ELECTRONIC WASTE EXCHANGE FOR JUST-IN-TIME BUILDING DEMOLITION

Sung Kin PUN¹, Chunlu LIU¹, Craig LANGSTON¹ and Graham TRELOAR²

¹ School of Architecture and Building, Waterfront Campus, Deakin University, 1 Gheringhap Street, Geelong, Victoria 3217, Australia. TEL: +61-3-522-78306; FAX: +61-3-522-78303; Email: chunlu@deakin.edu.au
² Faculty of Architecture, Building and Planning, The University of Melbourne, Parkville, Melbourne, Victoria 2010, Australia.

Abstract
Waste exchange is as a facilitator for construction and demolition waste deduction by reuse and recycling in construction projects. The just-in-time philosophy, which has been well cultivated in the manufacturing industry, is highly adoptable for demolition projects. Particularly, waste exchange that is usually performed after the actual demolition process can be shifted forward so that waste inventory from demolition is eliminated or reduced to facilitate waste reuse and recycling. A web-based waste exchange system is an ideal platform to enable communications among project participants before a demolition project commences so that waste materials can be sold before they are produced. Therefore, the productivity of the demolition project could be improved. This research paper aims to investigate and analyse the adoption of just-in-time philosophy in building demolition project management. It also describes the development of the proposed web-based waste exchange system that implements just-in-time demolition in detail, including its functionalities, information flows and major components.

Keywords
Building demolition, just-in-time, inventory control, reuse and recycling, waste exchange, Web-based system, e-commerce

INTRODUCTION
The increasing problem of waste disposal has recently challenged various industries worldwide. Most industrialised countries have high levels of consumption and correspondingly high levels of waste disposal. For example, Australia has the second highest domestic waste production per capita among all member nations of the Organization for Economic Co-operation and Development (NSWEPA 2003). Nearly one tonne of solid waste is sent to landfill per person each year. The whole country’s waste stream is about 14 million tonnes, of which about 30%-40% is construction and demolition waste (ABS 2003). The demolition of building structures produces enormous amounts of waste materials that in most countries result in significant waste streams (Poon et al. 2001). The construction industry, particularly in the demolition of constructed facilities, is the top contributor among all industry sectors. On the other hand, due to the lack of supply of usable second-hand materials on the market, new and high quality materials are used in construction projects whose design standards can be fitted by secondary or used materials. As a result, reuse and recycling of demolition waste poses huge potential in the construction industry. This could contribute significantly to ecologically sustainable development for both construction industry and the built environment as a whole.

Sensing the situation aforementioned, building demolition is undergoing revolutionary development. In addition, there is tightening environmental standards, by both governments and the industrial governing bodies (e.g. in Hong Kong) (Poon et al. 2001). The advances in innovative building demolition techniques result not only in increased cost-efficiency, but