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EDITORIAL: TALL SUSTAINABILITY—AN URBAN IMPERATIVE?

It is again with great pleasure that we see this second Council on Tall Buildings and Urban Habitat (CTBUH) annual special edition of the *The Structural Design of Tall and Special Buildings* come to fruition. In March of this year, we held our CTBUH 8th World Congress in Dubai under the title of *Tall and Green: Typology for a Sustainable Urban Future* [1]. It was the most successful event in the 40 years of the Council's history, with 954 delegates from 43 separate countries in attendance to witness papers from over 100 renowned speakers such as architects Dr Ken Yeang of Llewelyn Davies Yeang and Hani Rashid of Asymptote; structural engineers Professor Werner Sobek of Werner Sobek Ingenieure and Leslie Robertson of Leslie E. Robertson Associates (LERA); and urban planners Peter Wynne Rees of the City of London and Sadhu Johnston of Chicago, to name but a few.

The conference opened with a keynote session on three cities that are enthusiastically embracing both tall buildings and sustainability—Chicago, London and Dubai—then began 3 days of in-depth presentations and seminars. Seminal case studies profiled included the Bahrain World Trade Center with its three huge building-mounted wind turbines (profiled in last year's Special Edition of this journal, see [2]; the looping CCTV building in Beijing taking the tall-building typology horizontal as well as vertical; the Shanghai World Financial Center that has recently been completed and is the world's building with the highest occupied floor according to our CTBUH height criteria; the green master plan for the Dongtan eco-city in China; the London Bridge 'Shard of Glass' tower that will revolutionize the south bank of London; David Fisher's adventurous plans for the Rotating Tower Dubai; the Pearl River Delta eco-Tower Guangzhou with its ambition to be the world's first carbon-neutral tower; the curvaceous Aqua Building Chicago with its rippling facade; and the New York Times Building that has recently been announced the winner of our 2008 CTBUH Best Tall Building 'Americas' award.

A definite highlight of the congress was the keynote session on, and technical tour of, the Burj Dubai tower, now already significantly taller than any other man-made structure on earth and set to smash the world's tallest building record by 60% on completion. As part of this keynote, the audience witnessed presentations from His Excellency Mohamed Ali Alabbar, CEO of Emaar Properties, Adrian Smith of Adrian Smith + Gordon Gill, and William Baker of Skidmore Owings and Merrill; the client, the architect and the structural engineer speaking together for the first time ever on the same stage about this remarkable project.

Of course, the irony in holding a congress on urban sustainability in a city with one of the highest carbon footprints on earth was not lost on many of our delegates. But this was a big determinant in choosing the location—to take the message of the world's experts in the field to the place where it is most likely to make the biggest difference. Few would contend that Dubai is currently the epicentre of tall building construction activity globally. Moves are also afoot in Dubai to address the problem of the lack of sustainable development, with the ruler of the kingdom, His Excellency Sheikh Mohammed, issuing an edict in late 2007 that the city must now start to realign itself along green, environmental principles. For the Council, these parallel themes of the congress matter and Dubai's aspiration converged, allowing us to push our main message that the sustainable cities of the future have got to become more concentrated, denser cities of life, work and play—with the consequential

rejection of the ever-expanding, resource-intensive 'downtown core and suburb' model. We at CTBUH firmly do believe that the tall building is one important part of the equation in creating green cities—a typology for a sustainable urban future.

What sets CTBUH conferences apart from the wave of commercial conferences that seem to have proliferated in recent years around the globe (especially on the theme of tall buildings!) is the seriousness the Council pays to the concept of dissemination of information, specifically in the production of an accompanying, in-depth congress proceeding (in the case of Dubai, almost 900 pages long, see [1]. Dissemination of information is not just about speaking to 500 people in a room—it is about the speaker reflecting on the content beforehand and documenting it in the form of a paper, which is then published for distribution also to those who could not attend the event itself, and to create a historical legacy for the future. In that, CTBUH conferences share many of the same conceptual motivations as this, and other, scholarly research journals. The 102 papers that make up the Dubai proceeding, together with videos and photos of the presentations, can be found at: http://www.ctbuh.org/dubaicongress.htm.

