Technical Note

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Subject: Superseded standard – Minimum Operating Standards for Rolling Stock

This Technical Note is to advise that the RailCorp engineering standard ESR 0001 Minimum Operating Standard for Rolling Stock has been superseded by ASA standard T HR RS 00000 ST. The standard has been superseded as follows:

- ESR 0001 – 000 superseded by T HR RS 00000 ST
- ESR 0001 – 100 superseded by T HR RS 00100 ST
- ESR 0001 – 200 superseded by T HR RS 00200 ST
- ESR 0001 – 300 superseded by T HR RS 00300 ST
- ESR 0001 – 400 superseded by T HR RS 00400 ST
- ESR 0001 – 500 superseded by T HR RS 00500 ST
- ESR 0001 – 600 superseded by T HR RS 00600 ST
- ESR 0001 – 700 superseded by T HR RS 00700 ST
- ESR 0001 – A1 superseded by T HR RS 00811 ST
- ESR 0001 – A2 superseded by T HR RS 00812 ST
- ESR 0001 – A3 superseded by T HR RS 00813 ST
- ESR 0001 – A4 superseded by T HR RS 00814 ST
- ESR 0001 – A5 superseded by T HR RS 00815 ST
- ESR 0001 – A6 superseded by T HR RS 00816 ST
- ESR 0001 – A7 superseded by T HR RS 00817 ST
- ESR 0001 – A8 superseded by T HR RS 00840 ST
The ASA Minimum Operating Standards for Rolling Stock can be found in the following location on the ASA website under rolling stock:

ESR 0001 - D

RSU APPENDIX D - DRIVER SAFETY SYSTEMS

Version 1.3

Issued October 2012

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1 General requirements RSU 010

1.1 Introduction
RailCorp has established interface requirements pertaining to vehicles operating on the RailCorp network. These requirements are covered throughout this manual under common and specific interface requirements.

1.2 Purpose
The purpose of these standards is to ensure that all rolling stock operating on the RailCorp network meet the minimum standards required by RailCorp’s accreditation with the Independent Transport Safety Regulator (ITSR).

2 Scope
This standard covers the equipment, and performance requirements for such equipment, fitted to rail bound and road/rail vehicles, to provide an acceptable level of safety and integrity to vehicle, train, crew, passengers, public and infrastructure whilst the vehicle/train is being operated on the RailCorp Network.

The requirements of this appendix shall apply to all driven vehicles operating on the RailCorp network.

All new or substantially modified vehicles shall be fitted with driver safety systems in accordance with this standard.

2.1 Application
This appendix is to be referenced by users of the RailCorp Minimum Operating Standards for Rolling Stock.

2.2 Referenced Documents

Australian Standards for Railway Rolling Stock

RailCorp Train Operating Conditions manual TMR 001 – OS 001 IM

3 Definitions
An authorised person, in the context of this document, is a second person, accompanying the vehicle driver/operator, qualified to take control and bring the vehicle to a stand in case of an emergency.

3.1 Circumvention
Circumvention is a deliberate and improper act for the removal or bypass of a safety system, other than by an authorised procedure.
3.2 Coasting
Moving a train/vehicle with the reverser in the neutral or off position in such a way as to circumvent one or more safety systems.

3.3 Deadman device
See operator enable system.

3.4 Downgraded operating conditions
Operating conditions are reduced, such as by speed restrictions.

3.5 Driver/operator
A person suitably qualified to operate the controls of a powered vehicle or train on the RailCorp network.

3.6 Driver safety system
The combination of safety devices and associated logics such as an operator enable system, vigilance device and trip valve mechanism, fitted to the driven portion of a train/vehicle

The operator enable and vigilance systems are designed to bring the vehicle/train to a stand in the event of driver incapacitation.

The trip gear is designed to bring the vehicle/train to a stand after passing a signal at stop or approaching a signal at excessive speed (timed train stops).

3.7 Existing vehicles
Vehicles currently accepted for operation on the RailCorp network as at the date of issue of this version of the standard.

3.8 Emergency cock
A means of directly venting the brake pipe to atmosphere, usually located within a crew work area or in an appropriate location on the vehicle for access by authorised personnel.

3.9 Isolation
Isolation is the deactivation of the safety system by an authorised procedure.

3.10 Locomotive
A Locomotive, in the context of this document, is a rail bound vehicle with its own power source that is exclusively employed for the task of controlling and moving other rail bound vehicles.

