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Production monitoring system for understanding product robustness

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ABSTRACT

In the current quality paradigm, the performance of a product is kept within specification by ensuring that its parts are within specification. Product performance is then validated after final assembly. However, this does not control how robust the product performance is, i.e. how much it will vary between the specification limits. In this paper, a model for predicting product performance is proposed, taking into account design, assembly and process parameters live from production. This empowers production to maintain final product performance, instead of part quality. The PRECI-IN case study is used to demonstrate how the monitoring system can be used to efficiently guide corrective action to improve product performance. It is claimed that the monitoring system can be used to dramatically cut the time taken to identify, plan and execute corrective action related to typical quality issues. To substantiate this claim, two further cases comparable to PRECI-IN, in terms of complexity, material and manufacturing process, were taken from different industries. The interviews with quality experts revealed that the typical time taken for corrective action for both cases was accounted to be seven days. Using the monitoring system for the PRECI-IN case, similar corrective action would have been achieved almost immediately.

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Izvirni znanstveni članek

Sistem spremljanja proizvodnje za razumevanje robustnosti izdelka

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POVZETEK

V proizvodnji zagotavljamo konstantno kakovost (lastnost) izdelka tako, da zagotovimo, da so lastnosti njegovih sestavin v okviru proizvodnih specifikacij. Lastnost izdelka se preverja po končni montaži. Vendar pa ta pristop ne nadzira robustnosti lastnosti izdelka, tj. koliko se bo razlikoval od specificiranih lastnosti. V pričujoči raziskavi je predlagan model za napovedovanje lastnosti izdelka, ki upošteva zasnovo, montažo in procesne parametre neposredno iz proizvodnje. To omogoča, da v proizvodnji ohranjamo končne lastnosti izdelka namesto zgolj lastnosti njegovih sestavnih delov. Da bi prikazali kako je lahko sistem spremljanja uspešen pri vodenju korektivnih akcij za izboljšanje lastnosti izdelka smo uporabili PRECI-IN študijo primerov. Za podkrepitev teze, da lahko sistem spremljanja bistveno skrajša čas za identifikacijo, načrtovanje in izvedbo korektivnih akcij povezanih s kakovostjo izdelka, smo izvedli dve študiji primerov iz različnih industrijskih okolij. Intervjuji s strokovnjaki s področja kakovosti so pokazali, da je značilen čas, potreben za korektivne akcije, znašal v obeh primerih okoli sedem dni. Z uporabo sistema za spremljanje (PRECI-IN) pa so podobne korektivne akcije bile izvedene domala takoj.

PODATKI O ČLANKU

Ključne besede:
Robustnost izdelka
Spreminjanje lastnosti
Sistem za spremljanje robustnosti
Konsistentnost lastnosti
Robustnost element-element

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