SUMMARY IN ENGLISH

On July 9th, at 15.49 hrs, freight train service # 4343, consisting of two RC class electric locomotives and 24 freight wagons suffered a derailment of wagons 4 through 18. The accident occurred between Ovansjö and Alby, between kilometer posts 477 and 476, on the down track.

The railway is a dual-track construction, allowing a maximun speed of 130/160 km/h. At the point of accident, there is a large radius curve (> 500 m) to the right (in the down direction), which allows 120/150 km/h and a 10 promille upslope. The track runs almost in an east-west direction at the place of the accident.

The gross weight of the wagons was 1185 tons and the train length was 432 m. The first 9 wagons were empty or only lightly loaded, the following wagons, but the very last, were loaded to an axle load of about 20 tons. Wagons 8 through 11 were two-axle type wagons, all others bogie-type wagons. The wagons in the rear portion of the train (from wagon 12) were loaded with lead ingots and copper plates, except the last wagon, which carried only an empty container.

The train separated between wagons 11 and 12 and the stopping force of wagons 12 and 13 burrowing through the ballast, caused a number of wagons behind them to pile up and escape sideways; some of the cargo fell off at that point and the up track also sustained severe damage.

The permanent way for the down track was destroyed for about 100 m and was severely damaged for about 100 m in both directions from this area.

The locomotives and the first 3 wagons, as well as the 6 last wagons remained on track.

The first derailed wagon was # 4, which derailed only with axle 3 (first axle in rear bogie). The wheels derailed inward with respect to the curve but remained very close to the rails and hammered out the fastening clips (Pandrol) on the right-hand side of both rails. It is assumed, that the outer rail then tilted outwards under the prevailing forces in the track and the gauge was not upheld, which caused following wagons to derail. The track was progressively destroyed as the following wagons passed.

At the time of the accident, the weather was very warm (about 30ºC) and the sun was shining. A follow-up on meteorological data showed that the accident time coincided with the highest recorded temperature up to that point in time, for that summer season.

In the autumn of 2013, works were carried out on the permanent way. Defective sleepers were exchanged for new as a part of an ongoing, national project addressing the problem of "DEF-sleepers"; sleepers that deteriorate rapidly due to "Delayed Ettringite Formation", caused by a problem in the manufacturing process. At the place of the derailment, a number of sleepers had been exchanged, the track stabilized and measured, but the final track adjustment and re-establishing of the ballast section, didn't take place until May 2014. The line was then inspected and pronounced to be within specifications in all respects. Nevertheless, testimonies from experienced personnel engaged in the proceedings, and results from investigations carried out after the accident, indicate that there may have been deficiencies in the ballast section, i.e. too little ballast at some points.

The conclusion is that the train derailed due to a track buckle, which developed in the very warm weather that afternoon. The buckle is assumed to have appeared due to deficiencies in track stability, in turn caused by a lack of ballast at the crucial point.

The last stage included in the process of changing sleepers was to re-establish the ballast section and then to inspect the line. No problems were recognized or noted during any of the inspections that took place between the final track adjustments and the accident.

Safety recommendations

The Swedish Transport Agency is recommended to:

- work to ensure that infrastructure managers develop a clearer, more consistent system of inspections in connection with work of significance to traffic safety. *(RJ2015:03 R1)*

- through its supervision, check that the infrastructure manager, when hiring contractors, makes sure that the contractor has a system for communication and the securing of information transfer to, from and between hired subcontractors. *(RJ2015:03 R2)*