3.11 Operator enable system
A device which reacts by directly venting the brake pipe to atmosphere if a continuous control input required of the driver/operator is interrupted or not detected.
3.12 **Possession**
Closure of one or more lines to allow work to be carried out in the danger zone using a Local Possession Authority (LPA) or a Track Occupancy Authority (TOA).

3.13 **RailCorp rail network.**
The RailCorp network covers the following operating areas:
- Sydney suburban area bounded by Cowan, Bondi Junction, Emu Plains, Richmond, Macarthur and Waterfall.
- Sydney outer suburban area bounded by Wyong, Springwood, Macarthur and Kiama.
- InterCity area bounded by Newcastle, Lithgow, Port Kembla and Kiama.
- RailCorp - ARTC boundary is defined as: Woodville Junction 163.920 km & 164.045 km, Macarthur 57.965 km, the Unanderra to Moss Vale line at 91.080 km and Cooks River – Botany 10.410 km.
- RailCorp – CRN boundary is defined as Bowenfels 158.800

3.14 **Second person**
A suitably qualified person, that may be required to accompany the driver in the driver’s cab of a locomotive/train or a vehicle performing the function of a locomotive.

3.15 **Substantially modified vehicle**
A vehicle modified to accommodate its use for a different purpose. Vehicles undergoing major refurbishment with updated equipment, which may include the installation, to meet in part, or all of this standard for driver safety systems.

3.16 **Task linked vigilance system**
A vigilance system that accepts specified task functions as input, to satisfy acknowledgment within the vigilance control system.

3.17 **Train stop/trip gear system**
A system involving a trip valve on the train/vehicle and a trip arm located track side which when engaged, directly vents the brake pipe on the train/vehicle to atmosphere. The train stop is employed at signals in conjunction with a red aspect and also in areas where train speed is required to be externally controlled.

3.18 **Vigilance control system**
A system that will react by bringing a vehicle/train to a stand if an acknowledgment input is not received within a specified time increment. On conventional vehicles with an automatic brake this is achieved by directly venting the brake pipe to atmosphere.
4 Design parameters

4.1 Circumvention

The driver safety system shall be designed to minimise the possibility or opportunity for circumvention of any or all of the safety system elements by improper or inadvertent use of either isolation devices or driving controls. This may be achieved by the fitment of seals to isolation devices.

4.2 Isolation.

The driver safety system shall be designed to permit isolation of each sub-system in the event of failure of any vital driver safety system component, thus requiring an authorised procedure to allow the train/vehicle to proceed.

4.3 Fail safe.

The driver safety system shall be designed such that the failure of a vital component/system or the incorrect operation of a vital component/system, results in the train/vehicle being rendered to a safe condition.

To be fail safe the system and components of the driver safety system shall be designed such that:

- the system must be operative for the vehicle to move on track under the control of a driver/operator and;
- the brake pipe is directly vented to atmosphere should there be any vital component or circuit failure or the required sequence of events or signals do not occur within a specified timeframe.

4.4 Emergency cock.

On vehicles with an automatic air brake system, opening of the emergency cock shall ensure that the brake pipe is directly vented to atmosphere, traction power is cut and an automatic brake application is applied on all vehicles within a train.

On vehicles without an automatic brake system, opening of the emergency cock shall vent or release pressure holding spring parking brake cylinder off resulting in the application of the spring parking brake.

4.5 Trip gear valve

When the trip arm strikes the trackside train stop, the brake pipe is directly vented to atmosphere, traction power is cut and an automatic brake application is applied on all vehicles within a train.

4.6 Operator enable system

When input from the driver is interrupted the operator enable system shall ensure that the brake pipe is directly vented to atmosphere, traction power is cut and an automatic brake application is applied on all vehicles within a train.
4.7 Vigilance system

When the vigilance system is not acknowledged within the set time limits the system shall ensure that the brake pipe is directly vented to atmosphere, traction power is cut and an automatic brake application is applied on all vehicles within a train.

On vehicles without an automatic brake system, the pressure holding spring parking brake cylinder off shall be vented or released resulting in the application of the spring parking brake and traction power is cut.

5 Minimum requirements for rolling stock

The minimum requirements for the application of a driver safety system to vehicles operating on the RailCorp Network shall be as follows:

5.1 Multiple unit passenger trains (including XPT)

Each driven vehicle shall include a driver safety system incorporating the following:

- A vigilance system (task linked preferred)
- An operator enable system
- A trip gear valve
- An emergency cock
- An on-board control system that shall not allow the train/vehicle to power up, move or continue in motion with the driver safety system isolated, except under degraded and specifically defined operating conditions.

