

Project title: Development of an automatic yarn rejection unit to reduce fabric faults in the air-jet weaving process – YarnSelector

Partner: Institut für Regelungstechnik (IRT) of RWTH Aachen University

Duration: 10/2020 – 09/2022

Funding Agency: AiF

Univ.-Prof.
Prof. h.c. (Moscow State Univ.)
Dr.-Ing. Dipl.-Wirt. Ing.
Thomas Gries
Director

Andreas Münkel
Scientific Assistant

Rahel Krause
Scientific Assistant

Ref.: AM, RK
27.04.2021

Mission Statement

When staple fibre yarns or filament yarns are woven on air-jet weaving machines, up to 90 % of machine downtimes are due to weft faults. Weft faults are mainly caused by production-related faults or irregularities in the yarn (yarn faults). Assuming a machine speed of 700 rpm, 700 weft threads are inserted per minute on a weaving machine. This corresponds to 336,000 weft insertions per eight-hour shift. During this shift 10 stoppages per machine are to be expected. Of these, up to 9 machine stoppages are due to weft yarn faults. In a weaving mill with an average of 50 air-jet weaving machines, additional costs of 151,200 € per year are caused by weft faults. Additional costs result from undetected faults in the yarn, as well as the time and material lost due to long set-up times.

Therefore, the aim of this research project is to increase the fabric quality by reducing the number of fabric faults. For this purpose, an automated yarn sorting unit is being developed.

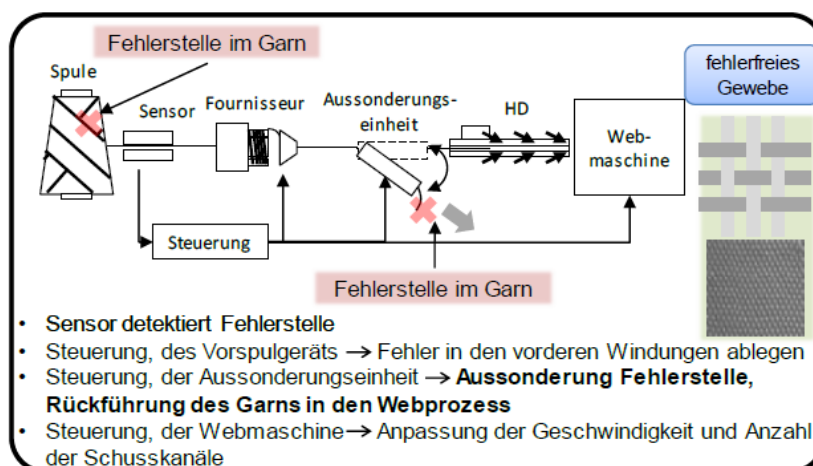


Figure: Aim of the project and design of the automatic yarn sorting unit

Approach

The ITA and the IRT work closely together throughout the entire project to develop an efficient solution. In a first step, the requirements and the con-

cept of the system architecture as well as the actuator technology are elaborated together. A suitable sensor system is then identified and tested. This system examines the yarn for faults during runtime and determines its position in the context of process automation. In a further step, the mechanical sorting unit will be designed and manufactured according to VDI 2221 by ITA and an automation solution for sorting out detected yarn faults during operation will be developed by IRT. After the implementation of the constructed automatic yarn sorting unit, it will be validated in the laboratory and in the production field.

Acknowledgement

The IGF Project YarnSelector (Nr. 21432 N) of the Research Association Forschungskuratorium Textil e.V. (FKT), Reinhardtstraße 14-16, 10117 Berlin was supported via AiF within the programme for promoting the Industrial Collective Research (IGF) of the Federal Ministry for Economic Affairs and Energy (BMWi) on the basis of a decision by the German Bundestag.

Contact

Institut für Textiltechnik der RWTH Aachen University
Otto-Blumenthal-Str. 1, 52074 Aachen

Andreas Münkel, M.Sc.
andreas.muenkel@ita.rwth-aachen.de
Tel.: (+49) 241 – 80 23487

Rahel Krause, M. Sc.
rahel.krause@ita.rwth-aachen.de
Tel.: (+49) 241 - 80 23570

Tong Wu, M.Sc.
T.Wu@irt.rwth-aachen.de
Tel.: (+49) 241 – 80 27489

Gefördert durch:



Bundesministerium
für Wirtschaft
und Energie

aufgrund eines Beschlusses
des Deutschen Bundestages