



international Engineering Safety Management

GOOD PRACTICE GUIDANCE

APPLICATION NOTE 6A MAINTENANCE AUDIT CHECKLIST

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DISCLAIMER

Abbott Risk Consulting Limited (ARC) and the other organizations and individuals involved in preparing this handbook have taken trouble to make sure that the handbook is accurate and useful, but it is only a guide. We do not give any form of guarantee that following the guidance in this handbook will be enough to ensure safety. We will not be liable to pay compensation to anyone who uses this handbook.

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- G Parris
- G Topham

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- Abbott Risk Consulting Ltd.
- Rio Tinto
- Technical Programme Delivery Group
- WSP

This handbook does not necessarily represent the opinion of any of these people or organizations.

Good practice in engineering safety management advances as people build on the work done before by others. This handbook has drawn on the work carried out by the contributors to the Yellow Book [YB4] and to PAS 55 [PAS] among many others and we acknowledge our debt to them.

1 INTRODUCTION

This Application Note (AN) is a component of the international Engineering Safety Management Good Practice Handbook, or 'iESM', for short. The handbook as a whole describes good practice in railway Engineering Safety Management (ESM) on projects. It covers both projects that build new railways and projects that change existing railways.

The iESM handbook is structured in three layers:

- Layer 1: Principles and process
- Layer 2: Methods, tools and techniques
- Layer 3: Specialized guidance

The first layer comprises one volume, Volume 1. Volume 1 describes some of the safety obligations on people involved in changing the railway or developing new railway products. It also describes a generic ESM process designed to help discharge these obligations.

Volume 2 provides guidance on implementing the generic ESM process presented in Volume 1 on projects. Volume 2 belongs in the second layer. At the time of writing, Volume 2 was the only document in the second layer but further volumes may be added to this layer later.

The third layer comprises a number of Application Notes providing guidance in specialized areas, guidance specific to geographical regions and case studies illustrating the practical application of the guidance in this handbook.

The structure of the handbook is illustrated in the figure on the right.

This document is Application Note 6a. It supports the main body of the handbook by providing an audit-type checklist for AN6 on Maintenance that may be used when carrying out some of the ESM tasks in a maintenance context.

If you have any comments on this Application Note or suggestions for improving it, we should be glad to hear from you. You will find our contact details on our web site, www.intesm.org. This web site contains the most up-to-date version of this Application Note. We intend to revise the handbook periodically and your comments and suggestions will help us to make the Application Note more useful for all readers.

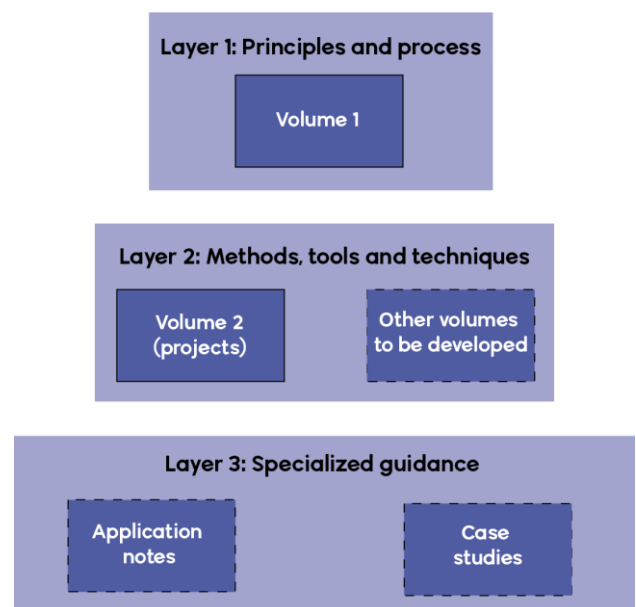


Figure 1 The Structure of iESM Guidance

2 MAINTENANCE AND THE IESM AUDIT CHECKLIST

2.1 Context

The iESM Working Group has developed a series of Application Notes (AN) to supplement the iESM Guidance [iESM]. Each AN provides more detailed guidance on a particular aspect of the iESM Guidance. Where useful, appendices have been developed to illustrate the practical application of the guidance in the main AN.

AN 6 [AN6] provides guidance on applying the engineering safety management Principles and Processes in iESM Volume 1 to maintenance. It can be thought of as a Volume 2 for Maintenance. This checklist in AN6a is designed to help people who are using that AN. It is derived from AN6 and contains no new guidance. It simply presents the main points of the existing guidance in a checklist format. You can use the audit checklist to assess existing maintenance arrangements or arrangements that you plan to put in place and how best to interpret each checklist item in your own particular context.

The checklists are set out in the same manner as the guidance in the AN, grouped under the Principles and Processes to which they relate.

When a question asks “Do you do something?” it generally means “Does your maintenance organization do something?”

Blind application of these checklists is unlikely to be helpful. You should read AN6 before using this checklist so that you understand the reasons behind the items in this checklist and can judge whether they are relevant.

This checklist is designed to support your judgement, not replace it. Being unable to answer “Yes” to a question in this checklist does not necessarily imply that you need to take action. The measure referred to in the question might be inappropriate in your situation or you might put the fundamental effectively into practice a different way.

You may also find that some questions ask about things that are beyond your control. In that case, if the question suggests that there is an issue to be resolved, you will need to bring the issue to someone else’s attention.

A useful way to use this Audit checklist might be as follows:

1. Answer the questions truthfully based upon your maintenance arrangements as they are (rather than as you would wish them to be).
2. Review the questions to which you answered “No” and consider whether there is a clear, immediate reason why you should be able to answer “Yes”. Possible reasons include the following:
 - The measure referred to is a reasonably practicable step that you could take to reduce risk.
 - The measure referred to is required by legislation, regulation or relevant mandatory standards with which you do not currently comply.
 - The measure referred to is likely to save more money than it costs.
3. Take an overall look at the measures that you have in place taking account of your specific situation and balancing the areas where you do not follow the guidance in the AN with additional steps that you take that are not mentioned in the AN.
4. Formulate an improvement plan and put it into action.

2.2 Definitions

iESM uses the term “*maintenance*” to describe all of the activities that need to be carried out to keep a system fit for service so that equipment (sub-systems, components and their parts) continue to be safe and reliable throughout the operational life cycle phase and in a “state of good repair”¹. This means activities such as:

- preventative maintenance, inspection and testing;
- fault finding and repair;
- component replacement; and
- like-for-like renewal.

