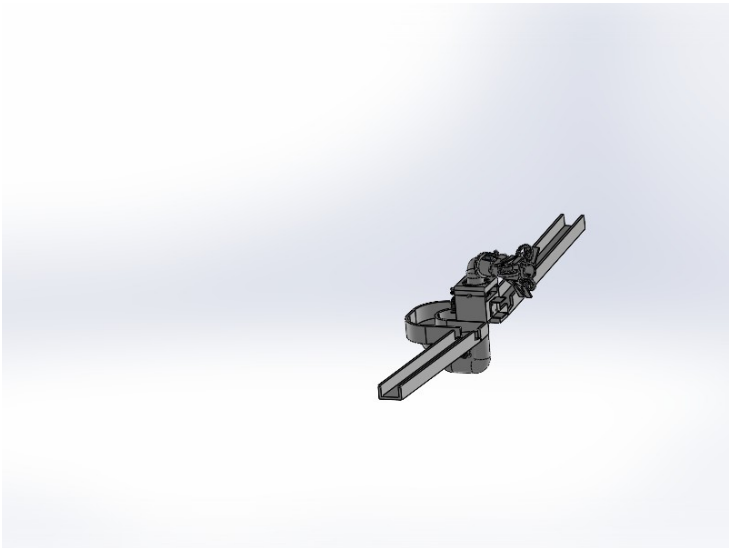
SOLIDWORKS
Sustainability Report

[Design of Table Tennis Ball Pitcher]

[ME 407: DESIGN PROJECT Group:C1]



Model Name:	Table Tennis Ball Pitcher
Weight:	4545.52 g
Built to last:	5.0 year
Duration of use:	5.0 year

Manufacturing Region
The choice of manufacturing region determines the energy resources and technologies used in modeled material creation and manufacturing steps of the product's life cycle.

Use Region
The use region is used to determine the energy resources consumed during the product use phase (if applicable) and the destination for the product at its end -of-life. Together with the manufacturing region, the use region is also used to estimate the environmental impacts associated with transporting the product from its manufacturing region to its use location.

Summary
The manufacturing region is selected to be Europe because most of the assembly have considerable simple parts that can be produced easily in Europe. Use region is also selected to be Europe.

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Assembly Process

Region :	Europe
Energy type:	Electricity
Energy amount:	3.00 kWh
Built to last:	5.0 year

Use

Region:	Europe
Energy type:	None
Energy amount:	0.00 kWh
Duration of use:	5.0 year

Transportation

Truck distance:	1900 km
Train distance:	0.00 km
Ship distance:	0.00 km
Airplane distance:	0.00 km

End of Life

Recycled:	40 %
Incinerated:	10 %
Landfill:	50 %

Comments

The energy required to assembly process is set to be 3 Kwh per day.
Since the manufacturing and use region is both set to be Europe, truck transportation is chosen.

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Environmental Impact (calculated using CML impact assessment methodology)

Carbon Footprint

Material:	93 kg CO_2e
Manufacturing:	18 kg CO_2e
Use:	0.00 kg CO_2e
Transport:	4.7 kg CO_2e
End of Life:	2.2 kg CO_2e

120 kg CO_2e

Total Energy Consumed

Material:	2100 MJ
Manufacturing:	320 MJ
Use:	0.00 MJ
Transport:	62 MJ
End of Life:	1.6 MJ

2500 MJ

Air Acidification

Material:	0.220 kg SO_2e
Manufacturing:	0.117 kg SO_2e
Use:	0.00 kg SO_2e
Transport:	0.069 kg SO_2e
End of Life:	1.1E-3 kg SO_2e

0.407 kg SO_2e

Water Eutrophication

Material:	0.066 kg PO_4e
Manufacturing:	4.3E-3 kg PO_4e
Use:	0.00 kg PO_4e
Transport:	8.2E-3 kg PO_4e
End of Life:	2.9E-3 kg PO_4e

0.081 kg PO_4e

Material Financial Impact

112.20 USD

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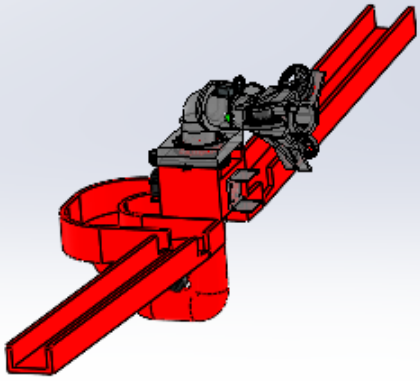
Component Environmental Impact

Top Ten Component Contributing Most to The Four Areas of Environmental Impact

Component	Carbon	Water	Air	Energy
Box	3.8	1.6E-3	0.012	75
Groove	3.4	1.6E-3	7.9E-3	68
Groove-2	3.4	1.6E-3	7.9E-3	68
PVC pipe	2.9	1.2E-3	8.2E-3	50
Main Body Bottom	2.5	1.1E-3	7.9E-3	51
4668K284 Permanently Lubricated Stainless Steel Ball Bearing	0.946	3.2E-3	4.0E-3	10
Main Body Top	0.813	3.6E-4	2.6E-3	16
Motor Attachment	0.528	2.4E-4	1.3E-3	11
Feeding Line	0.377	1.6E-4	1.2E-3	7.5
Slotted Pipe	0.315	1.3E-4	1.0E-3	6.2



Comments

The components which are contributing most to the environmental impact are shown in red color.

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RAW MATERIAL
EXTRACTION
MATERIAL
PROCESSING
PART
MANUFACTURING
ASSEMBLY
PRODUCT
USE
END OF LIFE
SUSTAINABLE
DESIGN

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Glossary

Air Acidification – Sulfur dioxide, nitrous oxides other acidic emissions to air cause an increase in the acidity of rainwater, which in tum acidifies lakes and soil. These acids can make the land and water toxic for plants and aquatic life. Acid rain can also slowly dissolve manmade building materials such as concrete. This impact is typically measured in units of either kg sulfur dioxide equivalent (SO2), or moles H+ equivalent.

Carbon Footprint - Carbon-dioxide and other gasses which result from the burning of fossil fuels accumulate in the atmosphere which in turn increases the earth's average temperature. Carbon footprint acts as a proxy for the larger impact factor referred to as Global Warming Potential (GWP). Global warming is blamed for problems like loss of glaciers, extinction of species, and more extreme weather, among others.

Total Energy Consumed - A measure of the non-renewable energy sources associated with the part's lifecycle in units of mega joules (MJ). This impact includes not only the electricity or fuels used during the product's lifecycle, but also the upstream energy required to obtain and process these fuels, and the embodied energy of materials which would be released if burned. PED is expressed as the net calorific value of energy demand from non-renewable recourses (e.g. petroleum, natural gas, etc.) Efficiencies in energy conversion (e.g. power, heat, steam, etc.) are taken into account.

Water Eutrophication - When an overabundance of nutrients are added to a water ecosystem, eutrophication occurs. Nitrogen and phosphorous from waste water and agricultural fertilizers causes an overabundance of algae to bloom, which then depletes the water of oxygen and results in the death of both plant
and animal life. This impact is typically measured in either kg phosphate equivalent (PO4) or kg nitrogen (N) equivalent.

Life Cycle Assessment (LCA) - This is a method to quantitatively assess the environmental impact of a product throughout its entire lifecycle, from the procurement of the raw materials, through the production, distribution, use, disposal and recycling of that product.

Material Financial Impact - This is the financial impact associated with the material only. The mass of the model is multiplied by the financial impact unit (units of currency/units of mass) to calculate the financial impact (in units of currency).