

Online Monitoring System for Technical Braiding Processes

Reference No: B78034

CHALLENGE

Technical braids are used for a variety of application fields like medical technology, automotive or composites industry. The technical braiding process is highly automated and allows for immense production rates. However, in this process faults such as frayed fibres, yarn gaps or yarn breakages may occur leading to rejects or even the necessity to stop the machinery and rethread defective yarns by hand. This manual intervention is a time-consuming task and results in considerable downtimes of the braiding machines.

INNOVATION

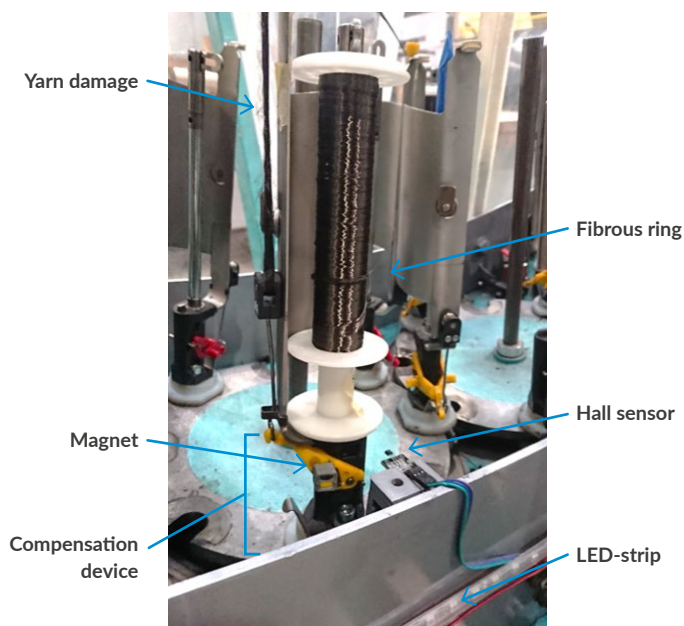
The background of the innovation is the observation that the above-mentioned faults are preceded by yarn tension anomalies that are caused by unwinding-related irregularities. Detecting this cause of error in early stages prevents the aggravation of the fault and the production of large amounts of rejects. Moreover, the work required in rectifying the problem is significantly reduced. In case of a yarn tension anomaly, the slider or lever of the compensation device of the bobbin carrier is moved to its uppermost position due to the elevated yarn tension. This distinct and unusual change in position already occurs in an early stage before any defects have manifested in the braided product or a yarn has broken. Due to the ratcheting mechanism in the compensation device, this never occurs during regular braiding at normal levels of yarn tension. According to the innovation, the change in position is detected using magnets that are mounted to the sliders or levers of the compensation devices of the bobbin carriers. Stationary hall sensors, which are located close to the tracks of the bobbin carriers, generate an impulse for the machine controller. On occurrence of a yarn tension anomaly, the machinery is stopped automatically and the position of the defect is displayed to operating personnel by a light signal in real-time.

COMMERCIAL OPPORTUNITIES

- Early fault detection
- Downtime reduction
- Quality control

DEVELOPMENT STATUS

Successful installation as a prototype on an axial as well as on a radial braiding machine.



Fibrous ring (accumulation of broken filaments) as an example of an unwinding-related irregularity that impedes the yarn from unwinding properly from the bobbin causing considerable yarn damage, magnet attached to lever of compensation device, stationary hall sensor next to track of bobbin carriers and LED-strip displaying the position of the error cause.