4. Influence of operation activity level on reliability of an electromechanical inventory of rope shovels

Reliability of electromechanical system of rope shovels is caused by smooth operation of its separate clusters which poor reliability reduces time of operation and efficiency of all complex of the rope shovel. The preliminary analysis of the emergency shutdowns of rope shovels on 6 open-pit mines showed that the largest duration of the outage times is the share of a mechanical part for the reasons of misuse of an inventory, low level of scheduled maintenance, influence of weather and climatic factors and also qualification of working personnel. For the detailed analysis of idle times the data on the most often found failures of rope shovels of the above-named open-pit mines were processed.

Reliability indicators of separate clusters and details of the rope shovels affecting on their reliability are given in tab. 3. It is clear from the table that the greatest number of the emergency shutdowns – 197, happened because of rise engine failure. The considerable number of breakings was the result of caterpillar failure – 173, a ladle – 165, the course mechanism drive – 157 and a rope – 118 breakings. The highest failure rate $\lambda \cdot 10^{-3}$ falls on the rise engine – 18,541/h; caterpillars – 16,331/h; a ladle – 15,571/h and the course mechanism drive – 14,811/h.. The greatest lost time t_B is the share of repair: a pressure reducer – 34,82 h; a rise reducer – 28,97 h; high-voltage cable crossing points – 20,43 h and a rope – 11,68 h.

5. Conclusions

The received statistical data showed community of results on 6 open-pit mines located in various points of the Kuzbass coal basin.

That is why they can find application when scheduling maintenance and repairs and also other actions for increase in operational reliability of rope shovels on the open-pit mines.

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