5.2 Locomotive hauled freight and passenger trains

Each locomotive driver’s compartment shall include a driver safety system incorporating the following:

- A vigilance system
- A second person
- An emergency cock
- An on-board control system that shall not allow the train to power up, move or continue in motion with the driver safety system isolated, except under degraded and specifically defined operating conditions.

OR

For Driver Only Operation,

- A vigilance system
- An operator enable system
- An emergency cock
- An on-board control system that shall not allow the train to power up, move or continue in motion with the driver safety system isolated, except under degraded and specifically defined operating conditions.
5.3 Infrastructure maintenance vehicles 
(with a driver’s compartment/position)

5.3.1 On-track (rail bound) infrastructure maintenance vehicles 
This clause covers on-track (rail bound) infrastructure maintenance vehicles operating in 
travel mode, alone or as a motive power unit hauling/controlling other infrastructure 
maintenance vehicles between and within track possessions, and with a potential for 
having a kinetic energy (E), exceeding 600 kiloNewton metres, based on the following 
formula.

\[ E = 0.0386 M V^2 \]

Where 

- \( E \) = kinetic energy (kiloNewton metres) 
- \( M \) = maximum vehicle mass (tonnes) 
- \( V \) = maximum vehicle speed (km/hr)

When the value of “E” for a vehicle is greater than 600 kNm, the driving 
compartment/position controlling the operation of the vehicle/train shall include a driver 
safety system incorporating the following:

- A vigilance system
- An authorised person to stop the vehicle/train in the event of an emergency. 
- An emergency cock or alternate suitable device for stopping the vehicle in an 
  emergency. 
- An on-board control system that shall not allow the vehicle to power up, move or 
  continue in motion with the driver safety system isolated, except under degraded and 
  specifically defined operating conditions. 
- An approved process to enable suppression of the vigilance system whilst the vehicle 
  is in work mode within a possession.

OR 

For driver only operation, 

- A vigilance system
- An operator enable system 
- An emergency cock or alternate suitable device for stopping the vehicle in an 
  emergency. 
- An on-board control system that shall not allow the vehicle to power up, move or 
  continue in motion with the driver safety system isolated, except under degraded and 
  specifically defined operating conditions. 
- An approved process to enable suppression of the vigilance system whilst the vehicle 
  is in work mode within a possession.

**Note:** Where it is not possible to incorporate a suitable driver safety system within the 
vehicle, the vehicle maximum allowable speed must be reduced to bring the value of “E” 
below 600 kNm.
5.3.2 Road/rail infrastructure maintenance vehicles

This clause covers road/rail infrastructure maintenance vehicles, (except those covered by clause 4.3.3) operating in travel mode, alone or as a motive power unit hauling/controlling other infrastructure maintenance vehicles between and within track possessions, and with a potential for having a kinetic energy (E), exceeding 600 kiloNewton metres, based on the following formula.

\[ E = 0.0386 M V^2 \]

Where

E = kinetic energy (kiloNewton metres)
M = maximum vehicle mass (tonnes)
V = maximum vehicle speed (km/hr)

When the value of “E” for a vehicle is greater than 600 kNm, the driving compartment/position controlling the operation of the vehicle/train shall include a driver safety system incorporating the following:

- A vigilance system
- An authorised person to stop the vehicle/train in the event of an emergency.
- An emergency cock or alternate suitable device for stopping the vehicle in an emergency.
- An approved process to enable suppression of the vigilance system whilst the vehicle is in work mode within a possession.

OR

For driver only operation,

- A vigilance system
- An operator enable system
- An emergency cock or alternate suitable device for stopping the vehicle in an emergency.
- An on-board control system that shall not allow the vehicle to power up, move or continue in motion with the driver safety system isolated, except under degraded and specifically defined operating conditions.
- An approved process to enable suppression of the vigilance system whilst the vehicle is in work within a possession.

Note: Where it is not possible to incorporate a suitable driver safety system within the vehicle, the vehicle maximum allowable speed must be reduced to bring the value of “E” below 600 kNm.

5.3.3 Road/Rail prime mover vehicles authorised to operate as a locomotive ONLY, within a track possession.

This clause covers road/rail prime mover vehicles operating in travel mode, alone or as a locomotive hauling/controlling rail bound rolling stock, exclusively within a track possession.

