

54<sup>th</sup> CIRP Conference on Manufacturing Systems

## Sustainable human-robot co-production for the bicycle industry

Doris Aschenbrenner<sup>a b\*</sup>, Åsa Fasth Berglund<sup>c</sup>, Matthijs Netten<sup>a</sup>, Zoltan Rusak<sup>a</sup>, Johan Stahre<sup>c</sup>

<sup>a</sup>TU Delft Industrial Design Engineering, Landbergstraat 15, 2628 CE, Delft, Netherlands <sup>b</sup>Aalen University, Aalen, Germany

<sup>c</sup>Chalmers University of Technology, SE-412 96, Gothenburg, Sweden

\* Corresponding author. Tel.: +31 (0)15 27 89523. E-mail address: [d.aschenbrenner@tudelft.nl](mailto:d.aschenbrenner@tudelft.nl)

---

### Abstract

Bicycle production has not changed much over the last 100 years, it is still performed mainly by manual labor in mass production. During the global pandemic, the demand for ecologically friendly and customized transport has increased. Hence, customers start to impose the same requirements on bikes as on cars: they want more customized products and short delivery time. This publication describes an approach to transform bicycle manufacturing towards human-robot co-production to enable smaller batch sizes and production on-shoring. We list the challenges of this transformation, our applied methods, and presents preliminary results of the cobot-driven prototypes.

© 2021 The Authors. Published by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Peer-review under responsibility of the scientific committee of the 54<sup>th</sup> CIRP Conference on Manufacturing System

*Keywords:* Manufacturing, Bicycles, Cobots, Automation analysis, Assembly, Industry 4.0

---