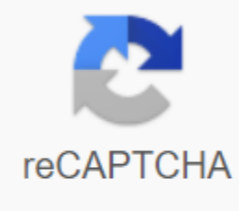




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Life cycle assessment of a pencil

Module 6: The overall purpose of pencil-making lifecycle analysis is to measure the potential impact, but it also triggers a whole new way for companies to think. To complete the pencil analysis, we used the methodology of identifying and scoping goals - defining systems, boundaries, assumptions, and data requirements. Measurement of pencils as functional units. Inventory analysis – Inputs and outputs. Use flowcharts to identify impact assessments and interpretations of primary and auxiliary materials – Identify quantitative or qualitative impacts on the local or global environment. Improvement analysis – opportunities for improvement and recommendations. Main contamination of products, prevention, and resource conservation. More than 14 billion pencils are produced every year around the world. Two billion of them are produced in the United States. The average pencil can write 4,500 words. The purpose of Pencil LCA (Life Cycle Analysis) was to determine the raw materials and production systems from raw materials to finished products, and to use environmental costs to determine the impact on the environment. I didn't complete an economical LCA or social LCA. The pencil data I collected is on top of the standard HB pencil. The basic life cycle flow can be shown in the following charts and production flows: forest > lumber > wood cut into pencil squares > wood dried in kilns to balance moisture > shipped to slats > pencil stock was cut into pencil blocks (slightly longer than normal pencils)> pencil blocks pencil slats Cut into (thin saw blades reduce waste of waste) and > defects screened full drying (short length). >Grading by width (cut to reduce the short length of waste)>, pencils shipped to the pencil factory > processed with pencils > shipped to a pencil factory > groover machine cut out grooves to accept lead > writing core (made from graphite and clay) inserted > glued two halves > stained with pencil > Glue metal rings and rubber cones>Metal rings and rubber cones>Ship erasers to packaging plants>>Consumer disposal>>; These inputs can be further expanded to an additional lifecycle analysis of each point: transportation: fuel, tires, parts forests: the impact on wild animals from logging (e.g., northern-potted owl habitats in the Pacific Northwest where most logging occurs) (Green, 2007). Manufacturing: Supply of paints, graphite, equipment raw materials: raw material consumption that affects resource input in wood, adhesives, graphite, paints, printing foils, metals and rubber environments - wood pencils require more than twice as much raw materials as raw materials and recycled paper materials than plastic pencils. Wood is usually harvested, cedar incense. However, a much higher percentage of the raw materials used in pencils with wood cases are recyclable, and wood pencils areHalf of the non-recyclable resources are made of plastic or recycled paper pencils. Adhesives contain animal adhesives or synthetic PVA. Pencils do not have lead, use all graphite and clay, but also contain fillers, pigments, animal fats, fatty acids, carboxylic acid, mineral waxes, mineral oils, and synthetic binders. Pencil paint coating consists of resins, fillers, pigments and dyes, metal pigments, flattening agents, flow and slip additives, fatty acids, binders, softeners, adhesives, vegetable oils, plasticizers and petroleum solvents. Eraser uses PVC eraser material (Halal Wood Case Pencil, 2014) water consumption - wooden case pencil consumes about 60% of water used in plastic pencils and about 10% of water consumed by paper pencils. Water is used to combine graphite, clay and other fillers, form a paste and then mold it into a rod. Energy consumption – Wooden pencils require the energy required by paper pencils and the same amount of energy as plastic pencils. Kosugi wood pencils take advantage of significantly more renewable energy sources than plastic and recycled paper pencils. Output : Environmental Output Atmospheric Emissions - Wood pencils bring less emissions of carbon dioxide, nitrogen oxides, carboxylic acids, and particulate matter plastic and paper pencils. Wooden pencils emit 5-6 times more carbon monoxide than plastic or paper pencils. Wood pencils emit more than three times as much organic pollutants as paper pencils, but only about 10% of plastic pencils. Wastewater Drainage - Wood pencils discharge a small amount of wastewater pollutants. In the case of plastic and paper pencils, the emissions of BOD and suspended solids will increase. - Wood pencils produce less solid waste in the pure process, which requires disposal than the other two pencil types, and suppress the disposal of consumer waste. Wood pencils produce significantly less hazardous waste than plastic or recycled paper pencils - a large part of this solid waste will later be recycled into various products while wood pencils produce more solid waste. Disposal: 1.6 billion pencils are thrown into landfills every year. Eco - efficiency can be introduced in pencil production through redesign. This has already been achieved by a company called Biopencil. Biopencils are produced from 100% natural compounds based on algae grown on collagen farms. Algae contain seeds in castings that can be planted when pencils are available, so production and disposal do not affect the environment. The casing of seaweed around the pencil helps to fertilize the soil to promote growth. Lumber and pencil production products are small with wastelt can be re-valued in the following ways: mushroom production: the cultivation of shiitake mushrooms, can be used for food fungi, wood shavings, and shavings. 70-100% of the dry mass of wood is consumed. Architectural Products: Germany has been using goring in particle plate production since 2007 Food processing: Traditional smoking for food conservation can use animal bedding smoldering waste: stables are more absorbent and can be bundled into blocks, so they require less storage, so use soldering. Environmental protection: A mixture of wood chips and compost can be used as a bio-filter to process odor air. A well-managed bio filter can reduce odor emission by 85%, hydrogen sulfide by 90%, and ammonia by about 60%. Researchers in Iowa, USA, have found that covering underground drainage tiles with wood chips can filter about 70% of nitrates caused by dead plants, human waste and crop fertilizers. When wood breaks down, bacteria convert nitrates into nitrogen gas. Lab tests have shown that if water is held in the system long enough, all nitrates can be effectively removed (Woodreport, 2012). The cost benefit of re-evaluating sodasts by product is the disposal costs of lumber and plants. The pencil market is driven by cost. The average retail price of wood/graphite pencils is 57 cents AU. If producers can eliminate or reduce cost drivers such as disposal and waste, this will reduce production costs. The impact on environmental marketing is unclear, but as consumer trends move to environmentally friendly products, this is seen only as a benefit. Pencil redesign and reduced raw material costs reduce the transportation of raw materials (wood, graphite, clay), but the initial production costs of manufacturing settings and the time it takes to build shares affect the benefits of economic costs. Biopencils do not give retail prices, they simply say their products by comparing prices to graphite pencils. The environmental advantages of introducing both forms of eco-efficiency are reduced emissions, reduced deforestation, soil conservation, reduction of chemical pollutants, and reduction of waste in landfills. The production of pencils can be improved using natural principles to solve production problems, biomimimilly. Instead of using glue, find out how animals stick to things. Geckos have small hairs and allow them to stick to the surface. Perhaps the adaptation of this principle can be used to eliminate the use of adhesives. To create the cradle principle of pencils and to make waste productive, biopencil products are closing life cycle loops using plant materials that break down 100% and regenerate and regenerate new plants. The cost benefit to the environment is to save 60,000 trees and reduce 1.6 billion trees each year.from landfills, transport emissions, related manufacturing emissions and carbon dioxide emissions. Economically, Biopencil provides a non-toxic and efficient production cycle that reduces transportation costs, raw material procurement and manufacturing, mining and waste disposal costs. Cost.

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