

The impact of the collaborative workplace on the production system capacity: Simulation modelling vs. real-world application approach

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ABSTRACT

In recent years, there have been more and more collaborative workplaces in different types of manufacturing systems. Although the introduction of collaborative workplaces can be cost-effective, there is still much uncertainty about how such workplaces affect the capacity of the rest of production system. The article presents the importance of introducing collaborative workplaces in manual assembly operations where the production capacities are already limited. With the simulation modelling method, the evaluation of the introduction impact of collaborative workplaces on manual assembly operations that represent bottlenecks in the production process is presented. The research presents two approaches to workplace performance evaluation, both simulation modelling and a real-world collaborative workplace example, as a basis of a detailed time study. The main findings are comparisons of simulation modelling results and a study of a real-world collaborative workplace, with graphically and numerically presented parameters describing the utilization of production capacities, their efficiency and financial justification. The research confirms the expediency of the collaborative workplaces use and emphasise the importance of further research in the field of their technological and sociological impacts.

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Vpliv sodelovalnega delovnega mesta na zmogljivost proizvodnega sistema: Pristop primerjave simulacijskega modeliranja z realno uporabo

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POVZETEK

V zadnjih letih je v različnih vrstah proizvodnih sistemov navzočih vse več sodelovalnih delovnih mest. Čeprav je lahko uvedba sodelovalnih delovnih mest stroškovno učinkovita, je še vedno veliko negotovosti o tem, kako takšna delovna mesta vplivajo na zmogljivost preostalega proizvodnega sistema. Članek predstavlja pomen uvajanja sodelovalnih delovnih mest pri ročnih montažnih operacijah, kjer so proizvodne zmogljivosti omejene. Z metodo simulacijskega modeliranja je narejena ocena vpliva sodelovalnih delovnih mest na ročne montažne operacije, ki predstavljajo ozka grla v proizvodnem procesu. Raziskava, kot osnovo za podrobno časovno študijo, predstavlja dva pristopa k vrednotenju uspešnosti na delovnem mestu, simulacijski model in primer sodelovalnega delovnega mesta v resničnem svetu. Glavne ugotovitve raziskave so predstavljene v obliki primerjave rezultatov simulacijskega modeliranja in študije realnega sodelovalnega delovnega mesta z grafično in numerično prikazanimi parametri, ki opisujejo izkoriščenost proizvodnih zmogljivosti, njihovo učinkovitost in finančno upravičenost. Raziskave potrjujejo smotrnost uporabe sodelovalnih delovnih mest in poudarjajo pomen nadaljnjih raziskav na področju njihovih tehnoloških in socioloških vplivov.

PODATKI O ČLANKU

Ključne besede:

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Industrija 5.0;
Montažna linija;
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