

---

# Life Cycle Analysis In Construction Industry The Case Of A University Building

---

Life-cycle Assessment in Building and Construction  
Life Cycle Assessment for Construction Products  
Building Life-cycle Management. Information Systems and Technologies  
Eco-efficient Construction and Building Materials  
Change Management Towards Life Cycle AE(C) Practice  
Life-Cycle Cost Models for Green Buildings  
Life Cycle Assessment for Construction Products  
Whole Life-Cycle Costing  
Life Cycle Design  
How to Calculate Embodied Carbon  
Towards a Sustainable Future - Life Cycle Management  
Life-Cycle of Engineering Systems: Emphasis on Sustainable Civil Infrastructure  
Life Cycle Assessment  
The Computational Structure of Life Cycle Assessment  
Sustainable Construction Technologies  
Embodied Carbon in Buildings  
Life-Cycle of Engineering Systems: Emphasis on Sustainable Civil Infrastructure  
Life Cycle Assessment  
Life-Cycle Greenhouse Gas Emissions of Commercial Buildings  
Pavement, Roadway, and Bridge Life Cycle Assessment 2020  
Estimating for Builders and Surveyors  
Proceedings of the 25th International Symposium on Advancement of Construction Management and Real Estate  
Life-cycle Assessment in Building and Construction  
Environmental Life Cycle Analysis  
Life Cycle Assessment in the Built Environment  
Life Cycle Costing for Construction  
Project Life Cycle Economics  
Integrated life cycle assessment of concrete structures  
Life Cycle Analysis and Assessment in Civil Engineering: Towards an Integrated Vision  
Life Cycle Analysis and Assessment in Civil Engineering: Towards an Integrated Vision  
Life Cycle Sustainability Assessment (LCSA)  
Life Cycle Costing for Design Professionals  
A life cycle approach to buildings  
Life-cycle of Structural Systems  
Life Cycle Impact Assessment

Life Cycle Design  
Life Cycle Costing for Facilities  
Integrated Solid Waste Management: A Lifecycle Inventory  
Life Cycle Assessment in the Built Environment  
Whole Building Life Cycle Assessment

*Life Cycle Analysis In  
Construction Industry  
The Case Of A  
University Building*

Downloaded from  
<ftp.wtvq.com> by guest

---

## NEAL HARRISON

---

*Life-cycle Assessment in Building and Construction* Butterworth-Heinemann  
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.

**Life Cycle Assessment for Construction Products** Taylor & Francis

This open access book includes a selection of contributions from the Life Cycle Management 2019 Conference (LCM) held in Poznań, Poland, and presents different examples of scientific and practical contributions, showing an incorporation of life cycle approach into the decision processes on strategic and operational level. Special attention is drawn to applications of LCM to target, organize, analyze and manage product-related information and activities towards continuous improvement, along the different products life cycle. The selection of case studies presents LCM as a business management approach that can be used by all types of businesses and organizations in order to improve their sustainability performance. This book provides a cross-

sectoral, current picture of LCM issues. The structure of the book is based on five-theme lines. The themes represent different objects that are focused on sustainability and LCM practices mainly related to: products, technologies, organizations, markets and policy issues as well as methodological solutions. The book brings together presentations from the world of science and the world of enterprises as well as institutions supporting economic development.

Building Life-cycle Management. Information Systems and Technologies  
Springer

Written for students taking courses in building and surveying, 'Estimating for Builders and Surveyors' describes and explains the method used by the estimator to build up prices or rates for items described in the SMM7 format. Each chapter is a self-contained unit related to a particular element in the building. Worked examples throughout reflect both traditional and up-to-date technology. Written by an author team of academics and professional surveyors, this book continues to be an invaluable introduction to the subject of estimating.

**Eco-efficient Construction and Building Materials** Butterworth-Heinemann

Eco-efficient Construction and Building Materials reviews ways of assessing the environmental impact of construction and building materials. Part one discusses the application of life cycle assessment (LCA) methodology to building materials as well as eco-labeling. Part two includes case studies showing the application of LCA methodology to different types of building material, from cement and concrete to wood and adhesives used in building. Part three includes case studies

applying LCA methodology to particular structures and components. Reviews ways of assessing the environmental impact of construction and building materials Provides a thorough overview, including strengths and shortcomings, of the life cycle assessment (LCA) and eco-labeling of eco-efficient construction and building materials Includes case studies showing the application of LCA methodology to different types of building material, from cement and concrete to wood and adhesives used in building

Change Management Towards Life Cycle AE(C) Practice Springer Nature

This revised second edition of the standard reference for design professionals supplies an arsenal of economic weapons for constructing, operating, and managing buildings at the lowest cost possible. Everything professionals need to put the latest construction-related strategies to work is right here in one convenient, quick reference guide.

