Defect Detection and Trimming in Wire Rod Mills Driven by Robotics and Computer Vision Technology




Currently, to avoid cobbles in the pit and improve a product's final quality, operators manually adjust or cut defective wire rod tails on the cooling conveyor. A fully automated wire rod tail defect identification and cutting system has been developed, which can be installed at the end of the conveyor. An artificial vision system processes the captured images during the wire rod passage and, through artificial intelligence models, determines whether the tail is defective. Downstream, an anthropomorphic robot intercepts and cuts the defective tail and removes it from the line. Cyclically or upon request, the system also conducts sample collection and its smart management.

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During the production of wire rod coils, there is a possibility that the terminal part of the wire rod may exhibit anomalous configurations. In severe cases, these configurations can disrupt the correct formation of the coil in the stacking pit. To prevent such situations, operators inspect the condition of the last wire rod loops on the cooling conveyor and take the necessary actions, such as their removal (trimming) or arrangement, to ensure the proper formation of the final coil.

Considering the widespread installation of wire rod plants globally, it is crucial to implement full automation of the trimming procedures. This to reduce the risk for operators, eliminate potential cobbles in the pit and enhance the overall quality of the production process.

At a plant in northern Italy, Danieli is currently assessing a fully automated trimming solution situated at the end of the cooling conveyor. This solution incorporates computer

Figure 1

Cobble example in the pit during the stacking phase of the final coil.