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Fast incoming material inspection in the steel mill

Schmiedewerke Gröditz, part of GMH Groupe (Germany) successfully uses SECOPTA's SlagLIBS technology for the fast analysis of ferro-alloys

In 2022, a LIBS device was put into operation at Schmiedewerke Gröditz (SWG), with which it is possible to analyze delivered alloy aggregates within a short time. SWG has decided to test and use the most commonly used alloy material - ferrochrome - for inspection with SlagLIBS technology. The plant receives three to five deliveries per week with grain sizes between 10 and 80 mm in different qualities, partly loose on trucks, partly in big bags. The chromium content plays a decisive role here, because it determines the price of the material. Therefore even a few percent deviation costs the factory many thousands of euros per delivery. The aim of the project was to significantly speed up the incoming material inspection and, if possible, to inspect the entire material delivered rather than just individual batches.

Customer requirement: SWG uses 100 percent steel scrap in production. By adding alloying agents such as ferrochrome or ferrovanadium, the alloys corresponding to customer requirements are produced. The data sheets from the suppliers show which substances are alloyed and in what quantity. In the worst case, deviations from the specifications lead to a block having to be melted down again or even scrapped. Previously, the delivered material was analysed using X-ray fluorescence analysis (XRF), which took a considerable amount of time to prepare the samples. The 10-80 mm material first had to be crushed to a grain size of 5 mm to 15 mm and then ground to a grain size of less than 100 µm. For very hard or very tough material, this process often took 20 to 45 minutes. In addition, the crushers and the laboratory equipment were subjected to very high mechanical loads. SWG decided to pursue two possible improvements. Firstly, to achieve process reliability (with regard to the materials used) in relation to the metallurgical requirements by means of a continuous analysis. Secondly to create the possibility to reject deliveries directly if they do not meet the specification. For this purpose, an analyser was needed that would allow a quick pre-selection and decision as to which material should be further tested by XRF.

Technical solution: With the SECOPTA SlagLIBS, alloying agents with a grain size of 5-15 mm can be analysed quickly and accurately. A representative amount of input material is crushed to the target grain size with a sufficiently large crusher and can be analysed without further intermediate steps. About 10-15 min after sampling, a reliable result is available. During this time, the decision to accept or reject the delivery can be made. If the lot is accepted, it can be decided whether it can be used in production without complaint or should be further examined with XRF.

Benefit: After calibration and commissioning of the SlagLIBS, two deliveries that did not meet the required specifications could be identified within a short time. This immediately prevented defective products in production. After the use of SlagLIBS technology became known to the alloy suppliers, the proportion of faulty batches delivered was significantly reduced.

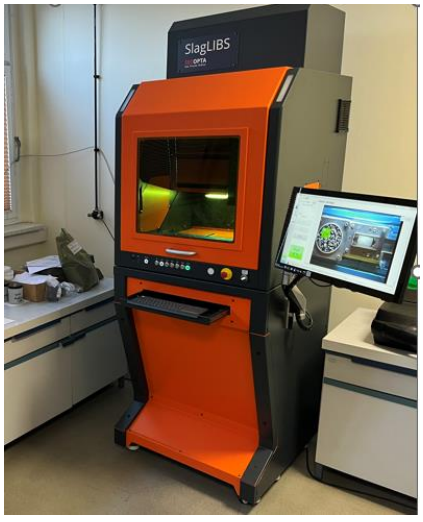

Fig 1: SECOPTA SlagLIBS in *SWG facility*

''The laser-based system SlagLIBS significantly reduces the time and effort previously required for sample preparation and analysis. We are now able to sample all materials and to detect incorrect material quickly.''

Schmiedewerke Gröditz


Fig 2: Ferrochrome 5-15 mm and as delivered

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