Maintenance is one of the key parts of what is often called “*Asset Management*”. This is defined in ISO 55000 [ISO], which extends consideration beyond physical assets to all types of financial and organization equipment, as:

“Co-ordinated activity of an organization to realize value from equipment.”

A more detailed definition of asset management was used in PAS 55 [PAS]:

“systematic and coordinated activities and practices through which an organization optimally and sustainably manages its equipment and asset systems, their associated performance, risks and expenditures over their lifecycles for the purpose of achieving its organizational strategic plan.”

iESM also covers planning and record keeping for maintenance, including:

- planning and recording the way maintenance will be done for new and changed equipment; and
- planning and recording changes to existing maintenance activities.

¹ As described in the US Moving Ahead for Progress legislation.

3 SAFETY PLANNING FOR MAINTENANCE

3.1 Defining your work

Your organization must define the extent and context of any activity that it performs which affects safety-related systems or products [iESM].

The organization shall establish, document and maintain asset management plan(s) to ensure that its asset management system can be adequately understood, communicated and operated, clause 4.4.5 [PAS], clause 2.5.2.3.4 [ISO].

- | | | | |
|-----------|---|---------------------------------|--------------------------------|
| A. | If you are maintaining a defined part of the railway, do you have an Asset Register? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| B. | If you are maintaining a part of the railway for someone else, do you agree the Asset Register with them? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| C. | Do you understand and record the context in which your maintenance will be done and any assumptions that could affect how you will do it? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| D. | If you are maintaining a part of the railway for someone else, have you found out how they will approve your safety plans and what work your organization can approve? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| E. | Where your work interfaces with other parts of the railway, other infrastructure or organizations, do you consider what work they do when you identify hazards and assess risk? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

3.2 Determining safety obligations, targets and objectives

Your organization must establish the obligations that are relevant to the safety of its systems or products [iESM].

Your organization must define objectives and targets for safety that are consistent with its obligations [iESM].

The organization shall establish, document and maintain processes and/or procedures for identifying and accessing the legal, regulatory, statutory and other applicable asset management requirements, clause 4.4.8 [PAS], clauses 2.1, 2.2 [ISO].

The organization shall establish, document and maintain processes and/or procedures for evaluation of its compliance with applicable legal and other regulatory or absolute requirements, clause 4.6.3 [PAS], clause 2.5.2.4 [ISO].

- | | | | |
|-----------|--|---------------------------------|--------------------------------|
| A. | Do you communicate your top-level safety plans so that people understand what they have to achieve? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| B. | Do you publish a yearly strategic plan that lists all of the safety and performance targets and identifies who is responsible for achieving each target? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| C. | Do you plan how you are going to do your work to meet the safety and performance targets that you have set or been given? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| D. | If you are maintaining a part of the railway for someone else, do you understand how those safety and performance targets apply to you. | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

3.3 Safety Planning

Your organization must plan out a program of ESM activities that will deliver the safety objectives and targets [iESM].

Your organization must carry out activities that affect safety by following systematic processes that use recognized good practice. Your organization must write these processes down beforehand and review them regularly [iESM].

The organization shall establish, document and maintain asset management plan(s) to achieve the asset management strategy and deliver the asset management objectives across the lifecycle, clause 4.3.3 [PAS], clause 2.4.4.3 [ISO].

A.	If you are planning to make a significant change to the equipment or its configuration, do you refer to iESM Volume 2 for Projects?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
B.	Does your maintenance planning allow for the possibility of significant changes, for example an ability to respond to an imminent environmental effect?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
C.	Do your maintenance plans make sure that standby and protection systems are fit for service as well as operational systems?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
D.	Do your maintenance plans identify areas where you depend on others to do your work or where others depend on you?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
E.	Do you develop a top-level plan that describes how you will fulfil your organizational goals and comply with legislation?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
F.	Do you plan to collect information about safety and performance and select types and sources of information that help you to develop new targets for parts of the railway, personnel, passengers and neighbours?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
G.	Do you plan: <ul style="list-style-type: none"> • what information you are going to collect to understand the risks you are responsible for controlling? • how you are going to collect and report it? • where you are going to collect it from? • when you are going to collect it and how often? • who will be responsible for collecting it, who will review it and who will decide whether something needs to be changed? • with what mechanism are you going to use to collect and record the information? 	Yes <input type="checkbox"/>	No <input type="checkbox"/>
H.	When collecting information, do you understand how accurate it is / needs to be and how representative it is of the situation you are investigating?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I.	Do you review your safety and performance targets on a regular basis (see Section 3.2 b))?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
J.	Do you plan to monitor the progress of your work against your plans and key safety performance indicators?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
K.	Do you plan how you are going to develop the control measures that your maintenance work will implement?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

L.	Do you have a plan to deal with unforeseen circumstances, including safety incidents?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
M.	Do your maintenance specifications describe the maintenance work that needs to be done to each equipment type and the periodicity with which it should be applied?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
N.	Do you plan to regularly test (or otherwise confirm) the correct operation of all safety functions?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
O.	Do you take account of the assumptions made in safety cases and manufacturers' documents within your maintenance plans?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
P.	Do your maintenance specifications include information about safety tolerances?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Q.	Where access constraints mean that limited time is available to maintain particular equipment, do you identify priority tasks such as safety-critical tests, so that they will be completed first?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
R.	Where it is not appropriate to prescribe the way work is done, do you look for, and publish, good practice?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
S.	Do you supplement your maintenance specifications with method statements that describe how the work will be done, the resources that you are going to use, staff competence and the measures that are necessary to ensure safety at the interfaces?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
T.	Do you communicate your method statements to personnel who do maintenance work in a way that meets their needs?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
U.	Do you make up-to-date method statements available for reference at the workplace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
V.	Do you use a standard structure / template for method statements?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
W.	Do you plan how you are going to collect safety and performance information so that you can decide whether your work is doing enough to control risk, changing the way you specify and program your maintenance work if necessary?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
X.	Do you develop a maintenance program that makes sure that your maintenance plans can be implemented effectively?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Y.	Does your maintenance program identify when each equipment is to be maintained and what needs to be done?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Z.	Do you include some flexibility to allow time for additional work / failure response, whilst not exceeding maximum maintenance periodicities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
AA.	Do you allocate your competent personnel to a wide range of tasks so that they develop and retain a broad range of competence and an ability to work with a variety of equipment types?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
BB.	Do you frequently review and update your maintenance programs so that they reflect the status of work?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

