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KC-B-R-FRVS – Kinematics characteristics of vibrating screen with rigid-flexible screen rod and the behavior of moist coal particles during the dry deep screening process

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High efficiency dry screening is a key problem to be solved urgently for the clean and efficient use of moist coal. The classification performance of the traditional rigid vibrating screen (TRVS) is poor and the screen aperture gets blocked easily when dealing with moist coal. In this study, a novel vibrating screen with rigid-flexible screen rod (R-FRVS) was proposed to solve the above mentioned problem. Kinematics characteristics of the rigid-flexible screen rod were systematically investigated by automatic dynamic simulation analysis. The behavior of the rigid-flexible screen rod and the moist coal particles, and the classification performance were studied by the screening test and image analysis system. The results indicated that when the rigid rod came in contact with the inner walls of the circular hole and elastic tube, they collided with each, which was followed by the spinning of the rigid rod and elastic tube, respectively. The average acceleration amplitudes of rigid rod and elastic tube were greater than those of side panel because of their collision. The formation of the sticky slime coating between adjacent elastic tubes was difficult, and the coal particles with size almost similar to sieve diameter could come out from the screen aperture because of the spatial rotation, collision motion, large acceleration energy of elastic tube, and the change of the distance between the adjacent elastic tubes. Therefore, the problem related to the caking of moist fine coal leading to the plugging of the screen apertures could be effectively solved. The classification performance of the R-FRVS was efficient, and it exhibited obvious advantages compared to the TRVS.

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