

Trends in Railway Asset Management

from the Operator and the Suppliers' Perspectives

Dr. K. K. Lee,

Professor of Transportation, Hong Kong Polytechnic University

In recent years there has been an obvious trend of changes across the full spectrum of railway asset management activities, encompassing design, procurement, maintenance, replacement, etc. Apart from drivers such as global advancement in technology, asset maintenance techniques and concepts, etc. this trend has been the result of a lot of interactions between the developments in two of the key stakeholders: the railway operators and key suppliers of railway systems. These interactions can be summarized as follow:

<i>From the Operator's Perspective</i>	<i>From the Supplier's Perspective</i>
Stakeholder expectations	Market competition
Opportunities	The voice of the market
Asset management and procurement practice	Maintenance services and technical support to clients
Operation practice	Product development
Business bottom lines	
Technology advancements	

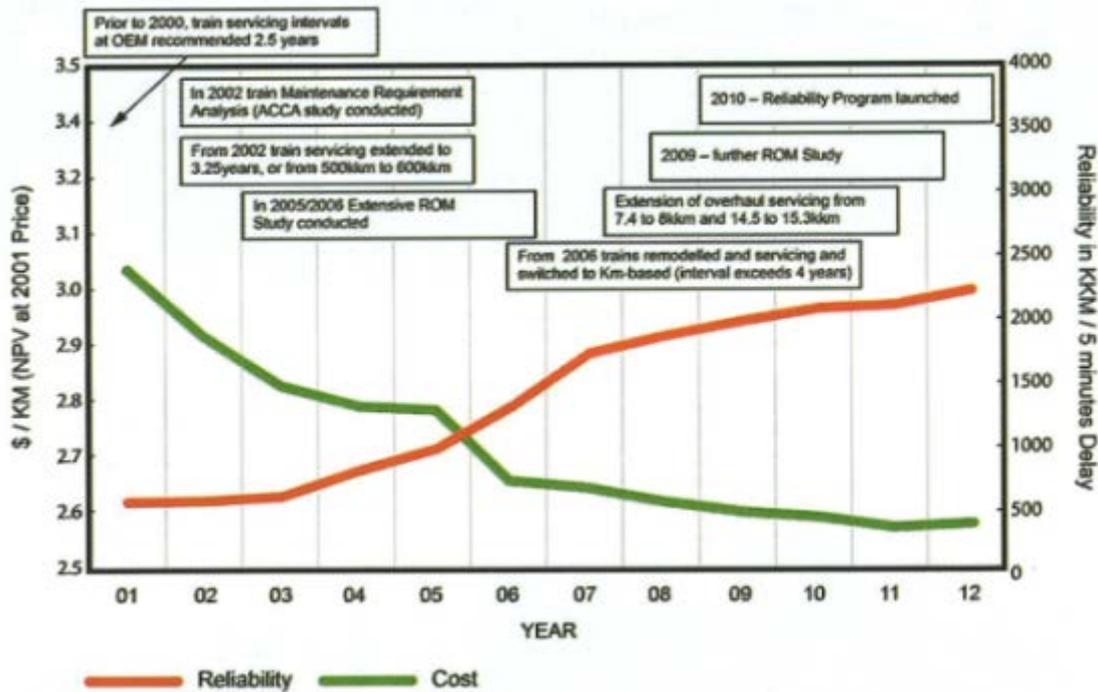
Stakeholder Expectations

As a result of social development and the proliferation of benchmarking information stakeholder expectations on railway operators have been ever rising. This is particularly significant in passenger railways, including both urban rail transits and high speed lines where the following issues have attracted a lot of attention:

- Service Performance – reliability, punctuality, and availability
- Safety
- Passenger convenience and comfort
- Affordable Fares
- Government Control

Financial abatement schemes based on Key Performance Indicators (KPI) on safety, service and customer satisfaction have now become a standard condition for almost all operation franchise contracts for passenger railways. It is therefore natural for operators to demand a higher level of RAMS performance of railway assets so that

these KPI targets could be achieved. Service pledges committed by railway operators to the passengers is also very popular these days. All these development in turn have created a lot of pressure on the suppliers to address the operator’s expectations on RAMS performance of key railway system such as trains, signaling and train control system, traction power system, etc.



Train reliability and maintenance cost trends in one of the major Metros in the world to meet ever rising stakeholder expectations.

Market Competition

To respond to severe market competition there has been an obvious trend among the key railway system suppliers to develop standard product platforms to reduce design and production costs, shorten delivery programme and facilitate obsolescence management. Typical examples include:

<i>Systems</i>	<i>Alstom</i>	<i>Bombardier</i>	<i>Siemens</i>
Metro Tains	Metropolis	Movia	Inspiro
Light Rail Trains	Citadis	Flexity	Avenio
CBTC	Urbalis	Cityflow	Trainguard

Product standardization on the part of the suppliers is also changing the way clients are designing and specifying the railway systems which they are going to procure.

