Disaster management and the built environment

In recent years, there has been increasing recognition of the contribution that built environment related professionals can make towards increasing a community's resilience to disasters. The "built environment" encompasses a wide variety of professional expertise including design, construction management, quantity surveying, building surveying, and property management. Their contribution occurs beyond the traditional cycle of feasibility analysis, planning, design, construction, operation, maintenance and divestiture, to encompass the built environment professional's ability to anticipate and respond to unexpected events that damage or destroy a building or infrastructure project, and reflect an ongoing responsibility towards the host community.

The role of built environment professionals and local communities in developing resilience to disasters can be viewed as two separate yet interrelated aspects:

1. To create a built environment that is not vulnerable to a disaster or disruptive challenge. This relates to the resilience of the physical state of infrastructure, buildings and cities as well as developing policies, legal and regulatory controls, and practices that govern the building industry to build safe structures. Essentially this means building cities or infrastructure that will not be affected by a disaster.

2. To develop organisational structures, capacities through education and training, and construction systems, that can react in the event a disruptive challenge does occur. This means responding to the immediate after effects of a disaster to restore operational conditions of infrastructure or the built environment as quickly as possible. This means also to aid in the speedy recovery of the region through sustainable reconstruction, post-disaster building or other related projects.

In February 2008, the Building, Education and Research (BEAR) Conference was held in Sri Lanka, with over 160 papers accepted for publication and presentation. The Conference was organised by the School of the Built Environment, University of Salford, in conjunction with the CIB (Conseil International du Bâtiment, in English this is: International Council for Building), a worldwide network of over 5,000 experts from about 500 member organisations active in the research community, in industry or in education, who cooperate and exchange information in over 50 CIB Commissions covering all fields in building and construction related research and innovation. The Conference was also held in association with EURASIA, a three year EU Asia-Link programme funded project that aimed to improve capacity in training, teaching and research activities associated with the creation and long-term management of public and commercial facilities and infrastructure in selected HEIs in Asia and Europe. The EURASIA partners included the University of Moratuwa and University of Ruhuna in Sri Lanka, Tallinn University of Technology in Estonia, and Vilnius Gediminas Technical University in Lithuania.

The theme of the 2008 conference was to promote built environment related education and research towards preparing for, responding to, and recovering from disasters. Like other affected countries, post-Tsunami rehabilitation in Sri Lanka is operating in a difficult context; among the most important factors is the pre-existence of very high densities of unplanned settlements in the Southern part of Sri Lanka with the majority of construction not observing some of the critical building standards. To add to this, the post-Tsunami rehabilitation operation has been affected due to weak local government institutions with poor response capacities to address the needs of such a magnitude. This is mainly because, before the Tsunami, Sri Lanka was known to be a safe haven where outrages of nature scarcely occurred except for occasional floods and landslides during the rainy seasons. The response to these challenges from the CIB community was not disappointing. Alongside the BEAR Conference's traditional themes of building education and research, in excess of 45 papers were published and presented on the themes of disaster mitigation, post-disaster recovery, post-disaster reconstruction, sustainability and environmental management. The conference programme also included five key note addresses that contributed to the debate on how the built environment community can assist society in developing resilience to disruptive challenges, including natural and man-made disasters, as well as the more traditional themes of advancing built environment education and research. The speakers brought with them knowledge and understanding from HEIs in four countries, as well as practical experience in Tsunami affected areas. The Conference also included a cross-theme discussion on the built environment community's role in disaster preparedness and reconstruction, which in examining the revised lifecycle, focused upon the associated themes of: capacity building, education, research and training; law and regulatory systems; the needs of developing countries; and, sustainable reconstruction. The discussion identified challenges and opportunities, helped to develop synergy, and identify areas for collaborations. It was evident that the CIB network of experts and member organisations active in the research community, in industry and in education, has a wide range of expertise to offer in addressing disaster related challenges. However, the attendees also recognised a need to fully engage with relevant stakeholders in order to address this challenging and complex problem, and working towards socially and environmentally sustainable human settlements.

