Management of engineering change
Process map

This process map should be read in the context of the page on the RSSB website on the management of engineering change.
Management of engineering change
Process map

Introduction:

1. The process map is written primarily for organisations involved in the GB mainline railway system and can be used when the proposer (the organisation introducing the change) has decided to make an engineering change.

2. The engineering change ‘process map’ is made up of a series of pages that use the Unified Modelling Language.

3. The process map illustrates the relationships between elements. It should not be read as a flowchart.

4. Where appropriate, links to relevant documents and websites have been provided.

How to read the process map:

Follow the arrows and read the relationship between two elements as a sentence (name, verb, name)

Examples:

1. On page 1 (CSM on Risk Evaluation and Assessment)
   “The AsBo checks the application of the CSM on RA”

2. On page 6 (Component assessment process - not interoperability constituents, not novel)
   “British Standards, Euronorms and Company Standards are types of Design and Manufacturing Standards”

3. On page 8 (Sub-system authorisation process – first authorisation)
   “The Technical File is made up of the certificate of verification (from the NoBo), the certificate of verification (from the DeBo) and the safety assessment report”

Components of the process map:

Example

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Operation</th>
</tr>
</thead>
</table>
| Checks application of | –

A ‘Stereotype’ is used to define the element
An ‘Attribute’ describes the element
An ‘Operation’ shows what the element does

Some elements do not have attributes or operations or both (where further description is not necessary).

Symbols used in the process map:

← = “is a type of…”

 ↔ = “is made up of…”
Management of engineering change
Process map

Stereotypes used in the process map:

1. Role
2. Legislation:
   i. UK Primary and EU legislation
   ii. UK Regulation (secondary legislation)
3. Process
4. Decision
5. Document
   i. Mandatory document
   ii. Guidance
   iii. Certificate
   iv. File
6. Requirement
7. Body

Abbreviations used in the process map:

AsBo – Assessment Body
ATOC – Association of Train Operating Companies
CDM – Construction (Design and Management) Regulations
CSM on RA – Common Safety Method on Risk Evaluation and Assessment
DeBo – Designated Body
DIT – Department for Transport
EC – European Commission
ECM - Entity in Charge of Maintenance
EN - EuroNorm
ERA – European Railway Agency
GN – Rail Industry Guidance Note
HSAW – Health and Safety at Work Act
HS1 – High Speed 1
IM – Infrastructure Manager
NoBo – Notified Body
NSA – National Safety Authority
NSR – National Safety Rule
NTR – National Technical Rule
ORR – Office of Rail Regulation
RACOP – Rail Industry Code of Practice
RAMS – Reliability, Availability, Maintainability and Safety
RGS – Railway Group Standard
RID – Railways (Interoperability) Directive
ROIR – Railways (Interoperability) Regulations
ROGS – Railways and Other Guided Transport Systems (Safety) Regulations
ROSCO – Rolling Stock Company
RSD – Railway Safety Directive
RU – Railway Undertaking
RV – Rail Vehicle
SMS – Safety Management System
SRM – Safety Risk Model
TSI – Technical Specification for Interoperability

05 April 2012
Issue 1.2
ii
CSM on Risk Evaluation and Assessment

Note: in ROGS, RU is called ‘Transport Undertaking’
Railway Interoperability Regulations / Railway Interoperability Directive sub-systems and vehicles only

**European legislation**
- **RID**

**guidance**
- DfT Helpnotes

**regulation**
- **RIR**
  - 2011

**mandatory document**
- **TSIs**
  - Requires production of

**guidance**
- **ENs**
  - can be mandatory if called up by TSI

**requirement**
- **Essential Requirements**
  - Defines

**process**
- Verification of sub-systems and vehicles
  - requirement for technical compatibility at European level

**process**
- Authorisation of sub-systems and vehicles for placing into service

**process**
- Authorisation/certification of operations by ORR

**process**
- Verification of interfaces
  - RIR regulation 17 para 2b

**process**
- Safe integration
  - Demonstrated by application of

**primary legislation**
- CSM on risk evaluation and assessment

**mandatory document**
- **NTRs**
  - fills open points in TSIs
  - defines compatibility with existing rail network

**mandatory document**
- **RGSs**
  - on GB mainline only
  - notified as NTR

**mandatory document**
- **ATOC standards**
  - on GB mainline only
  - notified as NTR

**mandatory document**
- **NR standards**
  - on GB mainline only
  - notified as NTR

**mandatory document**
- **HS1 documents**
  - on HS1 only
  - notified as NTR

**mandatory document**
- **RGSs**
  - on GB mainline only
  - notified as NTR

**mandatory document**
- **NR standards**
  - on GB mainline only
  - notified as NTR

**mandatory document**
- **NTRs**
  - supports UK Specific Cases in TSIs
  - fills open points in TSIs
  - defines compatibility with existing rail network

