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

Whole Life-Cycle Costing
Lifetime Environmental Impact of Buildings
Evaluation Sustainability Design
Life-cycle Assessment in Building and Construction
Life Cycle Assessment on Green Building Implementation
Life Cycle Assessment
Life Cycle Design
Project Life Cycle Economics
Life Cycle Assessment of Tall Building Structural Systems
Environmental Life-cycle Assessment of Highway Construction Projects
Environmental Life Cycle Assessment of Goods and Services
Progress in Life Cycle Assessment 2019
Life Cycle Assessment in the Built Environment
Life Cycle Analysis in Construction Industry
Life Cycle Assessment
Life-cycle of Structural Systems
Obtaining Life-Cycle Cost-Effective Facilities in the Department of Defense
Integrated Life Cycle Design of Structures
Change Management Towards Life Cycle AE(C) Practice
Pay Now or Pay Later
Pavement, Roadway, and Bridge Life Cycle Assessment 2020
Life Cycle Costing for Facilities
A life cycle approach to buildings
Life Cycle Design
Life Cycle Costing for Design Professionals
Integrated life cycle assessment of concrete structures
Building Life-cycle Management. Information Systems and Technologies
Using Anticipatory Life Cycle Assessment to Enable Future Sustainable Construction
Analysis of the Life Cycle of a Built Environment
Life-Cycle Greenhouse Gas Emissions of Commercial Buildings
Life Cycle Assessment
Life Cycle Analysis and Assessment in Civil Engineering: Towards an Integrated Vision
Eco-efficient Construction and Building Materials
Life Cycle Sustainability Assessment (LCSA)
Life-Cycle Cost Models for Green Buildings
Handbook of Energy Efficiency in Buildings
Life Cycle Prediction and Maintenance of Buildings
Analyzing the Practice of Life Cycle Assessment
Making Life Cycle Assessment of Buildings a Part of Everyday Building Design Through BIM-based Integration

BURNETT JULISSA

Whole Life-Cycle Costing Nova Science Publishers
Life-cycle Assessment in Building and ConstructionSETACSustainable Construction TechnologiesButterworth-Heinemann
Lifetime Environmental Impact of Buildings Walter de Gruyter
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.

Evaluation Sustainability Design National Academies Press

Life cycle assessment (LCA) is a quantitative tool used to evaluate the environmental impacts of products or processes. With respect to buildings, LCA can be used to evaluate the environmental impacts of an entire building's life cycle. Currently LCA in the building area is used in a limited capacity, primarily to select building products. In order to determine the causality for the lack of whole-building LCAs, focus groups with members of the architecture, engineering, and construction (AEC) communities were held. This article investigates the current level of knowledge of LCA in the AEC community and then discusses the benefits and barriers to the practice of LCA. In summary, the goal of the research was to identify why LCA is not used to its fullest potential in a whole-building LCA. In an open forum and moderated setting, focus group participants were asked individually to self-identify their experience with LCA, a brief education session on LCA was held, and then benefits and barriers to LCA were discussed. The focus group sessions were transcribed and systematically coded by social researchers in order to analyze the results. Hybrid flow and radar charts were developed. From the focus group results, the most important benefit to LCA was “provides information about environmental impacts.” The results did not identify a prominent barrier; however, building-related metrics were ascertained to be one of the more crucial barriers. The benefits and barriers classified by this analysis will be utilized to develop a subsequent online survey to further understand the LCA and AEC community.

Life-cycle Assessment in Building and Construction CRC Press

Facility designers and owners are frustrated with cost-cutting efforts that yield the cheapest product, but sacrifice quality. Life cycle costing, properly done, enables them to achieve both – high quality and costs that meet their budgets. The authors, widely recognized leaders in these techniques, show how LCC can work for a broad variety of projects – from several types of buildings, to roads and bridges, to HVAC and electrical upgrades, to materials and equipment procurement. LCC can be applied to every aspect of construction – from all types of buildings (commercial, educational, industrial, health care and more), to roads and bridges, to HVAC equipment and electrical systems upgrades and materials and equipment procurement. A life cycle costs section, a major part of the book, provides maintenance and replacement costs for all elements of the facility – from the foundation and structure to the walls and floors, plumbing, HVAC and electrical systems, and landscaping. The electronic life cycle costing spreadsheet program included with the book simplifies the process of applying LCC to users’ own projects. FEATURES: There are also sixteen Case Studies that show how to apply LCC to particular facility types and building components, including: Health care and nursing facilities College campus and high schools Office buildings, courthouses, and banks Chemical plants and museum renovations Regional highway systems Exterior walls, elevators, lighting, HVAC, and more The book’s extensive cost section provides maintenance and replacement costs for facility elements... from foundation and structure to walls and floors, plumbing, HVAC and electrical, and landscaping. These proven methods are equally effective in new construction, remodeling, renovations, and restorations.

