

CoMET and Nova Newsletter

Imperial College
London



Community of Metros
CoMET



Inside this Issue:

Improving metro finances through benchmarking	1
Determinants of metro delay incidents	2
Information during disruptions	2
Control of passenger flow	2
Fares for stakeholders	3
Customer service	3
PTI safety and accident precursor monitoring	3
The CoMET and Nova work program	4
Best practice compendia	4
New suburban rail benchmarking group created	4
Singapore SMRT development and installation of STARiS	5
Hong Kong MTR – Enterprise risk management framework	5
Knowledge-sharing – London Underground and Metro de Madrid	5
Membership developments	6

Improving metro finances through benchmarking

This fifth CoMET and Nova newsletter comes at a critical time for many metros. Growing concern over budgetary deficits has become particularly pronounced for many North American and European metros where the economic downturn has triggered funding crises in their cities. But the long term economic sustainability of many Asian and South American metros has also been undermined by examples of poor fares policy and many are challenged by rapid network growth.

Benchmarking is an essential tool for metro leaders at times of hardship as it is used to pinpoint weaknesses and strengths in a metro's cost and revenue structure and help prioritise scarce resources.



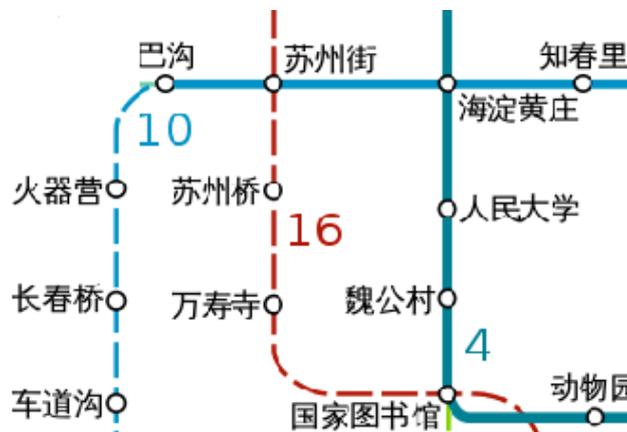
Despite financial pressures, demand in North American and European cities remains high or is continuing to grow. (Photo New York Metro, 96th Street Station)

The CoMET and Nova process has rapidly identified opportunities for cost savings, higher revenues and improved efficiency; moreover it allows metros to consult each other, foregoing the need for external consultants. Indeed, actions resulting from a recent bench-

marking study on escalator asset management are expected to save London Underground £100 million (US\$ 150m) in maintenance costs over the next 20 years. This year, one metro has secured a 1% increase in fare levels from its transport authority, supported by benchmarking submissions by the RTSC at Imperial College London.

Nonetheless, metros need to continue to offer high levels of safety and service quality to their customers if they are to retain revenues and public support at a time of increasing competition for government funds.

This newsletter reflects on this current climate by focusing on the highlights of recent case studies that support these aims.



Asian metros continue to expand at a record rate. Beijing Subway plans to expand from 14 to 19 lines by 2015 and extend many existing lines including Line 10 where 30km and over 20 stations are to be added by September 2013.

Centre for Transport Studies
Department of Civil Engineering
South Kensington Campus
London, SW7 2AZ
UK

richard.anderson@imperial.ac.uk
T: +44 (0)20 7 594 6092
F: +44 (0)20 7594 6102

www.comet-metros.org
www.nova-metros.org
www.RTSC.org.uk

Recent case studies

Each year of the CoMET and Nova work programmes, three in-depth research case studies are performed for each group. Below and opposite are the summary findings from six of the latest studies .



Determinants of metro delay incidents

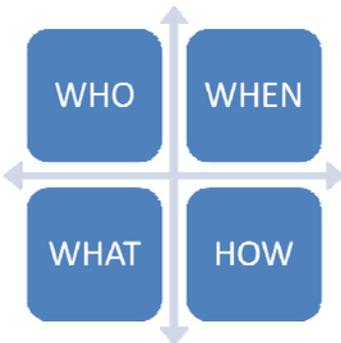
Train service reliability is a key metro management objective and a major part of a successful operation. Incidents on the network are likely to cause delays to the train service, perturbing the punctuality and regularity of the metro operation, and hence its reliability. Therefore one way to improve train service reliability is to reduce the occurrence of incidents in urban metro systems. This study used statistical techniques to identify the main factors explaining the variation in the number of delay incidents across 42 metro lines

from 15 different CoMET & Nova metro systems over the period of 2005-2009.

