

Practical Experience with High Speed Dual Robotic NDT Systems based on SIEMENS Sinumerik 840D sl CNC

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Automation and Automated processes in NDT have increased drastically in the last decades. Especially for Ultrasonic inspection, dedicated solutions were developed based on standard robots to comply with the needs of one single process. Such systems are mostly tailored to one single inspection technique or task. Although robots are becoming popular for NDT in Aerospace, the time and experience has shown that the integration of standard industrial robots is causing different challenges. Achievable velocity in 2D and 3D scan path's and path accuracy for dual robot inspection, resistance against splashing water for through transmission application, EMI as well as operator convenience in easy operating these systems are just some samples for expectations. This paper describes the development of a Dual Robot NDT System based on Standard Stäubli Robots, TX200L full integration into the SIEMENS CNC Sinumerik 840D sl, enhancements for unique absolute positional accuracy, high inspection speed and an the application independent Software FILL.Studio to operate the System(s). By having the SIEMENS World for the control system several different modalities can be supported with this Kinematics solution, also multi-modality systems - Standard UT combined with dry UT like Laser exited Dry Inspection (LEDI) or digital X-ray are possible as well as the integration of Metrology (commonly known as CMM) Tools like optical measurement systems based on structured light cameras. The described Dual Robot configuration was installed in phases to keep the old NDT system in operation until the first system was qualified. It is in operation as Single Robot NDT system since November 2018 and extended to a full Dual Robot System after the legacy system was dismantled in June 2019. The layout of the systems allows three different inspection areas for cooperated inspection in the center area or independent operation in the outer areas. This setup makes the system fully flexible by doing Through Transmission by Fork in one area while the other Robot is inspecting in Pulse Echo by Phased Array in the other area.