Mining and Refining 4.0

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Abstract

Bauxite mining and alumina refining will be radically transformed by the new wave of digitalization, branded Industry 4.0 a few years back. Autonomous, self-learning machines will replace people in most of the simpler, repetitive and sometimes arduous and dangerous tasks, such as opening and closing valves, cleaning heavy equipment, inspection and surveillance. They will also perform much more complex activities, such as operational supervision, troubleshooting and planning. The transformation will be enabled by, mostly existing and commercially available, cheap and reliable (heavy duty, when required) robotics and automation, advanced analytics and process digitalization. Task processing time, in countless cases, will shrink from hours, to minutes, to seconds. Tangible benefits of approaching error-free operations include the elimination of serious injuries and work related health issues, maximization of throughput and minimization of all forms of waste, leading to major reductions in variable and fixed costs. Plant and equipment design and construction will also greatly benefit, both in terms of quality of design solutions and cost to engineer and build, supported by advanced process simulators, 3-D tools and the astonishing speed and accuracy of digitalized construction machines. The 4.0 tsunami will test every business leader in our industry. It will test our capability to correctly and expeditiously assess the business potential of each new technology, prioritizing and enabling its implementation. It will also test our ability to deal with the complex labor relations issues that will derive from the digital transformation dislocation, eliminating obsolete jobs, creating new ones and re-inventing others. What will remain constant then? The limitless potential of the human creativity. Unlike many recent Hollywoodian fables, humans will remain in charge for the foreseeable future.

Keywords: Industry 4.0, self-learning machines, robotics, digital transformation dislocation.