CC.	If your planned work cannot be completed on time, do you adjust and re-issue your maintenance programs to reallocate your resources to tasks with a high priority?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
DD.	Do you make clear what planning responsibilities people have for all levels and types of plans and give them the planning resources they need?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
EE.	Do you give responsibility for planning to the people who have responsibility for implementing your plans?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
FF.	Are your planners competent, for example, do they understand the maintenance work that needs to be done and do they have information about the constraints that could affect the way it can be done?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
GG.	Do you make sure that planners have information about the railway and other work that could impact on maintenance work delivery?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
HH.	Do you have a planning procedure to provide consistency in process and output?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
II.	Do you communicate your plans so that people understand what maintenance work they have to do?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
JJ.	Do you manage your maintenance programs using an IT system, which will allow individual jobs to be allocated to work teams and enable maintenance reports to be entered to monitor progress of work against the program?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
KK.	Does the information contained in the plans meet the needs of those who have to do the work including the environment in which it will be used?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
LL.	Do you decide how you are going to manage changes to your plans to reflect changes to the railway, technology and changing work priorities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
MM.	Whenever you change your plans, do you re-issue them and communicate the changes to all those who need to know?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
NN.	Do you plan to check that safety of the railway, safety of personnel and safety of passengers and neighbours is being properly addressed by the maintenance work, covering both: <ul style="list-style-type: none"> • Supervision of personnel doing work? • Inspection of work done? 	Yes <input type="checkbox"/>	No <input type="checkbox"/>
OO.	When you have decided how you are going to check the safety of your maintenance work, do you build the capability into your organization?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
PP.	If safety could be affected elsewhere, do you tell others about it so that risk can be reduced?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
QQ.	Do you plan your supervision to make sure that the full range of personnel are observed working within their range of tasks over a certain period of time?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
RR.	Does the extent and frequency of supervision reflect the experience of your personnel and the risk associated with different types of work?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

- | | | | |
|-------------|--|---------------------------------|--------------------------------|
| SS. | Do you retain some flexibility in your plan so that supervision can be timed to coincide with significant work activities? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| TT. | Do you plan your equipment inspections to make sure that equipment populations are sampled to take into account a range of locations, ages, conditions and usage? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| UU. | Do you give higher priority to equipment that has a higher safety risk associated with it? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| VV. | Do you visit equipment at different times in the maintenance cycle to understand the effectiveness of your maintenance? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| WW. | Do you seek out and use good maintenance practices? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| XX. | If you do choose to use a new technology, do you consider all of the hazards that it introduces, as well as the existing hazards that it mitigates? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| YY. | Whenever you decide to change the way you maintain a part of the railway, do you make sure that what you are going to do will comply with railway standards and legislation? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| ZZ. | Do you make sure that you do not change the way you do things if it could reduce safety? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| AAA. | Does your planning take into account the results of the analysis of safety, failure and performance data collected in your Data Reporting And Corrective Action System (DRACAS)? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

4 RISK ANALYSIS FOR MAINTENANCE

4.1 Identifying hazards and assessing risk

Your organization must make a systematic and vigorous attempt to identify all possible hazards related to its systems or products [iESM].

Your organization must assess the effect of its work on the overall risk on the railway [iESM].

The organization shall establish, implement and maintain documented process(es) or procedure(s) for the ongoing identification and assessment of asset-related and asset management-related risks and the identification and implementation of necessary control measures throughout the life cycles of the assets, clause 4.4.7 [PAS], clause 2.5.3.3 [ISO].

- | | | | |
|-----------|---|---------------------------------|--------------------------------|
| A. | Do you do your best to predict and identify all of the hazards associated with the parts of the railway that you are responsible for? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| B. | Do you have an up-to-date Risk Register or Hazard Log and set of Safety-related Applications Conditions? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| C. | Do you identify hazards that may exist: <ul style="list-style-type: none"> • within the equipment that makes up part of the railway (for instance failure modes)? • as a result of the way equipment is used? • as a result of the way equipment connects to other parts of the railway? • at the place the equipment is located (for example within a confined space or adjacent to exposed electrical conductors, in locations that may be subject natural phenomenon such as to flooding, bush fire, or seismic activity etc.)? • as a result of the way the part of the railway is maintained? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| D. | Do you keep looking for new situations that are not addressed by your existing maintenance plans and programs? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| E. | When you find such a situation, do you identify all the hazards that arise from the change of use and the risk level associated with each hazard? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| F. | Before you identify hazards, do you decide what information you need and gather it from dependable sources? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| G. | Do you gather information about: <ul style="list-style-type: none"> • how the part of the railway works / what it is supposed to do? • how it is going to be used? • how long is it going to be used (i.e. is it temporary or permanent)? • where it is going to be used? • possible failure modes? • how other parts of the railway affect it when they operate normally and when they fail? • how it will affect other parts of the railway when it operates normally and when it fails? • how it has to be maintained? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| H. | Do you identify additional hazards that arise from doing maintenance? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

- | | | | |
|-----------|--|--------------------------|--------------------------|
| I. | Do you understand: | Yes | No |
| | • the hazards that affect your maintenance personnel? | <input type="checkbox"/> | <input type="checkbox"/> |
| | • the hazards that affect other parts of the railway, including railway operations? | <input type="checkbox"/> | <input type="checkbox"/> |
| J. | Do you record the assumptions on which the hazards are based so that you can reassess risk as part of a future risk review? | Yes | No |
| | | <input type="checkbox"/> | <input type="checkbox"/> |
| K. | If hazards associated with part of the railway have already been identified as part of a project, do you make sure that you know what they are before accepting safety responsibility for the equipment? | Yes | No |
| | | <input type="checkbox"/> | <input type="checkbox"/> |
| L. | Do you assess the risk that arises from each hazard? | Yes | No |
| | | <input type="checkbox"/> | <input type="checkbox"/> |
| M. | Do you consider the impact on relevant stakeholders? | Yes | No |
| | | <input type="checkbox"/> | <input type="checkbox"/> |

5 RISK CONTROL FOR MAINTENANCE

5.1 Reducing risk

Your organization must evaluate the risk associated with each of its systems or products against the criteria for safety that it is obliged to use. If the risk associated with a system or product cannot be reduced to an acceptable level, then it must be abandoned [iESM].

