DOWNLOAD PDF LIFE CYCLE TRIBOLOGY

Chapter 1 : Tribology Conferences

Over the three days of presentations that followed, life cycle tribology was explored across a range of areas including automotive tribology, bearings, bio-degradability and sustainability, bio-tribology, coatings, condition monitoring, contact mechanics, debris effects, elastohydrodynamic lubrication, lubricants, machine systems, nanotribology.

Agri-footprint Comprehensive Environmental Data Archive CEDA [24] Calculations for impact can then be done by hand, but it is more usual to streamline the process by using software. This can range from a simple spreadsheet, where the user enters the data manually to a fully automated program, where the user is not aware of the source data. For example, trees produce paper, which can be recycled into low-energy production cellulose fiberised paper insulation , then used as an energy-saving device in the ceiling of a home for 40 years, saving 2, times the fossil-fuel energy used in its production. After 40 years the cellulose fibers are replaced and the old fibers are disposed of, possibly incinerated. All inputs and outputs are considered for all the phases of the life cycle. The use phase and disposal phase of the product are omitted in this case. Cradle-to-gate assessments are sometimes the basis for environmental product declarations EPD termed business-to-business EDPs. This allows the LCA to collect all of the impacts leading up to resources being purchased by the facility. They can then add the steps involved in their transport to plant and manufacture process to more easily produce their own cradle-to-gate values for their products. Cradle to Cradle Design Cradle-to-cradle is a specific kind of cradle-to-grave assessment, where the end-of-life disposal step for the product is a recycling process. It is a method used to minimize the environmental impact of products by employing sustainable production, operation, and disposal practices and aims to incorporate social responsibility into product development. Various methods, such as the avoided burden approach have been proposed to deal with the issues involved. Gate-to-gate modules may also later be linked in their appropriate production chain to form a complete cradle-to-gate evaluation. The analysis is often broken down into stages entitled "well-to-station", or "well-to-tank", and "station-to-wheel" or "tank-to-wheel", or "plug-to-wheel". The first stage, which incorporates the feedstock or fuel production and processing and fuel delivery or energy transmission, and is called the "upstream" stage, while the stage that deals with vehicle operation itself is sometimes called the "downstream" stage. The well-to-wheel analysis is commonly used to assess total energy consumption, or the energy conversion efficiency and emissions impact of marine vessels , aircraft and motor vehicles , including their carbon footprint , and the fuels used in each of these transport modes. The well-to-wheel variant has a significant input on a model developed by the Argonne National Laboratory. The model evaluates the impacts of fuel use using a well-to-wheel evaluation while a traditional cradle-to-grave approach is used to determine the impacts from the vehicle itself. The model reports energy use, greenhouse gas emissions , and six additional pollutants: Additionally the translation of economic quantities into environmental impacts is not validated. It was designed to provide a guide to wise management of human activities by understanding the direct and indirect impacts on ecological resources and surrounding ecosystems. Developed by Ohio State University Center for resilience, Eco-LCA is a methodology that quantitatively takes into account regulating and supporting services during the life cycle of economic goods and products. In this approach services are categorized in four main groups: This exergetic material input per unit of service EMIPS has been elaborated for transport technology. The service not only takes into account the total mass to be transported and the total distance, but also the mass per single transport and the delivery time. An earlier term for the approach was energy analysis. Net energy content is the energy content of the product minus energy input used during extraction and conversion , directly or indirectly. A controversial early result of LCEA claimed that manufacturing solar cells requires more energy than can be recovered in using the solar cell[citation needed]. The result was refuted. Energy Cannibalism refers to an effect where rapid growth of an entire energy-intensive industry creates a need for energy that uses or cannibalizes the energy of existing power plants. Thus during rapid growth the industry as a whole produces no energy because new energy is used to fuel the embodied energy of future power plants. Work has been undertaken in the UK to determine the life cycle energy alongside full LCA impacts of a number of renewable technologies. This

