

Rail Safety and Standards Board

Certificate of Derogation from a Railway Group Standard

(in accordance with the Railway Group Standards Code)

1. Type of deviation:

Deviation Number: 08/037/DGN

Derogation

2a. Name of applicant:

2b. Position:

Operations Director

2c. Company name:

London Midland (operating name of The London and Birmingham Railway Ltd)

2d. Contact details:

4th Floor, 102 New Street, Birmingham B2 4HQ

3. Status of applicant:

Company who must comply with the requirements that are subject of the deviation.

4. Title of certificate:

Manual Selective Door Opening (SDO)

5a. Details of Railway Group Standard (RGS):

RGS Number:	Issue No:	Issue Date:	Title:
GM/RT2473	One	February 2003	Power Operated External Doors on Passenger Carrying Rail Vehicles

5b. RGS clause(s):

Clauses: B12.1 & B12.2.2

5c. RGS clause requirements:

“B12.1 Provision of a selective door opening system

Where there are no alternative means to accommodate all doors on a train within the length of a passenger station platform, a system of selective door opening (SDO) shall be adopted. SDO shall be provided with controls to automatically ensure that only those doors that are within the platform length are permitted to be unlocked for opening.

B12.2 System for selective door opening

B12.2.2

Manual arrangements that rely solely on the train crew to control the release of individual doors shall not be permitted as part of a SDO system, during normal service operation.”

6. Scope of deviation:

The deviation applies to the manual operation of an Enhanced Selective Door Operating Type 1 system operated by the conductor on new build Class 172/2 and Class 172/3 vehicles on all routes operated by London Midland.

7. Reason for deviation:

There are restrictions with the type of couplers utilised on the existing vehicles operated by London Midland, that if a fully automatic SDO system were to be fitted there would be a requirement for a derogation against other RGS and thereby lead to operational difficulties in the event of a vehicle rescue (both being rescued and providing assistance to Class 15x and Class 170 vehicles) leading to possible severe delays on the network; difficulties would also arise with Empty Coaching Stock (ECS) and Depot workings.

To comply with GM/RT2473 an automatic SDO system is required to be fitted to new vehicles. However as pointed out above, the new design of Class 172/2 and Class 172/3 vehicles needs to maintain coupler compatibility with Class 15x and Class 170 vehicles currently operated by the TOC; the Class 170 vehicles are fitted with a SDO Type 1 system.

The shortcomings of the existing SDO Type 1 system have been recognised by the project. In liaison with the vehicle designer it has been agreed to fit an Enhanced SDO Type 1 system to the Class 172/2 and Class 172/3 vehicles that provides the following advantages compared to the existing SDO Type 1 system:

- Forward of conductor present door released rather than all doors on that carriage.
- SDO is the default condition as opposed to 'all doors' enabled when panel active.
- No door release possible from intermediate cabs.
- Diagonally opposed release positions so that Operating Instructions can require a specific door at each short platform, irrespective of train formation or orientation.

The key points of the derogation request are bulleted below:

1. The new Class 172/2 and Class 172/3 need to be compatible with other Class 15x and Class 170 vehicles for operational, ECS and depot working reasons and to easily perform any related vehicle rescue activities, thereby avoiding extended delays to the network.
2. An automatic SDO system would mean the coupler connections would have to be modified and therefore compatibility between the Class 172/2 and Class 172/3 and other Class 15x and Class 170 vehicles would be lost.
3. It is currently impossible to provide sufficient contacts in the coupler head to enable Automatic SDO and maintain compatibility with other fleets; this would require a completely new design of electrical head. Since the coupler is of a BSI type and required to couple with the vehicles listed in GM/RT2190; a new type of electrical head would require derogation against said standard.
4. The enhanced SDO Type 1 offers a reduced risk of a door opening off platform compared to the original SDO Type 1 currently in operation on Class 170 vehicles.

This derogation is against GM/RT2473 in respect to the Enhanced SDO Type 1 not the existing SDO Type 1.

8. Proposed alternative measures to manage the risk:

The Class 170s operated by London Midland are fitted with existing SDO Type 1.

SDO Type 1 - Release of doors beyond the Guard's location.

With SDO type 1, when the Guard gives an SDO door release command all doors (on that side) are released on the following vehicles.

- Vehicle in which the cab is active (ie leading vehicle)
- Vehicle in which the active Guard's door controls are located.
- All vehicles between the vehicles described above.