Your organization must design its systems or products to meet its safety requirements and all control measures must be implemented [iESM].

The organization shall establish, implement and maintain documented process(es) or procedure(s) for the ongoing identification and assessment of asset-related and asset management-related risks and the identification and implementation of necessary control measures throughout the life cycles of the assets, clause 4.4.7 [PAS], clause 2.5.3.3 [ISO].

- | | | | |
|-----------|---|---------------------------------|--------------------------------|
| A. | When you have collected risk data, do you initiate the maintenance work you need to do to control risk in a timely fashion? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| B. | Do you take action to correct safety problems that you find during maintenance to restore optimum functionality? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| C. | When you decide that you need to do something to control a hazard, do you identify all of the hazards that arise from doing the work and control them as well? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| D. | Are you minimising the number of failures that occur? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| E. | Do you look for hidden failures (ones that do not reveal themselves as soon as they occur)? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| F. | When equipment fails, do you make sure that you collect enough information about the circumstances of the failure so that you can identify the cause? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| G. | When you decide what needs to be repaired, do you consider both the equipment that has failed and other parts of the railway that could have contributed to the failure? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| H. | Do you classify failures based on the risk arising? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| I. | Do you apply a hazard rating to failures to reflect the context of the failure? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| J. | When you repair equipment, do you restore the defective components to working order within the safety tolerances that apply? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| K. | Before you return equipment to service, do you make sure that it safely performs the function for which it is intended? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| L. | If you have to make a temporary repair, do you look for additional risk which might arise and decide whether you need to make any changes to your maintenance program or impose restrictions in order to control that risk? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

- | | | | |
|-----------|--|---------------------------------|--------------------------------|
| M. | If you have to make a temporary repair, do you make sure that a permanent repair is completed or arrange for a permanent change to ensure safety? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| N. | Do you have a log or register of temporary repairs? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| O. | Do you plan your work to reduce risk exposure to staff to an acceptable level? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| P. | Where safety incidents occur, do you collect enough information about the circumstances so that you can identify the root and contributing causes? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| Q. | Do you review the way you manage safety and performance after an incident / whenever a significant change takes place that could affect the work that you are responsible for? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| R. | Do you encourage your staff and your suppliers to report all safety incidents / near misses that occur? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| S. | Do you carry out workplace risk assessments and review them regularly and whenever circumstances or conditions change? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

5.2 Safety requirements

Your organization must set safety requirements which are sufficient to meet its safety obligations and targets [iESM].

- | | | | |
|-----------|--|---------------------------------|--------------------------------|
| A. | Do you define what is acceptable in terms of condition, measurement and test values so that you can decide whether the equipment for which you are responsible are safe when maintained and will remain safe until the next maintenance takes place? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| B. | Do your maintenance specifications clearly describe the safety requirements for each piece of equipment that you maintain and include information about the absolute safety tolerances that equipment is designed to operate safely within and also the preferred safety tolerances to ensure performance? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| C. | Do you set tolerances for your maintenance periodicities so that you can build some flexibility into your planning and anticipate a degree of late maintenance visits, without incurring additional risk? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| D. | Do you determine absolute safety limits for each component and use them to decide how much tolerance you should build in to your maintenance specifications to allow for system degradation between each maintenance visit? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| E. | Prior to taking on responsibility for maintaining new equipment, do you find out where any safety limits are defined? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| F. | Do you apply risk based maintenance techniques to help you decide what to do and when to do it? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| G. | If so, is the maintenance that you do and the frequency that you do it related to wear, predicted failure rates (where applicable), and the age of the equipment? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| H. | If you decide to set a single maintenance specification and maintenance periodicity for each different equipment type, do you make sure that the worst-case degradation is taken into account? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

5.3 Evidence of safety

Your organization must demonstrate that risk has been controlled to an acceptable level. Your organization must support this demonstration with objective evidence, including evidence that all safety requirements have been met [iESM].

- | | | | |
|-----------|---|---------------------------------|--------------------------------|
| A. | Is someone responsible for looking for evidence of safety with respect to maintenance activities and equipment performance? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| B. | Does the evidence that you gather give a true representation of the current state of the safety of the equipment, its maintenance and the associated railway? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| C. | If you have to produce any evidence of safety, do you consider all of the iESM Principles and Processes and guidance in AN6 to help you to put it together? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

5.4 Acceptance and approval

Your organization must obtain all necessary approvals before placing a system or product into service [iESM].

Where existing arrangements are revised or new arrangements are introduced that could have an impact on asset management activities, the organization shall assess the associated risks before the arrangements are implemented, clause 4.4.9 [PAS], clause 2.4.5.2 [ISO].

A.	If you are already maintaining a part of the railway, do you understand what approvals you need in order to do so?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
B.	If you are already maintaining a part of the railway, do you understand what approvals you already have?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
C.	If you find that you are doing something that is not approved, do you compare what you are doing with the standards that tell you what you should be doing?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
D.	If so and if you find a difference, do you either change what you do to comply with the standard or look for approval to continue what you are doing?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
E.	Before you start your maintenance work or implement a change, do you check that you have all the necessary approvals?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
F.	Do you look for standards that tell you which approvals you need?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
G.	Do you obtain approvals for: <ul style="list-style-type: none"> • your maintenance plans; maintenance specifications and method statements? • your maintenance programs? • your organization structure (including any division of responsibilities for safety management and associated competencies)? 	Yes <input type="checkbox"/>	No <input type="checkbox"/>
H.	Do you understand who is responsible for approving the work that you do?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I.	If your organization approves some types of its own work, do you give someone the responsibility and authority necessary to do this and make sure that the maintenance program is capable of fulfilling the maintenance plans and addresses all of the required equipment?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
J.	If your organization approves some types of its own work, is that approval done by a person or group sufficiently independent from the work being approved?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
K.	Where you cannot meet the requirements set down in a standard, do you apply for a non-compliance or derogation supported by evidence to show that you have alternative measures in place to manage risk to a low enough level?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
L.	Do you check that necessary non-compliances and derogations are approved before you go ahead with the affected work?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

5.5 Monitoring risk

Your organization must take all reasonable steps to monitor and improve the management of risk. Your organization must identify, collect and analyze data that could be used to improve the management of risk, as long as it has responsibilities for safety [iESM].