Conflicting views between the operators and suppliers on the degree of customization on the standard products are unavoidable, but it is good to note that there has been a steady trend of convergence of these views.

Opportunities for Railway Operators

Over the past 10 years there has been an upsurge of opportunities for railway operators principally through:

- A trend to employ railway as the backbone to urban public transportation
- Integrated urban development using the rail plus property model
- Growth of high speed networks, in particular in China
- The popularity of modern light rail transits

As a result of these opportunities the demand for railway systems has increased substantially, which provides the critical mass for the evolution of railway assets.

This is particularly true in major cities, for example in Shanghai or Beijing where, for several years, two to three new metro lines have entered service every year.

Voice of the Market

Unlike the old days when key suppliers determined the products available for the railway operators, they now have to listen to the voice of the market on what the clients need for their operations. To guide their product research and development the suppliers can listen to the voice of the market through the following channels:

- Discover the needs of the customers by proactively soliciting usage experience to identify gaps for improvement or new functional requirements for incorporation into the next generation of railway systems
- Standards set by international institutions, major operators and benchmarking institutions

Evolving Asset Management and Procurement Practice

Over the past 15 years, in line with global trends in other industries, railway asset management has taken on the following practice, which the suppliers have to respect when developing their products:

- Whole of life approach in asset management
- ISO55000 asset management standards
- Reliability Centered Maintenance for mission critical systems
- Predictive Maintenance

- Funneling in tendering of systems with much greater emphasis on technical merits

Maintenance Services and Technical Support to Clients

In addition to the supply of equipment to the clients the suppliers now have to consider the full spectrum of requirements during the life cycle of the equipment:

- Supply of spare parts, in particular those that are proprietary
- Resolution of technical problems, in particular teething problems during initial operational phase
- Product enhancement during the lifecycle of the equipment supplied
- Obsolescence management
- Supply plus Long Term Maintenance Contracts – this practice is becoming popular with contracts for the supply of trains

Evolving Operation Practice

The following items of operation practice have been emerging for the past 10 years:

- Unattended Train Operation
- Real time and smart passenger information through the smart phone apps
- Smart cards for fare collection
- Smart Train Management System
- Minimizing the number of station staff through more intelligent station control and surveillance systems

Product Development

In the R&D of products the suppliers have to consider holistically:

- Needs of the operators
- Impacts on their current lines of products
- Profit margins and sustainability
- Investment
- Market Risks

Business Bottom Lines

For the operators they have to consider the following business bottom line issues when acquiring and maintaining railway assets:

- Maximize patronage through passenger convenience and comfort, service and safety performance and affordable and competitive fares
- Maximize ancillary revenue – advertising, shop rentals, etc.

- Reduce operating cost through automation and simplification of operation procedures

- Reduce asset acquisition, maintenance and replacement

For the suppliers they have to consider the following business bottom line issues when deciding on the product and marketing strategy:

- Locations of production base to minimize production costs while maintaining quality standards

- Profit margins of a product line

- Contribution to the enterprise bottom lines

- Investments in R&D

Technology Advancement

When choosing technologies operators are always faced with the dilemma of either reaping the benefits of technology advancement through the use of state-of-the-art system, or reducing risks through the use of mature and well proven systems. In the old days operators would usually err on the more conservative side, however there has been a noticeable and encouraging change in recent years – operators are now more willing to undertake some risks in adopting new technologies. A typical case is the decision by Shanghai Metro in the late 90's to adopt CBTC as the signaling and train control technology for new metro lines at a time when CBTC products were still in their maturing stage. The same has occurred with the use of 25kV overhead rigid conductor rails to replace flexible catenary in tunnels.

On the suppliers side their motivation for technology advancement is more straightforward – either to continuously improve an existing product line or to achieve a quantum leap, leading to a completely new product line.

Operators & Suppliers Coming Together

Leveraging on experience of the IT industry, key suppliers of railway systems are now beginning to form user groups of major clients, with regular sessions and channels of communication to facilitate the suppliers to obtain first – hand knowledge of system usage experience. With this arrangement suppliers will be able to identify market needs in a most direct way, improve system performance based on feedback of operating experience and proactively resolve technical problem. A good example is the CBTC user conference organized by Thales on a regular basis, where major operators get together and share their experience of using the Thales CBTC systems.

Key suppliers and major operators can also join hands in the development of new products or systems through the posting of operating and engineering staff from railway operators to the supplier. Through such collaboration the new products would be able to better meet the needs of end users.

There is an emerging trend of awarding turnkey contracts on systems to a single supplier so as to reduce problem arising from key interfaces between trains, signaling and train control, main control, communication and traction power systems. Recent examples include the Panama Metro Line 1 and the Riyadh Metro Network projects, for which Alstom is the turnkey contractor for all the electrical and mechanical railway systems and providing integrated solutions based on the proprietary products of Alstom.