TYPES OF WEAR OF THE WHEEL-RAIL "TRIBO-CONTACT"

[1]Rizaev Abdumalik Nabiyevich, [2]Saipov Sarvar Ikromovich
T.f.d., professor Tashkent State Transport University[1],, doctoral student
Tashkent State Transport University[2]

ANNOTATION

In this work, the analysis of the main and associated types of wear of the friction pair "wheel crest - rail head" according to GOST 27674-88 was performed. The wheel bands and rail heads were examined, which were rejected due to their extreme wear

Keywords: Wheel, rail, friction, wear, locomotive, wheel run-in, tribocontact, crest, brake, wheel crest, rail head.

Numerous studies have been devoted to the wear of the wheel-rail "tribo-contact" [1,2,3,4,5].

To establish the main and associated types of wear of the friction pair "wheel crest-rail head" according to GOST 27674-88 wheel bands and rail heads that were rejected due to their extreme wear were examined.

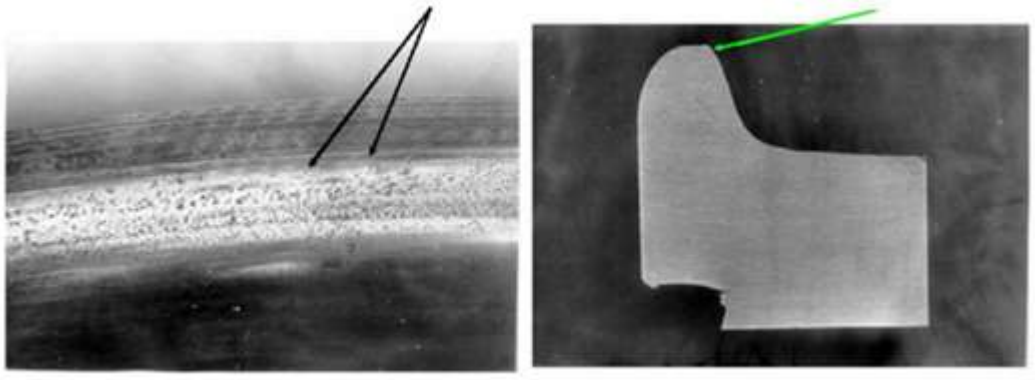
The first type of wear is observed in running wheel pairs of electric locomotives and electric sections operating on a section with a medium and heavy track profile and a large number of curves. The wear rate is high. The generatrix of the conical part of the ridge receives a curved profile with a large radius of curvature; the angle between the tangent to the generatrix and the axis of the wheelset is 65° for electric locomotives and 70° for motor car bands with a deviation of 1-2°. The transition from the generatrix to the top of the ridge is a pointed profile with a large plastic deformation-the roll-up of motor-car bandages (in electric locomotive bandages, the roll-up is removed by brake pads). The radius of the fillet has a size equal to 12-13 mm with a smooth transition to the conical part of the bandage.

The characteristically worn wheel crest (Fig. 1.4, a) has a matte metal surface with traces of metal setting in the form of deep pock-shaped depressions directed from the bottom up, that is, from the chip to the top. The friction surface is plastically formed - rolled up.

On electric locomotive bandages, small smallpox - like depressions predominate, on motor-car ones-larger ones. Closer to the top of the ridge, the number of depressions is noticeably reduced, and at the very top there are no depressions at all; they roll up when the plastically deformed metal flows towards the top of the ridge. The presence of areas of the "white layer" in those places where there are no smallpox setting was revealed.

At the top and top of the ridge, wear is observed as a result of plastic deformation, in the middle part - setting and deep alignment. Wear and violation of the strength characteristics of the friction surface change the original shape of the wheel crest, which begins to represent a pointed profile with a large plastic deformation-a pointed roll (Fig. 1. a b).

Smallpox wear due to setting and tearing of metal pointed forward



a) b)

Figure 1. Appearance (a) and cross-section (b) of the worn surface of the wheel crest

The ratio of the intensity of natural forms of wear (rolling and comb wear) depends on the operating conditions, but in all cases, the wear of the comb outstrips the increase in the vertical rolling of the bandage.

The second type of wear is observed in the bandages of wheel pairs of locomotives and electric sections operated on flat areas with a light track profile and a small number of curves. In these cases, the rolling of the bandage outstrips the wear of the ridge, which remains at least 27-28 mm in thickness. The type of wear remains the same, but there is much less pronounced gripping and scuffing of the surfaces. The radius of the chip is 10-11 mm. The transition from the cutting to the skating surface is smooth. The wear of the ridge is uneven in height: the cutting is more intense, so the angle between the continuation of the generatrix and the axle of the wheel pair increases to 70-75° at the maximum rolling.

REFERENCES

1. Bowden F. P. Friction and lubrication of solids / F. P. Bowden, D. Taylor. - M.: Mashinostroenie, 1968 – - 544 p.
2. Influence of the degree of hardening of materials in the process of friction on their resistance against badass / I. V. Kragelsky [et al.] / / Mashinovedenie. -1977. - No. 6. - pp. 88-94.
3. Komarovsky I. A. Modeling of the wear of a pair of comb wheel – rail on rollers in the transverse slippage / I.A. Komorowski, J. A. Zharov // Friction and wear. T 18. – 1997. – № 2. – P. 174-180.
4. Markov D. P. Mechanisms of coupling of a wheel – rail pair taking into account phonon friction / D. P. Markov / / Vestnik VNIIZhT. - 2003. - No. 6. - pp. 34-39.
5. Markov D. P. Adhesive-initiated types of catastrophic wear/ D. P. Markov, D. Kelly // Friction and wear. - 2002. - No. 5. - pp. 483-493.