provides a low-impact energy source, especially when compared with coal and natural gas [48] While incineration produces more greenhouse gas emissions than landfilling , the waste plants are well-fitted with filters to minimize this negative impact. A recent study comparing energy consumption and greenhouse gas emissions from landfilling without energy recovery against incineration with energy recovery found incineration to be superior in all cases except for when landfill gas is recovered for electricity production. Incorporating Dynamic LCAs of renewable energy technologies using sensitivity analyses to project future improvements in renewable systems and their share of the power grid may help mitigate this criticism. Some papers have focused on energy life cycle, [52] [53] [54] while others have focused on carbon dioxide CO2 and other greenhouse gases. If this is not done, a given class of energy technology may emit more CO2 over its lifetime than it mitigates. A thermodynamic measure of the quality of energy is exergy. According to the first law of thermodynamics , all energy inputs should be accounted with equal weight, whereas by the second law diverse energy forms should be accounted by different values. Not every factor, however, can be reduced to a number and inserted into a model. Rigid system boundaries make accounting for changes in the system difficult. This is sometimes referred to as the boundary critique to systems thinking. The accuracy and availability of data can also contribute to inaccuracy. For instance, data from generic processes may be based on averages , unrepresentative sampling , or outdated results. Comparative life-cycle analysis is often used to determine a better process or product to use. However, because of aspects like differing system boundaries, different statistical information, different product uses, etc. A wide variety of methods and assumptions were used, leading to different and potentially contrary conclusions â€" particularly with regard to carbon sequestration and methane generation in landfills and with carbon accounting during forest growth and product use. First, a proper method should be selected to combine adequate accuracy with acceptable cost burden in order to guide decision making. However, the former one only could provide limited details and the latter one with more detailed information is more expensive. Second, single measure of stress should be selected. Typical LCA output includes resource consumption , energy consumption, water consumption, emission of CO2 , toxic residues and so on. One of these outputs is used as the main factor to measure in streamline LCA. Last, stress selected in step 2 is used as standard to assess phase of life separately and identify the most damaging phase. For instance, for a family car, energy consumption could be used as the single stress factor to assess each phase of life. The result shows that the most energy intensive phase for a family car is the usage stage. LCA data of surface engineered materials [63] are used to improve life cycle of the engineered component. Life cycle improvement of industrial machineries and equipments including, manufacturing, power generation, transportations, etc.

Chapter 2 : Life Cycle and Biology â€“ Gypsy Moth in Wisconsin

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All butterflies have "complete metamorphosis. Each stage has a different goal - for instance, caterpillars need to eat a lot, and adults need to reproduce. Depending on the type of butterfly, the life cycle of a butterfly may take anywhere from one month to a whole year. You can print out this Butterfly Life Cycle coloring page to follow along as we talk about the 4 stages. The Egg Butterfly Eggs on a Leaf A butterfly starts life as a very small, round, oval or cylindrical egg. The coolest thing about butterfly eggs, especially monarch butterfly eggs, is that if you look close enough you can actually see the tiny caterpillar growing inside of it. Some butterfly eggs may be round, some oval and some may be ribbed while others may have other features. The egg shape depends on the type of butterfly that laid the egg. Butterfly eggs are usually laid on the leaves of plants, so if you are actively searching for these very tiny eggs, you will have to take some time and examine quite a few leaves in order to find some. The Larva Caterpillar Butterfly Caterpillar When the egg finally hatches, most of you would expect for a butterfly to emerge, right? Butterfly larvae are actually what we call caterpillars. Caterpillars do not stay in this stage for very long and mostly, in this stage all they do is eat. When the egg hatches, the caterpillar will start his work and eat the leaf they were born onto. This is really important because the mother butterfly needs to lay her eggs on the type of leaf the caterpillar will eat â€" each caterpillar type likes only certain types of leaves. Since they are tiny and can not travel to a new plant, the caterpillar needs to hatch on the kind of leaf it wants to eat. Caterpillars need to eat and eat so they can grow quickly. When a caterpillar is born, they are extremely small. When they start eating, they instantly start growing and expanding. From the outside of the pupa, it looks as if the caterpillar may just be resting, but the inside is where all of the action is. Inside of the pupa, the caterpillar is rapidly changing. Monarch Caterpillar Becoming a Chrysalis Now, as most people know, caterpillars are short, stubby and have no wings at all. Adult Butterfly Butterfly Emerging from a Chrysalis Finally, when the caterpillar has done all of its forming and changing inside the pupa, if you are lucky, you will get to see an adult butterfly emerge. When the butterfly first emerges from the chrysalis, both of the wings are going to be soft and folded against its body. This is because the butterfly had to fit all its new parts inside of the pupa. Watch a Monarch Hatching As soon as the butterfly has rested after coming out of the chrysalis, it will pump blood into the wings in order to get them working and flapping â€" then they get to fly. Usually within a three or four-hour period, the butterfly will master flying and will search for a mate in order to reproduce. When in the fourth and final stage of their lives, adult butterflies are constantly on the look out to reproduce and when a female lays their eggs on some leaves, the butterfly life cycle will start all over. These kids got to observe live Painted Lady caterpillars turn into Butterflies. There are many different ways that you can catch this miracle happen right before your eyes, for instance, there are live butterfly kits that come with caterpillars so you can see this amazing transformation right in front of you! One of the greatest things about these live butterfly kits is the fact that after the butterflies hatch out of their pupas, you can observe them for a little while and then let them go! Letting your butterflies go is not only a satisfying experience but it is one that is very important to teach your children. Children have to learn that animals do not need to be locked up and while it is okay to observe them sometimes, it is always best to let nature take its course. This amazing life cycle is a great lesson for anyone to learn and it is not only a lesson that involves an ever-changing insect, but it is one that we can apply to ourselves as well. For instance, when a child is feeling down on themselves, you can explain to them that not only do people change inside every day, but insects like the butterfly do too. The butterfly life cycle is a great story to tell anyone and everyone and it is even better to observe it happen right in front of you. Live butterfly kits allow you to see for yourself the entire life cycle of this incredible creature and allows your children to learn more and more about these beautiful insects! Our articles are free for you to copy and distribute. Make sure to give www.

