DOI 10.36074/20.11.2020.v5.02

THE MAIN CAUSES OF WEAR OF THE FLANGES OF THE RUNNING WHEELS OF THE BRIDGE CRANE AND CRANE TRACK

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As practice shows, in some cases, typical crane equipment does not have the necessary durability [1].

Many scientists have studied the dynamics of hoisting machines [2–4].

The running wheels of bridge cranes need special attention [5, 6]. Crane wheels are the fastest wear element of the crane [7, 8].

Each crane works according to its own norms. It is not possible to unify the parts and components of cranes, so each company that operates cranes solves the problem of spare parts independently, restoring worn surfaces by surfacing or making new wheels by repair services.

The comparative cost of restoring the crane wheel compared to the cost of a new one is:

– on a wheel with a diameter of 800 mm. repair of one flange 22%, rolling surface 44%, rolling surface and two flanges 62–75%;

– on a wheel with a diameter of 900 mm. repair of two flanges 22–36%, rolling surfaces and two flanges 45–50%.

The flanges can be repaired by surfacing up to 4 times, and the skating surface twice, which is limited by the appearance of cyclic cracks in the metal of the wheels.

For bridge cranes, the displacement of the rail relative to the axis of the wall should not exceed 15–20 mm., the non-parallelism of the axes of the rails should be within these limits. The mutual displacement of the ends of the joined rails in the plan and at a height of 2–3 mm. Clearances in joints of rails no more than 4 mm. Deviation of rails from a straight line on the basis of 10 m. (curvature) no more than 15–20 mm.

According to the norms of the State Technical Inspection 0.51, the wear of the rail on the rolling surface is allowed 4–8 mm., on the side surfaces of the rail head 10 mm. (5 mm. on each side). These tolerances determine the width of the wheel between the flanges, which can be reduced if the wheel design allows self-adjustment relative to the position of the rail.

The main causes of wear of the crane track are:

– insufficient rigidity of the bridge truss;

– incorrectly selected treadmill profile and flange of crane running wheels;

– design and type of crane beam;

– stresses caused by loads in the elements of the crane track, higher than the selected materials;

– low quality of metalwork and assembly works and construction and installation works at construction of a crane track and installation of the crane;

– faults in the mechanism of movement of the crane bridge and elements of the crane track;

– number, load capacity and modes of operation of cranes operating on one track;

– violation of the rules of technical operation of cranes;

– the simultaneous combination of the above factors accelerates wear.

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