The papers contained in this year's special edition of the *The Structural Design of Tall and Special Buildings* continue the theme and dialogue started in Dubai—that of 'Sustainability in the Context of Tall'—and extend it to embrace numerous building disciplines, in keeping with the intention to make the CTBUH special edition a multidisciplinary publication. We thus open the journal with Gordon Gill's vision of 'A tall, green future' [3], demonstrating some of the architectural thought behind the groundbreaking environmental work that his practice, Adrian Smith + Gordon Gill Architects, is producing for sustainable cities around the world like the EP09 development in Dubai and the MASDAR project in Abu Dhabi. The next paper shifts to the other end of the building programme and gives us the contractor's perspective on actually making these designs a built reality, with 'The builder's role in delivering sustainable tall buildings' [4] from Michael Deane of Turner Construction. Michael's conclusion, based on Turner's experiences, that if you get the team and systems right and in place early enough, sustainable design does not have to come at a cost premium yet can bring significant financial benefit, should serve as a major wake up call to those still sitting on the sustainable fence in the building industry.

There are two papers in the special edition focussed on sustainable structural engineering. The first, by Prof Mahjoub Elnimeiri and Prairna Gupta at the Illinois Institute of Technology [5]: 'Sustainable structures of tall buildings', gives an overview of some of the possibilities for the structural engineering profession to contribute to greater sustainability, highlighted with some telling case studies, whilst Kyoung Sun Moon, a professor at Yale, gives us a detailed analysis of reducing the volume and content of material in tall building structures [6]: 'Sustainable structural engineering strategies for tall buildings'—surely one of the most significant ways structural engineers can contribute to overall building sustainability.

The conservation and creation of energy in all buildings, not just tall buildings, is accepted as a key to counteracting the effects of climate change. Though many studies have been done on the potential for harnessing energy in tall buildings (for example, through the harnessing of wind energy at height, deftly explained in Peter Irwin and RWDI colleagues' paper [7]: 'Wind and tall buildings—negatives and positives', very few studies have embraced the concept of the enormous differences in environment that can occur between the top and bottom of a tall building. Luke Leung and Peter Weismantle's paper on 'Sky sourced sustainability: the potential advantages of building tall' [8] is perhaps the most ground-breaking of all the papers contained in this special issue as, on the back of their experiences detailed-designing the Burj Dubai and other supertall towers at Skidmore Owings and Merrill, they take us through an eye-opening journey through the temperature, pressure and humidity variants experienced by the envelope of a single building, and how this can potentially be put to good use in the building's operation.

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Further detailed studies follow in the second half of the special edition, focussing on a particular aspect/discipline of tall buildings. Dario Trabucco's insightful work into elevators and service cores [9]: 'An analysis of the relationship between service cores and the embodied/running energy of tall buildings' presents an interesting study of the factors that have affected service core design historically, and how the core can contribute positively or negatively to the carbon footprint of a tall building now, whilst Dong-Hwan Ko and colleagues at the Illinois Institute of Technology present a study on the effective use of daylighting in tall buildings, especially with respect to the LEED version 2.2 requirement [10]: 'Assessment and prediction of daylight performance in high-rise office buildings: daylight factor and the LEED 2.2 requirement'. Peter Swift and Matthew Stead of AECOM take us through the complex implications of increasing sustainable strategies in tall buildings on the acoustic performance of interior spaces with their paper 'Tall acoustics and the challenges of sustainability' [11]. What many of these papers show is the interconnectedness of many of these issues—and the knock-on effect of one disciplinary decision on another.

The final paper in the journal, Lester Partridge and Eoin Loughnane's (also of AECOM) 'Committed carbon—upgrading existing buildings' [12], reminds us of a vital facet in the struggle to counter climate change. Whilst most of the building industry's attention seems to be focused on new build and the buildings yet to be conceived or constructed, the contribution to climate change of the millions of existing buildings, often with their inefficient MEP systems and inappropriate skins, is all too often neglected. This is clearly a mistake, since the single biggest difference globally would be made tomorrow if the inefficient energy operation of the existing building stock was tackled in a significant way. This is especially true of the existing tall building stock, with their large volumes of committed embodied energy and the difficulty often associated with dismantling/demolishing such buildings. Partridge and Loughnane's case study on the upgrade of an existing tall building in Sydney, Australia presents an illuminating picture of the possibilities and benefits, and is an avenue that most, if not all, tall building owners will have to consider at some stage in the future.

Above all, this special edition on Tall Building Sustainability captures a snapshot of current 'best practice' in most disciplines and, as such, will hopefully be a useful insight to all readers connected with tall buildings, irrespective of profession. For us, it is the start of the dialogue rather than the end, on these issues. We hope you shall not hesitate to dialogue with us in response!

All the best,

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