Chapter 3 : life cycle tribology | Download eBook PDF/EPUB

Life Cycle Tribology: 31st Leeds-Lyon Tribology Symposium by Duncan Dowson The 31st Leeds-Lyon Symposium on Tribology was held at Trinity and All Saints College in Leeds under the title "Life Cycle Tribology" from Tuesday 7th September until Friday 10th September

Energy Policy Vol 26 , pp. Energy Policy Vol 33 , pp. Energy Vol 84 , pp. Rice University, May 3 International Energy Agency, Paris, France Vol 57 , pp. Vol 2 , pp. Manufacturing Engineering and Technology, Pearson Vol 60 , pp. Vol 32 , pp. How Bad Are Bananas? The Carbon Footprint of Everything. Vol 59 , pp. This study analyzes the effects of technological progress for energy intensity and energy use related carbon dioxide emissions during urbanization in China by a dynamic computable general equilibrium model. The parameters about technological progress and urbanization are all exogenously given. The impacts of technological progress on economic growth, energy intensity and carbon dioxide emissions during period from to are examined. Simulation results show that gradually pushing energy efficiency related technologies through appropriate policy incentives is the key to realize low-carbonized development while promoting economic growth in China. The energy consumption for manufacturing processes is the largest impact contributor in various characterization categories, based on the assessment of environmental effects during the whole life cycle. It is necessary to investigate the manufacturing processes in depth to find out mechanism that can improve energy efficiency. This paper presents a comprehensive overview on two important aspects of energy consumption models for manufacturing processes: These models can improve energy efficiency. Series of low-carbon concepts, whose purpose is to make use of natural resources reasonably by reducing carbon emissions, innovating concepts, techniques and standards, are caused by sustainable development nowadays. From the perspective of residential construction, the author would discuss the feasibility of applying low carbon technology in buildings. Also he would give a specific analysis for different types of low carbon techniques to different residential buildings. Low-carbon development of energy mix plays an important role in changing the development mode of Shaanxi Province, adjusting the industrial structure, promoting green development low-carbon life, and properly dealing with climate change. This thesis selects the system dynamics method, built the system dynamics model of the energy consumption. Model selected 28 variables, through the test of history, obtained future data. Finally, put forward the relevant recommendations of the energy structure of low-carbon development in Shaanxi Province. Along with global climate warming, low-carbon economy attracts much attention and has become one of the research hotspots. As the old industrial base, Northeast China is the key to emission reduction. This paper analyses the development status of low-carbon economy in the northeast old industrial base from the economic development, energy consumption and carbon emissions, and then concludes four problems, including heavy industry which dominated in the economy, the severe disproportion in the energy consumption structure, the lack of technological innovation and the outdated equipment, the unreasonable supporting policy mechanism, finally puts forward corresponding countermeasures, transform traditional industries and develop burgeoning industries, optimize energy structure and develop clean energy, introduce highly efficient equipments and encourage technical innovation, make the planning strategies and innovate in policy mechanism.

Chapter 4 : Life-cycle assessment - Wikipedia

The 31st Leeds-Lyon Symposium on Tribology was held at Trinity and All Saints College in Leeds under the title "Life Cycle Tribology" from Tuesday 7th September until Friday 10th September

Chapter 5 : Energy Requirements in Manufacturing: Lifecycle and Tribology Considerations

Summary. The 31st Leeds-Lyon Symposium on Tribology was held at Trinity and All Saints College in Leeds under the title "Life Cycle Tribology" from Tuesday 7th September until Friday 10th September

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Chapter 7 : Life Cycle Tribology: Volume 48 : Duncan Dowson :

Life cycle assessment needs to be deployed to identify the potential significance of developments in tribology, and hence to prioritise effort. Even for passenger vehicles, extending service life is potentially at least as important as improving lubrication.

Chapter 8 : Life cycle | biology | blog.quintoapp.com

Description: Tribology in Environmental Design is an indispensable collection of chapters exploring the life cycle of all stages of tribological issues for product design. The contributors for this edition are from a wide range of disciplines and countries ensuring a comprehensive overview of Tribology in Environment Design.

Chapter 9 : Butterfly Life Cycle: Article with Lots of Pictures

Total Tribology is a term coined to express the practice of considering tribology at all stages of the lifecycle of interface components to reduce the impact of wear.