



IMPROVING ASSET LIFE PREDICTION: DEGRADATION DRIVERS AND OPPORTUNITIES

Improving asset life prediction despite unknown degradation and imprecise failure mode understanding

Railway systems assets are typically a combination of mechanical and electrical parts making their degradation and eventual failure difficult to predict.

The assets here refer to the electronic, electrical and mechanical systems associated with train operation, which do not include stations' electrical and mechanical facilities, nor the structures. Railway systems assets include rolling stock (trains), signalling and control, telecommunications, power supply and traction power and trackwork.

We will look at opportunities that can be realised to improve asset life prediction despite unknown degradation and imprecise failure mode understanding, including:

- Supplier availability assessment, to increase the awareness of life cycle management of assets and how today's decisions affect future procurement;
- Obsolescence assessment, to study current asset condition and remaining life, as well as the supply chains of assets;
- Staff, to consider how the maintenance strategy and approach affects the staff implementing it.



Supplier Availability Assessment

Railway systems assets are generally procured from overseas suppliers. Working with a variety of railway operators, this is typically attributed to: a lack of equipment supplier in-country; local suppliers lacking the technology; stiff competition during the supplier tendering process; and local suppliers lacking the quality of output to meet stringent international standards.

There is also often an assumption from procurement decision makers that they would receive the same level of support from an overseas supplier as they would from local suppliers. The supplier may even establish a local office temporarily and have this office serve as a pass-through for parts and service requests to be re-directed to the supplier's base office outside the territory.

Two problems arise from this arrangement:

- Longer lead time for spares, and
- A lack of specialised engineers (supplier experts for design and rectification) stationing full-time in the local office.

Unless faults are foreseen in advance, the delay caused by sending and receiving parts forces equipment to stay idle for days awaiting the replacement parts' arrival.

A worst-case scenario can arise when the procurement decision maker takes maintenance for granted. The maintainer must uphold the level of train service (as per key performance indicator) despite the problems of overseas supply.

Opportunity: To consider an optimal life cycle cost of an asset during tender specifications. With an increased awareness of life cycle management of assets, railway companies and government bodies can involve downstream stakeholders in the procurement planning of second-generation assets.



Obsolescence Assessment

With an increasing reliance on electronic components in the railway industry, management of obsolescence is becoming increasingly important to railway operators. It is particularly crucial when operating in the hot and

humid climates of Asia. The maintainer typically relies on the supplier of systems to repair or replace these highly specialised electronic components, as the technology and expertise to repair such parts belongs to the manufacturer.

Maintainers are sometimes caught unprepared when the supplier informs them that the component will become obsolete within a short period of time, or in the circumstance the supplier significantly increase the cost of legacy of equipment. Under such circumstances, the operator would be forced to pay a premium to produce additional spares for the maintainer.

Reactive operators, as opposed to proactive ones, typically only carry out the necessary preventative maintenance work according to the manual, and corrective maintenance work only as required. Such an approach neglects the concern of obsolescence or of contemplating modifications to overcome this issue.

Opportunity: Asset management study should be conducted regularly to understand the asset condition and its remaining life. This includes a study of the supply chain to understand when components are due to become obsolete, and whether modifications can be made to assets to overcome obsolescence. An obsolescence assessment within such a study would consider:

- Modification of equipment;
- Disposal of an asset; and/or
- Procurement of new assets.

The cost of this study can offset the premiums paid for obsolete equipment, and downtime caused by ageing assets or resultant asset failure.

Staff

A rail operator may occasionally fall into a mindset of 'replace-then-carefree' strategy with

regards to its assets, hence lack the motivation to adopt more effective maintenance strategies.



Another notable trait is for staff of the operator to have a culture of following procedures by the book. This makes difficult a collective change in the mindset to do things differently from the original equipment manufacturer's maintenance manual. A long approval process, typically found within such a culture, creates barriers to introducing new ideas.

Opportunity: A shift in the strategy and approach of the rail operator towards its maintenance can lend itself to a change in culture amongst the staff. Such strategy can include:

- Condition-based approach, where the maintenance regime is adjusted based on the condition of the assets, which are often monitored and reported by staff;
- Risk-based approach, which would require staff to collect and analyse relevant data, and
- adjust the existing maintenance regime to avoid 'over-maintenance' or 'under-maintenance' of an asset.

Author

Joseph Wong
Director of Infrastructure
China Region
WSP in Asia



Joseph.Wong@wsp.com

About WSP

WSP is one of the world's leading professional services consulting firms. We are dedicated to our local communities and propelled by international brainpower. We are technical experts and strategic advisors including engineers, technicians, scientists, architects, planners, surveyors and environmental specialists, as well as other design, program and construction management professionals. We design lasting solutions in the Transportation & Infrastructure, Property & Buildings, Environment, Power & Energy, Resources and Industry sectors, as well as offering strategic advisory services. Our talented people around the globe engineer projects that will help societies grow for lifetimes to come. wsp.com