



Fi.LITE: Lightweight E-Scooter

Hartmann, S., Nikolaizig, F., Özdin, R.

Interdisciplinary Product Development (M.Sc.)



Fig. 1: Limited user-friendliness of many e-scooter models

Problem statement

Studies show that multimodal use of e-scooters with public transport has fallen from 57% in 2019 to 20% in 2021. The main reason for this is the heavy weight and bulky design of many models, which severely limit user-friendliness and the intention to purchase and use them (Fig. 1).

Approach

Scooter components with potential for weight reduction are identified based on a reference product. The reduction is achieved through topology optimization (Fig. 2) and the use of lightweight materials (Fig. 3). In addition, a trolley mechanism is developed to enhance the ease of use through biometrics (Fig. 4).

Practical implementation

An e-scooter with a clear focus on design was realized (Fig. 6). The load-bearing frame structure was created using the coreless filament winding process (Fig. 5).

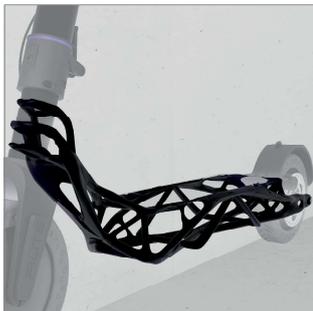


Fig. 2: Weight reduction through topology optimization



Fig. 3: Lightweight material such as carbon for handlebars



Fig. 6: Driveable prototype with topology optimization in lightweight coreless filament winding structure and lightweight materials with a focus on design



Fig. 4: Trolley mechanism for easy transportation



Fig. 5: Load-bearing frame structure in coreless filament winding process

Contact

Prof. Dr. Martin Luccarelli
martin.luccarelli@reutlingen-university.de
+49 (0)7121 271 8039