

First State of Good Repair Roundtable

Washington Court Hotel

Washington, DC 20001

July 8-July 10, 2009

Wednesday, July 8th

Lunch and Welcoming Reception

FTA Administrator Peter Rogoff opened his remarks thanking participants for attending the Roundtable and engaging in discussions over what can be done to bring the nation's transit systems into a State of Good Repair (SGR). He noted that the highly publicized accident on the WMATA system is giving the industry a chance to educate the public, law-makers and regulators about the need to improve the condition of public transit.

In addition to safety concerns, SGR is about reliability, which is central to our ability to hold ridership and entice new riders to the system." But tension exists between transit agencies which know they need billions of dollars in investments for recapitalization and local political leaders who would rather spend billions in expansions, not improvements.

DOT Secretary Ray LaHood, Rogoff said, asked FTA to expand the Rail Modernization Report — which studied the SGR needs of the 7 largest properties serving 80% of the rail transit ridership—to include "a broader universe of transit agencies." He also asked that agencies identify what percent of their backlog consist of safety critical infrastructure. "It's a hard question to answer," he said. "Nobody will come forward to say their system is unsafe."

At the same time, he adds, if maintenance problems are ignored long enough they become safety issues. "We need to get our hands around what we want to characterize as safety critical infrastructure," he said, "and what portion of that is within those deferred maintenance figures." He asked Roundtable participants to "move your agenda in the direction of helping us tackle that question."

John Catoe, Jr., General Manager, WMATA, said that while the cause of the June 22 tragic accident has yet to be determined, "when you look at WMATA system, built 36 years ago, there is a major need for capital investment."

General managers, lawmakers and the public must realize that before they agree to expand transit system, "you have to 'fix your own home'. Do the repairs to your system so it can operate in an A+ safe and reliable condition."

WMATA has been opened since late 1970s, but only recently have "significant capital dollars been afforded to maintain the system." Five years ago, the region put together a capital funding program that gives the agency \$3 billion over 5 years. "When we put it together we knew it only met 50% of the identified needs at that time," Catoe said. "Although it was a boost to our capital program, it did not suffice to keep us in a SGR."

The Roundtable meeting is timely. “It’s unfortunate that it takes adversity such as that in June 22, to get the action necessary. From a national perspective, we will work with Congressional leaders to take action to ensure systems are brought up to a SGR. We’ll lose the movement we gained if we can’t convince customers that transit is safe.”

Tour of WMATA Facility

Roundtable participants were invited to visit WMATA’s Carmen E. Turner Maintenance and Training Facility, a 725,524 square-foot back shop maintenance and training facility for both Bus and Rail. The backshop provides an in-house capability to perform mid-life rehabilitation and replace components to ensure the agency maintains a SGR. ([Maintenance and Training Facility.](#))

Thursday, July 9th

Opening Remarks and Objectives

Susan Schruth, FTA Associate Administrator for Program Management, kicked off the meeting echoing her colleagues’ comments about the timing of the Roundtable . “WMATA’s accident focused national attention on the safety operation of transit and the gap at the federal level for oversight of transit rail,” she said.

FTA Administrator Peter Rogoff, she said, asked FTA to make sure safety becomes an essential element in the conversation about SGR. A question on the table for discussion is whether the State Safety Oversight program is an effective strategy for ensuring safe transit operations, she said.

She then outlined steps FTA was taking to address the issue of SGR.

On August 13 and 14, 2008, she said, FTA convened a workshop with senior engineers and capital planning staff from 14 bus and rail agencies to address concerns over the magnitude of SGR needs nationwide. The agencies stressed the importance of defining SGR, developing and implementing asset management plans and ensuring safety becomes a priority among policy decision-makers.

A Roundtable, they agreed, would be a good vehicle to pursue these discussions.

FTA also started the FTA SGR Working Group, an internal working group that met regularly to consider SGR-related issues and possible solutions to the problem.

In May 2009, two months prior to roundtable meeting, FTA issued the Rail Modernization Study Report to Congress. The report was issued in response to a request a year

earlier by Sen. Richard Durbin (D, IL), and 11 other senators, (including the then Sen. Barack Obama (D, IL), who at the time of issuance of the report has become the president of the United States) to look at the needs of the seven largest rail transit agencies in the country. The study found that more than one-third of the agencies' assets are either in marginal or poor condition, indicating these assets are near or have already exceeded their expected useful life. Conclusion: Estimated SGR backlog of roughly \$50 billion (2008 dollars).

The study also points out that about 50% of transit capital expenditures are paid for by the federal government in FY 2006, with 90% of federal dollars going toward SGR elements. The report recommended a "special catch up fund" to be included in the next congressional authorization to start addressing this backlog.

Bus assets and facilities, she said, are at the "bottom of the rung" when looking at asset replacements and "we want to get at that. How do we address bus only systems in an appropriate way in this conversation?" Recommendations for the SGR program will apply to both bus and rail.

One of the most challenging tasks ahead will be to distinguish a safety critical asset from a non-safety critical asset.

Around-the-Table Introduction

Participants took turns going around the room introducing themselves. Sean Libberton, FTA Deputy Associate Administrator for Program Management, asked participants to identify SGR challenges, state whether their agency had implemented an asset management program and explain any methods used to prioritize reinvestment projects. He also asked agencies to try to distinguish safety critical assets from non-critical assets.

