

Testing the accuracy of in-process springback measurements in draw bending

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Abstract. Tube draw bending is used to manufacture accurate and repeatable bent components with the aid of automatic bending machines. However, when new production batches are launched, time consuming and costly trials-and-error procedures are necessary to compensate for the springback that may affect the final geometrical accuracy. Several off-line optimization techniques, both experimental and numerical, are available, but they require complex material characterizations and long computational times that make them not always really attractive and competitive. An interesting alternative to such approaches is represented by newly developed in-process measurement systems that use inertial platforms to monitor in real-time the orientation of the tube axis during the process. The paper focuses on testing the accuracy that these new techniques present when applied to cold draw bend tubular geometries. The main error sources are identified and a comparison with off-line measurements performed on a coordinate measuring machine is presented. The results show that measurements carried out with the system based on the inertial platform are in agreement with those obtained using off-line measuring system, with a maximum error lower than to 0.2 deg.