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Level 2

Signalling Design: Module A22

Management of Overlapping and Parallel Signalling Design

Endorsement and Authorisation

For endorsement and authorisation, please refer to NR/L2/SIG/11201

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Issue record

Issue	Date	Comments
4	June 2011	Modularisation of handbook and guidance notes, contains content of former NR/L2/SIG/19607

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 03/09/2011.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

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1 Purpose

This module, sets out the mandatory requirements that apply when it is necessary to produce signalling design detail in reduced timescales, so that risks are adequately controlled. The process for authorisation of such relaxations is defined.

2 Scope

The requirements of this module apply to both Network Rail and its design contractors.

This module applies when sequential design processes have to be compressed to run in parallel, including the special case when the programmes for consecutive design alterations overlap. The concurrent design processes specified shall be employed only after all other methods of achieving the required design output have been considered and then only in conjunction with the mitigating control measures described in section 5.1.

The benefits of running parallel processes decline rapidly as the following situations are approached:

- a) the time spent on assessing the risks and devising and implementing additional controls outweighs the time saved by process compression;
- b) it is likely that the amount of rework generated by a change in one process (requiring rework in all the concurrent processes) will outweigh the time saved by process compression.

Parallel processes shall not be used unless the safety risk resulting from the above considerations is controlled with appropriate mitigation (e.g. unless the business cost of not compressing timescales is grossly disproportional to the safety cost of doing so).

3 Definitions

The definitions are contained in [NR/L2/SIG/11201/Appendix E](#).

Parallel Design

Design, in which activities that would usually be undertaken sequentially, are undertaken concurrently.

Overlapping Design

A special case of parallel design, involving activities relating to more than one alteration or design group. This is only permitted where one engineer is identified as having overall responsibility for the interface between the successive design alterations.

Responsible Design Engineer (RDE)

Person directly employed by the design authority who has delegated responsibility for the design, development, safety and dependability of an engineering discipline associated with an infrastructure project. This post can filled either by a Network Rail or a Design Contractors employee.

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Responsible Overlapping Design Engineer (RODE)

Person appointed by Network Rail who has delegated responsibility for the design, development, safety and dependability of signalling associated with related overlapping infrastructure projects undertaken by different design authorities.

Network Rail Records Custodian

Person responsible for the management and configuration of signalling records including the issue and receipt of records.

Records Controller (design authority)

Person directly employed by the design authority who has responsibility for controlling signalling records within a design office.

First Design Group

The design office scheduled or nominated to install and commission signalling infrastructure next before the second design group, where design has been undertaken as part of an overlapping process.

The term applies equally to a design office belonging to a contractor, Alliance or Network Rail, as appropriate.

Second Design Group

The design office scheduled or nominated to install and commission signalling infrastructure next after the first design group, where design has been undertaken as part of an overlapping process.

The term applies equally to a design office belonging to a contractor, Alliance or Network Rail, as appropriate.

4 Delegation

Responsibilities within this Procedure may be delegated to nominated competent persons. Such delegation shall be recorded.

5 Parallel Design Processes

Permits the Route Asset Manager (S&T) to authorise variations to the mandated order in which design activities are undertaken.

In the special case of processes that affect more than one alteration, these shall not be run in parallel, except as permitted in section 7.

Examples of processes associated with a single alteration that could be run in parallel, with appropriate control measures, include:

- a) the production of control tables before scheme plan approval;
- b) the production of engineering details before the control tables are checked;
- c) the production of engineering details before site surveys are undertaken;
- d) correlation to production copies whilst work is in progress;
- e) pre-wiring apparatus housings before the engineering details are approved for construction;
- f) record updating before the commencement of construction;

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- g) commencing work on site before a 'letter of no objection to proposals' is received; and
- h) other parallel processes not expressly prohibited by [NR/L2/SIG/11201](#).

5.1 Control Measures for Parallel Design

Where it is desired to run phases of a project concurrently rather than consecutively, special controls shall be implemented by the RDE to check the integrity of the processes.