Your organization must take action where new information shows that this is necessary [iESM].

The organization shall establish, implement and maintain process(es) and/or procedure(s) to monitor and measure the performance of the asset management system and the performance and/or the condition of the assets and/or asset systems, clause 4.6.1 [PAS], clause 2.5.2.4 [ISO].

The organization shall establish, document and maintain processes and/or procedures for the handling of failures incidents and non-conformities associated with assets, asset systems and the asset management system, clause 4.6.2 [PAS], clause 2.5.2.4 [ISO].

The organization shall establish, document and maintain processes and/or procedures for investigating corrective actions for eliminating the causes of poor performance and preventive actions to avoid it occurring, clause 4.6.5 [PAS], clause 2.5.2.4 [ISO].

Top management shall review at intervals that it determines are appropriate the organization's asset management system to ensure its continued suitability, including asset management policy, asset management strategy and asset management objectives, clause 4.7 [PAS], clause 2.5.2.4 [ISO].

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|-----------|--|---------------------------------|--------------------------------|
| A. | Have you decided and written down what things you need to monitor? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| B. | Do you change the way you monitor these things and change what you monitor as parts of the railway change? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| C. | Do you decide which other parts of the railway you need to monitor for changes as well? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| D. | Are the types of monitoring that you do and the parts of the railway that you monitor appropriate to the risk that your maintenance is designed to control? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| E. | When you decide what you are going to monitor, do you consider risk to personnel, risk to the public and risk to parts of the railway? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| F. | When you have decided what you are going to monitor, do you make sure that you do it and communicate the information you gather to those who need it? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| G. | Do you take account of the condition of equipment? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| H. | Do you regularly test (or otherwise confirm) the correct operation of all safety functions? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| I. | Do you decide what data you are going to collect, how you are going to collect it and store it, and how you are going to analyse it to decide whether your maintenance work continues to control all of the risks? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

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|-----------|---|---------------------------------|--------------------------------|
| J. | Do you decide who is going to collect and analyse the data and check that they do it correctly? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| K. | Do you share data with other organizations and your suppliers where it is needed to monitor risk? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| L. | Do you decide how you are going to use the results of your analysis and who will decide whether to change your maintenance work or keep things as they are? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| M. | Do you also collect data so that you can check that the assumptions that you originally made are still valid? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| N. | Do you pro-actively review your safety record against your safety targets on a regular basis? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| O. | Do you review your safety record and Risk Register or Hazard Log when you receive information about an incident to look for any additional safety measures that might improve safety further? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| P. | Do you used the data you collect to develop and report against key safety and performance indicators? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| Q. | Do you use key safety and performance indicators (both leading and lagging) as part of the way you review your work and communicate how well you are doing to your personnel, your suppliers, your customers to your senior management, and regulatory authority? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| R. | Do you continue to review the way you maintain the railway to make sure that it is still good practice and that changes to parts of the railway have not reduced safety? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

6 TECHNICAL SUPPORT OR MAINTENANCE

6.1 Hazard Management

Your organization must keep a record of all hazards identified, the analysis of these hazards, the implementation of measures to put in place to control these hazards, and the validation of such measures in order to confirm that the risk associated with each hazard is, and remains, at an acceptable level [iESM].

- | | | | |
|-----------|---|---------------------------------|--------------------------------|
| A. | Do you record all of the hazards so that they can be reviewed in the future, for example using a Risk Register or Hazard Log? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| B. | Do you update the Hazard Log whenever: <ul style="list-style-type: none"> • a relevant hazard or potential accident is identified? • a relevant incident occurs? • further information relating to existing hazards, incidents or accidents comes to attention? • safety-related documentation is created or re-issued? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| C. | Is there a written process for updating the Hazard Log, including identified staff with authority to make and approve entries? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| D. | Is adequate provision made for security and back-up of the Hazard Log and other safety records? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| E. | Do you consider the data gathered in Section 5.5 above to check assumptions within the Hazard Log? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

6.2 Independent assessment

Your organization must ensure that engineering safety management activities are reviewed by competent people who are not involved with the activities concerned [iESM].

The organization shall ensure that audits of the assessment management system are conducted, clause 4.6.4 [PAS], clause 2.5.2.4 [ISO].

A.	Do you plan a hierarchy of independent assessment activities to make sure that all of your maintenance plans and the way they are implemented and reviewed are achieving the required level of safety?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
B.	Do you include your suppliers in your safety audit hierarchy?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
C.	Are the type, frequency and extent of the independent assessment activities that you carry out proportionate to the risks you are managing?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
D.	Do you include a level of independence within these activities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
E.	Are the people you use sufficiently competent, familiar with the risk being managed and have the authority to recommend changes where they are required?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
F.	Do they understand the risks that are being controlled and are they competent to decide whether your maintenance is sufficiently controlling them?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
G.	Do you ensure consistency by using checklists?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
H.	If so, do you develop these so that they prompt the checker to ask questions around adequacy of process and meeting requirements rather than just prescribing what should be checked?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I.	Are all findings formally recorded?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
J.	If you find a safety or compliance problem, do you issue a written instruction to the person responsible for putting it right, specifying the actions that you need to put into place to fulfil immediate, short-term and longer-term safety plans?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
K.	Do you communicate the results of independent assessment activities to people responsible for work planning and implementation so that they can take decisions about whether things need to be changed elsewhere?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
L.	Do you change the scope and frequency of independent assessment activities to reflect what you find or changes in your responsibilities/activities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
M.	Do you use the findings of independent assessment activities as input to the activities which you carry out in order to implement the “Monitoring Risk” fundamental?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

6.3 Configuration management and records

Your organization must put in place configuration management arrangements that cover everything that is needed to achieve safety or to demonstrate it [iESM].

Full and auditable records of all activities that affect safety must be kept [iESM].

The organization shall identify the asset management information it requires, considering all phases of the asset lifecycle, clause 4.4.6 [PAS], clause 2.5.2.3.4 [ISO].

The organization shall establish and maintain records as necessary to demonstrate conformance to its asset management system and this standard, clause 4.6.6 [PAS], clause 2.5.2.3.4 [ISO].