Raymond Friem, Transit Metro, said his agency has a strong safety assessment program in place. "We try to investigate the 'near miss' cases," he said. Over the past five years, customer injury has decreased dramatically and Workers Compensation claims were down by 70%, creating an overall savings of nearly \$8 million a year. The number of miles between failures in the system went up from 6,000 to 22,000. In 2002, the agency increased its rolling stock available from 78% of fleet assets to 92%.

Richard Viner, Jr., WMATA, said the agency operates a capital prioritization program, managed by the CFO and budget management office. Each department develops project proposals and the agency collectively selects those warranting capital spending. Challenge: Coming up with a certifiable items list without any standards to guide them. "This list could be used to prioritize capital projects," he said. Thought should be given to publishing a template of certifiable item lists.

Eric Waaramaa, MBTA, said safety is one of the criteria used in prioritizing projects for support under the capital funding program. "In fact," he said, "it's required by law." A

trolley operator who was recently sending a text- message crashed into the trolley in front of him. As a result, MBTA is working with unions and the state government to put a ban on holding a cell phone or a similar device while operating a bus, commuter train, or subway.

Geoff Hobin, TARC Transit Authority of River City, said a major challenge in asset management is the “inability to plan and implement proactively.” His agency develops an asset management plan, but the uncertain political environment hinders its implementation. Only 11% of vehicles in its fleet have expired their useful life this year, but that number is likely to rise to over 45% within two years.

Jerry Rutledge, King County Metro Transit, said that the property inspects fixed assets and rolling stock when they fall into the “lifecycle window” looking for problems that may have contributed to a minor slip or major collapse. “We use safety incidents as starting points for addressing safety from a systematic point of view,” he said. The system relies on sales tax for its revenue. The property is searching for more stable funding sources. Agencies must balance the need for up-keep with the public’s desire for “new and sexy” start-ups or extensions.

Peter Garino, New Jersey Transit, said SGR is the number one element identified in its capital investment strategy, which is laid out in an annual report submitted to the legislature. The property, which has a stable funding source and is in a SGR, stretches its dollars by analyzing, for instance, whether it’s more cost effective to rehab a bridge or replace it. Replacing a car rather than fixing it may be a better choice “because we can get a more unified fleet that reduces ongoing operating costs.”

Dave Springstead, MARTA, said the agency already prioritizes safety in its capital improvement plan. The safety program is broken down into three categories: the safety program itself and staff that supports it; safety related items (technical equipment, fire detection); and non-safety related items that are pending risk issues (cracking aerial structure). “If you take all your time taking care of safety related items,” he said, “the risk factor will go up on other assets and then you have an exponential situation that you can’t recover from.” MARTA hired an independent consultant to analyze 27 systems, and assess its safety program.

William Parks, MTA, said the agency has funding to make structural improvements to the system, but less is available for other asset repairs which, if not fixed, could turn into risks in a few years. The agency has implemented measures on the light rail system to improve traffic safety, like additional signage, and maintains a formal database for all structural inspections. MTA is looking to develop a formal system-wide asset management system.

Michael Hubbell, Dallas Area Rapid Transit, said its board requires the agency to conduct a system-wide assessment of all assets—including 1,600 vehicles, 38 million square feet of facilities and 250 track miles of light rail. As part of the 5-year capital program, the agency must prioritize projects to sustain and upgrade building infrastructure. The rapid change in technology raises questions about how to measure the useful life of an asset or a component that has to be replaced not because the useful life has been exhausted but because the asset has become obsolete.

Jacob Balter, Metro Transportation Authority—Long Island Rail Road, said his agency maintains an asset condition database which rates components on a 1-4 scale based on the number of failures reported. “We can compare priorities across different types of capital asset categories,” he said, determine the component’s maintenance cost, its useful life and its performance. “Once you determine that something is safety critical,” he said, “it’s hard to do comparisons between different types of assets.” What do you fix first a deteriorating platform or an aging bridge?

Sharon Cooney, San Diego Metropolitan Transit System, said the agency is close to meeting its goal of replacing 50 buses a year—but future up-keep plans are up in the air because of funding uncertainties. Nearly 60% of its revenues come from sales tax, an unstable funding source. “You never know if appropriations will come through,” she adds. The agency does not maintain an automated asset management system, but it is regimented in how it documents asset conditions.

Glen Tepke, Metropolitan Transportation Commission, said it would like FTA to provide guidance for conducting condition assessments that would feed into his agency’s asset management system. Data gathering from operators is often hit or miss. At the regional level, the agency assembled a regional transit capital inventory of all assets containing information on age, replacement, rehab cost. But they cannot prioritize projects because they don’t know the assets’ condition.

Doran Barnes, Foothill Transit, wants guidance from FTA regarding “spare ratio” and how this concept would be applied in the context of SGR. “A ‘one size fits all’ in spare ratio does not work,” Doran states, because maintenance requirements for an express fleet and BRT are different given the amount of time these buses are on the road. Safety plays a key role in the agency’s asset management plan, but so does human capital. Who is carrying out SGR? What skills do they need? “I’d like to see some shining examples of workforce development activities.”

Aida Asuncion, Los Angeles County Metro Transit Authority, points out that an asset’s lifecycle changes depending on use and maintenance. “Some assets deteriorate faster than predicted,” she said, while others last longer than envisioned. Advancement in technology also presents different lifecycles with faster scale of replacement than other assets. The agency’s capital program is “robust,” and the agency hired a consultant to develop a rail asset management plan. Much of the focus has been on appraising asset conditions.

