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AN APPLICATION OF THE SMED METHODOLOGY IN AN ELECTRIC POWER CONTROLS COMPANY

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Abstract:

Lean production is a strategy for high competiveness in manufacturing. The capability for economical manufacture in small batch sizes is an essential requirement for achieving lean production. This facilitates mixed production of several kinds of products to match varying product demand and can have a major impact in reducing inventories. An obvious requirement for this is the high frequency of equipment setups or product changeovers. This will not be attractive unless set-up times and costs can be reduced to competitive levels. The application of SMED can achieve this. SMED is a well-established methodology involving a set of techniques, methods and guidelines to achieve fast product changeovers at machines. This paper describes the application of SMED in the production process of plastic and metal components required for the assembly of several types of circuit breakers. The work was carried out during a short period of a few months under a master thesis project. Several important SMED strategies and solutions were implemented and evaluated in terms of their impact on productivity and on other manufacturing performance measures. Three specific machines were involved: a punch-bending machine, a punch press and an injection moulding machine. An important contribution was made by introducing innovative and simple solutions such as adapting tools and normalizing changeover operations. Most of the achieved results exceeded the initial expectations. Beyond the purely technical and economic benefits of SMED, better workstations' ergonomic conditions were also attained. Besides the usual quantification of setup time reduction, other indicators were calculated, namely: work-in- process (WIP), annual setup cost and distance travelled by operators during the changeover process. Reductions of setup time varying from 59% to 90% were achieved. WIP of metal components was reduced from 17.05 to 7.74 days reducing more than 50% on the corresponding costs. A more impressive reduction on WIP was obtained for plastic parts, actually from 5 to 1.09 days of work corresponding to a WIP cost reduction of over 80%. The distance travelled by operators during the changeover process was dramatically reduced too: typically a reduction from 300 m to 10 m and less. The total annual cost savings projection, in this small area of parts production, is near 20,000 €. Although large benefits were obtained from the study, scope for further improvement still exists. In fact the objective of product changeover times below 10 minutes aimed by SMED was not achieved in one case.

Keywords:

Machine setup, Quick changeover, SMED, Mass customization, Lean manufacturing.

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