

Assessment of Grain Size on Moving Steel Strips during Hot Rolling with Laser Ultrasonics

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Laser ultrasonics (LUS) has demonstrated, through numerous in-situ laboratory experiments, its ability to monitor microstructural features and metallurgical transformations which occur in steel strips during thermal cycles with temperatures reaching 1250°C. Within an original work supported by the European Commission, a consortium including ArcelorMittal, Imagine Optic and IMI-NRC integrated several LUS components (Generation and Detection Lasers, Two-Wave Mixing Interferometer, Dedicated Fibered Optical Head) in a transportable trolley in order to run investigations on moving strips during normal production in a hot rolling mill, at three different locations :

- the exits of stands 1 and 5 in order to evaluate the austenite grain size on steel products at temperatures between 850°C and 1050°C,
- the run-out table to estimate the ferrite grain size and austenite phase fraction on strips at temperatures.

Trials were carried out on classic low carbon grades, allowing to record signals which, with the development of a specific data processing tool, allowed calculating the grain size. Such results were then compared to predictions from metallurgical models, finding reasonably close values.

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