Editorial

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Biographical note: Ravi Jain, PhD, PE, Associate Editor, is a Dean of the School of Engineering and Computer Science at the University of the Pacific in Stockton, California. Prior to this appointment, he has held research, faculty and administrative positions at the University of Illinois (Urbana-Champaign), Massachusetts Institute of Technology (MIT) and the University of Cincinnati. He has directed major research programmes for the US Department of Defense and has worked in industry and for the California State Department of Water Resources. He has been a Littauer Fellow at Harvard University and a Fellow of Churchill College, Cambridge University. He has published 13 books, over 150 scholarly papers and technical reports, and has received national recognition for his teaching and scholarly activities.

In focusing on sustainable deconstruction and recycle strategies, let us review the sustainability concept as described in *Common Future* (World Commission on Environment and Development, 1987) and see if one can operationalise this concept in a meaningful way:

> Sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technical development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.

Thus, sustainable development focuses on *obligation to future generations, industrial practices, exploitation of resources* and the role of *science and technology*, among others.

Effective building reuse and recycle strategies can directly contribute to sustainability concepts. Reasons for this are Construction and Demolition (C&D) waste represents nearly 30% of landfill material; many commercial buildings, houses and military facilities in the USA are demolished each year. Since timber was used extensively for these buildings, it is one of the most salvageable and reusable materials. In the USA, timber production uses more acreage than agriculture; consequently, reusing material from construction demolition reduces the amount of land that has to be devoted to production of timber. Recent studies in the USA indicate that nearly 75% of construction demolition waste can be reused economically (US Environmental Protection Agency, 1998, 2002; US Green Building Council, 2001).

Considerable new ideas and knowledge related to building deconstruction and reuse technology are being developed. This special issue of the journal provides original papers covering some of the crucial topics related to *sustainable deconstruction and recycle strategies* and related technical, economic and systems concepts.

A comprehensive review of *Solid wastes sustainability related to building deconstruction* was conducted by Manar Shami; the paper discusses various issues of *sustainability* related to the topic. Four major areas that were researched include: major challenges in the deconstruction and demolition processes; economic and social impacts of deconstruction; decision criteria for deconstruction versus demolition; strategic issues in deconstruction; and lessons learned from past case studies. In this comprehensive paper, data collected and presented provides detailed assessment for available deconstruction technologies and material recycling and reuse methodologies. Clearly, benefits of deconstruction lead to reduce impacts on forests, energy demand and landfill space. Economics related to C&D wastes represent a determining factor for the viability of reuse and recycling; perhaps, tipping fees for the waste is one of the major cost factors. As new technologies are developed and as the costs for landfill increase, reuse and recycling of construction waste will become more economically viable.

The paper by Roy George and Ravi Jain describes *A Knowledge Management (KM) approach to environmental legislation and regulation monitoring*. KM systems can facilitate the acquisition, indexing and management of knowledge artefacts with the objective of applying this knowledge towards achieving competitive advantage and organisational efficiencies to issues related to the environment, including reuse and recycling of C&D wastes. The paper describes a flexible and open architecture that overcomes problems faced by traditional KM systems. The extensibility of this architecture is based upon the use of the functionality of the system through the use of software elements organised into functional agencies, and the representation of the domain through the use of ontology. Described in this paper also is a case study for the *Environmental Legislative and Regulation Monitoring Program (ELRAMP)*, a system based on a specialised architecture to this domain. This case study is an active KM environment which consists of the use of ontology, functional agents and domain-specific knowledge.

William Roper et al., describe *Water quality monitoring following Hurricanes Katrina and Rita*. For example, following the passage of Katrina, New Orleans was left with 80% of its land area flooded. In some locations, flood waters were over 30 feet deep; in the heat and stagnation that followed, water quickly became heavily polluted with petroleum products, industrial chemicals, raw sewage, etc… The paper describes a variety of approaches and technologies that were evaluated to achieve treatment with minimal impact on pumping operations. Some of these methods and technologies include: sorbet booms in the channels, oil and debris removal skimmers, floating and bottom anchored containment screens, sediment control devices for hot spots, application of flocculation chemicals in contained areas and aerators. Lessons learned from a water quality perspective during this massive disaster are presented in the paper with the goal of assisting future recovery efforts. This recovery effort is also related to considerable building deconstruction debris which contributed to water quality problems, as well.

Bill Boone et al., describe *Solid waste management strategies and global sustainability of deconstruction*. The paper provides evidence that higher diversion rates of C&D waste from the USA landfill sites are not only good from a sustainability standpoint, but also it is an achievable technical and economic goal. The paper proposes

that when deconstruction occurs, proper planning needs to start early to take advantage of relevant technologies and processes available for recycling and reuse along with marketing and economic factors. It further states that the Department of Defense in the USA has done pioneering work related to deconstruction solid waste management to reap the benefits of higher diversion rates from landfill; there have also been discernable efforts by industry to attain diversion rates, in some cases, as high as 90%.

The traditional approach in the deconstruction industry has been to demolish the buildings and put the waste in a landfill. In the paper *Sustainable deconstruction and role of knowledge-based systems*, Ravi Jain et al., describe the role of knowledge-based systems to address this issue. The current approach of demolishing and landfilling C&D waste has become increasingly unacceptable, as it generates enormous volumes of solid waste and also this approach wastes valuable resources. Knowledge of deconstruction techniques and tools and the use of salvaged material to support sustainability concepts need to be disseminated throughout the community. As information becomes more readily available, deconstruction can replace demolition and landfill as the desired alternative; this can stimulate markets for salvaged materials as well. As these tools, methods and procedures evolve, formalised approaches need to be developed to improve technology and information capture, analysis and dissemination. KM techniques are increasingly effective in the management and use of 'knowledge artefacts' in process management and improvement. The principle contribution of this paper is the exploitation of the informational requirements and the use of knowledge-based systems in managing and organising informational resources to address the problem of sustainability related to C&D waste.

This paper focuses on *Waste management policy revisions: lessons learned from the Katrina disaster*, William Roper identifies waste management policies that need to be changed based up on lessons learned from Hurricane Katrina. Policy issues addressed include fragmented jurisdictional control, issues related to types of debris, burning of household debris, wood infestation with termites and banning of yard waste from landfills. The paper examines current practices and trends in the building material/waste management following disasters like Katrina. It is proposed that having a plan in place to manage such wastes can allow for proper recycling, resource optimisation, waste reduction and effective deconstruction. Based on the lessons learned from Hurricane Katrina, the paper proposes changes in debris management policy following such natural disasters.

With the increase in the environmental legislation during the last few decades, awareness about sustainable management of C&D waste is growing around the globe. In the paper by Khalid Siddiqi et al., the *Role of education and industry towards more sustainable construction and deconstruction* is described. One of the objectives of this study is to benchmark sustainable construction education courses offered by accredited construction management programs in the USA. The other objective described focuses on identifying commonly used sustainable construction techniques used by industry. Findings from the research indicate that the study of sustainable or 'green' construction needs to be added to the construction management curriculum in the context of estimating, scheduling and building techniques to prepare construction management professionals for the 21st century. Constructors have used various methods to deal with the sensitivity of the environment in surrounding project areas. A few examples consist of sustainable construction, LEED certification, pollution prevention and addressing

community concerns through community involvement during various stages of the project. Findings from the study demonstrate that the proactive role played by the construction industry needs to be further strengthened by education providers; this can be done by offering sustainable construction courses to engineers and construction management professionals.

The first IJETM special issue on this general topic was published earlier (Jain, 2006) and this issue, building on the previous work, further describes *Sustainable deconstruction and recycle strategies*.

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