

Our Response to the Incidents in Which Tohoku Shinkansen Trains Came to a Halt Due to a Connecting Part
Coming Loose While Running

We would like to once again offer our deepest apologies to our many customers for the inconvenience caused by the incidents that occurred on September 19, 2024 and March 6, 2025, when the connecting part between the Hayabusa and Komachi trains came loose. These incidents are currently being investigated by the Japan Transport Safety Board, and we are cooperating with the investigation. Meanwhile, we have also established a verification committee to verify the estimated causes and the validity of countermeasures through technical and objective evaluation by external experts. We would like to report the results of our investigation and our countermeasures.

Moreover, based on the results of the investigation by the Japan Transport Safety Board, we will take additional measures as necessary.

1. Estimated causes based on the investigation to date and the results of the verification committee's investigation [Attachment 1]

In the first incident (September 19, 2024), it was determined that the malfunction was caused by metal fragments coming into contact with the terminal of a switch that is used to separate trains again if the coupling operation is not completed (hereinafter referred to as "Switch A"), and measures were taken. In the second incident (March 6, 2025), it was estimated that the cause was an erroneous output caused by a malfunction in the control unit inside the separation/coupling control panel, which activated a solenoid valve and caused the coupler to separate.

The separation/coupling control panel that was removed after the first incident was checked for operation and no abnormalities were found, so it was stored as a spare and installed on the train that experienced the second incident. A second incident subsequently occurred in March 2025, confirming that both the first and second incidents occurred when the same separation/coupling control panel was installed.

As a result of the above investigation and the investigation by the verification committee, it was concluded that the cause of the first incident, apart from a malfunction caused by metal fragments, may have been due to erroneous output from the control unit, as in the second incident. In addition, the command output to separate the coupler from the separation/coupling control circuit was made through a single command system, and no consideration was given to a mechanism to prevent erroneous output from the control unit, which is an electronic device.

2. Measures based on the investigation and verification results of the verification committee [Attachment 2]

(1) Measures already implemented

[Prevention of the inclusion of metal fragments and discontinuation of Switch A]

The metal fragments around Switch A, which are believed to have been generated during railcar manufacturing, have been removed, and we have established design conditions to prevent the inclusion of metal fragments during new railcar manufacturing. We have also permanently discontinued Switch A.

(2) Measures to be implemented by our company in the future

To further improve the reliability of the mechanisms and circuits involved in the separation and coupling of trains, the following measures will be implemented:

[1] Designing a mechanism that transitions to a safe state when an abnormality occurs in the equipment (fail-safe design [improving equipment reliability])

a) [Addition of a function to turn off the power to the control unit output circuit except during separation and coupling operation]

To prevent unintended equipment operation due to erroneous output from the control unit in the separation/coupling control panel, the output circuit of the separation/coupling control panel will be changed to cut off the power to the solenoid valve that operates the coupler and other devices except

when separation/coupling operation is being performed at stations, etc.

- b) [Addition of a mechanism that locks the coupler unless certain conditions are met, preventing the train from separating while running] (interlock mechanism)

A new solenoid valve will be added to prevent unintended separation of the coupler while the train is running in coupled mode by making it impossible to separate two trains unless the conditions for separation and coupling at a station, etc are met.

[2] Adding a self-monitoring circuit and recording function

[Addition of a function to record control unit malfunctions]

By replacing the control unit with a more versatile one, we will add a function to monitor whether the control unit is outputting correctly and to record any incorrect output.

[3] Reviewing repair methods and spare parts inventory

[Prompt equipment replacement upon failure] [Increased spare parts for separation/coupling control panels, etc.]

In the event of a malfunction of a separation/coupling control panel or potential damage to equipment, we will promptly replace the defective equipment. To this end, we will secure an appropriate number of spare parts for critical circuit components such as separation/coupling control panels.

3. Immediate response

As an alternative to the current method of installing a fixture during coupling operation, we will carry out modification work that will achieve the same effect as installing a fixture by operating a newly added switch that activates the solenoid valve (hereinafter referred to as “Switch B”). This modification work will be completed in December 2025, with the exception of some railcars. After training relevant employees, we plan to change operation to a method of operating Switch B, starting with coupling operation at Sendai Station and Morioka Station.

We deeply apologize for the inconvenience and concern caused to our many customers. We will work to implement measures as soon as possible and further improve railway safety.

Reference

1. Overview (Two incidents in which the connecting part between the Hayabusa and Komachi trains came loose, causing the train to stop)

• (1st) Incident on September 19, 2024

At approximately 8:07 a.m. on Thursday, September 19, while Tohoku Shinkansen Hayabusa/Komachi No. 6 (a coupled train formation of Hayabusa No. 6 from Morioka to Tokyo with a 10-car E5 series and Komachi No. 6 from Akita to Tokyo with a 7-car E6 series) was traveling between Furukawa Station and Sendai Station, the connecting part between the Hayabusa and Komachi trains (between Cars No. 10 and 11) came loose, causing the brakes to automatically activate and the train to come to a halt. Afterwards, inspections of the cars and tracks were carried out, and Hayabusa No. 6 and Komachi No. 6 each operated as a single formation to Sendai Station. Service resumed on the entire line at 1:12 p.m.

