RISSB Product Proposal (and Prioritisation)

(The information you provide in this form will be used to help stakeholders determine where this project sits within the railway's priorities.

The more thorough your submission, the better the decision-making process in prioritising new ideas.

Light blue italicised text is for guidance and can be deleted as the form is completed. Feel free to write more words, text boxes will expand as necessary.)

Primary information	
Type of product being suggested:	Guideline
Title of product being suggested:	Asset Management Systems Utilised for Condition Monitoring of Rail Infrastructure
Date of suggestion:	13/02/2019
Reason for suggestion:	There is currently a lot of interest on the subject from clients / Rail Transport Operators. However, there are not much details / guidelines on what, how, where and when this solution can be utilised to provide the most optimum rail infrastructure asset strategy to the clients.
Railway discipline area:	Rail infrastructure & rail systems only

Scope:

A guide to users on the possible benefits and system requirements for monitoring of rail infrastructure and rolling stock with the aim of improving asset utilisation.

The guideline should cover:

a. Scope and purpose of this product;
b. Definitions and Abbreviations used heavily in the rail / asset management context;
c. Develop requirements that is based on industry best asset management practices;
d. Referenced in service systems that has already been deployed successfully around the world;
e. Develop requirements that integrate condition monitoring into the Asset Management System;
f. Develop any process flow chart for smart asset management processes;
g. Above rail specific asset management practices;
h. Below rail specific asset management practices;
i. Reference to existing Standards / documentations / ISO55000 strongly related to Condition Monitoring and Asset Management Systems;
j. Description on what types of assets can best be managed with condition monitoring application;
k. Technological advances in Asset Management;

Out of scope for this document includes; Rolling stock assets as this will only cater for rail infrastructure assets only. The main reason to this is due to the size and differences in maintenance processes between these two main streams.

Objective:

The objective of this document is to allow Rail Transport Operator (RTO) contractors to be able to supply asset management systems that meets client requirements and understands the issues that the RTOs are facing such as reliability and maintenance issues of the rail assets.

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Through understanding these issues, potential contractors are able to develop condition monitoring systems that will be fit for purpose and tailored to suit the operators.

Condition monitoring systems are able to provide the client (RTOs) reliably identifying deterioration in asset performance. Instead of being reactive in fault fixing, the maintenance tasks (preventative) has enabled the reduction of a failure that could hinder train operations.

See Figure 1 for visualisation.

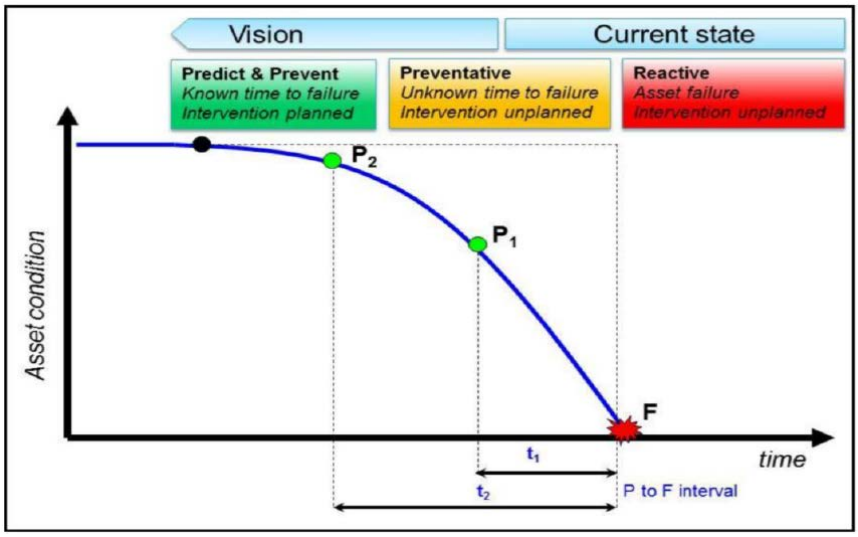

FIGURE 1: ASSET CONDITION VS TIME

Hazard identification: *(what safety hazards would the proposed document seek to address)*

1	Worker safety on trackside	6	
2	Asset failure which may result in an unsafe situation	7	
3	Unplanned works which may lead to an unforeseen incident	8	
4		9	
5		10	

Benefits: *(enter wherever applicable in below categories)*

Safety

By enabling remote condition monitoring system into the asset management strategy, safety risks could be significantly reduced. The benefits can be quantified as per below:

- Maintenance tasks can be adjusted to be more preventative rather than reactive. This arrangement would allow maintenance staffs to pre-plan their maintenance routine better. (eg; managing a potential fault during non-operational hours rather than fixing a known fault during peak hours). This means planned work is safer then unplanned work;
- Reduces the number of emergency site visits;
- Maintenance staffs are better informed regarding failure type / location;
- Future reductions in maintenance frequencies.

This strategy is known as “Predict and Prevent” maintenance.

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Interoperability[i] / harmonisation[ii]

By having a guideline, contractors would be able to develop Asset Management System (AMS) with built in condition monitoring system that is fit for purpose and can be deployed on rail infrastructure systems. One of the author's organisation has already adopted AMS with condition monitoring to maintain their rollingstock fleets in Sydney and will further deployed on the new rollingstocks and rail infrastructure / systems in Melbourne.