**process**
- Authorisation of sub-systems and vehicles for placing into service

**guidance**
- DfT explanatory memorandum

**guidance**
- DfT Helpnotes

**role**
- Project Entity

**role**
- Applicant for placing into service

**role**
- Member State

**role**
- DfT in UK

**role**
- ATOC standards

**role**
- Associated documents

**guidance**
- Associated documents

**guidance**
- Associated documents

**guidance**
- Associated documents

**guidance**
- Associated documents

05 April 2012
Issue 1.2
No.4
Component assessment process – Interoperability constituents

- **Role**: Component manufacturer
  - Manufacture component
  - Manage component assessment process
  - Sell component

- **European legislation**: RID
  - Transposed into UK law by

- **DfT Helpnotes**
  - Support

- **DfT explanatory memorandum**
  - Support

- **RIR 2011 regulations 24 & 25**
  - Requires conformity with

- **TSIs**
  - Requires conformity with

- **ENs**
  - Harmonised with

- **EC declaration of conformity and suitability**
  - For use

- **Assessment of conformity and suitability for use**
  - Provides for

- **Essential Requirements**
  - Used to demonstrate achievement of

- **Diagnostic**

05 April 2012
Issue 1.2
No.5
Component assessment process - not interoperability constituents, not novel

- **Component manufacturer**
  - manufacture component
  - sell component

- **Customer**
  - checks compliance with

- **Design and manufacturing standards**
  - checks compliance with

- **British Standards**
  - compliance maybe enforced by company regulations / contract

- **Euronorms**
  - compliance maybe enforced by company regulations / contract

- **Company standards**
  - compliance maybe enforced by company regulations / contract

- **European legislation**
  - Directive 98/34/EC
    - concerning technical products

- **Link R to ROGS/RSD diagram**

- **Reviews**

- **In-service testing**
  - as agreed with component manufacturer may be enforced by contract

- **Mandatory document**
  - SMS

- **Issue 1.2 No.6**
  - 05 April 2012
Component assessment process - not interoperability constituents, novel

- Component manufacturer
  - Manufacture component(s)
  - Sell component(s)

- Customer
  - Checks compliance with
  - Checks compliance with acceptance requirements

- Design and manufacturing standards
  - British Standards
    - Compliance maybe enforced by company regulations / contract
  - Euronorms
    - Compliance maybe enforced by company regulations / contract
  - Company standards
    - Compliance maybe enforced by company regulations / contract

- Directive 98/34/EC
  - Concerning technical products
  - Requires notification to the EC of

- SME
- ROGS/RSD diagram

- Link R to ROGS/RSD diagram

- Declaration of compliance
  - Compliance with acceptance requirements

- In-service testing
  - As agreed with component manufacturer
  - May be enforced by contract

- Revises notification to the EC of

- Reviews

- Supplies

05 April 2012
Issue 1.2
No.7
Sub-system authorisation process –
first authorisation (of a **new** sub-system)

- **Project Entity**
  - manage authorisation to place subsystem into service
  - manage compliance with TSIs
  - manage compliance with NTRs
  - manage application of CSM on RA

- **Body**
  - NSA
  - authorise subsystem for placing into service

- **Body**
  - NoBo
  - checks compliance with TSIs

- **Body**
  - DeBo
  - checks compliance with NTRs

- **Body**
  - AsBo
  - checks application of CSM on RA

**Verification declaration of sub-system**

**Authorisation for placing into service**

**EC verification procedure**

**Certification of verification**

**Safety assessment report**

**Technical file**

- Link L to RIR / RID diagram
- Link K to RIR / RID diagram
- Link Q to CSM diagram

**Verification declaration of sub-system**

**Authorisation for placing into service**

**EC verification procedure**

**Certification of verification**

**Safety assessment report**

**Technical file**

Responsibility for tech file may be amended by RIR 2011/12

05 April 2012
Issue 1.2
No.8
Sub-system authorisation process – renewal & upgrading

- **Change to authorisation for placing into service**
  - **NoBo**
    - independence
    - checks compliance with TSIs (to the extent required by DfT)
  - **DeBo**
    - independence
    - checks compliance with NTRs (to the extent required by DfT)
- **EC verification procedure**
  - **process**
  - **role**
    - **Body**
      - **data**
        - **document**
          - **requirement**
            - Requirement for authorisation for placing into service
- **Sets out**
  - **regulation**
    - RIR 2011 regulation 18
- **AsBo**
  - independence
  - checks application of CSM on RA
- **DeBo**
  - independence
  - checks compliance with NTRs (to the extent required by DfT)
- **NoBo**
  - independence
  - checks compliance with TSIs (to the extent required by DfT)
- **EC verification procedure**
  - **process**
  - **role**
    - **Body**
      - **data**
        - **document**
          - **requirement**
            - Requirement for authorisation for placing into service
- **Safety assessment report**
  - **process**
  - **role**
    - **Body**
      - **data**
        - **document**
          - **requirement**
            - Requirement for authorisation for placing into service
- **Verification declaration of sub-system**
  - **process**
  - **data**
    - **document**
      - **requirement**
        - Requirement for authorisation for placing into service

05 April 2012
Issue 1.2
No.9
Sub-system approval process -
not covered by RIR

- **role**: Sub-system manufacturer
  - manufacture sub-system
  - sell sub-system

- **document**: Design and build standards

- **guidance**: British Standards
  - compliance may be enforced by company regulations / contract