Before the Route Asset Manager (S&T) authorises parallel design, the associated hazards shall be identified and the risks shall be considered, in order to provide an appropriate level of mitigation. Examples of measures to control the risks may include some of the following:

- a) a tracking system to check that design changes generated by one process are updated in all concurrent processes;
- b) use of controlled multiple sets of modification sheets (after initial design issue) to update all overlapping alterations, instead of revising individual drawings;
- c) full correlation rather than partial;
- d) appointment of a manager to co-ordinate activities of the design, construction and testing functions;
- e) a means of recovery, should the amount of rework escalate out of control, such as designated 'hold points' in the design process beyond which work shall not progress until any deficiencies identified at regular design review have been eliminated;
- f) appointing a single person to control signal engineering records within a design group (see section 5.2); and/or
- g) an appropriate organisational structure to demonstrate unified design management for overlapping design (see section 6).

Any requirement for parallel design, together with the boundaries and necessary control measures, shall be stated in the design specification, or supplement thereto.

Before design documentation and software/data is issued for installation and testing purposes, all activities up to and including verification that could have a bearing on the accuracy of the designs shall be satisfactorily completed, and any deficiencies and inconsistencies arising from the variations to the mandated order shall be identified and eliminated.

5.2 Management of Signalling Source Records held by a Design Authority

The control measures described in this section guard against the loss of design records within a design authority, in support of the control and security requirements of [NR/L2/SIG/11201](#). They shall be used where determined by the risk assessment of section 6.1. The Route Asset Manager (S&T) may additionally require their use under other circumstances.

Where so determined, the design authority shall comply with the following when source records are issued for signalling alterations:

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- a) Appoint a single person to control signal engineering records within a design group. This records controller shall be advised to Network Rail and will be the only person within that design group to whom records will be issued.
- b) The records controller shall manage a secure store for the records held and maintain an index of records. Records shall only be released to designers requiring to work upon them, whose names shall be indicated on the index.
- c) The records controller's store, index and procedures shall be open to inspection and audit at any time by Network Rail.
- d) Design authorities with multiple design offices shall either apply the above requirements globally or separately for each office.

Note that the timescale for the return of source records is defined in [NR/L2/SIG/11201](#).

6 Overlapping Alterations

This is a special case of parallel design, affecting two or more alterations, projects or stages.

6.1 Decision to Adopt Overlapping Alterations

When selecting design authorities for a project, the Network Rail sponsor shall consider the proximity of any concurrent work and the design authority that is responsible for it. The sponsor shall determine whether the work envisaged will overlap and, if so, whether it is necessary for it to be undertaken concurrently. The chosen solution shall demonstrate that all risks are controlled with appropriate mitigation. The order of preference will generally be as follows:

- i. reprogram to remove the overlapping of concurrent work;
- ii. specify that the same design authority shall undertake all overlapping work (section 7);
- iii. allow overlapping work to be undertaken by different design authorities (section 8).

Option iii) is not appropriate if more than two projects are likely to overlap or if the overlapping is complex.

Where the implementation strategy requires a project to be commissioned in stages, it is likely that the requirements for overlapping alterations will apply. See section 6.5.

Before any alteration is commenced, the design authority shall ascertain from the Network Rail records custodian that all previous approval and issues records (AIRs) in the same area have been signed to confirm the preparation of final records. If not, the requirements for overlapping alterations will apply. (Note that an alteration is not deemed to have started until such time as its version control identity is obtained from the records custodian. This allows multiple scheme proposals to be progressed in parallel without restriction, e.g. by creating scheme plans, so long as no source records are altered. The version control identity is required in order to obtain the source records for altering, at which time the scheme plan shall be amended to agree with the current version of the signalling plan.)

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From section 6.3, it will be appreciated that the requirements for overlapping design are particularly onerous and it shall not be undertaken without full consideration. The process shall be fully controlled by the RDE or RODE where appointed.

