

## Category 2 Standard

# S2513

(Formerly E7501)

# Alterations to the signalling system

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## 1 Purpose

- 1.1 This standard defines the requirements that must be followed when making any planned physical change to the vital signalling system for which LU is the Infrastructure Manager where that change involves either:
- a) a departure from the existing design, or
  - b) a change of component type or version.
- 1.2 In this document the terms 'alteration' and 'change' are equivalent, and mean any departure from the existing design, either in respect of component types or versions, or in their electrical or mechanical arrangements.

## 2 Scope

- 2.1 All planned changes, whether temporary or permanent, shall be carried out in accordance with this standard. Urgent unplanned temporary changes (to provide service in the event of failure conditions) will normally be carried out in accordance with S2530, Irregular adjustments to the signalling system, but may be carried out in accordance with S2532 if all its requirements can be met.
- 2.2 The requirements of this standard generally do not apply to exact like-for-like substitution of components, but may apply (in whole or in part) if extensive and simultaneous like-for-like replacement or reinstatement is planned, even where this does not depart from the existing design drawings. The Head of Signalling Engineering should be consulted for guidance in such cases.
- 2.3 This standard shall not apply to any train carried elements, but shall apply to:
- a) any interfaces (such as power supplies, arrestors or point heaters) whose alteration might directly affect the safe operation of the signalling;
  - b) any integrity monitoring or enhancing features of the vital system.
- 2.4 This standard does not address the safety assurance or design approval process required for new types of equipment, or the detailed planning and documentation of testing.
- 2.5 The key requirements of this standard are:
- a) confirmation of the existing 'as built' records before making any physical change;
  - b) formal definition of the change by means of authorised drawings or documents;
  - c) the controlled release (or 'issue') of these documents by the Application Design Authority;
  - d) planning the execution of the work;
  - e) authorisation and certification of the physical task;

- f) physical 'proving' of the changes as they are made;
- g) independent principles test of any change;
- h) updating of records;
- i) personal competence (licensing).

2.6 While this standard is written primarily around the requirements for hard-wired systems, the spirit of the standard shall also be applied to data driven and other software based systems where this is appropriate. The requirements should also be used as a checklist when planning the alteration of control systems.

2.7 The expected users of this standard are all persons responsible for the procurement, planning, design, installation or commissioning of alterations to the Signalling System.

2.8 This standard supersedes E7501 A2, S2313 A2 and TLL-ENG-S7269- A1, which are withdrawn.

### **3 Requirements**

#### **3.1 Interpretation of requirements**

3.1.1 Attachments 1 to 8 provide direction on the interpretation of 3.2 to 3.9 respectively, and information about permitted exemptions. It should be noted that these attachments are an essential and obligatory part of the standard.

#### **3.2 Confirming the 'as built' records**

3.2.1 No changes shall be made to an existing signalling installation until the relevant 'as built' record documents for that installation have been confirmed to be correct.

#### **3.3 Specifying the alteration**

3.3.1 No changes shall be made to:

- a) wiring terminations;
- b) trackside physical dimensions;
- c) electrical or mechanical component types or versions;
- d) signs conveying operational information;
- e) installed system software or site data.

Except in accordance with properly authorised 'modification' drawings (or equivalent documents for software) issued by the Application Design Authority for the system concerned.

#### **3.4 Planning and preparing for the alteration**

Planned alterations shall only be made to the signalling system if:

- a) the intended work has been entered in the register of forthcoming signalling works;
- b) the work is carried out in accordance with a Commissioning Quality Plan, prepared and approved in accordance with S2529, Signalling and Control Systems safety critical processes;
- c) all appropriate pre-testing has been satisfactorily completed, and is documented on a pre-commissioning certificate, in accordance with S2524, Testing of Signal Installations;
- d) the Asset Steward (and maintenance contractor where different) has been given adequate notice of the work and has raised no objections;
- e) suitable arrangements have been made to notify operating staff of changes that affect them.

### 3.5 Independent testing of principles

Any changes made to:

- a) wiring terminations;
- b) trackside physical dimensions;
- c) electrical or mechanical component types or versions;
- d) installed system software or site data.

Shall be subjected to a principles test, independent of the designer, before entry into service.

### 3.6 Task authorisation and certification

For any change to the signalling system:

- a) a single person - the Tester in Charge - shall be appointed to take overall responsibility for ensuring that the signalling system has been restored to a safe and operable condition following the alteration;
- b) the task of executing the alteration shall be sanctioned before commencement by the issue of an Authority to Work Certificate to the Tester in Charge in accordance with S2529;
- c) correct operation of the signalling shall be certified on completion by the Tester in Charge completing and signing off the Authority to Work Certificate;
- d) the Tester in Charge shall not permit any signalled train movement within the area of interference between the start of the task and the signing of the Authority to Work Certificate.