The driving compartment/position controlling the operation of the vehicle/train shall include a driver safety system incorporating the following:
• A driver suitably qualified to operate the vehicle both on road and as a locomotive on rail.
• A brake controller compatible with the brake system on the vehicles to be hauled/controlled.
• A vigilance system
• A second person
• An emergency cock or alternate suitable device for stopping the vehicle in an emergency.
• An on-board control system that shall not allow the vehicle to power up, move or continue in motion with the driver safety system isolated, except under downgraded and specifically defined operating conditions.

OR

For driver only operation,
• A driver suitably qualified to operate the vehicle both on road and as a locomotive on rail.
• A brake controller compatible with the brake system on the vehicles to be hauled/controlled.
• A vigilance system
• An operator enable system
• An emergency cock
• An on-board control system that shall not allow the vehicle to power up, move or continue in motion with the driver safety system isolated, except under degraded and specifically defined operating conditions.

Note: Such vehicles shall be fitted with a suitable air compressor and main reservoir system to meet the duty requirements for a main reservoir and train brake air supply.

6 Train stop/trip gear system

6.1 Function.
The function of the train stop/trip gear system is to catch and stop a train/vehicle, fitted with trip gear, in the event that it fails to stop for a red stop signal aspect. When the train stop arm engages the trip gear lever the associated valve directly vents the train/vehicle brake pipe to atmosphere initiating a cut in traction power and an automatic brake application on all vehicles within the train. The train stop is employed at signals in conjunction with a red aspect and also in areas where train speed is required to be externally controlled.

6.2 Major componentry
The major components of the train stop/trip gear system are:
• A track side train stop/arm
• A bogie axlebox mounted trip valve/lever
• A control governor pressure switch or switches
• A safety apparatus or trip valve isolating cock (SAI cock)
6.3 Operation

6.3.1 Interfacing

The vehicle mounted trip gear system shall interface with the existing signal train stop and train braking systems.

6.3.2 Track side equipment

The train stop is an existing piece of track side equipment positioned adjacent to signals and also positioned as a group of timed train stops in areas requiring speed control. The Train Stop arm is raised when the signal is displaying a red stop aspect or in the area requiring speed control.

The track side train stop has set up limits as shown in figure D1 below.

Figure D1 - Train stop mounting dimensions

6.3.3 Train/vehicle onboard equipment

The trip gear valve/trip lever system is mounted on the left hand leading axlebox beneath each drivers/operators compartment. The trip lever shall be designed to engage the raised track side trip arm.

The trip gear shall be of lightweight construction. A robust design is an important factor in reducing the dynamic loading on the mechanism and its attachment to the bogie axle box. The trip lever shall be spring loaded to allow passing obstructions such as ballast and other signal trip arms in the reverse travel direction.

A manual latch shall be provided on the trip valve, to retain the trip lever in the latched up position on all non-leading vehicles. The design shall be such that, if the operating trip lever is manually latched up (out of service) the trip valve is held open and thus exhausts the brake pipe to atmosphere.
Systems that provide automatic raising of the trip gear lever for operation outside the limits of the RailCorp Network shall be designed to maintain the trip valve in the closed position.

When the trip valve is activated, the brake pipe pressure drops to a predetermined level, (eg 250 kPa) the pressure switch (control governor or equivalent) shall isolate traction power to the train/vehicle, which, together with an automatic brake application, will bring the train/vehicle to a stand.

The trip valve shall be designed to not reset unless the driver makes a deliberate action to reset the trip gear. This may be accomplished by reducing brake pipe pressure below a predetermined level (eg 70 kPa), such that brake pipe will not fall below this level with the brake pipe being charged and with the minimum allowable number of compressors running.

Systems that provide automatic or remote raising of the trip gear lever shall provide detection of the raise/lower status, such that traction power is disabled if the trip lever is not lowered, when operating on the RailCorp Network.

The trip lever shall be capable of striking a raised train stop arm whilst travelling in the reverse direction at a minimum speed of 25 km/h without trip valve activation, or it shall be latched up on terminal cars when trailing in the direction of travel. When the train/vehicle is propelling or reversing, the trip arm must be in the lowered position on the leading car in the direction of travel.

The trip lever shall be capable of striking a raised train stop arm whilst travelling in the forward direction at the train/vehicle maximum design speed without causing trip valve malfunction and/or damage to the trip gear or train stop mechanism.

### Operator enable system

#### Function.

The function of the operator enable system is to detect the presence of the driver or operator at the controls of the train/vehicle. If a required continuous control input by the driver/operator is interrupted or not detected whilst the train/vehicle is in operating mode, then the system shall react by venting the train/vehicle brake pipe to atmosphere.

