MIT, pp.121-122.

Cooke, C. 1983. „Moscow Map Guide: 1900-1930", *AD*, vol.53, no.5/6, pp.81-96.

Dehaene, M. & De Cauter, L. (eds.) 2008. *Heterotopia and the City: Public Space in a Postcivil Society*. Abingdon, Oxon; New York: Routledge.

Farrell Krell, D. (ed.) 1978. *Martin Heidegger. Basic Writings: from Being and Time (1927) to the Task of Thinking (1964)*. Abingdon, Oxon; New York: Routledge & Kegan Paul.

Faubion, J. (ed.) 2000 [1998]. *Michel Foucault: Aesthetics. Essential Works of Foucault, 1954–1984* [vol.2]. London: Penguin Books.

Kafetsi, A. (ed.) 1995. *Russian Avant-Garde 1910-1930. The George Costakis Collection: Theory Criticism*. Athens: The Ministry of Culture; National Gallery & Alexandros Soutzos Museum; European Cultural Centre of Delphi.

Levaco, R. (trans. & ed.) 1974. *Kuleshov on Film: Writings by Lev Kuleshov*. Berkeley, Los Angeles, London: University of California Press.

Lissitzky, El (ed.) 1930. *Russland: Die Rekonstruktion der Architektur in der Sowjetunion* [Neues Bauen in der Welt, Band 1]. Wien I: Anton Schroll & Co.

Michelson, A. (ed.) 1984. *Kino-Eye: The Writings of Dziga Vertov*. Berkeley; Los Angeles; London: University of California Press.

Tsantsanoglou, M. (ed.) 2008. *Lost Vanguard Found: A Synthesis of Architecture and Art in Russia, 1915-1935*. Thessaloniki: State Museum of Contemporary Art – Costakis Collection.

Tsivian, Y. 2006. „Man with a Movie Camera - Lines of Resistance: Dziga Vertov and the Twenties", in T. Perry (ed.) *Masterpieces of Modernist Cinema*. Bloomington, Indiana: Indiana University Press, pp.85-110.