

Heat Restriction FAQ's - Why are heat-related speed restrictions impacting service on the Worcester/Framingham Line, and what is the MBTA doing to resolve the issue:

What Is a Heat Order?

A heat order is an order given to railroad engineers requiring them to reduce the operating speed over a given section of track. Just as drivers are warned to slow down in inclement weather, trains are subject to the same speed restrictions, in the name of safety.

The operating railroad's engineering staff imposes a heat-related speed restriction when the temperature of the air reaches a specific temperature or if it has been excessively hot for a consecutive number of days. The "slow-order" requires train operators to limit the maximum operating speed to 30 mph within the affected territory. The temperatures at which heat-related speed restrictions are imposed can vary depending upon track characteristics.

This has been MBTA's policy for several years and it has been reviewed and approved by the Federal Railroad Administration (FRA). While the MBTA and Keolis Commuter Services realize the delays caused by heat-related speed restrictions are an inconvenience, the safety of our passengers, employees and the general public is of the utmost importance.

Why Are Heat Orders Necessary?

The Worcester/Framingham Line is partially comprised of continuously welded rail (CWR), which is rail welded together in strings, with each string being ¼-mile long. When installed, the ends of these rail strings are welded together to create a seamless piece of rail that is free of joints, creating a smooth surface for train wheels that results in a smoother ride for passengers.

One challenge with steel rail is that when temperatures rise the steel expands and when temperatures fall the steel contracts. In fact, a 1,450-foot long section of unrestrained rail will expand nearly 6 inches when the temperature increases by 50 degrees. To counteract the expansion and contraction of the rail, several safety measures are employed to limit movement in the track. These measures may include heating the rail to "de-stress" it, anchoring the rail to the ties and ensuring there is sufficient stone ballast and wood (or concrete) ties present.

With the steel rail firmly secured to the ties, a compressive force builds within the track structure and rail. Under conditions of extreme heat, the compressive force in the rail can build to the point that the track buckles under its own pressure, causing the track to shift suddenly. This sudden shift of the track is referred to as a "heat kink", which often occurs due to the vibration and dynamics of a passing train. Heat kinks can cause harsh shifts in track, which can result in train derailments. To safeguard against heat kinks and the associated issues they cause, a heat-related speed restriction is applied.

Why does it seem the Worcester/Framingham Line is the only commuter rail line impacted by heat-related speed restrictions?

In the case of the Worcester/Framingham Line, the track structure was built and maintained by other railroads with different design and maintenance standards than the MBTA's. In 2012, when the MBTA took over operations and maintenance of the Worcester/Framingham Line, there were no heat records provided for the existing rail to allow MBTA's Track Engineers to make the determination as to whether or not the rail would be susceptible to heat kinks. The absence of heat records require the MBTA and their current commuter rail operator, Keolis Commuter Services, to employ the heat-related speed restrictions as a safety measure until the rail is either replaced or de-stressed.

What's the solution and what is the MBTA doing to solve this problem?

To address these heat-related safety concerns, the MBTA has undertaken a major construction effort to either install new rail or de-stress sections of existing rail to make the Worcester/Framingham Line safer and remove the need for heat restrictions on the line. This work began in the Spring of 2014 and is currently ongoing. MBTA-contracted crews continue to perform track repair and replacement improvements until completed and all heat related speed restrictions are eliminated on the line.

During August and September of 2014 MBTA completed 7.5 miles of rail de-stressing on the outbound Track #1 between Framingham and Worcester.

Beginning in April and continuing through December 2015, MBTA will complete an additional 34 miles of rail de-stressing on the inbound Track #2 and outbound Track #1 between Boston and Framingham. Upon completion of this work, the heat-related speed restrictions will be removed on both tracks between Boston and Framingham.

For the next phase of work, the MBTA contracted with LM Heavy Civil to install 15 miles of new 136# (pound) continuously welded rail (CWR) on outbound Track #1 between Framingham and Worcester. This work is underway as of July 2015 with an anticipated substantial completion by the end of December 2015, weather-permitting.

There are additional track sections on inbound Track #2 between Framingham and Worcester that may require rail replacement or de-stressing. MBTA is currently working to address this ASAP.

Ultimately, MBTA's goal is to complete all work between Boston to Framingham on both the outbound and inbound tracks (88 total miles) as soon as possible so that passengers will be freed from the heat-related train delays before the summer of 2016.

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Comments by Dave Perry:

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