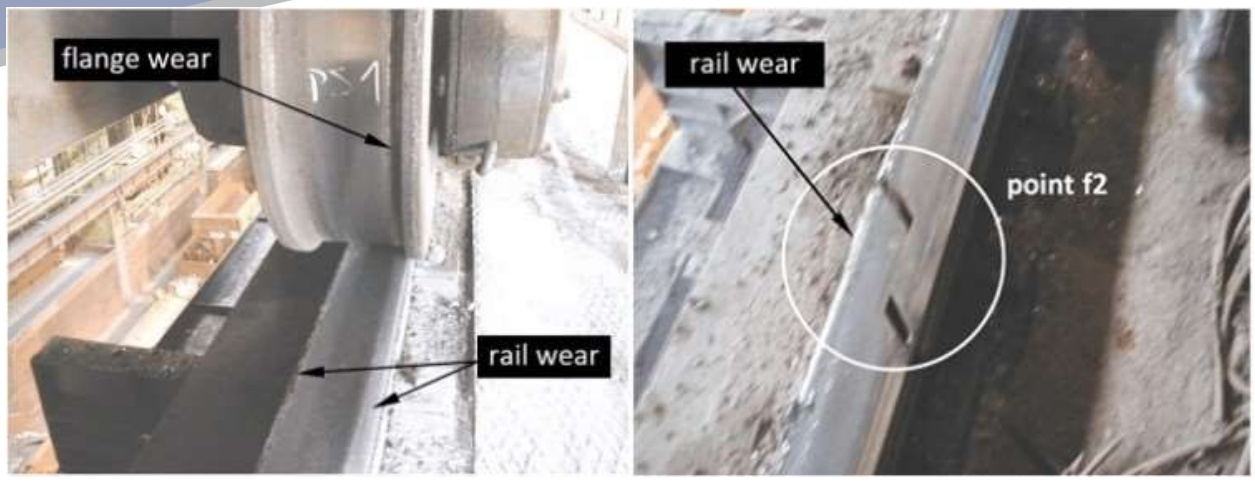
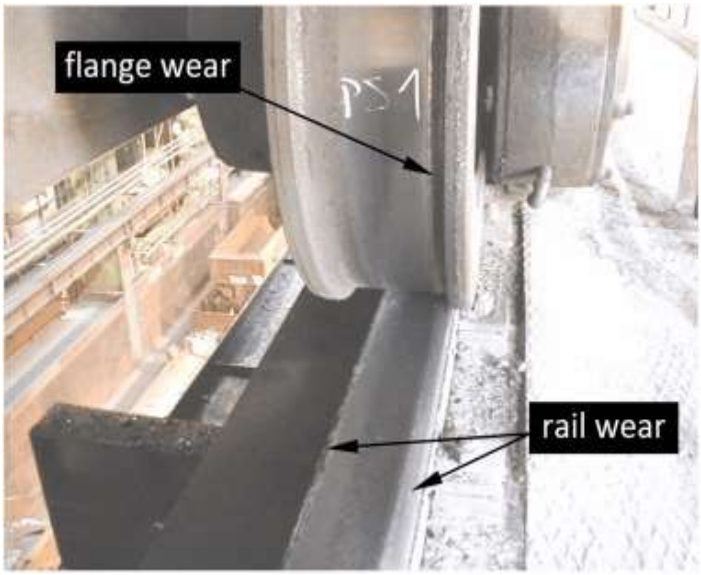


Crane Rail Wear Limits

Reference: crane manufacturer ZokeCrane-LinkedIN 2021

Transfer Carts, Overhead Crane Cars, Overhead Crane End Trucks or Trolleys while operating during normal (or abnormal) procedures can experience wheel rim and track side contact, resulting in horizontal lateral thrust, causing friction and wear of the wheel rim and track. Crane wear track phenomenon manifests itself in various forms, sometimes only one wheel wears the track, sometimes several wheels wear the track at the same time, sometimes round-trip operation wear the same side of the wear track, sometimes round-trip operation gnaw or wear track on both sides. The reasons behind track wear can be very complicated, it may be the track, wheels, bridge factors, or the influence of other factors. The following is some detailed analysis of the causes of the phenomenon of track wear for you to consider.



