



ELiSE

Evolutionary Light Structure Engineering

Automotive engineering

Headrest

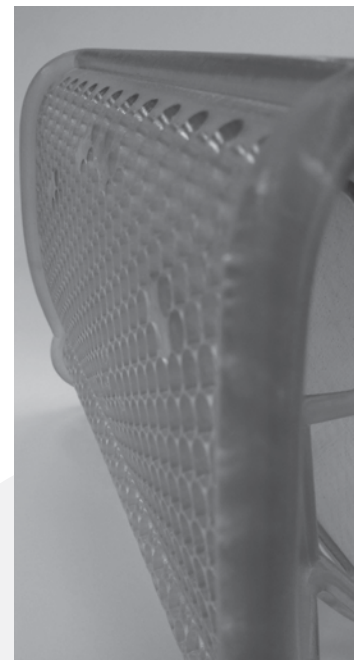
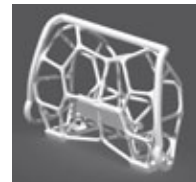
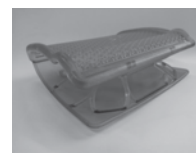
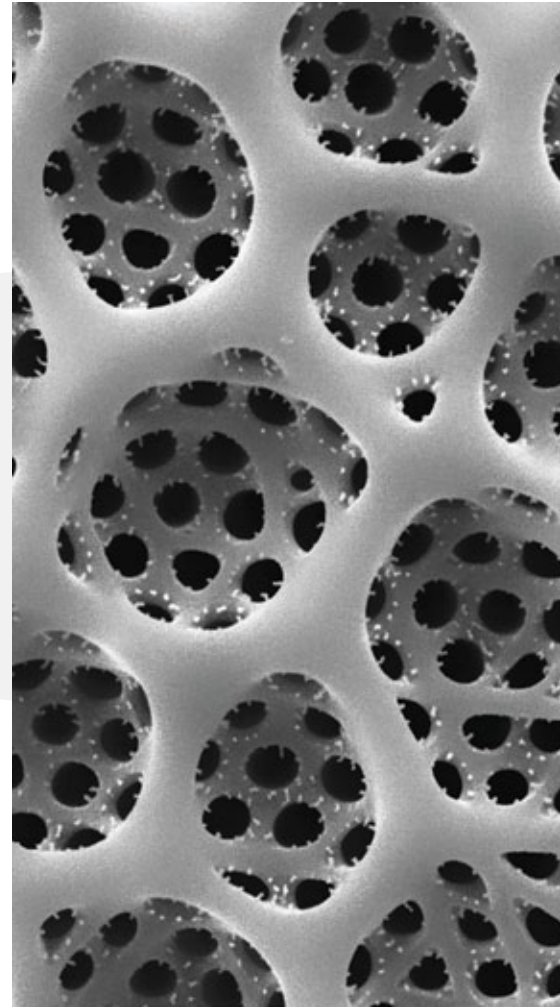
In the automobile industry it is important to develop products with a high structural stability and low weight. It is the intention to produce cars that combine minimal fuel consumption with high cost efficiency and aesthetic design. Based on marine planktonic organisms, "Evolutionary Light Structure Engineering" (short: ELiSE) was used to develop an optimized headrest satisfying not only the economical, but also aesthetic demands of companies and customers.

The headrest, which was developed from a plankton structure, shows an homogeneous stress-distribution over all visible components during typical load cases leading to an increase of the drivers' safety.

The biological archetypes for the exterior case are the marine diatoms *Coscinodiscus* and *Isthmia*. Since the interior space of the headrest can be used for functional structures, braces with a structural similarity to the case of the marine radiolarian *Lophospyris* were added to ensure an optimal load transfer.

The ELiSE-optimized headrest does not only provide an aesthetic design, but also its weight is at least 40 % lower compared to a conventional headrest. Furthermore an expensive foam-filling can be avoided, leading to increased material efficiency while simultaneously enhancing cost effectiveness.

- > Combination of diatom and radiolarian structures
- > 300g weight reduction in each automobile
- > Possibility of injection molding
- > High air permeability through porous surface material



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WEIGHT REDUCTION

40%

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