• (2nd) Incident on March 6, 2025

At approximately 11:30 a.m. on Thursday, March 6, while Tohoku Shinkansen Hayabusa/Komachi No. 21 (a coupled train formation of Hayabusa No. 21 from Tokyo to Shin-Aomori with a 10-car H5 series and Komachi No. 21 from Tokyo to Akita with a 7-car E6 series) was traveling between Ueno Station and Omiya Station, the connecting part between the Hayabusa and Komachi trains (between Cars No. 10 and 11) came loose, causing the brakes to automatically activate and the train to come to a halt. Afterwards, inspections of the cars were carried out, and Hayabusa No. 21 and Komachi No. 21 each operated as a single formation to Omiya Station, where passengers were asked to transfer to the following train. Service resumed on the entire line at 2:34 p.m.

2. Measures that we have taken since the incidents occurred

(1) Measures taken after the incident on September 19, 2024

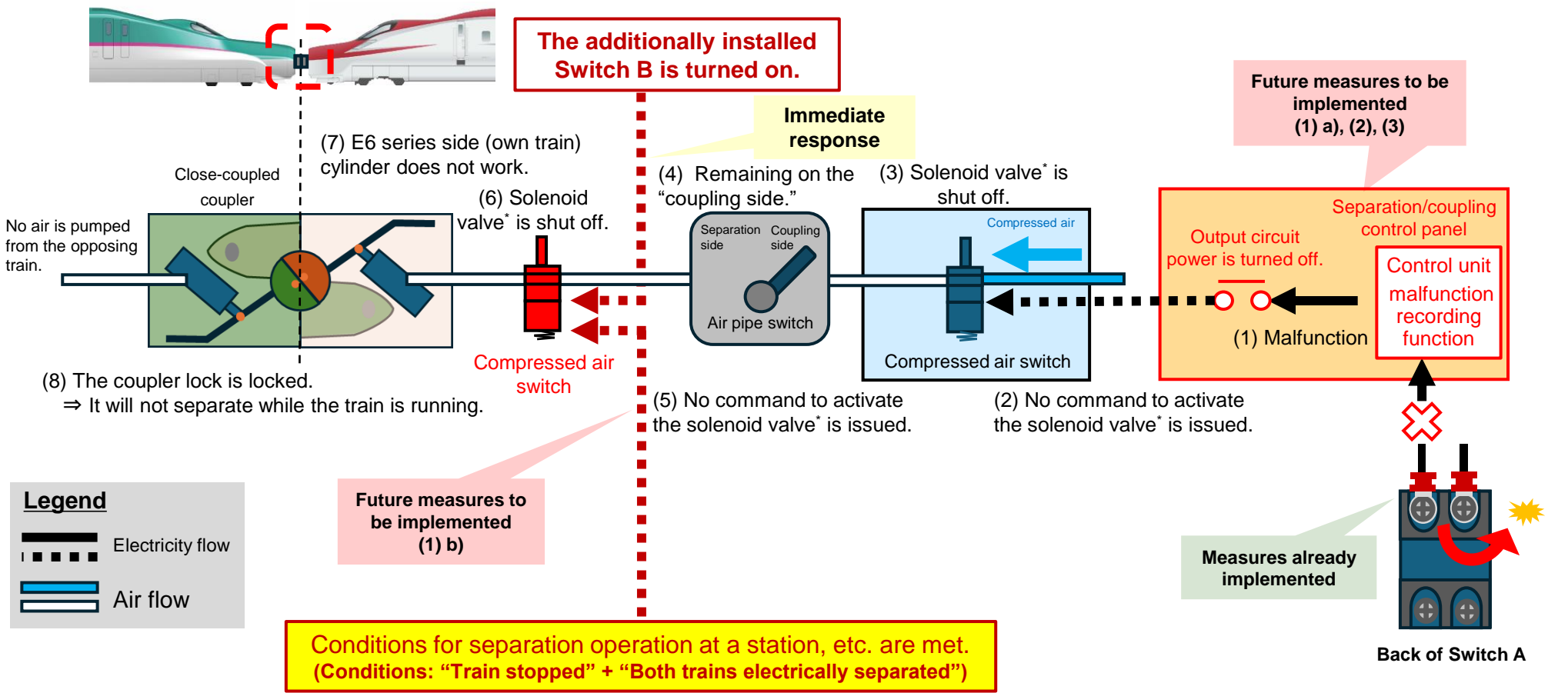
- For the target trains that are operated in coupled mode, the wiring was removed from the switch that is used to separate trains again if the coupling operation is not completed, and the circuit was disabled.

(2) Measures taken after the incident on March 6, 2025

- To prevent the coupler from separating even if an electrical abnormality occurs during coupled running, we have decided to install equipment that mechanically secures the operating equipment. This has been implemented during coupling operation at Fukushima Station and Morioka Station since March 14, 2025.
- We have established a verification committee to examine the incidents from various perspectives, including with the participation of external experts, and have been discussing future responses, etc.

Appendix 2: Countermeasures (Commentary on the state of the train while it is running)

* Solenoid valve: A component that opens and closes the passage of compressed air, etc. according to an electrical command



Measures already implemented

- (1) Metal fragment removal and Switch A discontinuation
- (2) Establishment of design conditions to prevent the inclusion of metal fragments during new railcar manufacturing

Immediate response

- Addition of an interlock mechanism through the operation of the newly added Switch B

Measures to be implemented by our company in the future

- (1) Fail-safe design
 - a) Addition of a function to turn off the power to the control unit output circuit
 - b) Addition of interlock mechanism
- (2) Adding a self-monitoring circuit and recording function
- (3) Reviewing repair methods and spare parts inventory