

Tech CONNECT

Sun Kinks, Breather Switches, and Train Disasters

Travelling by train is popular. Passenger trains carry people between towns and cities every day. Freight trains transport products over long distances.

Train cars glide on long parallel steel rails. Train tracks are manufactured in 20 m lengths that are welded together. This ensures a smooth, quiet ride. The continuous welded rail can be several kilometres long.

Railway tracks in Canada are exposed to extreme changes in temperature. These changes can cause a lot of thermal expansion of the rails in summer, as well as contraction in winter. To avoid these changes, the tracks are heated before being put together. Nevertheless, sudden bouts of extremely hot weather can cause a rail to buckle. This forms a twist in the rail that some people call a “sun kink.” Sun kinks are extremely dangerous, and have been linked to some serious train disasters.

On July 4, 2005, a train carrying 51 empty fuel cars derailed near Ottawa (Figure 1). It is believed that sun kinks were the cause. Luckily there were no injuries or deaths in this accident. However, the derailment disrupted normal passenger service between Montreal and Toronto for several days. Passenger train derailments involving sun kinks have caused many injuries and deaths. Scientists and engineers are working to develop rail technology that minimizes the possibility of sun kinks.

One method used to avoid sun kinks is to cut the rails at sharp angles. This leaves a small gap between the cut surfaces. These gaps are called “breather switches” (Figure 2). Engineers continue to work on methods that will improve train transportation safety.

To learn more about sun kinks and breather switches,

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Figure 1 If the cars had been filled with fuel, the derailment would have caused serious damage to wildlife and the surrounding environment.



Figure 2 A breather switch. The sharp angle at which rails are cut ensures a relatively smooth and quiet ride for passengers.