Wheel defects causing track wear

Wheel manufacturing and installation quality problems can cause wheel and/or track wear. Overhead Cranes that experience long-term overload or excessively high-load operations (or due to residual stress or other reasons) can experience deflection or deformation of the main girder(s), end trucks or trolley frame. This can cause skew of the wheels and span changes, thus causing the operation to wear the track, most commonly seen in large cranes/spans.

1. The diameter size of the two drive wheel treads is not equal. When the overhead crane is running, the running speed of the left and right sides will be different, causing the car to run off, making the wheel edge and the track on both sides contact, and cause track wear.
2. When the installation or bridge deformation leads to four wheels not in the same plane, the drive wheel pressure is not equal, track wear phenomenon is bound to occur.
3. Wheel level deflection. Due to the deflection or deformation of the bridge, resulting in the horizontal bending of the end truck, so that the horizontal deflection of the wheels exceeds the allowable difference, that is, the wheel width centerline and the track centerline form an angle α, the two drive wheels deflect in the same direction, resulting in track wear.
4. Wheel vertical deflection. The deformation of the bridge frame causes the wheel vertical deflection to exceed the tolerance, causing track wear. That is, the wheel tread centerline and the plumb line form an angle β. When the vertical deflection value of the drive wheel end face exceeds the tolerance, it causes track wear because the two active wheels are deflected vertically in the same direction. After the overhead crane is loaded, the two active wheels achieve unequal rolling radius, and the wheels wear the track. Wheel vertical deflection, will also cause the wheel tread and the top surface of the rail contact area to become smaller increasing the pressure per unit area, resulting in uneven wheel wear, and may even wear grooves in the tread. This cause of track wear during overhead crane operation is often accompanied by hissing sound.
5. The front and rear wheels do not run in the same straight line. Due to the installation or bridge deformation the span or diagonals are out of tolerance, so that the front and rear two wheels can not run in a straight line, causing track wear.
6. The wheel taper direction installation error is bound to destroy the speed adjustment performance between the two wheels, making the wheels ahead more ahead, lagging wheels more lagging, that is, leading to a serious misalignment and track wear.

Track defects caused by worn tracks

1. Track installation level bending is too large or the local deformation of the track is too large, more than the span tolerance will cause track wear. This track wear is characterized by wear only in the localized section of track. CMAA has produced guidelines for runway track installation tolerances and must be adhered to.
2. Track installation "figure of eight". Track installation is not standardized, resulting in one end of the track gauge being large, and one end small, the so-called track "eight-shaped". In this section of the track, the wheels running back and forth, will gnaw the outer and inner side of the track respectively.
3. The same section of the two tracks relative elevation difference is too large. This situation can make the overhead crane experience lateral movement, resulting in the higher side of the outer side of the track being gnawed and the lower side of the inner side of the track being gnawed.
4. The track gauge is too poor relative to the crane span. After building and assembling according to the process requirements, the running wheel gauge of the overhead crane running mechanism is a fixed value (Crane Span as measured from centerline to centerline). When the track gauge for some reason is outside tolerance the wheels will not run in the middle of the tread, thus causing the wheel edge and the side of the track to forcibly contact, creating friction and track wear.
5. The main girder(s) deflection/deformation can cause the trolley track to produce side bend, when beyond a certain range, the trolley wheel will pinch the track and cause track wear.
6. Bolted connections without fixed stops in the Girder(s) and End Truck(s) or other wheel connections can come loose and create misalignments.
7. Loosening of track hold-down hardware can lead to track position movement, so that the gauge, parallelism, straightness, etc. will exceed the acceptable tolerance.

Other causes of track wear and tear

1. Separately driven end trucks or drive wheels. If the motors are not synchronized, will force the crane to skew producing track wear phenomenon.
2. Separate drive brakes being adjusted differently, or acting differently. Due to the brake torque not being equal cranes can skew and will produce track wear phenomenon.
3. Drive shaft coupling gaps too large or too loose, the gear meshing gap too large can cause starting and asynchronous braking and produce track wear phenomenon.
4. If the track or wheel has dirt/grease that affect the friction coefficients it can causes the two active wheels to be driven differently, which will cause the track wear due to run out.
5. Replacing only one drive wheel, resulting in two active wheel diameter differences, causing the two wheels running line speed to be different and cause run off and track wear.