Rolando Cruz, Long Beach Transit, said his agency is required to identify environmental risks in addition to safety, reliability and financial risk. Eighty-seven of its 250 buses are now gasoline hybrid electric—more expensive to maintain than diesel buses and less reliable. “Part of my fleet is contingency vehicles,” he said, “old reliable diesel coaches (which are) 13 years old and still operating.” Because design engineers have little teaching experience,

the agency is designing its own classes on “predictive and preventive maintenance”—a difficult task since the technology is constantly changing.

Michael Schipper, Greater Cleveland Regional Transit Authority, said the agency’s capital program has seven criteria that projects are rated on, including safety. “But we found that a safety-only project doesn’t score.” The agency is revamping the program, throwing out the old criteria and re-ranking projects. “It’s amazing that as we deferred maintenance on something, the safety critical items all moved to the top.” He suggested FTA look at where formula funds are being spent and what agencies are doing with stimulus money.

Jeffrey Sweet, Niagara Frontier Transportation Authority, said half of its properties 330 buses are beyond their useful life. Some of the funding slated for bus replacements is now going toward mid-life rehab of its light rail vehicles. Stimulus funds are being used for bus replacement only. His agency tracks asset conditions in two separate databases: one for vehicles and equipment and the other for facilities.

Mark Pritchard, Central Oklahoma Transportation & Parking Authority, said his agency—which is adopting elements of preventive maintenance and quality control—is expanding its maintenance facility. The agency couldn’t compete for higher quality maintenance staff because of its labor contracts. Instead, the agency met with union representatives and said: ‘We’d like to raise the top mechanic rates by \$3 an hour.’ Paying more for the expertise is worth it, he said, because “we have a higher talented group of people who can help us move into better SGR.”

Leah Dawson, Chicago Transit Authority, said the property has been “parched” for so long that everybody knows what needs to be fixed or replaced immediately-- deteriorated railroad ties, for instance, or stations with crumbling platforms. “The first part is easy,” she said. But what happens next? The agency, she said, is not set up to do planning and large scale project management. “How will we sustain ourselves on the operating side if we want to make capital investments long term? Our revenue sources don’t match the services we provide.”

Michael Connelly, Chicago Transit Authority, said his agency maintains an asset database, but the evaluation is based more on age and useful life cycle, than on recent condition, an oversight he considers a “failing” in the system. A more “robust” database that includes recent conditions would prove to be a more “reliable tool to use for capital planning.” Much of their transit revenue sources come from sales tax and real estate transfer tax—both of which have suffered with the economic downturn.

Vicki Barron, TRIMET-Tricounty Transportation District of Oregon, said her agency—which has been more reactive than proactive—hasn’t implemented an asset management system, or developed an asset inventory list. But transit leaders would like to be “forced” to take a more rigorous approach toward assessing existing inventory, especially now as its start line is nearing 25- years-old. She asked whether FTA could impose reporting requirements related to SGR to “give us the kick in the pants that we need.”

Curt Miller, Sioux City Transit System, said that 11 out of 23 buses were purchased in 1988 and are past their expected life, but they are not as old as buses from other transit systems in the state. As a result, stimulus money cannot be used to replace them. “Buses are rated based on age and mileage,” Miller said. Local support tends to go toward funding expansions and development of multi-modal transportation projects. “We have to remind our Congressmen every year that these high profile projects take away from funds available for rolling stock.”

Jeff Knueppel, SEPTA, said that the agency puts safety first—ahead of modern fare collection systems, high tech customer information centers and aesthetics—and still needs twice as much funding as it is now getting to bring its assets into SGR. Putting off bus repairs, for instance, will cost more in the long run because buses will have to be replaced more quickly. SEPTA’s infrastructure improvement process is methodical. “We tend to work on geographic areas and get better cost by grouping things together.”

David Henley, New York City Transit, said that integrating new technology with a 100 year- old system is a major challenge. People with the skill sets necessary to maintain new systems are few and far in between. Companies which designed the programs are usually headquartered in Europe or Japan—and they’re hard to reach. “New technology has a shelf life that is indeterminate for us and rolling it out for a system as large as ours is a major factor.” Complacency among workers in the right-of-way is another major challenge.

Joe Lorenzini, Metra (Chicago, IL), said track and signal systems are in good shape but need to be upgraded to remain in a SGR. The agency can’t afford to install Positive Train Control Systems on all its lines, and over half of the system’s 800 bridges—over 90-years-old—are having trouble keeping up with the loads. Stimulus funding was used to rehab or replace cars and locomotives in the property’s aging fleet.

Advancing the State of Good Repair: Issues and Ideas

Darren Jaffe, Office of Program Management, FTA, and **Eric Waaramaa**, Deputy Director of Financial Planning, MBTA, reported on the results of the August 2008 SGR Workshop. They also talked about the FTA-Industry Working group which includes FTA staff and MBTA, NYCT, CTA, MARTA, King County Metro and Chapel Hill Transit, NC. ([FTA-Industry SGR Working Group.](#))

The FTA-Industry Working has been working to address some issues, which include the following questions: What is a SGR and how can it be measured it? How should industry define SGR? How can and should the Federal government help achieve SGR?

