

Railway accident investigation report

Railway operator: Kobe Electric Railway Co., Ltd.
Accident type: Train derailment
Date and time: About 19:59, May 28, 2013
Location: In the premises of Arimaguchi station, Sanda Line, Kobe City, Hyogo Prefecture.

SUMMARY

The outbound local 19001 train, one-man operated train composed of four vehicles, starting from Shin-Kaichi station bound for Dojo-Minamiguchi station, had started on schedule at No.2 platform of Arimaguchi station, Sanda line. The train driver noticed an abnormal sound and the following big sound while operating coasting at about 25 km/h at the turnout in the station, and applied the emergency brake to stop the train. After that he found the front bogie of the second car entered into the route to Arima-Onsen station, different route from the predetermined route, and found all two axles in the front bogie of the second vehicle were derailed. The first vehicle, the rear bogie of the second vehicle and the third vehicle had entered and stopped in the predetermined route to Doji-Minamiguchi station. There were about 60 passengers and the driver on the train, but no one was injured.

PROBABLE CAUSES

It is considered probable that the front bogie of the second vehicle of train started at No.2 platform of Arimaguchi station, Sanda line, had entered into the unexpected route to Arima-Onsen station and derailed, because the flange of the right wheel of the first axle in the front bogie of the second vehicle had climb over the tongue rail around edge of the right tongue rail of the point in the double slip switch, followed after passing the symmetrical turnout in the premises of Arimaguchi station, in this accident. And, it is considered probable that the second axle of the front bogie had derailed to the right in the double slip switch following to the first axle entered into the wrong route, although it had entered into the predetermined route at the point in the double slip switch.

It is considered probable that the status of the track, the vehicles, the electric facilities and operating status were within the company's reference values or the limits to be operated, however, right wheel of the first axle of front bogie of the second vehicle had climb up to the rail top, due to the combination of the following situations:

- (1) The large lateral force had on the right wheel of the first axle of the front bogie of the vehicle while the vehicle was passing the S-shaped track where the shape of curvature changes in the distance between the first axle and the fourth axle of a vehicle, that is shorter than the length of a vehicle, i.e., 18.14m.
- (2) It is possible that a relatively large lateral force is easy to occur because the track alignment increased as to decrease radius curvature near the tongue rail, which has the entrance angle, in the double slip switch at the accident site.
- (3) It is possible that the wheel flange climbs up to a rail top by contacting with the tongue rail at its entrance portion, because the flange part of the wheel of the vehicle had worn vertical compared to the designed cross sectional shapes.