The results indicated that among the main factors explaining differences in incident performance are the technology of train operation, passenger demand, the peak service level operated, and the practical capacity available. On the other hand, engineering and more fixed factors such as the type of track support, rail connection and rolling stock wheel, were found not to affect incident levels. The findings also suggested that metro-

specific factors help explain the variation in incident performance, where such factors refer to differences in maintenance and management practices, operations management, health & safety procedures and so on, across urban metros.

The study considered the range of factors affecting reliability.



The objectives of this study were to examine who should tell what to whom, when, and the information channels used to do so (how).

Information during disruptions

This case study focused on the provision of customer information during disruptions to metro service. The study addressed defining and understanding disruptions, good everyday practices (such as signage, training, and cooperation with other transport modes), information control and dissemination (including the control centre and the varying information needs of different audiences), and the information channels used to

communicate.

One key finding is that traditional channels, especially public address systems, are still the most used and most effective channels in providing information during disruptions, and metros must therefore maintain these channels for the foreseeable future. However, significant growth in the variety and sophistication of information channels available to metros and even faster

growth in customer expectations mean that metros must explore the use of advanced channels as well.

There is an increasing focus on and demand for real-time information, and advanced channels like smart mobile devices offer the possibility of pushing real-time, customised information to the customer right when they need it.

Control of passenger flow



In many members' networks, demand has changed quickly while train and station capacity is fixed in the short-term.

This case study took a holistic view of passenger flow through stations, including entrances and vertical circulation, platforms and boarding trains; a way of thinking unfamiliar to some metros.

Based on questionnaire responses, the study examined metros' existing practices across the three station areas, and also scrutinised a number

of stations in detail. Analysis was undertaken across these stations to find bottlenecks, emphasising that problems can lie in many different areas.

While there are specific best practice options that include better signage and announcements, improved use of staff, and separating passenger flows, wider strategic issues were also considered. Solu-

tions that were reviewed included peak pricing, changing train service patterns and the design of stations - for instance providing multiple entrances and exits along the platform for arriving and leaving flows.

Recent case studies continued...

Fares for stakeholders—supporting metros' dialogue with their governments

Metros throughout the world share the problem of how their high costs of operation, maintenance and renewals are paid for. Recently the RTSC has undertaken extensive research for the Nova and CoMET groups on metro funding and fares policies. Case study reports include Metro Sustainability (CoMET 2009 and its forthcoming 2011 update) and Fares Funding and Financing (Nova, 2010). The research aims to provide metros with the information and understanding of fares and funding issues that are needed for an informed dialogue with government, transport authorities and other stakeholders.

Analysis has shown that metros require a steady-state level of reinvestment funding equivalent to at least 40% of average operating costs – much higher than assumed depreciation. Dependable funding is required to provide stable levels of renewals and enhancements.

The ability of a metro to meet rising customer expectations and to provide a sustainable level of service quality in the medium to long term depends crucially on the supporting funding regime and the fares policies that underpin it. Yet to 2009, fares were falling in real terms for 60% of metros. Unit costs of

labour and energy were rising faster than inflation, yet labour productivity was actually falling for 75% of North American and European metros. The consequence was that cost recovery from fare income was falling for 70% of metros, increasing the burden on governments and taxpayers to fund the necessary investments in the existing metro.

The research outlines how fare setting and funding policies can be improved to better reflect the true economics of urban metros, support investment and achieve economic sustainability. It is clear that metros in most cities

require a much more robust and principled approach to fare setting and regulation to achieve these aims. In particular, fare adjustments must be applied regularly and systematically (a formula is good practice), better reflect the costs of inputs and affordability, support the imperative to renew assets and enhance service quality and, through differential pricing, more closely reflect the variable cost of travel.