The Working group proposed that , a transit asset could be considered in a SGR, if its weighted rating point score—based on four attributes—is greater or equal to 2.5, where the lowest score equals 1 and the highest equals 5. The attributes include:

- Age of the asset relative to its design useful life.

- Asset condition as determined through field inspection or otherwise
- Whether they meet industry standards for asset performance, service reliability and customer comforts
- Backlog of maintenance/deferred maintenance.

“None of the criteria is ideal for defining the current level of SGR of any asset,” said Waaramaa. “Age doesn’t necessarily tell you if something is well, you could have system past its useful life and running fine, or an asset that is not close to expiring its useful life having problems. In terms of condition, you can have an asset that looks horrible but is running great

“Performance is key regardless of age or asset condition,” he said, “but it’s not the perfect criteria. How the system is running the day I came up with the score doesn’t give you an indication of how it will be running tomorrow. Level of maintenance is an attribute that leads to good or bad SGR, but you could defer maintenance and not see the results for a long time.”

But together, these attributes provide “a good proxy for whether an asset is within a SGR. It does provide for common definition of SGR. It can be used across all asset types, it’s easy to implement and easy for the public to understand. You may not have a perfect system but folks think we have a good system because they trust the numbers and know that policy decision are made (based) on the SGR database.”

The public understands when assets are not in SGR—and when reinvestment is needed to replace an asset or fix what’s broken.

One participant said he was concerned over the funding repercussions of scoring high on the SGR scale—and warned about the unintended consequences. Won’t agencies with lower scores get preference over funding because their system is in worse shape? “If a formula like this is used to allocate funds,” says a participant, “we would be penalizing those who are applying other funds to achieve a SGR and create an incentive for them to direct thousands elsewhere so they can claim more federal funds.”

Susan Schruth added that the ultimate goal at the federal and local level is to make sure all systems are brought up to a SGR—regardless of the transit’s current condition. “Our goal is to ensure we invest in systems that may need help no matter how much they bring their system up to SGR.”

Hopefully, she said, “we can get a big enough pot” to cover the needs of all the systems. Sen. Durbin, she said, already introduced legislation to provide \$50 billion a year, nearly \$20 billion over the next 10 years to bring systems up to SGR.” Another participant resented the notion that a rating scale would dictate policies about which assets need to be fixed or replaced first. Agencies can do their own internal capital needs assessments based on specific local knowledge. He doesn’t want “somebody to tell me which bridge I need to do next because it fits into a chart. I’d rather the guys on the ground tell me (what needs to be done most) based on their own hand-on approach.”

Keith Gates of FTA said it is not productive for transit properties to report one set of number for FTA, and another for internal use. “Hopefully,” he said, “we can iron out incompatibilities and avoid having you do two sets of data.”

Many agency representatives agreed there was much to be gained by defining SGR and by “speaking the same language.” One agency representative warned, however, against using the wording “poor condition” in the asset rating score because of its connotations with “unsafe.” “In our system poor is out of service,” he said. “The lowest thing we use in service is marginal. Once it gets into poor or unsafe (condition) we take it out of service.”

Safety and State of Good Repair

Michael Flanigan, Director, FTA, Office of Safety and Security, discussed the effect SGR has on safety. In describing what a safety management system is comprised of, he used the metaphor of a three-legged stool in a room. A system is sustained by people, procedures and equipment—all of which exist within an organizational culture.

“It’s important to ask,” he said, “how did we get to a state of less than optimum repair? What kind of decision making has gone on within agencies, government, FTA and Congress that lead us to where we are? If we don’t change the decision making model, twenty years from now we’ll be in the same place.”

Flanigan then pointed out the safety repercussions to operating a system that is not in a SGR, and urged participants to look for warning signs. Derailments, for instance, may be caused by deteriorating track structures. FTA hangs its hat on a good safety record. Although tragic accident like the one WMATA experienced recently are “few and far in between, the political repercussions are severe, casting a negative light on the entire industry.”

“We need to focus on being almost perfect,” he said.

Employee’s attitudes also deteriorate when repeatedly reported repairs are not made—contributing to a negative cultural environment.

Some properties invest their funds in safety at the expense of modernization or beautification. SEPTA, for instance, told us today they chose safety critical assets over a new farecard system and “paint jobs.” But when repairs are made to improve the system’s operation and enhance safety, the public is either unaware of it or unimpressed by it. “How do you make SGR more sexy, to get more publicity?”

Marketing experts suggest “using before and after pictures” of the property so the public can see the newly installed state-of-the-art farecard system and other improvements made to facilitate transit travel and make public transit more attractive.

Research

Vince Valdes, Associate Administrator for Research and Innovation, FTA, outlined FTA's research initiatives. The agency's Multi-Year Program Plan, issued annually, summarizes ongoing research projects and activities and identifies transit industry research needs and potential future research projects for funding consideration. ([State of Good Repair Research, Valdes.](#))

In FY 09, FTA appropriated \$80.5 million for research programs including the Transit Cooperative Research Program, Fuel Cell Bus Program, National Research & Technology Program and University Centers program. FTA's research includes providing support to increase transit market share and to improve the performance of transit operations and systems.

Potential research targets for 2010 include SGR and safety issues (such as improving maintenance practices/technologies,) better lifecycle cost models, advanced models to estimate new technology cost, and improved capability for crash avoidance. Next steps: Develop a strategic research plan for SGR, and expand outreach to transit agencies and other stakeholders to get their input in defining and ranking the order of research topics.

