

Maintenance Reduces Availability

What is the situation?

For rolling stock and on-track machines to be effective and efficient they need to be maintained, this however has an impact on availability.

Direct maintenance costs make a significant contribution to an asset's cost of ownership. While this is an obvious cost, when it comes to maintenance there are other costs that are equally important and can have a bigger financial impact on the asset's ownership – reduced availability.

Reduced availability is impacted by planned and unplanned maintenance. Planned maintenance covers periodic inspection, upgrades to software and hardware and overhauls, and can also be termed as preventive maintenance. Unplanned maintenance includes fault repairs and accidents which contribute to asset downtime. These unplanned stops are often caused by operator errors, poor planned maintenance or poor reliability either mechanical, electrical or software.

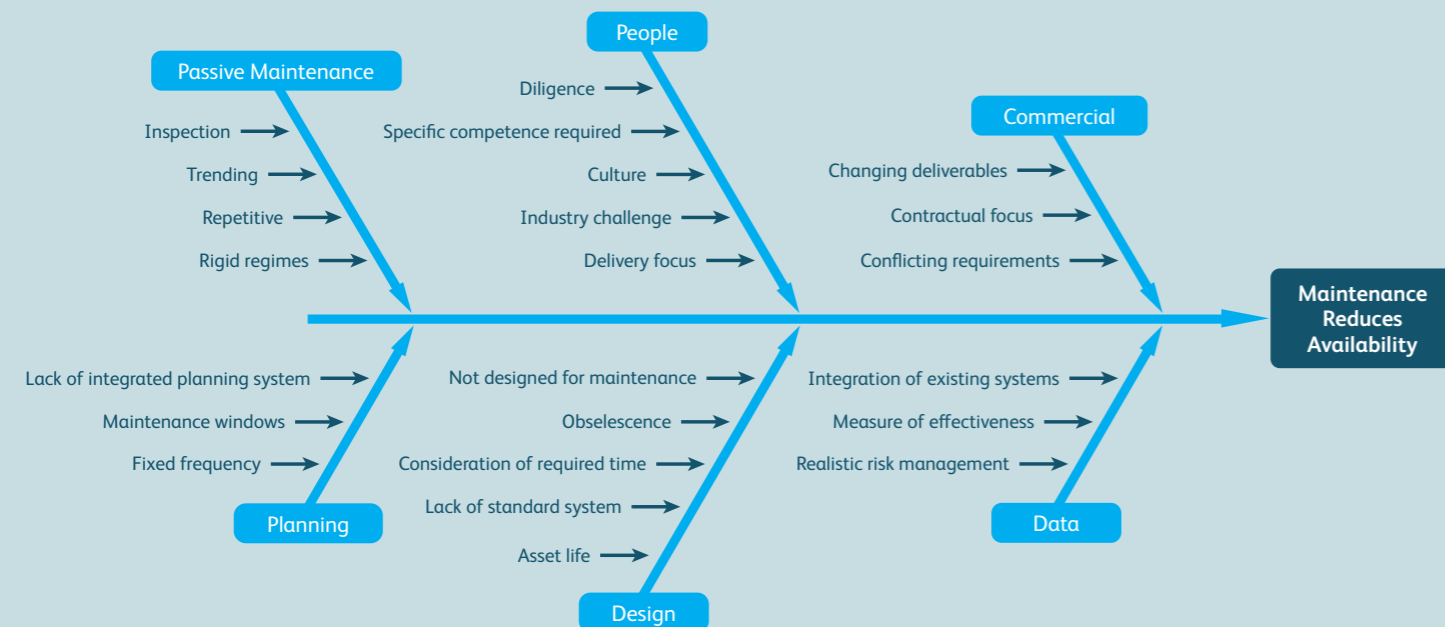
Another contributor to reduced availability is equipment obsolescence which represents a significant risk to operations of older fleets. Machine that are 10-15 years old are more prone to break down easily and require more maintenance. A risk audit can highlight problems and helps to be prepared when maintenance reduces availability. However, access to legacy information is needed to narrow the windows of expected breakdown and give a better time frame for essential maintenance.

It is important to adhere to maintenance schedules to ensure effective asset utilisation and reducing the possibility of unplanned stops. But is there opportunity to limit maintenance outages and optimise availability without agitating unplanned maintenance?

Manufacturers are looking into low-cost condition monitoring systems that enables predictive maintenance. This is empowering operators to be able to diagnose and fix their assets. How effective is this for a diverse collection of rail vehicle fleets?

Running an asset until it breaks trying to minimise 'maintenance reduces availability' will end up having even more serious break downs and longer outages. Preventive maintenance is very important as being proactive has been proven to be more effective than reactive. But what is the optimised level of proactive interaction required?

Analysis of causes



Scope

The overall scope of the challenge is to investigate the potential of new technology and techniques to reduce the maintenance time and improve scheduling of the maintenance regime, hence reducing overall downtime. The enablers for this are:

- Optimised design.
- Real-time understanding and control of maintenance procedures.
- Modern techniques for maintenance scheduling.

Priority problems

Specific priority problems

- Unknown effectiveness of planned maintenance.
- Unplanned maintenance causing spontaneous operational challenges.
- Assets requiring excessive maintenance. Low operation to maintenance availability ratio.

Related goal

- Have efficient maintenance plans and be able to plan resource effectively into maintenance contracts.
- 100 % performance and manage the required maintenance outages without causing operational performance uncertainty.
- Removal of obsolescence by design and acquisition of low maintenance assets.

Benefit

- Optimised maintenance and efficient use of funds.
- Reduced downtime and resultant delay costs.
- Reliable assets with reduced maintenance outages, allowing for increased productivity of assets.

Specific research needs

- Design and development of new tailored tools to optimise maintenance tasks.
- Determine real time health of assets and maintain it as required in service through collection, storage and analysis of data.
- Review what has been done in other industries and determine whether any of these solutions can be used for the rail industry.
- Fail safe asset systems which increase resilience of asset during operation.
- Predictive maintenance tools to eliminate unplanned maintenance.
- Development of smart facilities that automatically inspect health and maintain the assets.
- Assessment tools to determine maintainability of asset through its life cycle.
- Development of assets that are effective, efficient and require minimal maintenance throughout their life.



fig. 1

Expected impact & benefits

- Efficient whole life cost of asset through reduced maintenance.
- Improved availability providing planning flexibility.
- Efficient utilization of the assets.
- Effective maintenance plans which ensure reliability of asset whilst optimising availability.