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|-----------|--|---------------------------------|--------------------------------|
| A. | Do you store up-to-date configuration information so that it is easily retrievable? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| B. | Do you have a pro-active, systematic configuration management system? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| C. | Is the type of information and the amount of detail that you keep sufficient for the safety decisions you have to take and for the length of time that you have to respond to situations that arise? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| D. | Do you have up-to-date information about how the part of the railway that you maintain is configured? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| E. | Do you keep information about the way components and systems connect with each other to ensure safety? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| F. | Do you record the modification status of components, where compatibility with other parts of the railway is required to ensure safety? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| G. | Do you keep information about adjustments and settings where they can affect other parts of the railway? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| H. | Do you understand: <ul style="list-style-type: none"> • asset types? • modification states (for example; software versions, hydraulic valves, relay units)? • the location and population of equipment? • the status of temporary alterations and adjustments? • the service duty and condition of strategic equipment? • how each equipment is used, particularly where the number of operations is related to an equipment maintenance, servicing or replacement regime? • the configuration status of spare parts to make sure that when they are used, they are the correct type and modification state? • the availability, location, and shelf life of spare parts (including strategic spares managed by your suppliers)? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| I. | Where the risk associated with connecting incompatible components is too high, do you do something to prevent this from happening? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

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|-----------|---|---------------------------------|--------------------------------|
| J. | Do you check that the modification status of components is clearly identifiable? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| K. | Do you make sure that technical records are up-to-date and available to personnel who need to use them? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| L. | Do you make sure that your maintenance documentation is controlled and distributed so that your personnel have the correct, up-to-date version? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| M. | If so, do you use an IT tool to help you to manage this? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| N. | Do you give someone responsibility for managing the controlled distribution of documents and technical information? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| O. | Do you keep information about what documents are current, their version and the locations to which they are issued? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| P. | Do you maintain a master (source document) so that changes to documents can be safely controlled? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| Q. | Before you take a safety decision about the railway that requires information from technical records, do you check that the records you are going to use are up-to-date and the correct version? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| R. | Do you keep records of: <ul style="list-style-type: none"> • the risks you have to control? • equipment operations? • Incidents, failures and allegations? • your maintenance organization? • your maintenance process, including the types of maintenance you are going to do? • the maintenance work that you have done? • the resources you have used? • the decisions that you take about maintenance and the justification for the decisions (for instance decisions to defer maintenance or repairs)? • your communications? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| S. | Are your records clear, simple and appropriate to the decisions that may be required in the future? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| T. | Do you know what you are going to do with the records? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| U. | Do you avoid keeping records that are not needed? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| V. | Do you review records to decide whether risk is being controlled to a low enough level? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| W. | Do you record the decisions you take and the basis on which they were taken? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

- | | | | |
|------------|--|--------------------------|--------------------------|
| X. | Do you keep records: | Yes | No |
| | <ul style="list-style-type: none"> • about the way you have set up your organization, particularly the scope and allocation of safety responsibilities, your organizational goals, your safety culture and your competence? • about your suppliers? • of all the hazards that your maintenance work is designed to mitigate? • of decisions about what maintenance you are going to do, (Note: you should keep a record of the decision, traceable to the risk that your maintenance is designed to control)? • of safety-related communications? • of equipment operations? • of safety-related incidents and near misses? • of what you have done? • of what resources you have used? | <input type="checkbox"/> | <input type="checkbox"/> |
| Y. | Do you make sure that records are available at the locations and in a format so that those who need to use or communicate information about them can do so? | Yes | No |
| | | <input type="checkbox"/> | <input type="checkbox"/> |
| Z. | If people working on equipment need to refer to records, do you make sure that the records are available at the place that the work is being done? | Yes | No |
| | | <input type="checkbox"/> | <input type="checkbox"/> |
| AA. | Do you protect records against loss? | Yes | No |
| | | <input type="checkbox"/> | <input type="checkbox"/> |

7 TEAM SUPPORT FOR MAINTENANCE

7.1 Safety responsibility and authority

Your organization must identify and write down safety responsibilities for its staff [iESM].

Your organization must give people who have safety responsibilities sufficient resources and authority to carry out their responsibilities [iESM].

Your organization must give people who have safety responsibilities sufficient resources and authority to carry out their responsibilities [iESM].

The organization shall establish and maintain an organizational structure of roles, responsibilities and authorities consistent with the achievement of its asset management policy, strategy, objectives and plans, clause 4.4.1 [PAS], clauses 2.5.2.2, 2.5.4 [ISO].

A.	Does your organization set out what responsibilities it has for safety, including:	Yes	No
	<ul style="list-style-type: none"> • the parts of the railway it has to maintain? • the maintenance work it will do? • the people whose actions it is responsible for? • the people whose safety it is responsible for? 	<input type="checkbox"/>	<input type="checkbox"/>
B.	Do you agree responsibilities with any other organization that the work will involve?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
C.	Are you clear how the work that you do interfaces with work done by other organizations?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
D.	Do you understand the relationship between the safety of the parts of the railway that you maintain and the overall safety of the railway?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
E.	Does everyone within your organization that is given safety responsibility clearly understand the extent of that safety responsibility?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
F.	Has someone been given and accepted responsibility for managing the safety of each part of the railway?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
G.	Do you match resources and authorities to the safety responsibilities that each person has?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
H.	Do you have contingency plans which make sure that safety continues to be managed when safety-critical staff and support staff are not available?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
I.	Is someone responsible for collecting and managing up-to-date information about how each part of the railway that you maintain is built, how it is maintained, how safe and reliable it is, how it was designed and why it was designed that way?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
J.	Do you find out and record how the part of the railway that you are responsible for interfaces with passengers, neighbours, the rest of the railway and the work done by other organizations?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>

K.	Do you record the railway system boundaries that describe the limits of your maintenance responsibility?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
L.	Do you record the physical boundaries of your work activities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
M.	Where the part of the railway or the work you do has a boundary with another part of the railway or organization, if there could be any doubt about where safety responsibilities begin and end, do you agree in writing where the boundary is?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
N.	Do you write down the safety responsibilities that each person has?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
O.	Do you make sure that personnel are formally advised of their responsibilities and understand what they must do, particularly whenever there is a change in safety responsibility?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
P.	Do you demonstrate a top-level commitment to deliver safety?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Q.	Do you provide organizational leadership by communicating your safety policy throughout your organization and motivate your personnel to follow it in full?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
R.	Do you identify what legislation applies to your organization and set your goals to make sure you will comply?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
S.	Do you set targets to manage safety and provide the necessary resources to meet those targets?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
T.	Do you set targets to reduce the number of failures that occur?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
U.	Do you set targets for responding to failures?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
V.	Do you set targets for reducing staff safety incidents and near misses (or near hits)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
W.	Do you have the correct attributes (such as structure, management systems, tools, facilities, equipment, staff motivation and competence) to achieve your targets?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

7.2 Safety culture

Your organization must make sure that all staff understand and respect the risk related to their activities and their responsibilities, and work effectively with each other and with others to control it [iESM].

