



New Works and Technology Developments Requirements

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DOCUMENT CONTROL

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CHANGE HISTORY

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ABBREVIATIONS

Acronym	Definition
HL	Hazard Log
LC	Life Cycle
LCP	Life Cycle Phase
OHTE	Over Head Traction Equipment
QA	Quality Assurance
RA	Risk Assessment
RSR	Railway Safety Regulator
SMS	Safety Management System
URS	User Requirement Specification

DEFINITIONS

Custodian	A person who has responsibility for taking care of or protecting something.
Operator	A network operator, train operator, station operator or a combination of two or three of them
Person	Includes an unincorporated body, an organ of state and Minister
Policy	A policy is a statement of intent that is implemented as a procedure or protocol
Railway Operation	The activities performed by a network operator, train operator, station operator, or a combination of the two or three of them
Rolling Stock	A vehicle that can operate on a railway irrespective of its capability of independent motion
Safety Permit	An official document issued by the Railway Safety Regulator that allows an operator the right to undertake any railway operation or a component of a railway operation
Safe Railway Operation	A railway operation in which the risks associated with the railway operation which may impact on the safety of persons and property transported by railway and the safety of other persons, other property, and the environment, are as low as is reasonably practicable in the given set of circumstances, and does not include security

1. Purpose

The purpose of the New Works and Technology Developments Requirements document is to define the Minimum Submission Requirements that must be adhered to by all Railway Operators who intend to implement changes to their railway operations. The National Railway Safety Regulator Act (Act 16, 2002) as amended stipulates in Section 30 that, “*A new or proposed construction or operation which may impact on safe railway operations and which requires the approval of the Regulator, and the procedure for such approval, including the noting of objections*”

The changes for which this stipulation is intended for, encompass all activities that may have an impact/potential impact on railway safety, and these changes include the following:

- i) Construction of new lines
- ii) Changes to operating speeds
- iii) Significant changes to operating procedures
- iv) Changes to train authorization and control systems or equipment
- v) Changes to the type of motive power used and
- vi) Introduction of new or modified rolling stock.

To obtain the above-mentioned approval from the RSR, Railway Operators shall make submissions to the RSR through all the Life Cycle Phases (LCP) of the project as listed below:

- i) Concept phase
- ii) Design phase
- iii) Construction/Manufacturing phase
- iv) Test and Commissioning phase
- v) Operations and Maintenance phase and
- vi) Decommissioning.

2. Scope

The New Works and Technology Development Minimum Submission Requirements document applies to all Railway Operators (Existing and new entrants) and covers the minimum LCP requirements for new works, new technology and modifications to railway operations.

3. Minimum Submission Content

3.1 General

Submissions made by Railway Operators shall include the following project details:

- i) Company Profile
- ii) Project Description
- iii) Project Objectives
- iv) Location of Project
- v) Brief Technology Description
- vi) Project Plan
- vii) Interactions – Project Organizational Structure with a list of all the service providers including their roles and responsibilities

3.2 Concept Phase

The Concept Phase notification submission shall be made to the RSR by the Railway Operator. The RSR shall review the submission and issue a notice of **No Objection** provided all requirements/conditions are complied with. The Concept Phase submission to the RSR shall include the following:

- i) A project definition and scope description
- ii) An indication of the design standards to be implemented
- iii) A robust design change procedure identifying all persons concerned with the Project Team outlining the appropriate roles and responsibilities assigned
- iv) A project hazard log and risk assessment, managed by a competent person nominated by name and managed by a competent person with the appropriate authority to expedite the completion of corrective or mitigating actions and counter signed by all affected parties.

3.3 Design Phase

The Design phase **shall not** proceed until the RSR has issued a notice of **No Objection** on the concept phase. The Design Phase notification submission shall be prepared by the Railway Operator upon receipt of a No Objection notice on the Concept Phase. The submission to the RSR must include the following:

- i) A policy deliberate statement of principles to guide decisions and achieve rational outcomes
- ii) A User Requirement Specification (URS) document, signed off by the appropriate delegated authority(ies)
- iii) A project organisational structure and an operational framework guiding

decisions document

- iv) An audit trail substantiated by an organisational management procedure, defining the organisational involvement in the project, be it: define, design, sub-contract, build, integrate, operate, maintain and transfer or any combinations thereof
- v) A project purpose definition or functional description
- vi) Compilation of a risk analysis (RA) and hazard log (HL)
- vii) Statutory requirements (including environmental) to adhere to, or obtained prior to realization of the product
- viii) Standards to use
- ix) Product performance evidence envelope (functional, maintainability, reliability, availability)
- x) Infra Structure requirements (facilities, processes etc.) to sustain the product over the Life Cycle (LC)
- xi) Development of cost estimation 80/20
- xii) Operator machine interface over the LC leading to ergonomic requirements and
- xiii) Work creation and sustainability over the LC

Additional considerations for the design phase:

- Documented evidence of decisions, analysis reports, drawings and motivations of design alternatives including system specifications, standards, process, materials, Integration acceptance, quality assurance (QA) plan, updated RA and HL, compliance or verification checks (or both) as required and cost optimisation analysis to reach best alternative selection
- Process for procurement if applicable
- Procedure for technology validation and verification

