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INNOVATION IN THE PROCESSING OF IRON CONCENTRATE

It is difficult to imagine your life without iron tools, equipment, mechanisms, transport – steel is used everywhere. Man passed the bronze and iron age, until he learned how to make steel. Today, methods of steel extraction differ in their quality, productivity, and costs. This report deals with the new approaches in the practice of extracting and processing iron ore at the Poltava mining and processing plant.

The Poltava mining and processing plant which produces iron concentrate and pellets for metallurgical plants in Ukraine and in the world is currently being updated. The installation of new automated manufacturing facilities and computer technologies is almost completed. The equipment does not only manufacture the highest quality iron concentrate, which can be used to produce pellets for direct production of all grades of steel in electric furnaces, but also manages the processes:

- Transportation of the finished concentrate to the place, where pellets are made;
- Transportation and stacking of the finished concentrate to a warehouse;
- Transportation of the finished concentrate to the railway loading station, where the specified amount of concentrate is automatically loaded into railway cars;
- Creation of electronic commercial documents for cargo.

Modern methods of concentrate enrichment can significantly improve the quality of the output product. For example, the filtration technology that was used earlier, namely disk vacuum filters, was less effective. Due to the imperfection of the design, about 30% of the iron was lost. Modern camera filter technology is controlled by software and works automatically. More advanced filtering algorithms allow you to remove the maximum amount of iron from the ore. The ready concentrate is delivered to railway cars and loaded (on average 60 tons per 4 minutes with accuracy of 100 kilograms). If there are no available railway cars, then the concentrate can be conveyed by transporters to closed warehouses, where it is stacked not to stop the production. The concentrate can also be directed to a factory for the production of pellets, which are then also loaded into railway cars and delivered to the plants in different parts of the world.

The railway cars under loading are moved automatically, without the participation of the operator. All machines: pumps, compressors, conveyors and auxiliary equipment work automatically – with the help of software that has been developed specifically for automating this process. At the end, the costs of technical water, compressed air, electricity and the output are taken into account.

The control system is based on SIEMENS controller technology. The connection of the main controller with the Executive controller takes place via the

redundant networks PROFIBOS. As a result, we have a fully automated system for filtering, loading and transporting concentrate, which leads to reduction of the number of people working at the plant. Previously, such plants required a large number of experienced specialists, but now the number of working staff has decreased, so the production costs are reduced. The capability to switch the entire system to semi-automatic mode at any time makes it very flexible and reliable.

After loading the concentrate, it is delivered to steel mills all over Ukraine and abroad. The concentrate is fed to the furnaces in the steel mills. In contrast to the coke blast furnaces, the electric arc furnaces are often used. During the smelting process, various impurities are added to the concentrate (molybdenum, manganese, tungsten, vanadium, and others) to produce high – quality steel of various grades- from the softest to the hardest.

As we can see, everything is being developed and improved. Ukrainian enterprises such as the Poltava mining and processing plant provide resources to the production in different parts of the world. Thus, it allows humanity to move forward.