Best Approaches in Building an Effective Asset Management System

Rick Laver, Senior Consulting Manager, AECOM, said "asset management" is designed to help properties with large infrastructure manage their investments. Asset management programs provide agencies with a more informed understanding of the condition of their transportation assets, their long-term capital investment needs, and the costs, benefits and tradeoffs of all investment options.

Transportation Asset Management (TAM) can provide an assessment of the current physical conditions of existing transit assets based on the assets' types, ages, maintenance histories and past use. TAM is also used strategically to balance the competing needs of operations, maintenance, reinvestment and system expansion. ([Best Approaches to Building an Asset Management System, Laver](#))

Core questions TAM should address include:

- What is the current state of my assets?
- What do I own?
- Where is it?
- What condition is it in?
- What is the asset's remaining useful life?
- What is its remaining economic value?

Properties adopting TAM practices should ask themselves: "What level of investment do we need to attain specific objectives in SGR, and how long will it take to fix the problems given current funding sources?"

He then summarized the findings of FTA's recent Rail Modernization Study, which assessed the level of investment required to bring the nation's largest rail transit systems into SGR. Finally, he said the highway industry is ahead of transit when it comes to implementing asset management plans. "There are a lot of folks thinking about this and many industries are ahead of us, so let's figure out what they know," he said.

Are transit agencies required to use TAM results as the bases of their capital reinvestment program? "In the end," he said, "TAM is only a (needs assessment) model." It can be used as a decision support tool to help capital planning staff conduct "what-if" scenarios to answer questions like: "What level of investment is required to attain SGR in 10 years?" or "What happens to asset conditions if funding levels remain unchanged?"

"When we did the Rail Modification study," he said, "we came up with numbers similar to what agencies came up with themselves." The study compared TERM's modeled estimates of capital needs—generated by using FTA's national methodology—with each agency's own internal estimates of unconstrained capital reinvestment needs.

Another FTA staffer said that the TAM results can also be used to alert the public, legislators and other policy makers of what may happen if the agencies don't receive the funding they need to bring their system into a SGR. "That's more valuable than coming up with a number of dollars," he said.

Is there a correlation between an agency's SGR and the sophistication of their asset management system? Another FTA staffer said it's too soon to tell what influence the asset management process has on the agency's SGR backlog or status.

Legacy Systems—SGR Practices

Waaramaa said some of MBTA's infrastructure is over 100 years old. "Every day, every component of every system needs to work," Waaramaa said. "All it takes is a broken subway escalator to mess up your trip."

SGR is important because older transit agencies have aging systems, limited debt capacity, rising operating costs, shrinking revenues and increased ridership—creating more demands on the system. Maintenance and modernization of the current system must be a top priority. This is where SGR data base or asset management systems can help out. ([SGR: MBTA Practices and Lessons Learned, Waaramaa](#))

SGR, he said, is a capital planning tool which stores information of all asset types, broken into categories such as vehicles (Revenue & Non-Revenue), facilities, elevators, stations, signals, tracks. The scoring system is based on age, operational impact, and cost effectiveness. The system ranks capital actions, develops basic schedule and cash flows within specified funding limits, such as a 5-year capital program, and determines system impacts from various investment scenarios.

Data taken from the 2006 SGR Report shows that the backlog of capital investments required to achieve SGR is estimated at \$2.7 billion, \$470 million a year just to maintain current SGR backlog. “Our policy was developed around the number that came from the SGR database.” SGR database is also used in MBTA’s public relations effort to draw attention to its needs. “People believe in the numbers,” he said, “they can understand it, they see a list of projects that will or will not get done based on different funding levels.”

MBTA then ranked projects based on five factors specified in its enabling legislation. Factor 1, for instance, is safety, health and environmental impacts, while Factor 2 is SGR. The agency selected projects based on the ranking. Lessons Learned: Timely input of accurate data by departments is critical to a successful program implementation; the SGR database can be an important device for documenting the capital backlog and making the case to state and federal policy makers for increased funding levels.

“No transit system can achieve and maintain the ‘Ideal’ SGR condition,” he said, but SGR database can help management better define the current problem, forecast future capital funding needs, make more effective long term capital funding decisions and make an argument in favor of increased capital funding levels.”

Leah Dawson and **Mike Connelly** from CTA added that the property conducted a comprehensive engineering review in 1992-1994, and formed an asset database still used for structural inspections. The property then began a 20- year needs assessment with Capital Program Manager in 2001.

The project profile was defined by asset type, data was used in capital planning. “We did an estimate that it would take us \$822 million annually in capital investment once we reach a SGR to keep it going.” ([Chicago Transit Authority: Dawson & Connelly](#)) ([20 Year Needs Assessment Project Profile – Detail](#)), ([Detail of Projected CTA Annual Capital Cost](#)) and ([Detail of Capital Improvement Program ’09-13 Project Request Form](#).)

CTA’s vision for an asset database: One comprehensive database across Facilities and Power & Way which will include all assets, consider the integration of fare collection and communication.

David Henley, New York City Transit, broke down assets into visible and invisible components. Visible infrastructure includes railcars, stations and buses, while invisible infrastructure include , pump rooms, miles of track and power cabling, overhaul shops, subway tunnel route miles and fan plants. ([New York City Transit, Henley](#).)

The property conducts full asset inventories for the sake of capital planning every 5 years.

