

A CASE-BASED SUSTAINABLE REFURBISHMENT FRAMEWORK FOR MULTI-STOREY RESIDENTIAL BUILDINGS

Improving the energy efficiency of existing buildings has been identified as one of the most effective strategies to reduce the carbon emissions as a high proportion of energy is consumed by building occupants. However, the biggest challenge is to persuade owners and occupants to take up sustainable actions as any refurbishment works would involve cost and may affect their daily life. A sustainable building refurbishment scheme may fail if it focuses purely on reducing carbon emissions without addressing the owner and occupants' concerns. The problem is aggravated when a building facility is occupied by different people as their perceptions and expectations could be quite different. If successful or failure experience can be made available to owners and/or occupants when sustainable refurbishment decision is made, the potential benefits and drawbacks of different sustainable refurbishment solutions can be compared to ensure any possible concerns are dealt with satisfactorily. Case-based reasoning which solves new problems by retrieving, comparing and reusing the experience of old cases in a collective manner offers a good potential for modeling the complex and dynamic interactions amongst the building condition, human expectations and emission reductions. In this paper, a case-based sustainable refurbishment framework for multi-storey residential buildings is proposed. The model consists of five modules namely input, data and knowledge, case-based reasoning, analytical, and output. The paper begins by identifying the characteristics of sustainable refurbishment for multi-storey residential buildings. The key considerations of sustainable refurbishment viz. emission reduction, life cycle costs and possible disruption are highlighted. It is then followed by an introduction of the case-based sustainable refurbishment framework for multi-storey buildings. The paper concludes by the implications of the proposed case-based sustainable refurbishment framework and the way forward.