- Documented evidence of all rights associated with the implementation of the product
- Evidence of a documented change management process which captures all changes in detail design, manufacturing requirements, standards, technology, compliance conditions and impact on the RA, HL and cost optimisation
- Application of document control system, change management process and notification process for the introduction of new technology
- Preparation of drawings, revised bill of materials, list of standards that the design is based upon, builder's instructions, project schedules and sub-contractor's business continuity management (Risk Management) compliance certificate
- Generating reports on all type and prototype testing as required by statutory, safety and performance standards adopted including, scope of test, measurement norms, measurement methodology, failure criteria and any variations approved
- Specifications and drawings - system drawings, layouts, schematics and specifications for civil, perway, signalling, telecommunications, rolling stock and electrical (OHTE, traction substation, Transmission lines/equipment, etc.) signed off by a registered professional as per ECSA requirements
- Standards compliance statement and
- Any requests for derogations to standards and regulations

3.4 Execution/Manufacturing Phase

The Execution/Manufacturing phase **shall not** proceed until the RSR has issued an **Approval** notice on the Design Phase, provided all requirements/conditions are complied with. Notification submissions for the execution/manufacturing, assembly or production phase shall include the following:

- i) Proof of Environmental Authorisation where required
- ii) A plant, product or process documentation pack inclusive of :-
 - All drawings
 - Bills of Material
 - Manufacturing, assembly or production assembly execution plans
 - Quality Plans, processes, norms and methodologies
 - Supply Chain sustainability and competence procedures and
 - Interface agreements with all affected parties
- iii) Define and implement such procedures required for safe working and certified hand over between sub-system or component groups. Such procedures shall clearly indicate integration and resolution process responsibility
- iv) A robust and enforced design change procedure (as required during manufacture/ assembly for which the detail design did not accommodate) shall be in place with sign off from all persons as identified within the project team with the appropriate role & responsibility
- v) The project hazard log and risk register shall be current, managed by a competent person with the appropriate authority to expedite the completion of corrective or mitigating actions and counter signed by all affected parties

3.5 Inspection, Test and Commissioning Phase

The Inspection, Testing and Commissioning phase **shall not** proceed until the RSR has issued an **Approval** notice for the execution/manufacturing phase. Procedures, processes, documents and notification submissions for the Testing and Commissioning phase shall include the following:

- i) A Test & Commissioning plan must be in place and be signed off by the relevant role players
- ii) The test plan shall cater for asset functionality and asset safety as experienced by operators or users (or both) of the asset or service

- iii) The plan shall include the scope, parameters, measures, methodology, norms and acceptance criteria for the asset or system or process or a combination thereof
- iv) The plan shall define certification contents and signatories for each component, system and sub-system
- v) The plan shall be submitted to the RSR for review and issuance of an approval prior to commencement of the ITC phase
- vi) Where applicable, the Railway Operator shall make a submission to the RSR, in the appropriate format, for a Testing and Commissioning Permit. The RSR will advise on the need for a permit
- vii) The Testing and Commissioning entity shall notify the RSR of any intended change or new test requirements after original submission
- viii) The hazard log and risk register shall be current, managed by a custodian with the appropriate authority to expedite the completion of corrective or mitigating actions and counter signed by the responsible person
- ix) Define and implement such procedures required for safe working during execution of the testing and commissioning tests. Such procedures must clearly indicate completion or demarcate areas where other sub-system groups may operate
- x) Appropriate certification shall be available and rendered to the RSR for ratification that the system, sub-system or component is fit for use from a safety aspect
- xi) Certification shall also include correct functional operation of the sub-system if the output of the sub-system is an input to another sub-system and certify that if required the change process was followed to implement a design or manufacturing or assembly change

- xii) The Test Engineer Certification (including ECSA registration) and a resume
- xiii) A comprehensive and complete document pack shall be available for audit which includes all documentation pertinent to the system development excluding any modification or decommissioning or disposal documentation where that has not yet been implemented or initiated

3.6 Operations Phase

The Operations phase **shall not** proceed until the RSR has issued an **Approval** notice for the Testing and commissioning phase. Any envisaged changes to monitoring and maintenance standards, procedures, processes, agreements and associated activities shall require notification submissions to the RSR for consideration and shall include the following:

- i) Human resource plan, including recruiting and training plan where applicable
- ii) Documented proof of the existence and effectiveness of operational standards, procedures and processes and an audit trail of any change management activities, implementation and training thereof (**Note: A competent person must be empowered to manage, sustain and monitor the above**)
- iii) Any change envisaged must be pre-empted with a submission to the RSR and must include the purpose, scope, methodology of implementation, training norms and acceptance criteria and risk assessment for the envisaged change
- iv) The submission must define certification contents and signatories for the envisaged changes for each system, sub-system or component
- v) The submission must be made to the relevant RSR department/unit for review prior to service implementation, in the appropriate format

NB: Any change effected should consider the following:

- Revised organisational structure, roles and responsibilities and competency impacts
 - Revised processes or procedures
 - Impact (risk assessment) of the introduction of new assets, procedures, processes, technology or service providers and
 - Notification to the RSR of such changes
- vi) Risk assessments of the operating procedures
- vii) A hazard log and risk register must be developed for the envisaged changes, kept updated and managed by a custodian with the appropriate authority to expedite the completion of corrective or mitigating actions and counter signed by the assigned competent person
- viii) Define and implement such procedures required for safe working during execution of the envisaged changes
- ix) Appropriate certification must be available and rendered to the RSR for ratification that the envisaged changes to system, sub-system or component maintenance or monitoring (or both) is fit for use from a safety aspect. Certification shall also include the correct functional operation of the sub-system if the output of the sub-system is an input to another sub-system and certify that if required the change process was followed to implement a design or execution change.