NYCT recognized it needed a new approach to implementing an asset management program that more adequately communicated true conditions, functionality and capital asset needs. The approach had to recognize SGR needs on a more detailed sub-asset basis—and information on condition would apply regardless of the previous legacy rating system.

According to the revised strategy, backlog defects would be eliminated within 20 years. “The strategy recognizes that not all components have the same replacement cycle,” he said. Lessons Learned: Condition information and reports are increasingly sophisticated and they should be used. “Make the tough life cycle choices—throw out the gold standards.” Recognize that there will never be “enough money,” but agencies can still make the “best” decisions.

One participant asked how often they brought SGR issues to their boards. Waaramaa said the 5-year capital investment program is revised yearly—and is submitted to the board every year. “We explain that it’s not just the sexy projects,” he said, “but lots needs to get done in SGR to maintain the current level of SGR.”

Henley says his agency meets with different subcommittees at least 7 or 8 times a year. “We feed them a lot of information on an ongoing basis on projects within the program. It’s a more real time exchange information. We may say to them, ‘We’ll spend \$2.5 billion in (rehabilitation) stations, and here are the stations. We’ll fix three vent plans, and here are the locations of the plants.’ It’s not a back and forth at that level.”

The MTA corporate office, not the board, makes decisions.

Dawson added that the property submits construction updates monthly. “They see projects in process,” she says. “In terms of strategic planning, they asked us to do more work explaining to them how we prioritize projects.” The property is reconvening an executive group focused on defining policy and sharing their vision for a SGR plan to make sure “they agree with it and sign off on it (our plan.),” she said.

Mid-Life Systems—SGR Practices

Richard Viner, Jr., from WMATA, one of the new generation heavy rail systems reaching mid-life, developed a ten-year CIP in November 2002, requesting \$12.2 billion. The plan included “Must Do” infrastructure renewals, “Need to Do” Systems Access and Capacity, and “Should Do” System Expansion. ([SGR, Lou Viner.](#))

The Metro Matters agreement, based on a multi-year program to, in part, maintain SGR, established an average level of capital spending of nearly \$500 million annually. Greater needs exist to keep the system in SGR because Metro is, for the first time, faced with replacement of a series of railcars, and many assets have a 30 year life cycle.

The capital needs assessment showed the need for improvements to enhance service and customer experience and to increase rail and bus capacity. Under a new practice, WMATA will award one contract to perform all rehab work in one segment of the system, starting with the oldest section first, to reduce cost and minimize conflicts and delays.

Contracts will also be awarded to bring rail yards and bus facilities into a SGR.

SGR is achieved, he said, when the infrastructure components are replaced on a schedule consistent with their life expectancy. Example: The useful life of a bus is 15 years. To sustain a replacement of the fleet on an annual basis, 1/15 of the fleet is replaced each year. Annual replacement will grow as fleet grows.

David Springstead, MARTA, said condition assessments form the basis of MARTA's Capital Improvement Program (CIP). The last assessment was performed in 2000 and includes asset break down by component and type starting with stations, traction power substations, delivery systems, transformers, etc. Where do you stop? Evaluating only the visible infrastructure of a facility or vehicle doesn't provide enough information to determine the true condition of the assets. "But if you go too small you get to this unmanageable ridiculous level... the information becomes massive and hard to keep track of in the database."

Nearly 50% of MARTA's revenue is spent on capital programs. "We don't have the ability to flex over from capital to operating," he said. "We are one of the only properties restrained that way. It would be nice if legislation gave us relief to move money over to operating."

In 2008, MARTA completed an independent comprehensive system -wide safety assessment which will be used when prioritizing projects to be undertaken with CIP funding. [\(Management Program – Springstead\)](#)

Jerry Rutledge, King County Metro, said his property has three asset management program: Fixed assets, vehicles (revenue and non-revenue), and IT (hardware and software). The fixed assets are grouped into four categories for inventory and inspection purposes including civil, architectural, mechanical and electric. The property's mission statement for fixed assets is to preserve the agency's plant and equipment, and replace it as indicated by facilities and equipment assessments, life cycle projections, condition inspections and maintenance reporting. [\(SGR Practices, Rutledge.\)](#)

The King County Asset Management Program is managed by a team of individuals who produce the annual Facilities Condition Report (FCR), a summary of the annual assessment of facilities, equipment and infrastructure. The report identifies and recommends action, includes project costs and recommends project schedules. The FCR is also used to help develop program budgets for asset replacement.

Factors other than a SGR may be considered when determining replacement or refurbishment of an asset.

A question was raised about the use of contractors in the TAM process. Springstead said his staff does "most of the heavy lifting work," and gets outside help for fine tuning or report writing. "You could burn \$750,000 with a consultant in a heartbeat before you get your work order written."

Do any of the agencies receive Dept. of Homeland Security funding? Springstead said MARTA tries to work with the Dept. of Homeland Security when protections such as a closed-circuit television (CCTV) and target hardening are installed. “We partner with police to maximize any projects with the monies that comes in.”

Rutledge added that many Homeland Security grants don’t include maintenance budgets. “We’ve had some of the security system for a couple of years and maintenance dollars are high,” he said. “We put in some chemical warfare sensors, and there is a high maintenance cost for those.” If police install CCTV or chemical detection systems, they’ll tell IT staff, ‘You can maintain the asset with existing staff.’

“We have to then come back and say, no, this project is not being advanced because we can’t pay to operate the thing once we install it,” he adds.