The present volume of *Disaster Prevention and Management (DPM)* draws on the wide range of expertise that built environment professionals can contribute towards increasing resilience to disasters. It compiles original papers which were prepared for a panel of the Building Education and Research Conference, held in Kandalama, Sri Lanka, between 11 and 15 February 2008. The papers address different stages of the disaster management

lifecycle, from pre-disaster risk reduction, through to post-disaster response and relief, and finally, long term sustainable reconstruction.

Lee Bosher and co-authors focus on the mitigation for flood hazards in the UK; particularly in understanding the extent of the problem, collating key guidance and legislation related to flood hazard mitigation, and identifying who the key construction decision makers are and the most opportune stages of the Design-Construction-Operation Process when they need to make their key decisions. Bosher et al. conclude that despite the publication of a range of guidance on flood hazard mitigation in the UK there is still insufficient evidence that key construction stakeholders are playing an active role in mitigating flood risk.

Also looking at risk reduction, Kanchana Ginige and co-authors highlight the vulnerability of women in many disasters and emphasise the importance of gender mainstreaming as an element in disaster reduction policy, and to integrate a gender equality perspective in all policies, and at all levels. Ginige et al. conclude by discussing the ways in which women's specific needs may be captured and incorporated at the disaster management planning stage.

Moving on to the recovery phase, Zeeshan Aziz examines how mobile computing support can be used by professionals involved in a disaster response and recovery operation to facilitate better assessment of the damage caused to buildings and to make this assessment information available to personnel within the disaster response arena so as to expedite a safe, efficient and effective disaster response process. The paper describes a Radio Frequency Identification (RFID) enabled mobile devices and tags system deployed and trialled at Illinois Fire Services Institute (IFSI). They conclude that the system can be used for posting, gathering, storing and sharing building assessment information in an efficient manner with lesser errors, leading to improved efficiency and effectiveness in the emergency response process.

Nicole Becker shows how a risk index can be developed to investigate the distribution and the reasons for post-disaster homelessness. Henerichs goes on to present options for an insulated tent floor with enhanced thermal properties that will not only raise the immediate post-disaster living conditions of the affected, but also enhance the overall sheltering process and create more time for good reconstruction to become available.

The final two papers focus on the longer term reconstruction requirements. Milinda Pathiraja and Paolo Tombesi contend that in fast urbanizing economies such as Sri Lanka, the construction industry tends to fragment into almost separate spheres of production with little or no reciprocal connection in training, know-how and career development paths. Set against this background, the paper presents the results of a technical review of a small sample of ideal-type projects in Sri Lanka, developed with the intention of forming an empirical basis to address: whether strategic planning of specific building technologies could lead to professional frameworks capable of narrowing the gap between high-quality architectural production, middle-quality commercial building and low-quality shelter supply; and, whether architecture can act as an engine of social and economic growth for those involved in its production. Based on government statistics and building output analysis, the paper argues that the above should and can indeed be the case, provided that such an agenda is developed strategically.

Finally, Rajendram Thanurjan and Indunil Seneviratne investigate the concept of knowledge management in the context of post disaster housing reconstruction in Sri Lanka. Their study found inadequate compiling and synthesising of accumulated data, information and knowledge, and that storing and organising knowledge was a major challenge faced by the donors and consultants. The study also found that although most organisations are aware of the importance of knowledge management to improve performance, most organisations engaged in post-disaster reconstruction of housing have not formally implemented knowledge management practices.

This special issue of Disaster Prevention and Management is our contribution to increasing the resilience of communities affected by disasters. It contributes to increasing our understanding of the built environment professions' role in disaster mitigation, response and reconstruction. Hopefully many more studies will build on this contribution and encourage the built environment community to engage with relevant stakeholders in order to address this challenging and complex problem.

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