Customer service

While metros have long been focused on the mechanics of operating the railway, this study examined the growing importance of customer service in metros. Metros must not only achieve and maintain technical proficiency (e.g. safety and reliability) but also become service-oriented, customer-focused organisations.

The study examined trends in customer service from other industries and identified best practices in metro customer

service in the following areas:

- Commitment (mission/vision statements/customer charters);
- Customer service staff; focusing on four models of station staffing and the factors influencing station staffing; and
- Customer interfaces, specifically information, customer input (customer feedback/call centres) and ticket machines

One of the key findings of the study is that improving cus-

tomers service requires top-level commitment first, followed by clear organisational responsibilities for customer service and the understanding that customer service is everyone's job.

Although customer service is unique in metros due to the volume of customers, the process of running a railway, and economics, metros can learn from other industries and each other to implement best practices that lead to positive cycle of benefits, including improved

customer and employee satisfaction and ultimately improved metro reputation and support for funding.



“Customer service must be every employee's job”

Station and Platform-Train Interface (PTI) safety and accident precursor monitoring

This case study examined how to improve safety in stations and at the platform-train interface, where the greatest number of injuries and fatalities occur in metros. Metros must consider short- and long-term actions regarding station design, safety devices, staff action, and passenger behaviour. A lack of data in many metros is a significant limitation and a

key recommendation is that metros collect complete and accurate data about injuries in order to understand, manage, and improve safety.

The report includes best practices in station safety, focusing on vertical circulation and passenger flow, and in PTI safety, looking at common incidents, gaps, and the use of platform doors. Platform doors are the

most effective strategy to improve PTI safety, as they virtually eliminate PTI incidents for most metros, a finding strongly supported by recent evidence at Paris RATP. Further still, the doors help to improve train service reliability. Metros should consider retrofitting stations where there are high PTI incidents with platform doors.

In Hong Kong, Platform Assistants supervise boarding in stations with and without PSDs



The CoMET and Nova work programme

Each year, for CoMET and Nova separately, the work programme is developed and decided at the annual Management Meetings. Results of the work programme are then shared and discussed six months later at the Annual Meeting. In the latest year, New York MTA were the hosts of the successful CoMET Management Meeting and the group is looking forward to the 2010-11 Annual Meeting in Sao Paulo in October. In April 2011, Taipei proudly hosted the Nova Annual Meeting where the results of the latest Nova work program were presented. The 2011-12 Nova Management Meeting is being held this month in Montreal, hosted by STM; where representatives

from Nova members will shape the 2011-12 phase of research.

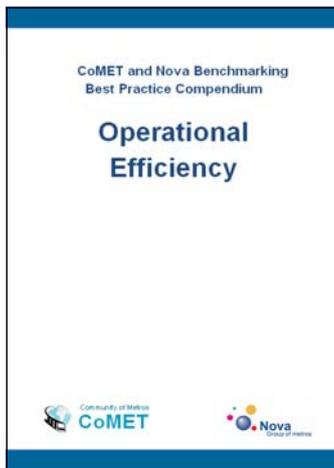
Further to the Annual and Management Meetings, the CoMET and Nova programme offers uniquely valuable knowledge-sharing opportunities; firstly for high-level executives at the CoMET-Nova joint CEO/COO Days, secondly for specialist technical consultations through advanced, joint workshops, and thirdly through regional meetings for geographically closer members to share more region-specific issues.

The CEO/COO days usually occur in tandem with the Annual Meetings and the latest CEO/COO day held in Taipei alongside the

Nova Annual Meeting was especially valuable as senior representatives from other metros in the region, for example Hong Kong MTR, attended constructive meetings to share experiences and practices. A similar day is taking place over the CoMET Annual Meeting in Sao Paulo.

Two technical workshops are taking place under the current work programme; a risk management workshop hosted by Hong Kong MTR in October, and a Communication Based Train Control (CBTC) workshop hosted by London Underground in November.

Representatives from CoMET member organisations met in New York from the 2nd to 4th March 2011 for the CoMET Management Meeting hosted by MTA.