**Life-Cycle Cost Models for Green Buildings** CRC Press

This volume contains the papers presented at IALCCE2018, the Sixth International Symposium on Life-Cycle Civil Engineering (IALCCE2018), held in Ghent, Belgium, October 28-31, 2018. It consists of a book of extended abstracts and a USB device with full papers including the Fazlur R. Khan lecture, 8 keynote lectures, and 390 technical papers from all over the world. Contributions relate to design, inspection, assessment, maintenance or optimization in the framework of life-cycle analysis of civil engineering structures and infrastructure systems. Life-cycle aspects that are developed and discussed range from structural safety and durability to sustainability,

serviceability, robustness and resilience. Applications relate to buildings, bridges and viaducts, highways and runways, tunnels and underground structures, off-shore and marine structures, dams and hydraulic structures, prefabricated design, infrastructure systems, etc. During the IALCCE2018 conference a particular focus is put on the cross-fertilization between different sub-areas of expertise and the development of an overall vision for life-cycle analysis in civil engineering. The aim of the editors is to provide a valuable source of cutting edge information for anyone interested in life-cycle analysis and assessment in civil engineering, including researchers, practising engineers, consultants, contractors, decision makers and representatives from local authorities.

#### **Life Cycle Assessment for**

**Construction Products** Springer Science & Business Media

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.

*Whole Life-Cycle Costing* Walter de Gruyter

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.

#### **Life Cycle Design** Springer Nature

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.

*How to Calculate Embodied Carbon* CRC Press

This proceedings book focuses on innovation, cooperation, and sustainable development in the fields of construction management and real estate. The book provides a detailed analysis and description of the disciplinary frontiers in the field of building management and real estate and how they can be promoted in the context of the epidemic. A wide variety of papers provide a reference value for both scholars and practitioners. The proceedings book is the documentation of "the 25th International Symposium on Advancement of Construction Management and Real Estate" (CRIOCM 2020), which was held at the School of Public Administration, Central China Normal University, Wuhan, China, in 2020.

*Towards a Sustainable Future - Life Cycle Management* CRC Press

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  $\text{€CO}$ , 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.

**Life-Cycle of Engineering Systems: Emphasis on Sustainable Civil**

**Infrastructure** McGraw-Hill Companies  
This book gathers the latest advances, innovations, and applications in the field of information systems and construction engineering, as presented by researchers and engineers at the International Scientific Conference Building Life-cycle Management. Information Systems and Technologies, held in Moscow, Russia on November 26,

2021. It covers highly diverse topics, including Information modeling technologies in building life-cycle management, Mathematical models and methods for building life-cycle management, Management of organizational processes in construction. The contributions, which were selected by means of a rigorous international peer-review process, highlight numerous exciting ideas that will spur novel research directions and foster multidisciplinary collaborations in the construction industry.

#### Life Cycle Assessment Routledge

This book offers a detailed presentation of the principles and practice of life cycle impact assessment. As a volume of the LCA compendium, the book is structured according to the LCIA framework developed by the International Organisation for Standardisation (ISO) passing through the phases of definition or selection of impact categories, category indicators and characterisation models (Classification); calculation of category indicator results (Characterisation); calculating the magnitude of category indicator results relative to reference information (Normalisation); and converting indicator results of different impact categories by using numerical factors based on value-choices (Weighting). Chapter one offers a historical overview of the development of life cycle impact assessment and presents the boundary conditions and the general principles and constraints of characterisation modelling in LCA. The second chapter outlines the considerations underlying the selection of impact categories and the classification or assignment of inventory flows into these categories. Chapters three through thirteen explore all the impact categories that are commonly

included in LCIA, discussing the characteristics of each followed by a review of midpoint and endpoint characterisation methods, metrics, uncertainties and new developments, and a discussion of research needs. Chapter-length treatment is accorded to Climate Change; Stratospheric Ozone Depletion; Human Toxicity; Particulate Matter Formation; Photochemical Ozone Formation; Ecotoxicity; Acidification; Eutrophication; Land Use; Water Use; and Abiotic Resource Use. The final two chapters map out the optional LCIA steps of Normalisation and Weighting.