3.7 Monitoring and Maintenance Phase

Any envisaged changes to monitoring and maintenance standards, procedures, processes, agreements and associated activities shall require notification submissions to the RSR for approval and shall include the following:

- i) Documented proof of the existence and effectiveness of the monitoring and maintenance policy, strategy and plan (**Note: The monitoring plan, parameters**)

and analysis must cater for the system functionality and safety as experienced by operators or users (or both) of the system within the operating environment)

- ii) The scope, parameters, measures, methodology, norms and acceptance criteria for the asset or system or process (or a combination thereof)
- iii) Defined certification contents and signatories for the envisaged changes for each system, sub-system and component
- iv) Submission made to relevant RSR Department/unit for review and issuance of **Approval** notice prior to service implementation
- v) The Operator shall make the submission to the RSR, in the appropriate format and any change submission shall include the following:
 - Revised organisational structure, roles and responsibilities
 - Revised asset management policy, strategy, objectives and plans
 - Revised processes or procedures (or both)
 - Impact (Risk Assessment) of the introduction of new assets, procedures, processes, technology or service providers
 - Description of the change including specifications, drawings or schematics where applicable.
 - Proof of the availability of spares and
 - Proof that the maintenance personnel is trained to maintain the system and operations personnel trained to operate the system
- vi) A hazard log and risk register shall be developed for the envisaged changes, kept updated and managed by a competent person with the appropriate authority to expedite the completion of corrective or mitigating actions and counter signed by the assigned responsible person.
- vii) Define and implement such procedures required for safe working during execution of the envisaged changes

- viii) Appropriate certification shall be available and rendered to the RSR for ratification that the envisaged changes to the maintenance or monitoring (or both) of the system, sub-system or component is fit for use from a safety aspect. Certification shall also include correct functional operation of the sub-system if the output of the sub-system or component is an input to another sub-system and certify that, if required, the change process was followed to implement a design or execution change (or both).
- ix) A comprehensive and complete document pack shall be available for audit which includes all documentation pertinent to the Rolling Stock development and maintenance excluding any modification, decommissioning or disposal documentation where that has not yet been implemented or initiated

3.8 Modification Phase

Modified systems **shall not** be put into Operations without an **Approval** notice from the RSR. Standards and procedures for the control of the process for modification or re-assembly of systems and components shall include consideration for the following:

- i) Effects of the proposed modification on the railway system as a whole
- ii) Effects of the environment on the proposed modification
- iii) Design, implementation and commissioning of the modification or re-build in accordance with clause 6 to clause 10 (inclusive)
- iv) Effective recording, promulgation and communication of changes and modifications where especially operational safety is affected

3.8.1 Configuration management

Where new technology is introduced, a submission of such intent shall be made to the relevant RSR department/unit in the required format detailing the following:

- Description of the technology including schematics, drawings and specification sheets
- Standards to which the technology is compliant

- Scope of the technology impact with associated risk assessment
- Test & Commissioning and implementation plan, and
- Proof of training maintenance team/employees on the maintenance of the new asset technology installed (*Could be employees in the organization or a contractor to conduct maintenance when required*)

3.9 Decommissioning Phase

Systems **shall not** be decommissioned without an **Approval** notice from the RSR. Standards and procedures for the decommissioning, disposal and means of preventing inappropriate usage after disposal shall be developed. The Railway Operator shall include in their Safety Management System (SMS) as referenced in the SANS 3000-1 Standard, the following as considerations for decommissioning:

- i) Appropriate marking of each decommissioned item for identification purposes
- ii) The movement of decommissioned rolling stock, including rolling stock systems, sub-systems or components, and the identification of a person(s) appointed to authorize such movement
- iii) Ensuring safe operations during decommissioning, scrapping and disposal
- iv) Ensuring that the condition of decommissioned material and equipment is clearly identified
- v) Prevention of inappropriate re-use of decommissioned material
- vi) Minimizing environmental risks, including health, safety and pollution hazards associated with the decommissioned items and the process thereof as well as considering both short-term and long-term impact

The Railway Operator shall make a submission of intent to the RSR that must include the following:

- Description and identification of assets involved
- Disposal strategy and plan including environmental considerations

- Complete risk assessment including socio economic, environmental and statutory impacts or requirements
- Safe working operations during disposal
- All required certification, signed off by a competent person, that the disposal is compliant to all statutory or other requirements
- Updated operator asset register.