

| SAFETY ALERT       |  |
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| <b>Subject</b>     | Rolling stock - other  |
| <b>Equipment</b>   | ETCS-equipped maintenance vehicle, OTM, "MTR-E" on ERTMS Level 2 Botnia Line. ETCS On-Board system from Bombardier, AOS_BV release EOS 3 version 3.1.  |
| <b>Description</b> | <p>On Friday, September 13 2019 a safety error occurred on the Botnia Line (ERTMS Level 2) between Solum and Harasjön.</p> <p>The event occurred for a MTR-E type vehicle equipped with a turning device that allows the complete vehicle to by itself turn on the line. The vehicle had a movement authority (MA) in OS which was valid in the opposite direction compared to the vehicle's direction of travel after the vehicle used the turning device. When using the turning device, the ETCS system needs a restart (the power must be switched off), which did not happen.</p> <p>ETCS was then unable to report the correct direction to RBC so a MA was sent for the route that was still locked in the direction of Solum. Along the way, the vehicle reports link errors at the positions where the balises included in the link chain for MA should have been in the direction of Solum. When real balises were passed, there was no reaction because balises were not included in the link chain (all this is according to ERTMS requirements).</p> <p>When the vehicle arrived at the position where the onboard system expected the second balise group, a more powerful reaction came from the ETCS system. The ETCS onboard system applied the operating brake to a full stop and shortened the MA to the front of the vehicle. A text message "balise linking error" was sent to the ETCS on board and to the RBC. At stand still, the onboard system automatically sent a request for a new MA to the RBC. The vehicle received a prolonged MA in the operating mode "On sight". The driver acknowledged operating mode "in the long run" one more time. When the vehicle drove back to Harasjön, two more balise groups were passed without any reaction from the ETCS system. After the vehicle had stopped at Harasjön, it still had a MA, operating mode "On Sight".</p> <p>This could have led to a collision or derailment. After the analyses of log files by the onboard manufacturer, the manufacture concluded that no technical errors were detected. The ETCS system worked as specified. The manufacture and the IM concluded, that the event could happen because of how the ETCS's onboard system was integrated in the particular vehicle type, in combination with the (in)correct use of the vehicle. The RU concluded that the SRAC in the vehicle user manual was not known by the driver. Furthermore, it was unclear what is meant with "to restart the ETCS onboard system". Swedish operational rules need to be clarified for "occupied movements with a MA".</p> |
| <b>Country</b>     | Sweden   |

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| <b>Issuer</b>       | NSA  |
| <b>Issuing Date</b> | 06/05/2020   |
| <b>Attachments</b>  | Preliminary about incident turning plate_sept 2019.pdf |