

Railway accident investigation report

Railway operator: Hokkaido Railway Company.
Accident type: Train derailment.
Date and time: About 21:55, May 27, 2011.
Location: In the premises of Seifuzan signal station, Sekisho Line, Simkappu Village, Yufutsu County, Hokkaido.

SUMMARY

The inbound limited express 4014D train, named "Super Ozora 14" composed of six diesel vehicles, of Hokkaido Railway Company, starting from Kushiro station bound for Sapporo Station, departed Tomamu Station about 2 minutes behind schedule, on May 27, 2011.

The conductor, in the conductor's compartment of the fourth vehicle of the train, running toward Seifuzan signal station, notified to the train driver that he had heard an abnormal sound and had felt irregular vibration. The train driver applied braking operation immediately after notified from the conductor. The train stopped in Niniu No.1 tunnel in the premises of Seifuzan signal station.

After that, the smoke of the fire which broke out from the train flowed into the train. The train driver tried to move the train halting in the tunnel to outside of the tunnel, but the train could not be moved.

There were 248 passengers, the train driver, the train conductor, and 2 cabin attendants on board the train. All members had evacuated outside the tunnel on foot, but 78 passengers and the conductor were injured.

It was found that the first axle of the rear bogie of the fifth vehicle of the train had derailed to the left. There were many parts of the dropped power transmission device, etc. scattered along the track for about 2 km length away from the halted point of the train. Moreover, all the 6 vehicles of the train were burnt by the fire.

PROBABLE CAUSES

It is considered probable that all 2 axles of the rear bogie of the fourth vehicle and the first axle of the rear bogie of the fifth vehicle of the train were derailed as a result of the following steps, originated from the pin suspended the reduction gear device on the rear part of the fourth vehicle fell down.

- (1) When the reduction gear device was hung down forward as rotate around the axle, the propeller shaft was also hung down. As a result, the universal joint was broken and finally the reduction gear and the propeller shaft were separated.
- (2) As the separated reduction gear device further rotated and hung down, the suspender of the reduction gear device hit the lead rail of the turnout No.12-Ro in the premises of Seifuzan signal station. At this moment, the rear bogie of the fourth vehicle was pushed to the left along the lead rail and the first axle derailed, the second axle of the rear bogie derailed following the first axle. The derailed 2 axles were restored at the turnout No.11-I.
- (3) As the rear bogie of the fifth vehicle hit the bevel gear on the track fallen off from the hanged reduction gear device, the rear bogie was pushed up and the first axle was derailed.

It is considered probable that the pin suspending the reduction gear device fell down following the process described below. It is also considered probable that these process were related with huge vibration acting on the rear bogie of the fourth vehicle, due to the circular irregularity of the tread profile of the left wheel in the first axle of the rear bogie of the fourth vehicle.

- (1) There were local wear caused by contacts with other components in the split pin which fixed the grooved hexagonal nut for the suspension pin supporting the reduction gear device, and in the stopper split pin which was inserted at the head of the suspension pin to prevent fallen out.

- (2) As the grooved hexagonal nut was loosened, the split pin inserted in the groove was exposed to the iterative tangential load and finally fell out of the groove of the hexagonal nut.
- (3) The grooved hexagon nut loosened by missing the split pin and rotated still more until fell out.
- (4) The stopper split pin which was inserted at the head of the suspension pin fell out by the iterative tangential load from the suspension pin.
- (5) After the grooved hexagonal nut and the stopper split pin fell out, the suspension pin suspended the reduction gear device fell out of the guide.

About the damage of the train by fire after the train derailment accident, it is considered probable that the fallen bevel gear of the reduction gear device hit and broke the fuel tank in the front part of the sixth vehicle, the light oil scattered on the track around the wooden sleeper had caught a fire ignited at around the generator or rear upper part of the engine and spread to the whole train.

According to the results of the overhaul inspection about the under floor equipments that were badly burnt and the equipments to get high temperature during operation, it is considered probable that all equipments caught fire by the external heat sources, then, the precise point where a fire was outbreak and the cause of outbreak fire were not identified.

RECOMENDATIONS

In view of the result of this accident investigation, the Japan Transport Safety Board recommends as follows to Hokkaido Railway Company pursuant to Clause 1 of Article 27 of the Act for Establishment of the Japan Transport Safety Board in order to secure transport safety.

Hokkaido Railway Co. should establish the proper inspection system, i.e., inspection period and methods for monitoring the condition of the wheel tread, and should manage the condition of the wheel tread throughout, and never use the wheel which should be treated as the wheel whose size of the tread defects or exfoliation are exceeded the limit to be used.