Life Cycle Assessment on Green Building Implementation fib Fédération Internationale du béton

The life cycle assessment (LCA) methodology is one of the most applied ways to evaluate the environmental impacts of buildings and is an important part for sustainability in the construction sector. This dissertation proposes an analytical process addressing the subject of making life cycle assessment of buildings a part of everyday building design through BIM-based methodologies. The focus was on LCA-BIM integration and LCA results interpretation in context of building design. After an expansive literature review, a methodology was developed and tested on theoretical case study involving multiple building design alternatives. The results showed that the integration of LCA analysis into BIM enabled a smooth compilation of multiple design alternatives, accurate data acquisition, clear processing of outcomes and a comprehensive comparison of design variants based on the set of environmental criteria. From a buildings designer point of view, the LCA results interpretation showed to be complex as there are no standardised guidelines on how to evaluate LCA results of multiple design alternatives. Study findings showed that building designer decisions can be influenced by the LCA interpretation method/ concept, which can lead to diverse design decisions. Additionally, through a real-life case study, we underlined that the LCA concepts should be included in early design stages. We conclude that the BIM-LCA integration is achievable, which we presented through the methodology developed in this dissertation, and that building designer should have standardised guidance when interpreting LCA results in order to simplify the decision-making process when evaluating multiple design alternatives.

Life Cycle Assessment Taylor & Francis

Environmental life cycle assessment is often thought of as cradle to grave and therefore as the most complete accounting of the environmental costs and benefits of a product or service. However, as anyone who has done an environmental life cycle assessment knows, existing tools have many problems: data is difficult to assemble and life cycle studies take months of effort. A truly comprehensive analysis is prohibitive, so analysts are often forced to simply ignore many facets of life cycle impacts. But the focus on one aspect of a product or service can result in misleading indications if that aspect is benign while other aspects pollute or are otherwise unsustainable. This book summarizes the EIO-LCA method, explains its use in relation to other life cycle assessment models, and provides sample applications and extensions of the model into novel areas. A final chapter explains the free, easy-to-use software tool available on a companion website. (www.eiolca.net) The software tool provides a wealth of data, summarizing the current U.S. economy in 500 sectors with information on energy and materials use, pollution and greenhouse gas discharges, and other attributes like associated occupational deaths and injuries. The joint project of twelve faculty members and over 20 students working together over the past ten years at the Green Design Institute of Carnegie Mellon University, the EIO-LCA has been applied to a wide range of products and services. It will prove useful for research, industry, and in economics, engineering, or interdisciplinary classes in green design.

Life Cycle Design Springer

Buildings and other public facilities can have very long and productive service lives, providing efficient shelter and serving a wide range of activities. To do so, however, these facilities must be managed effectively, in a manner consistent with key design decisions. A variety of political and technical obstacles to effective management raise the public's total cost of ownership for these facilities, particularly when actions to deal with short-term government budget deficits have long-term, high-cost consequences. This book identifies obstacles to controlling the costs of ownership and suggests ways these obstacles can be overcome.

Project Life Cycle Economics Woodhead Publishing

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.

Springer

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 Assessment of Tall Building Structural Systems Springer Nature

We now find ourselves in an age where "green design" is at the forefront of many tall building projects around the world, where it seems that every year brings new technologies and innovations that are touted as the be-all and end-all for a long-term sustainable future. But these solutions tend to only reduce the environmental impacts of a building during its operation phases, with the stages before and after this period often neglected. This is perhaps best illustrated by the fact that the world is currently constructing tall buildings in excess of 1,000 meters in height yet we have never demolished a building of even 200 meters in height through conventional means. Despite this reality, our cities continue to be filled with myriad skyscrapers, most of which are not given full considerations for their entire life cycle, or end-of-life. Through the Life Cycle Assessment (LCA) methodology, we can gauge the environmental consequences of human actions by analyzing the flow of materials used in a building and trace the environmental impacts linked to each stage of its life cycle. When information from each stage is combined, a holistic picture of environmental impacts can be formed for a given product, one that acknowledges the various actions that are required to bring a single entity into existence through contemporary means. This research identifies and compares the life cycle implications for the structural systems found in 60- and 120-story buildings. It is intended to inform the international community of professionals and researchers specializing in tall buildings on the life cycle environmental performance of the most common structural systems by providing the most accurate, up-to-date analysis on two key impact categories: Global Warming Potential (GWP) and Embodied Energy (EE). In doing this it presents interesting research results, and also lays down a methodology in this emerging field for others to follow.

