System for Design and Computation of Lightweight Structures Made of Bent Profiles

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Abstract. The process chain for the production of lightweight profile structures consists of the design and computation phases, the manufacturing of straight profiles, the manufacturing and further processing of bent profiles, and the joining of single profiles to lightweight structures. A sophisticated lightweight construction design of profile structures is characterised by the use of the correct material at the correct place with the correct dimensions. To design in this way means to purposefully find the technically and economically best solution. This requires a holistic technological approach covering the whole system “design-material-manufacturing”. Furthermore, appropriate experiences in design and the use of calculation software for the determination of several mechanical component properties as well as the simulation of manufacturing processes are necessary. A satisfactory component optimisation and a manufacturing specific design of the components presupposes, however, the integration of design, computation, and manufacturing knowledge into a single system using modern CA technologies to realise simultaneous engineering.