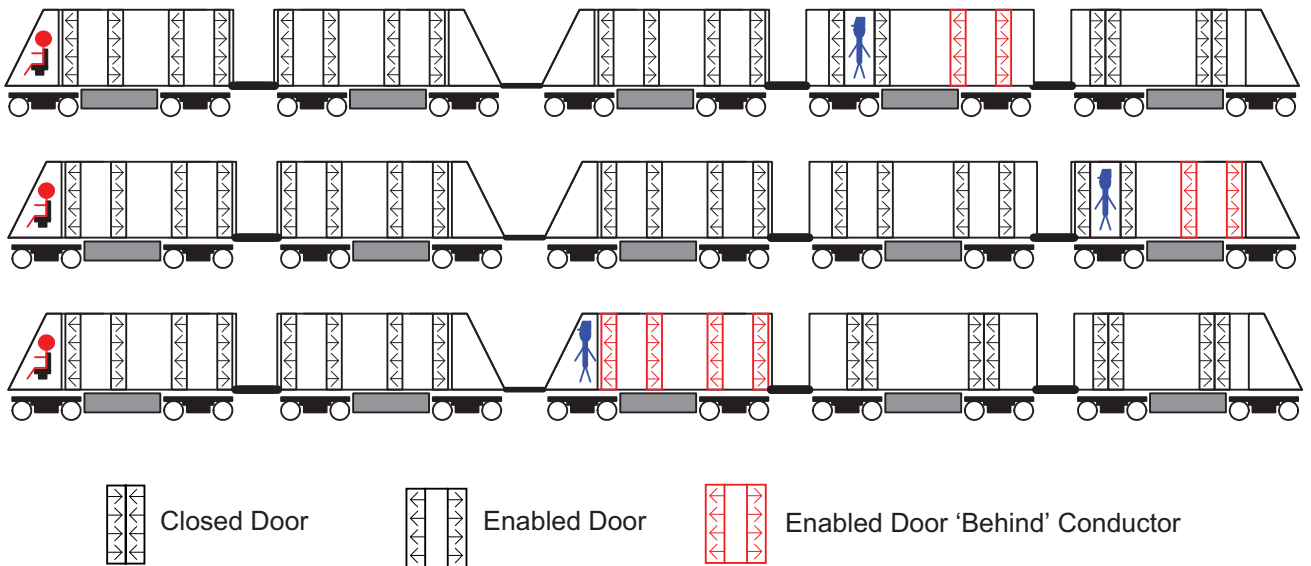
SDO Type 1 Applicable Fleets

- CL170/3
- CL170/4
- CL170/5
- CL170/6
- CL170/7

It should therefore be noted that under the following circumstances doors “Behind” the Guard’s location are released:

1. When the Guard commands a SDO release command from a vestibule.
2. When the Guard gives the SDO release command from a forward-facing coupled cab. (Two sets of doors beyond Guard Released).

See below for scenarios:



Class 172/2 and Class 172/3 Enhanced SDO Type 1

Enhanced SDO Type 1 Functionality.

It is proposed that SDO Type 1 functionality is replaced with Enhanced SDO Type 1 functionality, giving the following features.

- From vestibule positions the default door release will be SDO release. A positive Guard Action will be required to cancel SDO and achieve a full release.

The control system shall be arranged such that when the panel is enabled SDO will be set and the SDO indication will be illuminated. To obtain a full release the guard will need to press the door close pushbutton to cancel SDO before demanding door release. Should a Guard incorrectly cancel SDO the panel will need to be de-activated and re-activated (Key Off – Key On) to reinstate SDO. The combined SDO pushbutton and indicator previously fitted to door control panels will therefore be replaced with a simple SDO indicator.

