

The Perspective of Sensor Integration and Automated Decision Making in Roll Forming

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Abstract. The ongoing trend towards shorter product life cycles, smaller batch sizes and the desire for individual products challenges established manufacturing processes such as roll forming. To meet recent market requirements, process setup and troubleshooting must be accelerated. So far, these activities have been strongly based on the experience of employees. At the same time, both developing and developed countries tend to have a shortage of skilled workers for different reasons. While demographic change is responsible for this development in developed countries, the lack of vocational training is the reason for this challenge in developing countries. To solve this problem, new paths have to be taken to either support less qualified employees or help skilled workers to accelerate and safeguard their actions. The integration of sensor systems into manufacturing processes combined with an automatic evaluation of sensor data might help to create operator assistance systems serving this purpose. This paper draws a perspective for sensor integration and automated signal process in roll forming processes. For this reason, load sensors are implemented into an industrial roll forming process and disturbances frequently observed in manufacturing processes are intendedly set into the process. Simultaneously, a framework for an automated signal evaluation within an operator assistance system evaluating and analyzing the current process states based on sensor signals and providing recommendations for process improvements is introduced. The results demonstrate that force measurements can contribute to error diagnosis. At the same time, however, it becomes evident that force measurements alone are not sufficient to detect all process states that lead to an undesirable plant status or quality losses. For this reason, a perspective for a continuous improvement of the assistance system is finally established.