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Wear monitoring in fine blanking processes using feature based analysis of acoustic emission signals

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Abstract

Tool wear during fine blanking impairs the quality of the sheared part, which is assessed in regular samples in an industrial environment. This leads to scrap production and low planning reliability due to low wear predictability. A tool condition monitoring based on acoustic emission (AE) data for the prediction of the remaining useful life of the tool would mitigate those effects. In a production series, AE signals were recorded, and the tool wear observed. The AE signals were then preprocessed using feature engineering and visualized using linear and nonlinear dimensionality reduction techniques. These visualizations preserve information about the data structure even in two dimensions and resemble the temporal dependent observed tool wear during fine blanking.

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