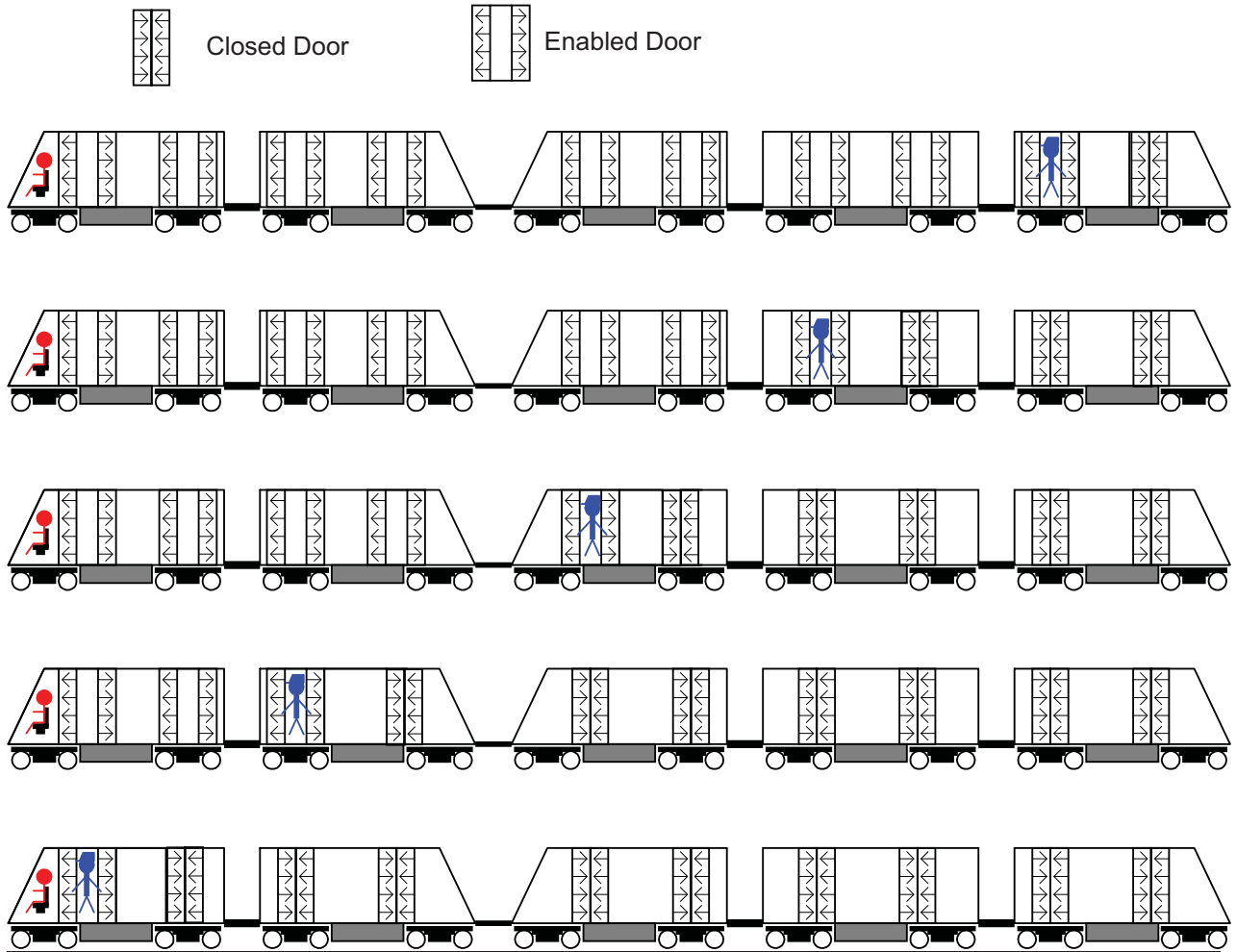
- From vestibule positions an SDO release will always release only those doors between the enabled Guard’s position and the active cab, regardless of the orientation of the vehicles.

It is noted that the released doors will therefore always be bracketed between two members of staff who will have responsibility for ensuring their position on the train is adjacent to the platform.

- Guard SDO release will no longer be available from Cabs.

Providing this functionality from coupled cabs, combined with the above features, would introduce significant additional complexity to the design and would therefore have a negative impact on the reliability and safety of the circuits. It is noted therefore, in addition to the physical difficulties on access to a gangwayed cab, that the cab SDO pushbutton and indicators are no longer required for Enhanced Type 1 SDO.

Enhanced SDO Type 1 Scenario



Compatibility with existing SDO Type 1 Fleets

The Enhanced SDO Type 1 functionality will not preclude the inter-working of Class172/2 and Class172/3 vehicles with SDO Type 1 CL170s.

It is noted however that the exact response of the train to crew demands would vary dependent on whether the Guard was located within a “new” or “old” vehicle. Management of the risks associated with this variance would lie with the train operator.

To further enhance the existing modular capabilities of the Turbostar design the circuitry shall be arranged such that conversion from Enhanced SDO Type 1 back to existing SDO Type 1 could be achieved at a later date, subject to the train operator obtaining an appropriate derogation and safety case.