General guidance on safety culture is contained within iESM Guidance, Volume 2 for Projects, Chapter 20. Your safety culture should be promoted throughout your organization and led from the top so that it is felt and observed throughout your organization.

- | | | | |
|-----------|--|---------------------------------|--------------------------------|
| A. | Do you promote your safety culture throughout your organization so that it is felt and observed throughout your organization? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| B. | Do you promote a culture of: | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| | <ul style="list-style-type: none"> • 'compliance' with standards and procedures? • 'right first time'? • 'not accepting poor standards of work'? • 'understanding' risks and safety objectives? • 'reporting' incidents and near misses to improve the safety of work and overall safety of the railway? • 'sharing information' so that your maintenance staff become the eyes and ears necessary to detect things that are wrong? • 'action' and 'just culture' where something is found to be wrong? | | |
| C. | Do you put measures in place that minimise the potential for complacency? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

7.3 Competence and training

Your organization must make sure that all staff who are responsible for activities that affect safety are competent to carry them out [iESM].

Your organization must monitor the performance of all staff who are responsible for activities that affect safety in order to ensure that they carry out their responsibilities competently [iESM].

The organization shall ensure that any person(s) under its direct control undertaking asset management related activities has an appropriate level of competence in terms or education, training or experience clause 4.4.3 [PAS], clause 2.5.2.3.2 [ISO].

- | | | | |
|-----------|---|---------------------------------|--------------------------------|
| A. | Have you determined and documented the basic abilities needed by staff to satisfactorily do their job? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| B. | Do you select people who have the basic abilities to do the job? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| C. | Do you continue to develop people's competence through their careers using education, training, mentoring and workplace experience? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

D.	When considering whether a person is competent, do you consider:	Yes	No
	<ul style="list-style-type: none"> • technical skills, knowledge and experience? • leadership and managerial skills (if relevant)? • attitude and integrity? • fitness? • confidence? 	<input type="checkbox"/>	<input type="checkbox"/>
E.	Do you take into account a person's ability to work under pressure, particularly where they will be expected to respond to incidents or failures that affect train running?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
F.	Do you make sure that the overall capability of your maintenance teams includes the right balance of technical abilities and leadership qualities and that team members understand and can use the information and resources they need?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
G.	When deciding on the number and location of your personnel, do you take into account the need to respond to unforeseen events and the location of the equipment that they are responsible for?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
H.	Do you formally assess personnel to verify that they are competent and then give them authority to work?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
I.	Do your scope and methods of assessment consider:	Yes	No
	<ul style="list-style-type: none"> • the maintenance processes that need to be followed? • the systems, components and equipment that they need to work with? • the underpinning knowledge needed to take decisions? • the attitude and experience of the person being assessed? • the required working environment (including situations that they may face)? • the activities that they are required to do, including use of tools, materials and test equipment? • The required knowledge of railway operations commensurate with maintaining a safe and reliable railway? 	<input type="checkbox"/>	<input type="checkbox"/>
J.	Do you fully understand the job profile and health requirements for jobs and then screen people for pre-existing conditions as part of the selection process?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
K.	Do you assess people by observing them doing the required work, either at the workplace or by setting simulated exercises?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
L.	When you assess people who have to take safety decisions, do you look for evidence that they have the breadth and depth of competence necessary to take correct decisions in a timely manner?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
M.	Do you look for good practice assessment techniques that are used elsewhere in the industry (or similar industries)?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
N.	Do you check that people's competence continues to match the requirements of their job?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
O.	Do you regularly review competence records and work allocation to make sure that an authority to work does not lapse through certification expiry or lack of application?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
P.	Do you continue to monitor the integrity of work that is done, look for any lapses in competence and implement remedial work where lapses may have introduced a safety risk?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>

- | | | | |
|-----------|---|---------------------------------|--------------------------------|
| Q. | Do you keep records, regularly review competencies, work requirements and standards, and then decide whether any additional training is required? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| R. | Where you identify training needs, do you make sure that the training is provided to all those who need it? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| S. | Where training is provided, do you assess the trainee's increased level of competence, and the suitability of the training delivered? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| T. | When you authorise people to do work, do you also give them responsibilities for putting things right? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| U. | Are your people given sufficient resources to carry out their responsibilities? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

7.4 Working with suppliers

Whenever your organization contracts out the performance of activities that affect safety, it must confirm that the supplier is capable of doing the work, including any necessary aspects of engineering safety management [iESM].

Whenever your organization contracts out the performance of activities that affect safety, it must confirm that the supplier does what they are required to do [iESM].

Where an organization chooses to outsource any aspect of asset management that affect conformity with clause 4 [PAS], the organization shall ensure control over such aspects. The organization shall determine and document how these parts shall be controlled and integrated into the organization's asset management system, clause 4.4.2 [PAS], clause 2.5.4.3 [ISO].

