

Bio-inspired Sunlight Collection

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INTRODUCTION

Much of the indoor illumination happens at daytime, which means that the sunlight is not used optimally. The sun would be able to supply enough light in most cases, so there would be much to gain in respect of reducing CO₂-emissions, if this light could be collected more efficiently.

Today many houses and office buildings are constructed in a way, so it is not possible to use the full potential of the outdoors light. In many cases, this means that electrical light must be used to get enough illumination indoors, though it might be midday and the sun is at its brightest.

The goal will be to design a low-price collector that gathers sunlight at one point, independently of the direction of the sun.

THEORY

This project has been based on the bio-inspired design approach, where inspiration from biological phenomena is used, so that it takes advantage of the millions of years of trial and error that has happened in nature.

METHOD

The method to carry out the bio-inspired design was the problem solving top-down approach. The method chosen divides the design process in various steps, focusing on processing biological phenomena, so that the best ones can be chosen, and later these mechanisms are synthesized in one concept; this method has been suggested by T. Lenau et al. (2010).

RESULTS AND FURTHER WORK

The result reached at this moment is a design concept, based on a combination of the constructions of the eyes of a deep-sea shrimp and that of a cephalopod. Simple models have been built, which have shown that each part of the concept is likely to function. The further proceeding of this project will be building a throughout model, that proves that the complete construction will be able to focus light in a single point independently of the position of the sun.

REFERENCES

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