#### *The Computational Structure of Life Cycle Assessment* Springer Nature

The financing of modern construction projects reflects the need to address the costs and benefits of the whole life of the project. This means that end of life economics can now have a far greater impact on the planning and feasibility phases. During the project itself, decisions on construction materials and processes all influence the schedule as well as both immediate and down-the-line costs. Massimo Pica and his co-authors explain in detail the fundamentals of project life cycle economics and how they apply in the context of complex modern construction. This is an essential guide for those involved in construction project design, tendering and contracting; to help ensure the sustainability of the project or their contribution to it, from the start. It is also important for those involved in the delivery of the project to help them make the choices to keep the project on a financial even keel. Government, corporations and other organizations are looking for new models of collaborative working to fund their large construction and infrastructure projects in the face of changing attitudes to risk; a better

educated and more demanding base of end-user clients and the increasing requirements for projects that are environmentally responsible and sustainable. Project Life Cycle Economics is a fundamental primer for those commissioning and those delivering construction.

*Sustainable Construction Technologies*  
Routledge

This comprehensive resource provides expert guidance on how Life Cycle Costing (LCC) can optimize decision-making and enhance long-term profit. Sixteen case studies show how to apply LCC to particular facility types and building components, in a new construction and remodeling.

*Embodied Carbon in Buildings* SETAC

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.

Life-Cycle of Engineering Systems: Emphasis on Sustainable Civil Infrastructure CRC Press

The trend in industry and with the EPA is to prevent wastes before they are created instead of treating or disposing of them later. This book assists design/systems engineers and managers in designing or changing a product or set of processes in order to minimize the negative impact on the environment during its life cycle. It explains the overall concept of environmental life cycle analysis and breaks down each of the stages, providing a clear picture of the issues involved. Chapters 1 and 2 provide an introduction and overview of the environmental life cycle analysis process. Chapter 3 establishes the basis and methodologies required for analysis through description of the basic framework, definition of boundaries, use of checklists, data gathering processes, construction of models, and interpretation of results. Templates and special cases that may be encountered and how to handle them are addressed in Chapter 4. Chapters 5 through 9 go into detail about modeling, issues, and data collection for each stage of the product life cycle. The final chapter provides a summary of the various steps and offers ideas on how to present data and reports.

**Life Cycle Assessment** Springer  
Nature  
Life-Cycle Cost Models for Green

Buildings: With Optimal Green Star Credits illustrates the tools and methods for developing a life-cycle cost model that incorporates developer constraints while maximizing the number of credit points achieved. The book identifies the interdependencies among various credits in the Green Star environmental rating system. Afterwards, life-cycle cost is calculated by considering six main central business districts (CBDs) of Australia. The net present value (NPV) technique is used to calculate life-cycle costs. Further, a sensitivity analysis is also carried out for selected credits to identify the changes to life-cycle cost to the changes in discount rate. Once all the life-cycle cost data is calculated, this book illustrates the development of the proposed model using a Java application which allows users to evaluate each key criterion of green buildings separately. The book is designed to provide ample knowledge of the various options available to get green building certification and the further implications in-terms of life-cycle. Provides cost saving and management advice for keeping a green building project operating on time and budget throughout their life-cycle. Expertly explains the various options available for gaining green building certification. Allows users to build life-cycle cost models which is unique to the project at hand.

*Life-Cycle Greenhouse Gas Emissions of Commercial Buildings* Royal Society of Chemistry

The book explores how architectural, engineering and construction (AEC) firms have been adapting and changing to effectively address key environmental challenges, focusing on Life Cycle Thinking and related methodologies (Life Cycle Assessments and Life Cycle

Costing). Starting from current practice, the book outlines the necessary change management to turn into life cycle AE(C) practice, switching from a product-technology mindset to a life cycle thinking and holistic approach. Although the primary audience of the book are Architectural and Engineering firms, the broad range of topics encourages readers from different backgrounds to explore the latest advancements in construction sector. Service companies and software developers can find inspiration to develop innovative tools and solutions, clients can find ways to demand sustainability as key target for building design and universities can align academic programmes to address new industry challenges.

Pavement, Roadway, and Bridge Life Cycle Assessment 2020 RSMears

This volume contains the papers presented at IALCCE2016, the fifth International Symposium on Life-Cycle Civil Engineering (IALCCE2016), to be held in Delft, The Netherlands, October 16-19, 2016. It consists of a book of extended abstracts and a DVD with full papers including the Fazlur R. Khan lecture, keynote lectures, and technical papers from all over the world. All major aspects of life-cycle engineering are addressed, with special focus on structural damage processes, life-cycle design, inspection, monitoring, assessment, maintenance and rehabilitation, life-cycle cost of structures and infrastructures, life-cycle performance of special structures, and life-cycle oriented computational tools. The aim of the editors is to provide a valuable source for anyone interested in life-cycle of civil infrastructure systems, including students, researchers and practitioners from all areas of engineering and industry.