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As a result, recycling rates have suffered from project construction to the end ... carbon considerations in a traditional life cycle cost analysis." Strategies to improve a building's operational ...

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This report serves as a guide for the project team to define and model the structural system within the reference building design as required by green building standards and rating systems.

Life cycle assessment enables the identification of a broad range of potential environmental impacts occurring across the entire life of a product, from its design through to its eventual disposal or reuse. The need for life cycle assessment to inform environmental design within the built environment is critical, due to the complex range of materials and processes required to construct and manage our buildings and infrastructure systems. After outlining the framework for life cycle assessment, this book uses a range of case studies to demonstrate the innovative input-output-based hybrid approach for compiling a life cycle inventory. This approach enables a comprehensive analysis of a broad range of resource requirements and environmental outputs so that the potential environmental impacts of a building or infrastructure system can be ascertained. These case studies cover a range of elements that are part of the built environment, including a residential building, a commercial office building and a wind turbine, as well as individual building components such as a residential-scale photovoltaic system. Comprehensively introducing and demonstrating the uses and benefits of life cycle assessment for built environment projects, this book will show you how to assess the environmental performance of your clients' projects, to compare design options across their entire life and to identify opportunities for improving environmental performance.

Life Cycle Assessment addresses the dynamic and dialectic of building and ecology, presenting the key theories and techniques surrounding the use of life cycle assessment data and methods. Architects and construction professionals must assume greater responsibility in helping building owners to understand the implications of making material, manufacturing, and assemblage decisions and therefore design to accommodate more ecological building. Life Cycle Assessment is a guide for architects, engineers, and builders, presenting the principles and art of performing life cycle impact assessments of materials and whole buildings, including the need to define meaningful goals and objectives and critically evaluate analysis assumptions. As part of the PocketArchitecture Series, the book includes both fundamentals and advanced topics. The book is primarily focused on arming the design and construction professional with the tools necessary to make design decisions regarding life cycle, reuse, and sustainability. As such, the book is a practical text on the concepts and applications of life cycle techniques and environmental impact evaluation in architecture and is presented in language and depth appropriate for building industry professionals.

The aim of this book is to investigate the whole life cycle of a building, regarded carbon emissions and energy consumption. Buildings have considerable impact on environment: from construction, use, maintenance and renewal to their demolition. Considering their environmental, economic and social impacts, it is obvious that buildings are an important part of sustainable cities. The current research has been performed using the LCA methodology, which allows evaluating the environmental burdens related to the production and use of a specific product or service. The studied building was the PG centre of HW University that is located in Riccarton Campus, Edinburgh. Results of the analysis found the great contribution of use stage as it concerns CO2 environmental impacts. At the construction stage, reinforced concrete, plasterboard, steel and bricks were the most significant material, regarding quantities. As it concerns carbon emissions, steel is the most important material. The study focused on the small distribution of end-use phase and the credits associated with the use of recycled material since it can have a strong influence on the final environmental impacts.

An increasing number of agencies, academic institutes, and governmental and industrial bodies are embracing the principles of sustainability in managing their activities. Life Cycle Assessment (LCA) is an approach developed to provide decision support regarding the environmental impact of industrial processes and products. LCA is a field with ongoing research, development and improvement and is being implemented world-wide, particularly in the areas of pavement, roadways and bridges. Pavement, Roadway, and Bridge Life Cycle Assessment 2020 contains the contributions to the International Symposium on Pavement, Roadway, and Bridge Life Cycle Assessment 2020 (Davis, CA, USA, June 3-6, 2020) covering research and practical issues related to pavement, roadway and bridge LCA, including data and tools, asset management, environmental product declarations, procurement, planning, vehicle interaction, and impact of materials, structure, and construction. Pavement, Roadway, and Bridge Life Cycle Assessment 2020 will be of interest to researchers, professionals, and policymakers in academia, industry, and government who are interested in the sustainability of pavements, roadways and bridges.

This book proposes an economic and environmental assessment tool to help private and public building designers and owners determine the global sustainability value of green buildings from a life cycle perspective. As it demonstrates, sustainable life cycle tools for building design and construction can help to achieve successfully integrated architecture. The first part of the book defines the relationship between environmental and economic aspects in a sustainable design approach and illustrates how life cycle methodologies, including Life Cycle Assessment and Life Cycle Costing, can be applied to life cycle design. Further, it highlights methods for calculating costs from LCA data, taking into consideration both discounted cash flow and external costs. In turn, the second part of the book presents an experimental design model, the Life Cycle Design Model (LCDM), which is based on a life cycle design approach that can be used to produce two different outcomes based on two assessment levels. The first assessment level involves creating a grid, called a Design Matrix, which is useful in the design process. The second assessment level involves drawing on LCA and LCC results to develop a user-friendly tool for designers and other actors involved in the building process so that they can assess the most sustainable design option using €CO, a factor that combines the environmental and energy effects of the building system with time and costs. Selected case studies illustrate the practical application of life cycle analysis and show how reflecting the environmental impacts and costs can improve the sustainability of buildings. The LCDM represents a transdisciplinary tool for the design team and, at the same time, allows information on users' needs and building performance to be communicated between experts and non-experts.

A building's entire life cycle aooOCU1/4oOe1/4o from construction through occupation, cycles of renovation and repairs, up to demolition and disposal, impacts the flow of materials thereby created. The decisive path of a building's environmental impact is however usually set early in the planning phase, at a time when planners often still lack knowledge about the sustainability characteristics of different building materials and constructions."

Environmental policy aims at the transition to sustainable production and consumption. This is taking place in different ways and at different levels. In cases where businesses are continuously active to improve the environmental performance of their products and activities, the availability of knowledge on environmental impacts is indispensable. The integrated assessment of all environmental impacts from cradle to grave is the basis for many decisions relating to achieving improved products and services. The assessment tool most widely used for this is the environmental Life Cycle Assessment, or LCA. Before you is the new Handbook of LCA replacing the previous edition of 1992. New developments in LCA methodology from all over the world have been discussed and, where possible, included in this new Handbook. Integration of all developments into a new, consistent method has been the main aim for the new Handbook. The thinking on environment and sustainability is, however, quickly evolving so that it is already clear now that this new LCA Handbook does not embrace the very latest developments. Therefore, further revisions will have to take place in the future. A major advantage of this Handbook is that it now also advises which procedures should be followed to achieve adequate, relevant and accepted results. Furthermore, the distinction between detailed and simplified LCA makes this Handbook more broadly applicable, while guidance is provided as to which additional information can be relevant for specialised applications.

The construction industry is becoming increasingly aware of the need to adopt a holistic approach to the design, building, and disposal of structures. With 60 per cent of the total construction budget in most developed countries being spent on repair and maintenance, there is an obvious need to design for reliability and durability, with more carefully planned maintenance and repair schedules. One important facet is to look at how costs are distributed and spent during the lifetime of a structure: an approach known as life cycle costing, which has the ultimate aim of minimising total lifetime expenditure. As an example, choosing an inexpensive coating for steelwork may require maintenance every three years, whereas a coating which is more expensive may require repairing only once per decade. It is a question of balance - taking the lifetime costs of the structure into consideration. This new book provides an insight into how whole life costing is affecting our approach to designing, building, maintaining and disposing of structures. The book is written for consulting engineers in the fields of civil and structural engineering, building designers, architects, quantity surveyors, refurbishing specialists, as well as practising civil and structural engineers engaged in planning, design, construction, repair and refurbishment of structures.

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