

RoboCT Application for in-situ Inspection of Join Technologies of large scale Objects

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In sophisticated mechanical engineering like e.g. automobile industry, the reliability of joins like rivets, screws or especially adhesive bonding is usually being examined by regularly repeated destructive testing of these manufactured parts or components. At full scale, this implies disassembling whole car bodies or automotive high voltage batteries. In case of adhesive bonding's, all opened by force to inspect the geometry, level or correct encapsulation of these joins. Whilst X-ray CT is one established means of NDT applied to cutout specimens or subcomponents in the laboratories of such manufacturers, it is only beginning to come available to full-scale objects since few years. Over more than one decade, Fraunhofer Development Center X-ray Technology EZRT has developed a technology using two cooperating industrial robots as a large and highly flexible manipulation system for X-ray equipment. This technology is called RoboCT. In 2018 EZRT has taken the very first of such systems in operation in the prototype plant of BMW. This system of four cooperating robots is designed to address large automobile components, whole car bodies or even fully assembled cars and shall help to reduce the time to market of new models. In this contribution, we introduce the technology and its first implementation in production environment. We demonstrate the exemplary application of RoboCT to different join technologies and compare the results to regular Micro-CT of the corresponding cutouts.