KiwiRail

E-Protect System Manual

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1. E-Protect Introduction

E-Protect is a system on locomotives that uses GPS technology to monitor the speed of trains approaching Compulsory Stop boards and applies a penalty brake if the train does not stop at the Compulsory Stop board.

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2. System Implementation

E-Protect will be implemented in areas for all affected Locomotive Engineers, and compulsory stop protection qualified Rail Protection Officers.

Work Areas protected by E-Protect will be shown on the information bulletin with the following icon ☗:

Table 1. Example of Information Bulletin

135.000 km ☗ Te Puke	137.000 km ☗ Pongakawa	TS04 Compulsory Stop Protection	Call Sign

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3. Locomotive Cab Signal Alert

E-Protect will operate the locomotive cab signal alert (see Figure 1) by flashing the signal alert button and sounding an intermittent beep for 6 seconds as an approach warning for Locomotive Engineers.

Locomotives fitted with HARK will use this system to verbally announce warnings:

- At the Outer Warning Board:
  - Caution, approaching work site - Check speed
- At the Inner Warning Board when train speed exceeds 40 km/h:
  - Caution, Inner Warning Board - Prepare to Stop.

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4. E-Protect Description

The E-Protect system creates a GPS monitoring zone approaching a compulsory stop protection site. The GPS monitoring zone is an invisible barrier that activates the alerts and brake interventions (see Figure 1).

NOTE
The 40 km/h alerts and brake interventions are lower than the initial E-Protect training video. This is consistent with the stabilised approach KiwiRail / RMTU SPAD working party initiative.

IMPORTANT
If advanced and/or inner warning board distances are varied, the E-Protect alert distances do not change and remain as listed below.

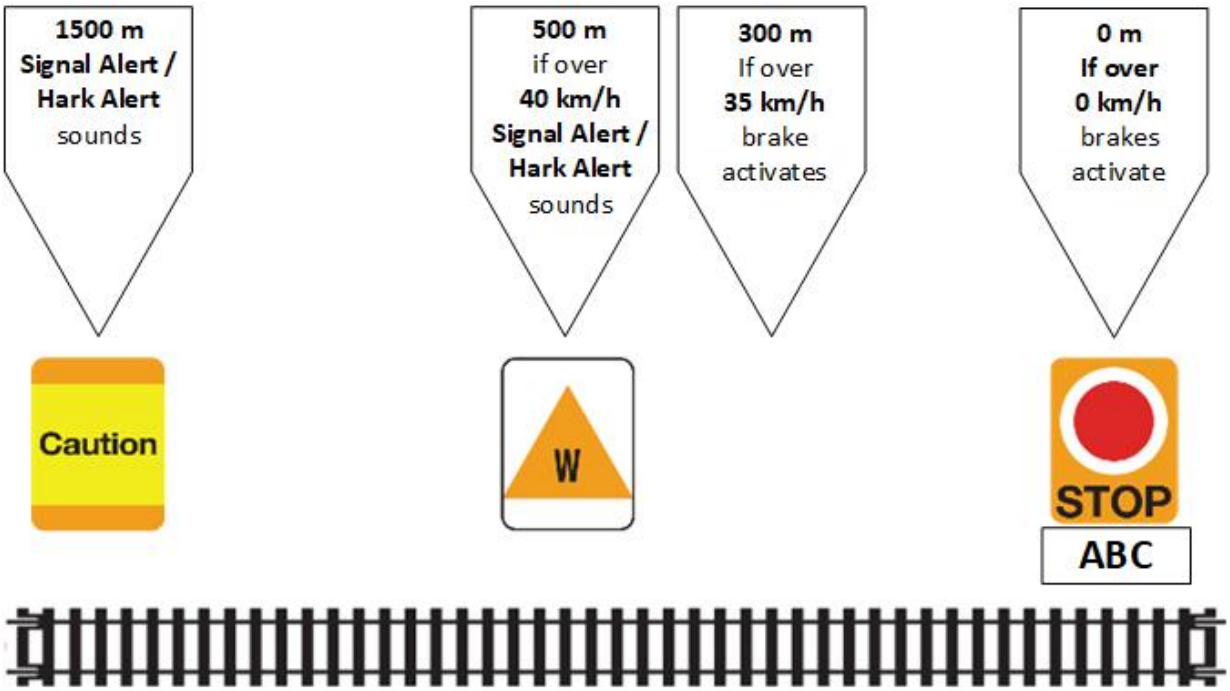

Figure 1: E-protect Layout

A Kupe Mobile Controller, which uses GPS technology to identify the locomotive location, is linked to the locomotive Tranzlog event recorder system. These systems apply the penalty train brake if the approach speed to a compulsory stop protection is exceeded or a stop board is passed without stopping.