Environmental Life-cycle Assessment of Highway Construction Projects CRC Press

This book is a printed edition of the Special Issue "Life Cycle Assessment on Green Building Implementation" that was published in Sustainability

Environmental Life Cycle Assessment of Goods and Services SETAC

This work discusses the impact of the life of buildings on sustainable development methods. The study of the lifespan of the building is used to assess and manage the environmental impacts associated with all the stages of a product's life, from raw material extraction through to repair, maintenance and 'end of life' scenarios. While several papers have discussed the greenhouse gas emissions of buildings, less research has been done on how these are affected by the lifespan of the building. This book serves to highlight the pertinence of this factor and contributes to providing new ideas on efficiency within the life cycle assessment of a structure.

Progress in Life Cycle Assessment 2019 Routledge

This book is a uniquely pedagogical while still comprehensive state-of-the-art description of LCA-methodology and its broad range of applications. The five parts of the book conveniently provide: I) the history and context of Life Cycle Assessment (LCA) with its central role as quantitative and scientifically-based tool supporting society’s transitioning towards a sustainable economy; II) all there is to know about LCA methodology illustrated by a red-thread example which evolves as the reader advances; III) a wealth of information on a broad range of LCA applications with dedicated chapters on policy development, prospective LCA, life cycle management, waste, energy, construction and building, nanotechnology, agrifood, transport, and LCA-related concepts such as footprinting, ecolabelling,design for environment, and cradle to cradle. IV) A cookbook giving the reader recipes for all the concrete actions needed to perform an LCA. V) An appendix with an LCA report template, a full example LCA report serving as inspiration for students who write their first LCA report, and a more detailed overview of existing LCIA methods and their similarities and differences.

Life Cycle Assessment in the Built Environment Routledge

Environmental Life Cycle Assessment (ELCA) that was developed about three decades ago demands a broadening of its scope to include lifecycle costing and social aspects of life cycle assessment as well, drawing on the three-pillar or ‘triple bottom line’ model of sustainability, which is the result of the development of the Life Cycle Sustainability Assessment (LCSA). LCSA refers to the evaluation of all environmental, social and economic negative impacts and benefits in decision-making processes towards more sustainable products throughout their life cycle. Combination of environmental and social life cycle assessments along with life cycle costing leads to life cycle sustainability assessment (LCSA). This book highlights various

aspects of life cycle sustainability assessment (LCSA).

Life Cycle Analysis in Construction Industry LAP Lambert Academic Publishing

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.

Life Cycle Assessment Routledge

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

Life-cycle of Structural Systems Butterworth-Heinemann

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.

Obtaining Life-Cycle Cost-Effective Facilities in the Department of Defense Butterworth-Heinemann

The Department of Defense (DoD) constructs, operates, and maintains a large number of facilities. DoD incorporates life-cycle cost-effective practices into many aspects of the military planning and construction processes. This report provides RAND's description and assessment of the process used to obtain life-cycle cost-effective facilities and how that affects DoD construction options and choices.

Integrated Life Cycle Design of Structures John Wiley & Sons

Traditionally the process of design has concentrated on the construction phase itself, with the primary objective being to optimise efficiency and minimise costs during development and construction. With the move towards a more sustainable development comes the need for this short-term approach to be expanded to encompass the entire service life of the structure. This book describes how to optimise the service life of structures, through an optimum integrated life cycle design process. Sustainability and material performance issues are detailed. Integrated Life Cycle Design of Structures provides a comprehensive account of this rapidly emerging field. It is essential reading for civil and structural engineers, designers, architects, contractors, and clients.

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

Life-cycle inventory assessment (LCIA) provides us with quantity estimates of the inputs and outputs from a system. There have been limited applications of life-cycle assessment (LCA) to road construction in the United States. This thesis presents a lifecycle inventory of the environmental emissions to air from the construction of 3.2 miles (four lanes of highway) of a road in Texas. A process-based approach, which is basically a material and energy balance approach, was used and compared with the economic input-output life-cycle assessment (EIOLCA) method. The EIOLCA provides environmental emissions on the basis of a dollar value of a product or service used. A hybrid method was also employed to quantify emissions from the road. This hybrid method is an extension of the EIOLCA and is a recently developed method. Five major airborne emissions such as CO2, CO, NOx, SO2, and PM were quantified but the comparisons with other methods were done using CO2 as it had the highest value in emissions. The results of the process-based approach revealed that 18,590 tons of CO2 were released to the environment, while the EIOLCA approach provided an estimate of 750 tons of CO2 released. This thesis highlights the weak points of both methods and makes suggestions to improve both. Sensitivity analysis provides an estimate of the impact of different input values on the output. The results show that the emission factors utilized for calculating emissions affect the output the most. This research, by conducting an inventory assessment on a case study and comparing it with other methods, has shown that though the EIOLCA is a widely accepted method, the results provided are not always accurate. For individual cases, a combination of a process-based approach and an EIOLCA needs to be adopted.