The asset conditions are tracked through Mincom Ellipse Maintenance Management, a system that enables the agency to manage their assets’ complete life cycle. Vehicle conditions are rated annually on a scale of 1 to 5, as required by New York State DOT.

Small Transit Systems—SGR Practices

Doran Barnes, FootHill Transit, said the private sector provides operating facilities for the transit system, which began services in December 1988. [\(SGR, Barnes.\)](#)

The vehicle’s appearance is tied in with the property’s mission. As such the property has a zero tolerance for graffiti. Buses are washed every other day, and they are waxed and polished twice a year. Barnes compares the property’s approach to good repair to Disney World, where “a piece of trash barely hits the ground when somebody comes by to pick it up.”

The transit agency looks at facilities and vehicles in terms of SGR. It contracts out with two companies to provide day-to-day operations and maintenance. Quarterly maintenance audits are conducted as a management tool to ensure “contractors are on their toes. It’s allowed us to maintain strong quality with the fleet.”

Technology impacts SGR initiatives since up-keep of SmartBus and Electronic Bus fleets require different maintenance systems. The agency partners with other transit systems and the local community college to provide training in “bite size pieces” so everyone can attend the classes.

Jeff Sweet, Niagara Frontier Transportation, said METRO operates and maintains a fleet of 326 full size buses, 27 rail cars, 66 small buses/vans and 5 replica trolleys. It uses 3 bus garages, a bus heavy maintenance facility and a rail maintenance facility. Its asset categories are broken down into vehicle (revenue and Non-Revenue), equipment and facility. [\(SGR—Sweet.\)](#)

Ray Friem, Metro, St. Louis said that, in the past, major maintenance investments were made in the declining years of bus life cycle and nearly 15% of the fleet was awaiting repair in the main shop at any given time, with average turnaround time of 117 days. Under the new program, MetroBus performs specific maintenance at regularly scheduled intervals based on unit mileage. [\(SGR, Friem.\)](#)

Anticipated program rewards: The property could calculate vehicle maintenance expenses, predict the vehicle's reliability over its entire life cycle, and improve maintenance without significant cost increase. SGR coaching tips: Develop one common measure for all managers and incorporate those into the evaluations, and rotate key manager assignments so, for instance, central repair area supervisors learn the impact of their teams' work on finished product.

In response to a question, Barnes said all FootHill assets were owned by the public agency. Private contractors just provided personnel to carry out the agency's mission. When the private sector provides capital assets the value of the assets has to be amortized over the length of the contract. The shorter the contract, the lower the equipment payments.

Friday, July 10th

International Perspectives on Asset Management and SGR

Bill Robert, Cambridge Systematics, Inc., said limited information is available on best practices beyond materials from the FTA SGR workshop. But agencies can draw upon Lessons Learned internationally. [\(International Perspectives, Robert.\)](#)

He discussed two international case studies: London Underground and Victoria Department of Transport. Both systems are mature and underwent privatization efforts. The public agencies ultimately reclaimed some of the previously privatized responsibilities.

The London Underground, for instance, developed a comprehensive asset register which included condition measures for all of its assets, and an annual asset management plan which took into account funding availability and deferred maintenance costs.

Conclusions: The most important element of a transit asset management plan is a well defined set of lifecycle maintenance policies. Transit agencies in the US should develop better measures to characterize conditions, calculate the impact of deferred maintenance, and build an asset hierarchy register.

Condition Assessment Standards in Bridge Asset Management

Gary Moss, FHWA, said that USDOT uses the National Bridge Inventory Standards (NBIS) component data to allocate bridge funds to the states and monitor national bridge

condition trends. State transportation departments are responsible for inspecting all bridges within their boundaries, except for bridges owned by Federal agencies. Routine bridge inspections take place at least once every two years. ([National Bridge Inspections Standards, Moss.](#))

Inventory of all bridges subject to NBIS must be prepared and maintained, and SI&A data must be entered into inventory within 90 days for State and Federal bridges and 180 days for all other bridges.

To be a program manager, for instance, the individual has to be a registered PE, or have 10 years bridge inspection experience, and have successfully completed an approved comprehensive bridge inspection training course.

Ann Shemaka, FHA, Office of Bridge Technology, said the National Bridge Inspection Program (NBIP) maintains inventory of all highway bridges on public roads, classifies them according to serviceability, safety and “essentiality for public use (sufficiency rating.) Priority for replacement or rehabilitation is then assigned based on that classification, and replacement or rehabilitation cost is then determined. ([National Bridge Inventory, Shemaka.](#))

The Coding Guide sets the minimum data elements to be inspected, how they are to be recorded and the format in which they are to be reported to FHWA. Ninety-Four data items are collected and stored in metric values, then broken down into groupings. Once the information is incorporated into the National database, a status is also assigned.

The four status types include: Structurally Deficient, Functionally Obsolete, Not Deficient, Not Applicable. A bridge, for instance, is considered structurally deficient if significant load carrying elements are found to be in poor condition or the waterway adequacy is insufficient. “This does not imply the bridge is unsafe rather in need of repair,” she said. “If a bridge is unsafe it is closed.”

Schipper said his property owns 65 bridges. “Of all asset maintenance material,” he said, “it’s the best documented. It’s the best data I have. That isn’t the case with other facilities.” Moss added that most bridge funds are “aimed at taking bridges we have and trying to keep them in good condition.”