(It is thought this may be relevant in the future for a small fleet of Class 172s operating within a much larger and established fleet of older Turbostars). It should be noted however that this conversion would not include re-instatement of cab SDO controls; existing SDO Type 1 would therefore be available from vestibules only.

Enhanced SDO Type 1 Detailed Design Process.

In accordance with standard Bombardier Transportation practices the detailed design process for the Class 172 will include the production of a component level circuit functional description and Failure Mode and Effects Analysis (FMEA).

This design documentation will demonstrate the inherent safety features of the design and highlight any functionality checks which may be required within the maintenance system to ensure “hidden” system failures which may reduce the design integrity are revealed.

9. Justification for deviation:

Since these are new vehicles and as yet are not built, certain risk mitigation actions are yet to be undertaken but will be performed, prior to the vehicles entering passenger service.

1. Local release panel will default to SDO release mode; a lamp on the panel will confirm this. The conductor must make a positive action to cancel the SDO mode to allow 'all doors' to be enabled, this action will extinguish the SDO indicator. The operator is familiar with the operation of manual SDO on its current rolling stock and has procedures in place.
2. Risk assessments relating to the dispatch of the Class 172/2 and Class 172/3 vehicles will be undertaken by London Midland prior to the vehicles entering passenger service, as with all new vehicles.
3. Crew will have thorough Route Knowledge training including location specific instructions in accordance with the operators SMS. Additional location markers will be placed on the platform adjacent to the last safe opening door position so that the senior conductor can verify the driver has stopped in the correct position prior to enabling the doors. On a full train the conductors will position themselves at the correct door location for the next stop.
4. Operational procedures to ensure driver stops at identified stop marker, routes to be assessed to ensure correct positioning of boards ensuring they comply with the RGS.
5. Routes to be assessed to ensure correct positioning of boards and drivers sightlines as per RGS.
6. Driver to conductor and conductor to driver 'buzzer coding' will be used to communicate between each other as and when required by operational procedure.
7. In the event of an overshoot the driver would have to communicate to the conductor to ensure the conductor does not release the doors until the train has set back to the correct position (in accordance with the rule book), this is no different to current operational practice. This would be double checked since the 'last door' position would not align with the platform marker to be observed by the conductor (see bullet 3).
8. Where FMEA identifies unrevealed failures maintenance procedures will be required to check for them, this is performed as part of the normal design review process by the manufacturer.
9. The conductor will not open the doors at all, unless it is safe for him to do so and the safety of the passengers is not compromised (in line with the rule book), this is no different to current operational practice.
10. In the event of a door being locked 'out of use' the conductor will release the doors from the panel adjacent to the next available door forward of the 'out of use' door. Suitable PA announcements alerting the passenger that certain doors will not be available to alight the train will be made.
11. See attached Hazard Log.
12. Conclusion:
 - Whilst not an automatic SDO system, the Enhanced SDO Type 1 system proposed provides a clear safety improvement over the existing SDO Type 1.
 - The Enhanced SDO Type 1 system maintains coupling compatibility with the existing Class 15x and Class 170 vehicles enabling rescue and recovery.
 - It is therefore concluded that the risk of passengers alighting where no platform is available is considered, using engineering, operational and safety judgement, As Low As Reasonably Practicable (ALARP).

10. What other options have been considered?

Lengthening of platforms - an ongoing process is in place to review the platforms with intent to increase their lengths. However, it is conceivable that extension of all platforms may not be possible due to geographical and infrastructure constraints.

11. Method of elimination:

N/A

12. Start and end date:

N/A

13. Alternative words for the RGS:

N/A

14. Additional actions/observations:

There have been no reportable incidents related to SDO operation on Class 170/5 or Class 170/6 vehicles.

15. Signature of applicant:

Operations Director

Date of application:

07/02/2008

16. Status in respect of Notified National Technical Rules:

GM/RT2473 is currently on the list of NNTRs under the

- Locomotives and Passenger Carriages Conventional Rail TSIs,
- Rolling Stock (published) High Speed Rail TSI

17. Lead Standards Committee details:

Name of Committee:

Rolling Stock

Date of meeting

28-29/02/2008

Minute reference:

08/RST/02/074

Authorised by:

Signed by Jon Taylor on 25/03/2008

Date of Authorisation:

25/03/2008

Jon Taylor
Head of Delivery, Infrastructure and Rolling Stock