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Fuel gas operation management practices for reheating furnace in iron and steel industry

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ABSTRACT

How to evaluate the fuel gas operation (FGO) of various working groups (WGs) and working shifts (WSs) in reheating furnace is still ambiguous problem. In this paper, a novelty time-series FGO evaluation model was proposed. The strategy mainly included: Firstly, the fuel gas per ton steel (FGTS) was calculated in certain time interval; Secondly, the FGTS time-series data set was formulated in statistical period; Thirdly, the FGTS time-series data set was divided according to working schedule; Lastly, the FGO evaluation model was established. Case study showed that: i) The fuel gas operation evaluation results of various WGs in different WSs were accorded with normal distribution; ii) For various WGs, A WG performed best, followed by C WG and D WG. The performance of B WG was the worst due to its violent fluctuation of fuel gas operation evaluation results in three WSs; iii) For different WSs, the day WS and swing WS performed well, whereas the performance of night WS was unsatisfactory. Discussion results showed that the improvement of working skills, working responsibility and working passion, which were effective measure to achieve energy saving in terms of operation, should be enhanced through skills training and the reward and punishment system. Generally, this novelty time-series FGO evaluation method could also be applied to other industrial equipment.

ARTICLE INFO

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Izvirni znanstveni članek

Prakse ravnanja z zgorevalnim plinom za ogrevalne peči v železarski in jeklarski industriji

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POVZETEK

Kako ovrednotiti upravljanje različnih delovnih skupin (WG) in delovnih izmen (WS) z zgorevalnim plinom (FGO) za ogrevalno peč je še vedno zahtevna naloga. V tem prispevku je bil predlagan nov model ocenjevanja FGO s časovno vrsto. Strategija je v glavnem vključevala naslednje korake: 1) najprej je bil v določenem časovnem intervalu izračunan porabljen zgorevalni plin na tono jekla (FGTS), 2) nato je bil oblikovan nabor podatkov o časovni vrsti FGTS v statističnem obdobju, 3) nabor podatkov o časovni vrsti FGTS je bil razdeljen glede na delovni urnik in 4) bil je vzpostavljen model vrednotenja FGO. Študija primera je pokazala, da: i) so bili rezultati ocenjevanja upravljanja z zgorevalnim plinom različnih delovnih skupin v različnih delovnih izmenah usklajeni z normalno porazdelitvijo; ii) izmed različnih delovnih skupin se je najbolje odrezala delovna skupina A, sledili sta ji C in D. Učinkovitost delovne skupine B je bila najslabša zaradi močnega nihanja rezultatov ocenjevanja upravljanja z zgorevalnim plinom v treh delovnih izmenah; iii) pri različnih delovnih izmenah sta se jutranja delovna izmena in popoldanska delovna izmena odrezali dobro, medtem ko je bil rezultat nočne delovne izmene nezadovoljiv. Rezultati razprave so pokazali, da je treba za izboljšanje delovnih veščin, delovne odgovornosti in delovne strasti, ki so učinkovit ukrep za doseganje varčevanja z energijo v smislu upravljanja, vpeljati sistem usposabljanja ter sistem nagrajevanja in kaznovanja. Na splošno bi lahko predlagano metodo ocenjevanja časovnih vrst FGO, ki je novost, uporabili tudi za drugo industrijsko opremo.

PODATKI O ČLANKU

Ključne besede:
Železarska industrija;
Jeklarska industrija;
Upravljanje z zgorevalnim plinom (FGO);
Ogrevalna peč;
Model vrednotenja FGO;
Časovna vrsta zgorevalnega plina na tono jekla (FGTS);
Delovne skupine;
Delovne izmene

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