E-Protect:

- is capable of detecting the direction of travel
- is set to detect trains approaching compulsory stop protection
- does not affect trains exiting the protected work area.

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5. Application of E-Protect

E-Protect:

- will be used to support **TS04 Compulsory Stop Protection** only. **TS04 Compulsory Stop Protection** will remain the primary method of protection
- is a supplementary protection method and only intends to intercept any train that overruns a compulsory stop board
- capability will only be available on all DC, DFB, DX, DL, and EF class locomotives (in the lead position).

IMPORTANT
Because the level of system reliability of E-Protect is not absolute, and the system is not available on all locomotives, all provisions of **TS04 Compulsory Stop Protection** must continue to be fully complied with.

5.1 Establishment and Changes to an E-Protect Work Area

The E-Protect protection for the work area will be activated automatically when Network Access Planning approve the E-Protect application.

The times the system is activated for the E-protect work area will be varied by the Train Controller when the Rail Protection Officer advises:

- the work is cancelled, or
- commencement will be delayed, or
- the work is completed early.

To avoid unnecessary penalty brake applications:

- the Rail Protection Officer must advise the Train Controller if work is cancelled or commencement is delayed, and
- trains must stop at the metrage within the time stated on the bulletin until the Train Controller advises that the locomotive has received updated data.

5.2 Area of Operation

E-Protect will operate on all main lines nationwide.

5.3 Board Placement in Multi-Line Work Areas

Because E-Protect will not be able to distinguish between trains approaching on either main:

- E-Protect may only be enabled when protection in multi-line areas is protected as shown in Figure 3 of **RP04 Using Compulsory Stop Protection, 4. Placement Guide**
- E-Protect must not be enabled when protection in multi-line areas is protected as shown in Figure 2 of **RP04 Using Compulsory Stop Protection, 4. Placement Guide** because it will trigger unnecessary brake activations on the opposite main
- where one main in a multi-line area is impassable and is protected by **TS03 Mis.60** or **TS06 Blocking**, E-Protect can be applied to the passable main.

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5.4 Board Placement - Signals and Platforms

When signals or station platforms are in the vicinity of the intended location of Compulsory Stop boards, they should be placed:

- at the platform end, or
- adjacent to the controlled signal, or
- 500m before or beyond the uncontrolled signal (unless excepted by Network Access Planning).

IMPORTANT

Placing the boards within 500m of a normal stopping location may lead the system incorrectly interpreting a train has stopped for the compulsory stop protection. Therefore no further braking protection will operate.

5.5 Yards and Sidings

E-Protect will not:

- apply for Compulsory Stop boards exiting yards or sidings, or
- be applied at locations where the system may interfere with operations within yards or sidings.

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6. Penalty Brake Activation

When the train is stopped, the Train Crew must advise the Train Controller of the locomotives location from the position of the Compulsory Stop board.

If the system inadvertently stops a train short of a Compulsory Stop board, this means the board is closer to the work area than planned, and the following will apply:

- After consulting with the Train Controller, the train must be moved forward to a position where the work area call sign can be viewed before requesting authority to enter the protected work area.
- The Rail Protection Officer must arrange for the E-Protect meterage to be updated to where the compulsory stop protection is placed or the Compulsory Stop board moved to the correct GPS location.

If the penalty brake applies after correctly passing the Compulsory Stop board, the compulsory stop protection has been placed further away from the work area than planned, and the following will apply:

- The Train Crew must verify to the Train Controller the position of where the locomotive has been brought to a stop in relationship to the Compulsory Stop board
- the Rail Protection Officer must arrange for the E-Protect meterage to be updated to where the compulsory stop protection is placed, or the Compulsory Stop board moved to the correct GPS location

If a SPAD A has occurred, the train must remain stopped, and the Train Controller advised.

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7. E-Protect Unavailable

Any planned or extended outages of the E-Protect system will be notified by bulletin.

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