- **guidance**: Euronorms
  - compliance may be enforced by company regulations / contract

- **document**: Company standards

- **decision**: Significance of change

- **process**:
  - Installation & Commissioning
    - as agreed with manufacturer may be enforced by contract
  - In-service testing
    - as agreed with manufacturer may be enforced by contract

- **process**:
  - In-service testing
    - compliance checks may be independent
    - compliance checks may be enforced by contract
    - decides significance of change
    - operates and manages assets
    - manages approval of sub-system for use in service

- **role**:
  - Proposer
    - decides significance of change
    - operates and manages assets
    - manages approval of sub-system for use in service

- **process**:
  - Link S to CSM on RA top-level diagram
    - May require
  - In-service testing
    - May require

- **process**:
  - Link J to ROGS / RSD diagram

- **document**:
  - SMS
  - Reviews
  - Link S to CSM on RA top-level diagram

- **decision**:
  - Link J to ROGS / RSD diagram

- **role**:
  - Sub-system manufacturer
  - manufacture sub-system
  - sell sub-system

- **document**:
  - Design and build standards

- **guidance**: Directive 98/34/EC
  - concerning technical products
Rail vehicle authorisation process –
Subsequent authorisation (of vehicles conforming
to an authorised vehicle type)

- Role: Applicant for Vehicle Authorisation
  - manages authorisation to place vehicle into service
  - manages conformity with TSIs
  - manages application of CSM on RA
  - manages conformity with NTRs

- Applies to:
  - Role: NoBo
    - independence
    - checks conformity with TSIs
    - checks vehicle is of a type included in ERATV

- Produces:
  - Certificate of verification
  - Declaration of EC verification

- Checks:
  -_PRODUCES_ Authorisation for placing into service
  - Applies to _EC verification process_

- Sets out:
  - European legislation: RID Annex VI

- Link M to RIR / RID diagram
- Link O to RID / RIR diagram
- Link to GB National Reference Document on ORR website (not yet available)
Rail vehicle authorisation process –
Renewed authorisation (of a type authorisation that is not valid anymore)
Rail vehicle authorisation process –
Additional authorisation (of vehicles already authorised in another EU MS)
Rail vehicle authorisation process – ‘New’ authorisation (of a modified vehicle or vehicle type)

1. Applicant for placing into service
   - Manage authorisation to place vehicle into service
   - Manage conformity with TSIs
   - Manage application of CSM on RA
   - Manage conformity with NTRs

2. Body
   - NWA
   - Authorises vehicles for placing into service

3. Process
   - Declaration of EC verification
   - Authorisation for placing into service
   - Checks conformity with TSIs
   - Checks conformity with NTRs
   - Checks application of CSM on RA

4. Body
   - NoBo
   - Checks application of CSM on RA

5. Body
   - AsBo
   - Checks application of CSM on RA

6. File
   - Describes modification to rail vehicle

7. Document
   - Safety assessment report

8. Certificate
   - Certification of verification

9. Process
   - EC verification process

10. European legislation
    - RID Annex VI

11. File
    - Technical file

12. Document
    - Certified technical file

13. Certificate
    - Certification of verification

14. Process
    - Existing authorisation

15. Process
    - New authorisation

16. Requirement
    - Requirement for authorisation for placing into service

17. Decision
    - DfT
    - Change to authorisation for placing into service

18. Requirement
    - Requirement for authorisation for placing into service

19. File
    - GB National Reference Document on ORR website

20. File
    - GB National Reference Document on ORR website (not yet available)

21. Body
    - NSA
    - Authorises vehicles for placing into service

22. Body
    - DfT
    - Examines
    - Decides

23. Process
    - Existing authorisation

24. Process
    - New authorisation

25. Requirement
    - Requirement for authorisation for placing into service

26. Document
    - Link to GB National Reference Document on ORR website

27. Document
    - Link to GB National Reference Document on ORR website (not yet available)

28. Document
    - Link to GB National Reference Document on ORR website

29. Document
    - Link to GB National Reference Document on ORR website (not yet available)

30. Document
    - Link to GB National Reference Document on ORR website

31. Document
    - Link to GB National Reference Document on ORR website

32. Document
    - Link to GB National Reference Document on ORR website

05 April 2012
Issue 1.2
No. 12
Rail vehicle approval process – not covered by RIR

- Rail vehicle manufacturer
  - manufacture rail vehicle
  - sell rail vehicle

- Proposer
  - Designs and builds standards
  - checks compliance with
    - British Standards
      - compliance maybe enforced by company regulations / contract
    - Euronorms
      - compliance maybe enforced by company regulations / contract
    - Company standards
      - compliance maybe enforced by company regulations / contract

- ROSCO
- RU
- DfT

- Installation & Commissioning
  - May require
  - as agreed with manufacture and IM (Network Rail)
  - may be enforced by contract

- In-service testing
  - May require
  - as agreed with manufacture and IM (Network Rail)
  - may be enforced by contract

- Link T to CSM on RA top-level diagram

- Link P to RDGS / RIDD diagram

- Significance of change

- Directive 98/34/EC
  - concerning technical products

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Issue 1.1
No.13