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Smart Production Cell: design determinants and challenges

Smart production cells are contemporary solutions within manufacturing management. The author presents the historical background of the design of production cells in both, the approach of the so-called American-European model and the Japanese model. As the conclusion, classification of contemporary solutions with human approach as a criterion is presented, resulting in two main streams:

- not limiting human participation in the production process,
- limiting human participation in the production process.

The idea of a smart production cell lies within the contemporary trend limiting human participation in the production process, and is a part of the Industry 4.0 concept. The lecture presents the technical and economic market-driven determinants of smart production cells design. Among the discussed determinants, there is development of automation and robotics, material engineering, increase of the requirements concerning customization of manufactured products, and finally the dynamic development of the Internet of Things (IoT). The challenges of development and implementation of the Internet of Things are to be discussed in the context of shaping the structure and hierarchy of production planning and

shop floor control. Finally, production and organization conditions and constraints that smart production cell undergoes are to be introduced and analysed. The conclusion from the lecture is the smart production cell design procedure, which integrates two design levels i.e. the manufacturing facilities planning and production cells design.