Best practice compendia

Over the years, CoMET and Nova have amassed a large quantity of knowledge in a wide range of subject areas. Many best practices have been identified, but without reading a whole study it is difficult to extract and implement the findings. As part of the groups' knowledge management strategy areas of knowledge are now being compiled into best practice compendia, providing members

with high-level best practice messages for use with internal and external stakeholders.

Compendia are available covering Energy Efficiency, Rolling Stock, and Service Quality. A fourth compendium, on Operational Efficiency is now under development. This will examine practices concerning the day-to-day operation of transporting passengers whilst minimising waste.

Further best practice compendia are planned and will be organised into five areas: service operations; labour; maintenance; passenger behaviour; and incident recovery. The compendia will assume that the reader has no previous knowledge of the work undertaken by CoMET and Nova, and provide sufficient information for the metro to duplicate and implement the practices themselves.



New suburban rail benchmarking group created

Following interest from several suburban rail operators, the RTSC at Imperial College has founded an international benchmarking group for suburban railways. This group aims to provide a framework for the identification and sharing of best practices within the suburban rail industry. The group will build upon the 15 years of experience gained by the RTSC

through the successful management of the CoMET and Nova metro benchmarking groups, and the International Bus Benchmarking Group.

In November 2010, Phase 1 of the benchmarking process started, with 11 participating operators. The group successfully held its first annual meeting in Munich in June, with full attendance. The results of case

studies, clearinghouse studies and other research were shared.

ISBeRG plans to grow to a similar size as CoMET and Nova: 12-15 members, and is currently in

London Overground is the 2010/11 chair



discussion with many enthusiastic prospective members. The current members are BART (San Francisco), CPTM (Sao Paulo), DB S-Bahn (Munich), DSB S-Tog (Copenhagen), JR East (Tokyo), London Overground, Metro Train Melbourne, MTA Long Island Rail Road and Metro North Railroad (New York), NSB (Oslo) and Sydney CityRail.

Best practices

Shared instances of the development and implementation of best practice from CoMET and Nova members.

Singapore SMRT - development and installation of STARiS

As rail networks grow in complexity, the need for a more user-friendly and sophisticated passenger information system becomes a necessity. Currently available commercial systems have a number of drawbacks; they can be expensive to purchase, operate and maintain, slow and complex to deploy and update and are often less flexible trigger-based Automatic Train Control (ATC) systems.

In 2007, SMRT chose to develop the solution in-house and created a highly flexible, highly de-

ployable, and cost-efficient on-board audio-visual passenger information system – the SMRT Active Route-map & Information System (STARiS™).



STARiS 2.0 Information Display showing progress along route and other information

Key benefits of the system include: flexibility – with local distance-based triggers rather than fixed beacons, accuracy – using the intelligent on-board algorithm, responsiveness – synchronising with station information over radio, and operational agility – automatically sensing stock-type and performing look-ups on the fly. The system is also easy to implement and cost-efficient overall.

After the successful roll-out of version 1.0, SMRT engineers are now developing version 2.0

which aims to be fully automated and will display additional information.



The lightweight, unibody enclosure is no thicker than a CD case and fits into existing advertising panels

Hong Kong MTR – Enterprise Risk Management framework

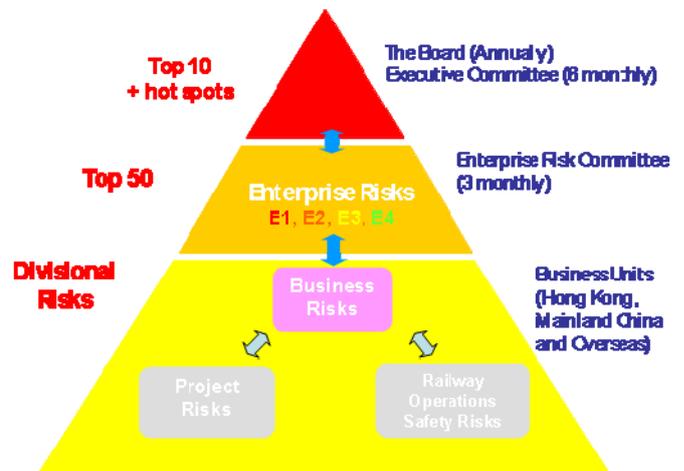
In response to the changing business environment in Hong Kong, new challenges from mainland China, and overseas growth initiatives, MTR has established an Enterprise Risk Management (ERM) framework for the strategic management of business risks.