6.2 Generic Requirements

Special controls, incorporating a unified design management structure, shall be implemented where it is necessary to relax the design process to allow such successive stages or alterations to follow in close succession, in the same signal box or geographical area. Production, updating and version control shall be strictly applied in accordance with [NR/L2/SIG/11201](#), except as follows:

- a) the production of a subsequent alteration may be commenced as soon as any common source records have been updated in anticipation of the previous commissioning, **provided that** the same RDE (or RODE where appointed) has been appointed to oversee all overlapping alterations **and** security copies (section 6.4) have been taken where necessary for record purposes;
- b) source records may be updated as soon as an alteration has been checked, **provided that** the same RDE (or RODE where appointed) has been appointed to oversee all overlapping alterations **and** security copies (section 6.4) have been taken where necessary for production purposes.

6.3 Modification Process

So as to simplify the modification process, source records that require updating shall not generally be updated prior to commencement of construction, unless the overlapping timescales require it. However, source records shall always be updated before the commissioning to include all design and construction modifications issued by that time. This allows maintenance records to be provided on site at the time of the commissioning. When it is necessary to commence the production of subsequent alterations before the completion of final records, any such modifications shall additionally be transcribed onto the copies listed in a) to c), below.

All these copies shall be further updated or endorsed after the commissioning to incorporate any commissioning modifications or testing comments into the documentation for each alteration. The pink test copy of the design details and any remaining green designer's copies of modification sheets, shall be returned to the appropriate design authority within 48 hours of commissioning in order to initiate the final record update.

Correlation copies, for use during commissioning or prior to the next alteration, shall be obtained from the current master record or security copy (or, where work is in progress and it is agreed in the design specification to allow parallel processes, from a production copy). Any correlation corrections shall be updated or endorsed on the copies listed in a) to c), below.

As soon as practicable, a designer shall update the source records (and any production masters of subsequent alterations) and transcribe any of the above modifications or corrections in blue onto the following copies, as appropriate, quoting the serial number of the modification, or other identification:

- a) current security copy, current maintenance site copy, current production site copy and production office copy;

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- b) production office copies, any site copies and security copies of previous, not yet commissioned, alterations;
- c) production office copies and production site copies of any subsequent alterations already commenced.

The transcription shall be independently checked, signed and dated. Production site copies may have the appropriate copy of the modification sheet attached to the top right hand corner of the affected sheet, in lieu of endorsement.

Note that maintenance records on site shall be maintained up to date with the current state of the infrastructure at all times. When it is necessary to endorse a previous maintenance copy with a modification or correction in order to provide a temporary maintenance copy, this shall be replaced with a final record copy within the timescale defined in [NR/L2/SIG/11201](#).

6.4 Security Copies

When source records are retained by a design authority after commissioning, a security copy shall be supplied to the Network Rail records custodian, as soon as the commissioning modifications and testing comments have been incorporated, as required in 6.2a) , together with the respective test copy (and any pink test copies of modification sheets) and AIR sheet.

Security copies of previous, not yet commissioned, alterations shall be retained by the appropriate design authority, as required in 6.2 b) , for the following purposes:

- to obtain maintenance site copies for the respective commissioning,
- to obtain correlation copies for the next alteration,
- to supply to the records custodian at the appropriate time, and
- as a means of recovery, in the event of cancellation or rescheduling (section 6.6).

6.5 Stagework Design

In planning the stagework programme for a multiple stage project, it is important that spare time is allowed in the programme for the rescheduling of work that is cancelled or incomplete (see section 6.6).

A separate set of design details shall be produced for each stage (i.e. alteration), in accordance with [NR/L2/SIG/11201](#). Work packages shall also be treated as separate alterations, unless the relaxation given in [NR/L2/SIG/11201](#) applies.

Temporary stagework wiring (that is to be removed before the final commissioning) shall be identified on drawings as to be run in a distinctive colour to enable it to be readily distinguished, as described in [NR/L2/SIG/11201](#). Relaxations in the technical requirements for temporary work are given in [NR/L2/SIG/11201/A16](#).

When it is known that installation is to be in progress on more than one set of stagework drawings (stage or package) at the same time, the drawings shall be endorsed that wires for each stage shall be clearly identified. The type of identification to be used shall be agreed after consultation with the relevant tester in charge.