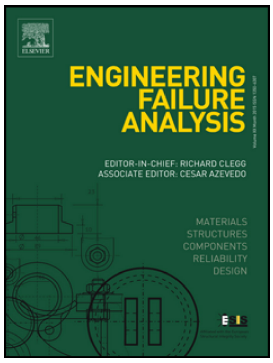

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Stanislav Honus, Peter Bocko, Tomáš Bouda, Ivica Ristović, Milivoj Vulić

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The effect of the number of conveyor belt carrying idlers on the failure of an impact place: A failure analysis

Stanislav Honus[a,b,*], Peter Bocko[c], Tomáš Bouda[c], Ivica Ristović[d], Milivoj Vulić[e]

[a]VŠB – Technical University of Ostrava, Centre ENET, 17. listopadu 15, 708 33 Ostrava – Poruba, Czech Republic
[b]VŠB – Technical University of Ostrava, Faculty of Mechanical Engineering, Department of Energy Engineering, 17. listopadu 15, 708 33 Ostrava – Poruba, Czech Republic
[c]IDIADA CZ, JSC, Pražská 320/8, 500 02 Hradec Králové, Czech Republic
[d]University of Belgrade, Faculty of Mining and Geology,Djušina 7, Belgrade, Serbia
[e]University of Ljubljana, Faculty of Natural Sciences and Engineering, Aškerčeva c. 12, 1000 Ljubljana, Slovenia

Abstract

The article deals with the failure analysis of a conveyor belt related to the place of impact where material lands. It studies how the number of conveyor carrying idlers influences the belt compression stress in the place of impact. The landing material is represented by an impactor of 500 kg landing from the height of 4 m. The analyses are grounded in mathematical modelling of the transport belt and experimentally determine the quantities vital for the simulations. The place of impact under examination is the critical site of the whole facility as it is subject to extreme stress. The failure analysis considers two variants of idler number in the place of material impact. The results clearly demonstrate that the construction making use of a higher number of idlers is more suitable due to lower deformations of the belt. The conclusions presented in the article may thus lead to conveyor belt construction optimisations, and thus contribute to their longer life. At the same time, there is a great potential for further research, as the topic of longer conveyor belt life via changing the number of carrying idlers at the place of impact has not been widely investigated.

Keywords: conveyor belt; failure analysis; Finite Element Method/Analysis (FEM); impact energy; mathematical model