The venting the train/vehicle brake pipe shall be accomplished by the system opening the emergency application valve, resulting in a full brake application on the train/vehicle and traction power isolation. Isolation of traction power is effected through a pressure switch when the brake pipe pressure drops to a predetermined level, (eg 250 kPa), which together with the brake application will bring the train to a stand.

The operator enable system must interface and be fully compatible with the train/vehicle traction control and braking system.

#### Driver incapacitation

Loss of circuit continuity within the operator enable system could mean driver incapacitation and possible loss of control of the train/vehicle. The interface between the driver/operator and the operator enable system shall be designed such that, it is necessary for the driver/operator to remain at his/her work station, either sitting or standing and maintain the detection circuit continuity, whilst the train/vehicle is in motion with the brakes released.
7.1.2 **Circumvention**

The operator enable system shall be designed, as far as practicable, to prevent intentional or unintentional circumvention of its operation whilst the train/vehicle is in motion with the brakes released.

7.2 **Operation**

7.2.1 **Controls**

The driver/operator shall be required to maintain either a spring loaded foot pedal, controller handle or other operator enable system control, continuously in a predetermined position or range, such that the detection circuit continuity is maintained. A venting of the train/vehicle brake pipe shall be initiated if all of the operator enable system controls are released and the detection circuit is opened, whilst the train/vehicle is in motion with the brakes released.

Resetting the operator enable system shall be readily achieved by moving any of the operator enable system controls back to their predetermined position or range.

A means shall be provided to suppress the operator enable system without driver/operator input, whilst the train/vehicle is stopped at stations or signals.

7.2.2 **Fail safe**

In addition to the fail safe requirements specified in clause 3.3, the equipment providing the operator enable system function shall provide a fail safe function whilst ever the brakes on the train/vehicle are released and the controller key/reverser handle is in the operating position. This requirement shall apply unless the operator enable system is isolated in accordance with an authorised procedure to allow the train/vehicle to proceed. The operator enable system shall be designed to vent the train/vehicle brake pipe to atmosphere if the system becomes inoperative due to technical failure or due to inappropriate actions by the driver/operator whilst the train is moving with the brakes released.

8 **Vigilance system**

The function of the vigilance system is to monitor the responsiveness of the driver/operator/crew person and bring the vehicle/train to a stand in the event that the driver/operator or crew person fails to acknowledge the necessary control indications within a specified time interval.

On conventional rolling stock this is achieved by venting the train/vehicle brake pipe to atmosphere.

8.1 **Function.**

The vigilance system is a timed cycle of events consisting of first, a visual warning, followed by an auditory signal which, if neither are acknowledged, results in a brake penalty being initiated by venting the train/vehicle brake pipe.

Some vigilance systems randomly select the time interval and thus the driver/operator can only acknowledge the vigilance warning after the visual signal. Other systems use task linking to reset the vigilance cycle before the visual warning occurs. The latter system is preferred because it reduces the driver/operator workload and in the main, receives more frequent confirmations of driver awareness.
Some trains are fitted with a speed dependent vigilance control system. In this case as the speed increases through speed bands, the vigilance cycle times are decreased.

8.2 Operation

8.2.1 Vigilance cycle

If after the elapsed time specified in tables D1 and D2, from the initial vigilance acknowledgment, the driver/operator or crew person has not made another vigilance acknowledgment via the available system control inputs, the following shall occur:

An in-cab visible warning shall commence in the form a flashing light located such that it is visible to all crew personnel, under all operating conditions. Any crew person shall respond to the visible warning through the operation of any of the task linked driving controls, or press a vigilance acknowledgment button, or by fully depressing the operator enable system foot pedal (if fitted), for no more than two (2) seconds.

If the visible warning is not acknowledged within the time interval specified in tables D1 or D2, from the onset of the visible warning, an audible warning will sound. The audible warning shall be audible to the crew persons under all operating conditions. Any crew person shall respond to the audible warning sound in the same manner as for the visible warning.

If the audible warning is not acknowledged within the time interval specified in tables D1 or D2, from the onset of the audible warning, a brake penalty is initiated by venting the train/vehicle brake pipe.

It shall not be possible to release the brakes until time stated in tables D1 or D2 has elapsed. Once the time has elapsed, the vigilance cycle can be reset, by pressing the acknowledgment button and the brakes can be operated, in the normal manner.

If an owner/operator proposes an alternate vigilance control system, this will be considered providing the system has been approved by the Independent Transport Safety and Reliability Regulator.

