

# MOVEMENT OF COKE IN THE DRY COKE QUENCHING PLANT DURING ITS UNLOADING

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Zones of accelerated coke descent and stagnant zones appear when the coke is unloaded. This area of the process of dry coke quenching has not been studied and explained by the impossibility of conducting research on a directly operating industrial DCQP [1]. Such studies can be performed using either mathematical or laboratory modeling [2].

The study presents a more detailed analysis of the revealed influence of the design of various units of the DCQP on the nature of the movement of coke in the quenching chamber of the DCQP during its unloading. The numerical terms of the change in the rate of coke descent in the fire extinguishing chamber of the DCQP depending on the design of the blower head and the difference in the supply of refrigerant is presented. It can be argued that the constructive creation of resistance to the movement of coke in the form of a two-beam structure for supplying coolant to the blower head creates conditions for a more uniform descent of the coke loaded into the quenching chamber of the DCQP, on average reducing the rate of descent of coke by 4.6 %. Comparison of the surface profiles of the considered DCQP indicates an earlier and noticeable manifestation of zones of accelerated coke descent with a single-level blow head, the reason for which is its smaller cross-sectional area than that of a five-level blow head.

The movement of coke to the level of the blast head is characterized by the constancy of the rate of unloading of coke over the cross section of the quenching chamber, which creates optimal conditions for uniform distribution of the coolant in the array of quenched coke. A single-beam DCQP is characterized by the presence of two zones of accelerated descent located in the sectors of the boiler and coke sides. A larger number of zones of accelerated descent creates a condition for a more uniform descent of coke throughout the entire volume of the DCQP chamber. The manifestation of the action of zones of accelerated descent begins the earlier, the smaller the surface of the blow head.

## References

1. Grebenyuk A.F., Pozdnyakov A.G., Ryazantsev A.A. Osobennosti raboty USTK bunkernogo tipa // Koks i himiya. 1998. – No. 3. – P. 14–16.
2. Fidchunov A.L., Stelmachenko S.Yu., Pozhar S.G., Kryuk R.A., Kovalev A.B. 3D model ustanovki suhogo tusheniya koksa // Uglehimicheskiy zhurnal. 2018. – No. 6. – P. 3–7.