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DEVELOPMENT OF AUTOMATED SEALING SYSTEM FOR AIRCRAFT COMPONENTS

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Abstract
Automating assembly lines in aircraft manufacturing poses significant challenges, entailing both technological complexities and financial risks. A key technical hurdle lies in the precise application of sealant to the aircraft rib panel wing's edge surfaces, which proves to be one of the most intricate operations in the automated manufacturing process due to the complex spatial shapes involved. In this context, the adoption of human-robot collaboration emerges as a viable approach to achieve the necessary customization and adaptability in automation. The fundamental idea is to enhance process efficiency and elevate product quality by employing a sensitive robot to support workers in the manufacturing process. The study has primarily focused on incorporating three distinct mechanisms - a dispensing mechanism, a nozzle applicator, and a robotic arm with a workstation - as essential components of the hardware. These mechanisms play a pivotal role in the successful implementation of the automated robotic sealing system. During the development phase, the system underwent rigorous testing to establish the critical parameters required for the automated robotic sealing process. Results from the study show the ideal pressure range for the dispensing system lies between 2.0 and 3.5 bar. For the nozzle applicator system, the most efficient approach involves extending the base of the 4 mm short straight roller and incorporating a makeup puff. The findings have demonstrated the method and parameters used to achieve optimal results for aircraft components using the automated sealing system process.

Author Keywords
aircraft components; automated sealing system; dispensing system; nozzle applicator; rib panel

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