A.	Do you assess your potential suppliers and the resources you obtain before you use them?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
B.	Where possible, do you use preferred accredited suppliers, who are regularly assessed against accepted railway industry supplier standards?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
C.	Do you work with your suppliers to improve safety and cover any safety gaps?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
D.	Do you make sure that each supplier is fully aware of the risks it is exposed to and accepts its safety responsibilities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
E.	If you do decide to use a supplier, do you make clear which safety responsibilities you are sharing and agree with it how you are going to work together to manage safety?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
F.	Do you make sure that your suppliers have processes in place that fulfil the safety, quality and performance standards that you require and deliver the things that you need from them?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
G.	Do you make sure that your suppliers know which records they have to keep and when they must be made available to you?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
H.	Do you agree methods of communication and procedures with suppliers to make sure that your requirements are both properly specified and understood?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I.	Do you monitor the safety and quality of work done by suppliers and implement the necessary measures where uncontrolled risk is found?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
J.	Do you inspect suppliers' products to check that the quality is maintained over time?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
K.	Where responsibility for work is to be shared with a supplier, do you agree your plans with them?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
L.	Do you make sure that your suppliers understand the division of responsibilities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

7.5 Communicating safety-related information

If your organization has information that someone else needs to control risk, your organization must pass it on to them and take reasonable steps to make sure that they understand it [iESM].

If someone tells you or your organization something that suggests that risk is too high, prompt and effective action must be taken [iESM].

The organization shall ensure that pertinent asset management information is effectively communicated to and from employees and other stakeholders, including contracted service providers, clause 4.4.4 [PAS], clauses 2.4.2, 2.5.2.3.2 [ISO].

A.	Do you make sure that everyone in your organization knows who to tell if they find out information that there is an unacceptable safety risk?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
B.	When you communicate information, do you make sure that the information has been correctly received and is understood by the recipient?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
C.	Where information about safety risk could have wider implications, do you have communication systems in place that allow you to pass the information to someone who has the authority to decide what action to take?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
D.	Are decisions taken by management communicated to those at the front line who have to implement the decision?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
E.	Do you communicate information throughout your organization to make sure that your standards and procedures are properly implemented, particularly when work requirements change?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
F.	Are decisions taken at the front line communicated to management?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
G.	Have you established communication systems that are capable of use in normal, degraded and emergency situations?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
H.	Do you co-ordinate the flow of safety-related and time-critical information using a dedicated reporting facility?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I.	If so, do you make sure that people have the contact details?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
J.	Are the resources you provide sufficient to manage and prioritise all of the information types that you need to deal with?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
K.	Do you identify and select best practice where it exists within the railway industry?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
L.	Do you implement anonymous or independent reporting facilities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
M.	If so, do you make sure that these are only used where appropriate?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
N.	If you are using written documents to communicate your requirements, do you make sure that all of your personnel have access to the correct, up-to-date version?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
O.	Do you make sure that the document hierarchy is clearly understood and that front line specifications and organizational policy documents are consistent with each other?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

- | | | | |
|-----------|---|---------------------------------|--------------------------------|
| P. | Do you use agreed technical vocabulary and standard English in verbal communications and avoid informal jargon or colloquialisms? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| Q. | Do you use a structured message notation for communicating safety information verbally? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| R. | Do message recipients repeat verbal messages back to the sender to confirm their understanding? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| S. | Do you record and store safety-related verbal messages using backed up information technology systems? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| T. | Do you make sure that processes are in place to maintain communication integrity (including coverage and back-up systems)? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| U. | Do you avoid sending out too much information? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| V. | Do you have a fall back method to maintain communication in the event of an IT failure? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

7.6 Co-ordinating safety-related information

Whenever your organization is working with others on activities that affect the railway they must co-ordinate their engineering safety management activities [iESM].

- | | | | |
|-----------|--|---------------------------------|--------------------------------|
| A. | Have you given someone responsibility for co-ordinating all of your plans? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| B. | Does the co-ordination role encompass all activities that affect your work, including co-ordinating: | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| | <ul style="list-style-type: none"> • access to the railway and equipment? • use of available resources (such as plant, personnel and materials)? • different types of maintenance work? • project work and maintenance work, including hand-over and hand-back? • maintenance work with railway operations? • maintenance work associated with unplanned and emergency situations? | | |
| C. | Where conflicts arise between different plans, do you look for solutions that ensure that additional risk is managed? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| D. | Do you plan work well in advance adjusting work programs to allocate available resources to critical items? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| E. | Where you are maintaining a range of equipment spread over a wide area do you co-ordinate your plans? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| F. | Do you co-operate with other organizations to agree and set down the arrangements for co-ordinating work by agreeing what needs to be done and planning together how it will be done safely? | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

8 GLOSSARY

This glossary defines the specialized terms and abbreviations used in this AN appendix.

8.1 Abbreviations

ESM	Engineering Safety Management
SMS	Safety Management System

8.2 Specialized terms

Engineering Safety Management (ESM)	<p>The activities involved in making a system or product safe and showing that it is safe.</p> <p>Note: despite the name, ESM is not performed by engineers alone and is applicable to changes that involve more than just engineering.</p>
human factors	The field of study and practice concerned with the human element of any system, the manner in which human performance is affected, and the way that humans affect the performance of systems.
hazard	A condition that could lead to an accident. A potential source of harm. A hazard should be referred to a system or product definition.
hazard log	<p>A document in which hazards identified, decisions made, solutions adopted and their implementation status are recorded or referenced.</p>
maintenance	All of the activities that need to be carried out to keep a system fit for service so that equipment (sub-systems, components and their parts) continue to be safe and reliable throughout the operational life cycle phase.
system	A set of elements which interact according to a design, where an element of a system can be another system, called a subsystem and may include hardware, software and human interaction.
system lifecycle	<p>A sequence of phases through which a system can be considered to pass.</p> <p>A product may also pass through some of these phases.</p>
systematic failure	A failure due to errors, which causes the product, system or process to fail deterministically under a particular combination of inputs or under particular environmental or application conditions.
triggering event	An event, outside the system or product of interest, which is required in order for a Hazard to result in an Accident.

9 REFERENCED DOCUMENTS

This section provides full references to the documents referred to in the body of this volume.

[ISO]	ISO 55000:2014 Asset Management Overview, Principles and Terminology
[iESM]	international Engineering Safety Management Guidance, Volume 1
[PAS]	Publicly Available Specification 55:2008 Publicly Available Specification for the optimal management of physical assets
[AN6]	iESM Application Note 6 Maintenance
[YB4]	Engineering Safety Management, issue 4, "Yellow Book 4", ISBN 978-0-9551435-2-6 Yellow Book 4 now has the status of a withdrawn document.

Note: This revision (Issue 1.1) of the Application Note has not modified any of the technical content present in the previous revision. Some of the standards referenced may have been revised. A full technical review is planned to be undertaken of this Application Note prior to its next revision.

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