

Railway serious incident investigation report

Railway operator : Hokkaido Railway Company.

Serious incident type : Vehicle damage, railway serious incident related with malfunction, damage, destruction, etc., effecting the safe train operation in the running gears, brake equipment, electric devices, coupling devices, train protection system, etc., of the vehicle, prescribed in Number 8, Clause 1, Article 4, of the Ordinance on Report on Railway Accidents, etc.

Date and time : About 15:41.03, July 6, 2013.

Location : In the premises of Yamasaki station, Hakodate Line, at around 89,926 m from the origin at Hakodate station, Yakumo Town, Futami District, Hokkaido.

SUMMARY

On July 6, 2013, the driver of the inbound Diesel Limited Express 5014D train, Limited Express Hokuto No.14 composed of 8 vehicles, starting from Sapporo station bound for Hakodate station of Hokkaido Railway Company, while operating in coasting at about 130 km/h in the premises of Yamasaki station, found that the engine indicator lamp was off, and stop the train.

The driver checked the train and found the smoke emitted from under floor of the 4th vehicle, and found the fire above the engine. It was found that the upper part of the engine was damaged and the paint coated part of the body was partly burnt by the spattered combustible liquid that was considered to spatter from the damaged part of the engine.

There were about 200 passengers and 4 train crews, i.e., the driver, the conductor and 2 cabin crews, were onboard the train, but no one was injured.

PROBABLE CAUSES

It is highly probable that the incident occurred by the following process.

[1] As the pin press fitted into the guide arm of the sliding block, used as the speed governor for the diesel engine, DML30HZ-10024, installed in the 4th vehicle of the Diesel Limited Express 5014D train, broke by metal fatigue at the edge of press fitted part, then the engine became uncontrollable and over speed operation caused damages of the piston and connecting rod etc., equipped inside of the engine.

[2] The fuel and the lubricating oils for the engine and antifreeze corrosion inhibitor included in the coolant of the engine spouted from the bored holes caught a fire by the spark generated by the broken connecting rod stabbed and destroyed the cylinder block, and these oils etc., stacked on the high temperature surfaces of the exhaust manifold, the turbo charger, the exhaust pipe, etc., and combusted.

[3] As the train ran in high speed at that time, the above mentioned fuel and engine lubrication oil etc., scattered to the rear vehicles of the train and stacked on the side surface of the vehicle body, then the paint on the surface of the vehicle body burned.

It is probable that the pin of the sliding block broke in the short term after the simultaneous renewal

because the large bending load of about three times the designed maximum value of the manufacturer, acted continuously on the edge of the pin press fitted to the guide arm, and the stopper bolt was not installed in the engine, in addition to the undesirable behaviors in the fuel control device such as so called "Todou" or "Shakuri" in the company, which were the phenomena of the vibration of the piston or the instantaneous displacement of the piston to the direction to reduce the fuel injection rate, in the hydraulic servo motor when the notch of the master controller was shifted to the particular position.

It is probable that the reason why the engine was damaged by the over speed operation were related with that the control rack was designed to act to increase fuel injection rate when the pin of the sliding block was damaged, and that there was no mechanism to stop the engine operating in over speed, forcibly.

It is somewhat likely that the backgrounds of occurrence of the serious incident were that the measures were planned by the limited staffs in charge without investigation by the whole company against the frequent damages of the parts related with the sliding block and the fuel control which effected the vehicle etc., seriously, furthermore, these measures were the symptomatic therapy instead of the measures decided by the analyses and investigation based on the data obtained by the sufficient inspection.