



DESIGNER CHAIR WITH INTELLIGENT INTERNAL STRUCTURE

Krailling, February 16th, 2007: Stress analysis and structure manipulation software developed by Dr Siavash Mahdavi at University College London has enabled world-renowned designer, Assa Ashuash, to create a chair that combines his artistic flair with precise mechanical characteristics. They include lightness, extra strength in areas that are under greatest stress, and minimum material usage. In the past, such a structure would have been impossible to build, but modern rapid manufacturing technologies have come to the rescue. The chair has been made a reality by taking horizontal slices through a 3D computer-aided design (CAD) model. The resulting data was then used to drive a laser-sintering machine, which creates the product in sections by fusing successive layers of plastic powder.

Explained Mr Ashuash, "The Osteon Chair is the first to be designed using a combination of 3D production tools and artificial intelligence. The software knows where to create sufficient support, rather like the evolution of the biological structure and mechanism of bone. The chair is grown in free space with a 'DNA' code containing all the information required to ensure that the object will transform perfectly from a virtual design into a 3D object that achieves optimum strength, whilst maintaining the desired visual aesthetic."

Added Dr Mahdavi, managing director of Complex Matters, the London-based consultancy he went on to establish after university, "Our software works rather like finite element analysis in reverse. We formulate an ideal set of end results as the starting point and work backwards to create the optimal structure required to achieve that goal.

"In this project, our software imported the CAD model of the chair and all of the relevant parameters including the average person's weight (120 kg was chosen) and the maximum permissible amount of flex at various points around the chair's structure.

"Artificial intelligence in the software then worked on the data, identifying stress points in the chair, morphing the original design slightly to satisfy the physical requirements, and generating a bespoke lattice that minimised the amount of plastic used yet incorporated the necessary strength and mechanical characteristics. An external skin was incorporated over a majority of the structure for aesthetics and user comfort." Finally, the virtual chair was split into sections so that each could be grown within the 700 x 380 x 580 mm build envelope of an EOSINT P 700 laser-sintering machine.

Commented Stuart Jackson, EOS' Regional Manager for the UK and Ireland, "It has been fascinating to work with Assa and Siavash on the Osteon Chair project, and to see the realisation of a beautiful yet practical piece of furniture. It is noteworthy that our rapid manufacturing technology lends itself to the creation of bespoke products as well. So if a person is heavier than 120 kg or wants greater stiffness in the lumbar region, for example, the chair could be modified to suit. "With Dr Mahdavi's new software, the possibilities of laser-sintering in the arts and industry are endless, and applications are already being found in engineering, construction and medicine."

About EOS

EOS was founded in 1989 and is today the world leading manufacturer of laser-sintering systems. Laser-sintering is the key technology for e-Manufacturing, the fast, flexible and cost-effective production of products, patterns or tools. The technology manufactures parts for every phase of the product life cycle, directly from electronic data. Laser-sintering accelerates product development and optimizes production processes. EOS completed its last business year on September 30th, 2006 with revenues of 52.3 million Euro and thus continues its ongoing growth.

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