

Sun kinks – another consequence of searing temperatures

More than roads buckled under Iowa's extreme heat earlier this summer. Railroad tracks are also susceptible to the high temperatures, and this is keeping railroad crews and Iowa DOT track inspectors busy as well.

For decades, researchers have tried to figure out how to keep steel railroad tracks from warping in high temperatures. Despite the successful prevention measures adopted by the railroad industry, no technology exists that can completely prevent it from happening. The so-called "sun kinks" can happen out of the blue. If undetected, they can result in a derailment.

The buckling happens to welded rails, rails that do not have joints. Rails come from the welding plants in strings one-quarter mile long. Once the rails are laid in the track, the ends are welded to each other to create strings of rail that are continuous. The United States began using a welded rail system instead of jointed in the 1950s because it provides a smoother ride, eliminates the "clickety-clack" of traditional rails and reduces maintenance costs.

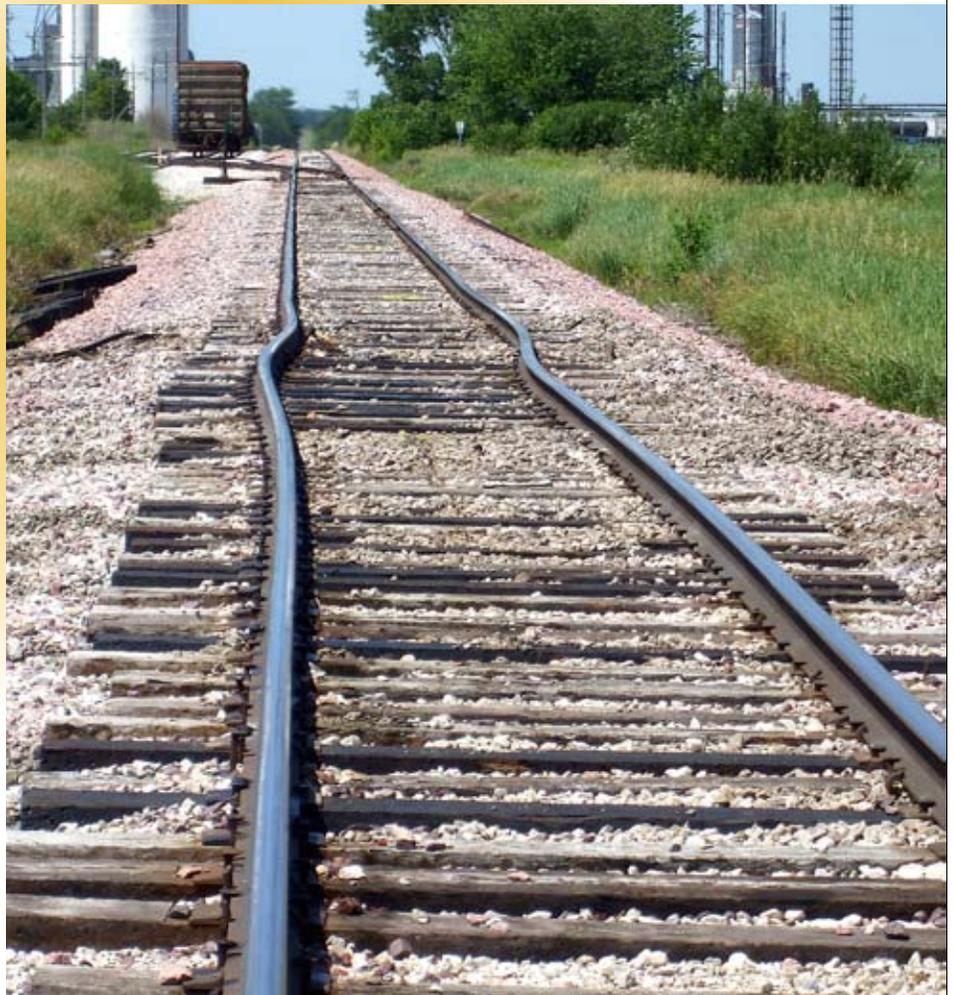
Steel rails slowly expand and contract as temperatures rise and fall. An 1800-foot length of rail will expand almost a foot with an 80-degree change in temperature. Before welded rail, expansion was absorbed by a small gap (joint) between the rails. With welded rail the normal tendency to expand must be constrained internally by securing the rail.

Careful engineering measures, including heating the rail, are taken when rail is installed to account for rail expansion and contraction. The railroad spikes, tie plates and cross ties, supported by the rock ballast, as well as rail anchors that are applied in a strict pattern to contain the rail from movement, can normally contain these stresses. However, in some cases these measures cannot hold the extreme amount of force that high temperatures can create. A sudden release of these stresses may occur, resulting in the rapid (and often audible) development of a kink or sideways movement in the track.

That is where the heat inspectors come in. To add an extra measure of safety, track inspectors are sent out

when the temperature rises quickly from night to day or when the daytime temperatures become extreme and the rail attempts to rapidly expand. These inspectors look for signs the track is under extreme compression and in danger of kinking. Signs include wrinkles in the track and disturbances of the ballast. When a kink or high tension is discovered in the track, it is taken out of service, repaired and then returned to service.

If warranted, a heat restriction or order may be imposed by the railroads as an additional safety measure. During these restrictions, trains must operate more slowly through the affected areas.



This railroad track near Goldfield kinked earlier this summer.