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Development of the industrial model of a phosphate destoning unit

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Abstract

Several industries are deploying the systems engineering approach in their process of transforming needs and requirements into effective systems that meet the expectations of their stakeholders. In fact, systems engineering presents a methodological approach in the design and integration of complex systems in the industrial environment. The approach has been exploited for a long time only by the aeronautics and manufacturing sector, but in our work we applied it to a more complex field which is the mining industry. Our work presents an application of systems engineering in the development of the industrial model of phosphate processing. At first we limited the scope of our study to the modeling of a fully automated destoning unit which is a part of the process of physical phosphate treatment. Our contribution was elaborated based on the ISA 95 standard, developed by the International Society of Automation to provide a framework for the specification of automation levels and information flows exchanged between the different levels of the computer integrated manufacturing pyramid. We used the SysML language to elaborate dynamic and static models of the process. Our results will serve as a support for the mining industries in the establishment of phosphate ore processing entities fully automated.

Keywords: Systems engineering, SysMl, ISA95, phosphate ore processing.

Biographies

Fatima-ezzahra Choubi Ph.D. student in Structural Engineering, intelligent systems and electrical energy Laboratory at the Faculty of Ben Msik of CasaBlanca in Hassan the first University, and Process Engineer graduated from National School of Applied Sciences KHOURIBGA. She is also a member of the laboratory research team: Complex Systems Engineering at Mohammed VI Polytechnic University. Her research fields are MBSE, Phosphate ore processing, Complex System Engineering.

Laurent Deshayes is currently deputy director of the complex system engineering laboratory at the Mohammed VI Polytechnic University in Morocco. Mr. Deshayes holds an Engineering Degree in Industrial Systems from the National Engineering School of Tarbes, France and a PhD Degree in Mechanical Science from the National Institute of Applied Sciences in Lyon, France. He taught courses in industrial management, advanced automation, manufacturing execution systems. He is currently developing living labs and research platforms for mining and chemical processes in order to build strong Moroccan and African competencies in advanced engineering areas such as System Engineering, Advanced process control, real time scheduling, industrial digitization and Beneficiation processes.