EXTENDED SUMMARY IN ENGLISH

Two freight trains, Railcare T AB 34871 and VR Track Sweden AB 26890, collided at Fångsjöbacken station on 11 October, 2016.

Fångsjöbacken is a two-track station on a single track line. The interlocking plant allows simultaneously incoming trains.

RC 34871 was travelling over the main track (track 2), as VR 26890 was entering the siding (track 1) through switch 3. RC 34871 was approaching a "Danger" aspect in signal 2/5, which is the starting signal on track 2. The driver of RC 34871 claims he had not been able to see the home signal 2/1 due to the position of the sun, which at the time was shining directly into the drivers cab through the front window. As a result of this, he also did not note the distant signal aspect in 2/1, showing that 2/5 was at "Danger". When he noticed the red light in 2/5 and also noticed that the ATP engaged the brakes, he applied emergency brake. The train did not have enough braking power to stop until it came to the obstruction point in switch 3, and the locomotive touched one of the cars in the incoming train VR 26890. The stopping point was 105 metres beyond the starting signal 2/5.

If a driver fails to apply brakes and decrease speed when the train is approach-ing a point where it has to stop (e.g. a signal at "Danger"), ATP will engage brakes instead, in response to the information gathered at the distant signal or similar information point. The ATP action is triggered as a result of internal computations that take into account the speed and the braking power of the train, as well as the reaction time of the braking system. With correct values stored in the system, ATP will bring the train to a standstill before a dangerous point even without driver action. Before actually braking the train, ATP will show visual information and also give audible warning signals.

In this case, the train passed the safe stopping point (signal 2/5) with 105 metres, despite ATP (and driver) action. The investigation show, that this situation had the following contributing factors:

Being disturbed by the sun, the driver saw neither the home signal 2/1 nor the information that was shown in the ATP. Neither did he note the warning sound from the ATP. A contributing factor was that the sound of the ATP warning system was set to minimum and ear protection was used.

The combination of a too high value for braking power being entered into ATP and the prolonged reaction time of the brakes compared with the value stored in ATP, resulted in ATP triggering the brakes too late to stop the train before signal 2/5. The locomotives' ATP was tested after the event and showed no deviations from expected performance.

The braking power value that was entered into the locomotives' ATP, did not correspond to the actual braking power of the train and, in fact, not even to the theoretical braking power that would have been available if the locomotive had had well-functioning brakes. The deceleration value entered into ATP was 0,69 while the actual retardation was 0,57. The correct value to enter into the ATP should have been 0,58.

No deceleration check was carried out due to an upslope on the line. A lower deceleration value due to this had not been entered into the ATP.

The locomotives brake system did not function properly, inasmuch as the brake reaction time was longer than it should be, and the braking power was lower than was to be expected. Subsequent examination of the locomotive indicates that these conditions seem to have been caused by contaminants (oil and water) in the locomotives' pressurized air system, and that brake power was restricted as mechanical limitations in the brake linkage came into play due to thin brake blocks and near-minimum wheel diameter on at least one axle.

The railway undertaking had not ensured that information given to the staff was also understood and used in practice. Another contributing underlying factor was the fact that the maintenance program used by Railcare was not sufficient to detect the deficiencies in the brake system.

Safety recommendations

In the light of the actions taken by the railway undertaking in response to the accident, (for example more frequent service and inspection of the brake system and strengthened follow up of drivers), and the supervision of Railcare T AB´s application of the EU-regulation 1078/2012[1] marked as prioritized in the Swedish Transport Agency's library for up-coming supervision, SHK has decided not to issue explicit recommendations in these respects.

It is assumed, however, that the findings described in this report are taken into account during the audit mentioned above.

Railcare T AB is recommended to:

- In addition to the measures already taken, consider if it is possible to improve the physical working conditions regarding the visibility, lighting and sound conditions for the driver in this type of locomotive. *(RJ 2017:05 R1)*

The Swedish Transport Agency, possibly in conjunction with the Swedish Work Environment Authority, is recommended to:

- Within the framework of the agency's supervisory efforts review how other railway undertakings handle the visibility, lighting and sound conditions in older types of locomotives. *(RJ 2017:05 R2)*

[1] COMMISSION REGULATION (EU) No 1078/2012 of 16 November 2012 on a common safety method for monitoring to be applied by railway undertakings, infrastructure managers after receiving a safety certificate or safety authorisation and by entities in charge of maintenance.