### 3.7 Proving of wiring alterations

Any wire or cable being added to or removed from any terminal of the signalling system in the course of an alteration:

- a) shall be 'proved' from end to end at the time of its termination or removal, in accordance with S2529;
- b) shall be subject to an independent wire count of its terminations prior to entry into service, in accordance with S2529.

### 3.8 Updating of records

The process of amending the 'as built' records to reflect the actual state of the railway shall be planned and executed as an integral part of the alteration work, and shall include:

- a) updating the site copy documents before leaving the site of work,
- b) provision of updated copies for the Asset Steward's technical staff (or maintenance contractor where different), and for the Design Authority's office copy records, in readiness for the start of traffic following the alteration, and for other controlled copy holders in due course,
- c) provision of updated Traffic Controller's diagrams for the Line Controller in readiness for the start of traffic following the alteration, and for other controlled copy holders in due course,
- d) provision of information to update the master asset database.

### 3.9 Competence of personnel

Alterations to the signalling system may only be carried out by persons who are competent in the particular task concerned. Such persons:

- a) must have their generic competence established and recognised through the holding of an appropriate licence, and
- b) must be able to demonstrate their specific competence and knowledge in the particular systems, environments and procedures which are relevant to the task.

### 3.10 Verification

The Head of Signalling Engineering has the authority to verify compliance with this standard by audit.

## 4 Responsibilities

The **Head of Signalling Engineering** is the person within LU with responsibility to:

- a) determine the technical contents of the Standards;
- b) advise on the correct interpretation of Standards and grant approval of concessions to the Standards;
- c) resolve any conflicting issues with Standards and other related safety matters;
- d) ensure that an appropriate level of surveillance of compliance to standards is undertaken.

**Project Managers and Procurement Agents** are responsible for ensuring:

- a) that work on the signalling system is only procured from suppliers capable of meeting the necessary competence requirements;
- b) that compliance with this standard is clearly specified as a requirement for all such works;
- c) that appropriate arrangements to comply with this standard and to verify such compliance are adequately budgeted and resourced within project plans.

**Lead Engineers for the Application Design Authority** are responsible for:

- a) all technical aspects of the design alteration and of the total signalling system design that results from it, including:
  - 1) correct interpretation of user requirements specifications
  - 2) correct functionality across all interfaces
  - 3) practicality of the design
  - 4) design of any stageworks
  - 5) identification of procedural elements of the total system which are critical to achieving the required integrity;
- b) the correctness of relevant design records and published information, including:
  - 1) existing designs used in defining the alterations
  - 2) documents for on-site validation and verification activities (tester's copies)
  - 3) adequate and correct 'as built' records on completion (including Traffic Controller's Diagrams)
  - 4) published information on design changes (including details in Traffic Circulars or special notices);
- c) adherence to the appropriate standards, procedures and best practice in the execution of all design processes associated with the alteration, together with:
  - 1) detailing the intended alteration in the register of forthcoming signalling works
  - 2) involving other disciplines and organisations as appropriate
- d) identifying changes that may affect the safety case of the operator or the maintainer;
- e) advising the Head of Signalling Engineering of any instance where elements of this standard appear to conflict.

**Testers in Charge** are responsible for:

- a) preparing and validating the Commissioning Plan, to the satisfaction of the Assurance Authority;
- b) confirming that the Asset Steward and the operating staff have been properly notified of the intended alteration, and that suitable arrangements have been made for the timely replacement of operational record drawings;
- c) ensuring that correlation of the existing installation to the 'modification' drawings remains valid at the date of commissioning;
- d) managing all the technical aspects of the execution of the Commissioning Plan.

**Asset Stewards** (and their Maintenance Contractors where these are different) are responsible for:

- a) co-operation with designers, installers and project managers to facilitate the implementation of authorised alterations;
- b) secure and timely handling of the revised 'as built' controlled copy records;
- c) acceptance of new assets for maintenance, and their integration into an appropriate maintenance regime.

## 5 Supporting information

### 5.1 Background

- 5.1.1 The business objective of this standard is to ensure that changes to signalling systems are properly controlled to safeguard the operational safety and performance of the railway, and the personal safety of staff and customers.

### 5.2 Safety considerations

- 5.2.1 The primary purpose of the railway signalling system is to ensure that train movements are safeguarded against the dangers of collision and derailment.

The consequences of such hazards are obviously very severe. Alterations to the signalling system - if not properly carried out - introduce the risk that they may fail to protect adequately against such hazards.

It follows that the processes and procedures used to manage and control alterations to the signalling system are highly critical to safety, and all persons who participate in such activities must be regularly reminded of that fact.

- 5.2.2 As well as the primary requirement to prevent danger, alteration procedures should ensure, as far as reasonably practicable, that altered systems are free of unpredictable or abnormal operation, or failure, even if no direct danger arises. Such abnormalities may lead to secondary risks from the imposition of manual operating procedures, and weaken the confidence which operating staff need to have in the safe operation of the systems.