8.3 Vigilance control - driver interface

8.3.1 Vigilance system acknowledgment & task linking

Acknowledgement of the vigilance system may be made through pressing the acknowledgement button or automatically via task linked activities which may include:

- Movement of the power controller handle
- Movement of the brake controller handle
- A set operation of the operator enable system foot peddle (where fitted)
- Operation of the warning horn
- Headlight high/low beam switch (where fitted)
8.3.2 Timing

When there is no vigilance control input detected, then the cumulative elapsed time before the onset of, and the time intervals between the visible and audible alarm indications and brake penalty application shall be as specified in tables D1 or D2.

**Note:** The system design shall be such that, if the vigilance acknowledgment button and/or operator enable foot pedal are depressed continuously, the time cycle will remain uninterrupted and thus it will continue to cycle as if no acknowledgment has been made.

<table>
<thead>
<tr>
<th>Rolling stock type</th>
<th>Maximum time between acknowledgment and visual warning</th>
<th>Maximum time for audible warning</th>
<th>Maximum time for brake penalty (Note 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Elapsed time (seconds)</td>
<td>Time interval (seconds)</td>
<td>Elapsed time (seconds)</td>
</tr>
<tr>
<td>Passenger</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suburban/Intercity</td>
<td>45</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>Long distance</td>
<td>50</td>
<td>5</td>
<td>55</td>
</tr>
<tr>
<td>Loco hauled (Driver + second person)</td>
<td>60</td>
<td>17</td>
<td>77</td>
</tr>
<tr>
<td>Freight (Note 4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver only</td>
<td>40</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Driver + second person</td>
<td>60</td>
<td>17</td>
<td>77</td>
</tr>
<tr>
<td>Infrastructure maintenance vehicles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operator second person +</td>
<td>60</td>
<td>17</td>
<td>77</td>
</tr>
</tbody>
</table>

Table D1 - Timings for a non-speed dependent vigilance control system

**Notes on table D1:**

1. The minimum time before the vigilance control system can be reset after a penalty brake application, is 30 seconds.
2. Where a vehicle is fitted with a speed dependent vigilance control system, the maximum times must not exceed any of the above timings for any speed.
3. Some vigilance systems are designed to be only acknowledged after the visual warning. That is, an acknowledgment made before the visual warning, does not reset the vigilance control system timing cycle.
4. Locomotives operating exclusively in shunting yards do not require a driver safety system however, if such locomotives are required to be moved on the main line they must be hauled dead attached or operated within a locomotive consist but not as the lead locomotive.
### Table D2 - Timings for a speed dependent vigilance control system

<table>
<thead>
<tr>
<th>Vehicle/train speed km/hr</th>
<th>Maximum time between acknowledgment and visual warning</th>
<th>Maximum time for audible warning</th>
<th>Maximum time for brake penalty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Elapsed time (seconds)</td>
<td>Time interval (seconds)</td>
<td>Elapsed time (seconds)</td>
</tr>
<tr>
<td>0 to 75</td>
<td>45</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>Over 75 to 90</td>
<td>35</td>
<td>5</td>
<td>40</td>
</tr>
<tr>
<td>Over 90 to 110</td>
<td>30</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>Greater than 110</td>
<td>25</td>
<td>5</td>
<td>30</td>
</tr>
</tbody>
</table>

**Notes on table D2:**

1. In the event of a defective speed input signal, the vigilance timings shall default to the time periods for the “Greater than 110 km/hr speed range”.
2. After a train/vehicle has come to a stop after a vigilance penalty application, the vigilance system must not be able to be reset for at least a further 3 seconds. If the speed signal is faulty, the reset must not occur until at least 45 seconds from the time of the penalty application.

#### 8.3.3 Location of vigilance acknowledgment button

The vigilance acknowledgment button/s shall be located on the driver's desk or on a vertical face in the control area such that the driver (or second person where appropriate) shall be able to reach the button with an outstretched arm and without upper body movement. The button shall not be located such that it can be operated by the movement of the driver's or second person’s thigh, knee or foot.

#### 9 On board data logging

Operation of the driver safety systems shall be logged onto the on-board data logger. Where a separate maintenance data logger is not installed on a vehicle then the driver safety system shall include a facility for logging of information relating to the operation of the train and its safety system.

#### 10 Alternate driver safety systems

If an owner/operator proposes alternate driver safety systems, this will be considered providing the system has been approved by the Independent Transport Safety and Reliability Regulator.