Financial

The AMS with condition monitoring capability will provide the following benefits from a financial point of view:

- Assets will be maintained on a "Right maintenance, right asset, right time" basis where labour and materials will be optimised on a needs basis;
- The reduction in maintenance frequencies and improve on right first time intervention will reduce the likelihood on operational train delays and as a result, reduction in any heafty fines by the government whilst meeting contractual obligations;
- Lifecycle cost will be fully optimised with the help of condition based renewal.

Environmental

(Describe how the product might contribute to protection of the natural environment.

Periodic maintenance will likely work well if we understood fully the assets condition which has the same number of usage per day, environmental condition it is in, external influences such as vandalism, interdependent asset condition; etc. However, no one asset condition is identical. Some assets may be used more often than the other, whilst the other asset may have been installed in a location with harsher environmental condition than another.

Even though they may present a very different condition, these assets are meant to be maintained periodically as per the manufacturer's recommended timeframe. By reducing and utilising condition monitoring systems, these asset lifecycle could be prolonged. As a result, fewer replacements of parts and materials will be realised and subsequently reducing negative footprint to the environment.

Impacts:

The main constraints would be the following:

a. A single guide covering rail infrastructure and rolling stock assets maybe to large/variable.
b. The Development Group would require those with technical knowledge of both the current operating environment and potential of any future systems & technologies.
c. The guide is to prescriptive potentially slowing future innovation in this field.

i ***Interoperability*** is the ability of a process, system or a product to work with other process, systems or products (aka compatible systems through managed interfaces).

ii ***Harmonisation*** - the act of bringing into agreement so as to work effectively together (aka uniformity of systems).

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Other items to aid RISSB project planning

(This information will help RISSB plan the project should it be successful at prioritisation.)

Structure:

The following will be how we would structure the product:

a. Scope and purposes of this product;
b. Definitions and Abbreviations used heavily in the rail / asset management context;
c. Develop requirements that is based on industry best asset management practices;
d. Develop requirements that integrate condition monitoring into the Asset Management System;
e. Include any flow processes that describes smart asset management approaches;
f. Above rail specific asset management practices;
g. Below rail specific asset management practices;
h. Description on what types of assets can best be managed with condition monitoring application;
i. Referenced in service systems that has already been deployed successfully around the world;
j. Reference to existing Standards / documentations / ISO55000 strongly related to Condition Monitoring and Asset Management Systems;
k. Technological advances in Asset Management;

Reference / source materials: *(This is very important; it will directly impact the tone/style/flavour of the product. It will also have a big impact on the research we will ask our Author to undertake and therefore impact timescales/cost. Do this section carefully because addition of new material later could impact on those. It may also be important here to stipulate reference / source materials that the SC would like to avoid.)*

#	Reference / source material	Available from
1	AS/NZS ISO 17359 Condition Monitoring and Diagnostics of Machines – General Guidelines	Standards Australia
2	IET International Conference on Railway Condition Monitoring	IEEE Xplore Library
3	ISO55000 Asset Management Standards	Standards Australia
4	Failure reporting and FRACAS	RTOs
5	PAS55	Standards Australia
6		
7		
8		
9		
10		

Assumptions:

a. There will be sufficient and the right resources / SME utilised to undertake this tasks;
b. Any reference materials can be provided by suppliers and be provided in a timely manner;
c. Will require contribution from RTOs to enable better fit for purpose solution;
d. Authors will be able to get access to the reference documents above;

Constraints:

(As above) in the 'Impacts' section

Australian Standards considerations: (only applies if proposed product is to be a Standard)

Does proposed Standard duplicate an existing Australian Standard *(Where such duplication occurs, justification or explanation shall be included in the standard)*	~~*yes*~~ */ no*
(if yes – please list)	
Will proposed Standard be developed for conformance assessment purposes? *(relates only to inspection and testing activities subject external certification)*	~~*yes*~~ */ no*

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(if yes – please detail expected certification activities)	
Are there are any International Standards on the same subject	*yes / ~~no~~*
(if yes – could Int.std.be adopted or used as a basis for this development	*yes / ~~no~~*
(if no – please provide reasons)	
Expected effort required at key stages:	
Activity *(There are other activities in a RISSB project which are well understood and easier to control. This section relates to some of the more variable activities.)*	# Days *(Baseline estimates for consideration)*
The Author's research into the reference / source materials.	14
The Author's further (if required) development of draft headings for the document (including any work that may be required on the scope, purpose and hazard references).	1
The Author's production of the draft content building on the above.	20
The Author's production of a further draft based on Development Group comments on the above.	10
The Author's development of the 'post public consultation' draft based on the guidance of the Development Group in addressing public comments. *(Try to imagine the subject of the product, how complex/political it is and therefore what the reaction might be at public consultation.)*	30
Independent validation[iii] (applies only to standards).	
The Author's finalisation of the product incorporating Development Group's validation comments.	20

[iii] Independent validation is to:

1. Check that clauses relate to the identified hazards
2. Check that the standard is of comparable quality to other similar domestic / international standards
3. Check that the standard is fit for the Australian railway (and is therefore nationally applicable)
4. Provide a recommendation for any deficiencies from the above