ASEC 2008
ABSTRACT

Title of abstract:	Sustainable Structural Design: Conceptual Design of Adaptable Commercial Buildings
Author's Name and job title:	Elizabeth Kelly, Research Student, School of Civil Mining and Environmental Engineering, University of Wollongong, NSW 2522
Co – author names, job title and organisation:	Timothy J McCarthy, Professor of Structural Steel and Design, School of Civil Mining and Environmental Engineering, University of Wollongong, NSW 2522
Abstract:	This paper examines some of the principles in conceptual design of commercial buildings that enhance the adaptability of a structure to different uses. These principles allow a building to be designed with increased longevity improving the potential environmental sustainability of the structure. The purpose of this research is to attempt to fill part of the gap in current methods of sustainable building design. The most prominent aspect addressed in the design of a sustainable building is energy efficiency. However, all buildings house embodied energy, the energy and resources used in construction, and all buildings demolished significantly add to waste that ends up in landfill. If a building is adaptable it can be easily adjusted to different uses. Therefore, construction that not only embraces energy-efficiency but also longevity and flexibility, through adaptable design, has much greater sustainable properties in that it has the potential to reduce long-term resource use and waste. It is impossible to predict exactly how buildings will be used in the future and what needs future societies will have. Therefore, the main factor determining adaptability is flexibility. This paper will begin with an overview of how adaptability has the potential to improve the sustainability of commercial buildings. Structural features of adaptable design will be examined; for example durability of main structural elements, inbuilt redundancy, large free-column space and floor to ceiling heights, flexible facades, and flexible location of services. Finally, current incorporation of adaptable design and the main challenges for the future are described. The paper explores the conflict between the extra capital costs for including some degree of structural redundancy with the long term saving when the building is remodelled or renovated.