The framework embeds a proactive risk management culture into every management processes and articulates the company's risk culture. It also helps to sustain business success by preparing staff to respond to changing business environments.

The ERM framework provides a clear view of key risks facing MTR. It also assists executives and individual business areas to manage the risks and supports the board in discharging its corporate governance responsibilities.

The framework is overseen by the Enterprise Risk Committee ("ERC"), who regularly review the nature of business risks. MTR have also launched a commercially available risk management IT system; capturing multi-disciplinary risks and best practices under one platform.

The Hong Kong MTR Enterprise Risk Management Framework.



The ERM Framework

Knowledge-sharing – London Underground and Metro de Madrid

Following a Comet member visit of Metro de Madrid (MdM) in 2008, London Underground (LU) and MdM have developed a program of cooperation and knowledge-sharing. This has involved further site visits, rolling stock inspections and even an exchange of engineers.

The implementation of Communications-Based Train Control (CBTC) has been an important

topic for both operators, with MdM upgrading lines 1, 6, and 7 and LU improving the Jubilee and Victoria lines. MdM managed to implement changes without the need for closures. In light of this, LU made changes to future phases of line upgrades in progress. LU were also interested in reliability, availability & maintainability initiatives that MdM had adopted which appeared feasible for LU.

Following the success of this program, a memorandum of understanding between LU and MdM has been jointly signed. Further still, the Greater London Authority were interested in the cooperation taking place between the two metros. Both organisations intend to go on cooperating and further activities are currently under development.

Andy Heath, Senior Asset Engineer, LU witnessing night-time CBTC testing in Madrid:



Centre for Transport Studies
Department of Civil Engineering
South Kensington Campus
London, SW7 2AZ
UK

E: richard.anderson@imperial.ac.uk
T: +44 (0)20 7 594 6092
F: +44 (0)20 7594 6102

www.comet-metros.org

www.nova-metros.org

www.RTSC.org.uk

Membership developments

In 2011 CoMET welcomed Guangzhou Metro as the newest member of the group, STIB Brussels have joined Nova, and Metro Taipei have moved from Nova to CoMET following years of sustained growth.

Guangzhou

Guangzhou is China's third largest city with a municipal population of 12 million. It is located in southern China and it is the capital of Guangdong province

The Metro

- Network length of 236 Km
- 4.4 million passenger boardings per day
- 2010 annual boardings totalled 1.18Bn
- 14,035 employees
- 8 lines serving 144 stations
- Assets of 35.4Billion RMB

Construction on the first line began in 1993 and the network is expanding very rapidly. Very significant growth is planned with total investment of 63Bn RMB (US\$9.8 Billion) to develop new metro lines and intercity rail, 73 km of metro lines are under construction so that by 2015 there will be 12 lines in total.

CoMET membership and cooperation will be invaluable for Guangzhou as it manages the rapid expansion of its network and continues its strong commitment to self-improvement. This will also be of great benefit to other CoMET and Nova systems undergoing expansions and meeting growing passenger demand.



STIB Brussels

Brussels is the capital, and largest city in Belgium and has a metropolitan population of 1.8 million. It is also the seat of the European Parliament and is host to a number of associated organisations.

The Metro

- Total network length of 41km
- 7 lines serving 68 stations
- 79.6 million passenger journeys per year

Construction for the first underground tramway line began in 1965. A modernisation program is underway with the planned automation of 2 lines by 2016. There are also plans to complete a new line by 2018 and develop an RER network by 2017

By joining Nova, STIB will be able to learn from, and share with, other operators in similar-sized cities, with comparable network ages who utilise similar technologies and face similar challenges.