TERM

Laver said the Transit Economic Requirements Model (TERM) is a decision support tool initially designed to estimate capital investment needs for the entire US transit industry, including investments in asset rehabilitation and replacement, expansion to meet ongoing growth in transit travel demand and investments to improve core capacity and operating speed. It provides an assessment of the current physical conditions of existing transit assets based on the asset type, age, maintenance history and past use. ([TERM, Laver](#))

TERM uses six modules to estimate national transit investment needs including, in part, Rehab-Replacement, asset expansion, crowding reduction, average speed increase, benefit cost I, and benefit cost II.

TERM's Rehabilitation and Replacement Module, for instance, estimates the long-term capital replacement needs. The module begins with an inventory of the total capital asset holdings at transit agencies and simulates the future replacement and rehabilitation needs of each asset over its lifecycle

The Rail Modernization Report relied on TERM to evaluate the SGR needs of nine rail operators. The agencies operate and maintain many of the nation's oldest transit assets—more than one third are in either marginal or poor condition. For all other US transit operators, the proportion of transit assets in marginal or poor condition is less than 20%, suggesting that agency reinvestment needs of the more mature agencies are higher than the rest of the industry

According to the study, TERM estimates a current SGR backlog for the seven study agencies at about \$50 billion (2008). Once this backlog has been addressed, an estimated annual average of \$5.9 billion in normal replacement expenditures would be required to maintain that SGR. Alternatively, agencies would need \$8.4 billion in annual investment to attain SGR over a 20-year period while also addressing normal replacement needs.

. A participant asked about the complexities of conducting sub-component inspections.

Rutledge said it varied by asset types. Buses and vehicles were comprised of 40 to 60 components. "It took a while to go through each vehicle, especially when inspectors were first doing the first round of assessments." The same team worked on all the inspections, providing consistency in the data. Facilities had closer to 80 to 100 different components. "You look at the roof, structure, pavement, lighting, electrical system, planning and equipment in the shop."

Was the rating system based on straight scoring or were they weighted for safety or other factors?

The weighted factors involved three tiers, Lever said. Round One started with the lifecycle weighting. "If you look at a specific component on the bus, what cost contribution did that component give to the total lifecycle cost of the bus? If it was a washer, a small component may not be a lot."

Round two questions the safety implications for that component. "When you get into safety," he said, "you get into subjective weighting of different components."

Round three addresses the vehicle's appearance and level of comfort. Did the vehicle look nice? Was it nice to be in? "Some buses may be in the same physical conditions as others but they smelled bad or looked terrible. We'd mark buses for those reasons."

Connelly asked about the decay curves: Did Laver update the numbers as he came across new data? Lever said the numbers are static. Engineers conducted inspections across the country

to generate the curves—but these should be updated periodically, given the utility of the vehicles “You may also want to adjust those decay curves to reflect local experience. The weather in Chicago is different than in other parts of the country and that may have an impact on life expectancy of different assets.”

Perspectives on Reauthorization

Robert Tuccillo, Associate Administrator for Budget and Policy, said that transit agencies need \$80 billion to bring systems into SGR—a 72% increase of the current budget. “It would be hard to increase budget that much in a single authorization,” he said. “We were thinking over several authorization, depending on how funding shakes out.” ([Perspectives on Reauthorization, Tuccillo.](#))

SGR is “on the tip of everyone’s tongue as we talk about reauthorization,” and it may be one of the top three issues discussed in surface transportation reauthorization.

Forty-four percent of the capital funding shares from 1997-2006 came from the federal government, 28% from state and local, and the rest from directly generated initiatives. The federal share increase won’t be enough to cover that amount, so transit agencies should “get your state or local governments to contribute more. It’s important that we recognize this is a partnership.”

The Fixed Guideway Modernization formula is a mix of seven funding tiers, lump-sum funding allocations, and formula-based allocations—funding sources that currently favor rail systems with newer assets. What kind of help can the government provide? Revise the current funding tiers and formula factors to more evenly match funding with reinvestment needs or revise formulas to cover roughly equal proportion of each grantee’s capital needs?.

Creating a Temporary SGR Investment Fund to eliminate SGR backlog would be another option. Nearly \$2.5 billion would be needed annually over a 20 year period to address the backlog experienced by nine agencies studied.

Connelly suggested the agencies produce “self generating revenues.” He said that when Metra raised its fare some of the revenue was set aside for capital projects—and not counted against operating revenue. Some agencies also own and operate parking concessions, and revenue goes into the capital funds as part of transit as well.

Tuccillo then addressed permitted uses of Fixed Guideway Funds. He said that financial plans for expansion projects seeking New Stars funding sometimes include Fixed Guideway Modernization as a project funding source. Is that appropriate, given the intended use of these funds and the magnitude of existing backlog of transit reinvestment needs? “You get more publicity when you cut a ribbon for a new project, or add an extension than when you show up and say, ‘We repaired 10 miles of track,’ or ‘we put in a new power generating system’”

Another participant once again raised the concern over treatment of agencies with high SGR scores. If funding will be allocated to properties based on the size of their backlog, he asked, “how do we avoid creating penalties for operators who don’t have such enormous needs because they resisted political pressure to use their formula funds for expansion projects?”

Tuccillo said the agency has been considering providing incentives to agencies with higher rates. “Nobody wants to penalize folks who have done a good job.” “We don’t have a solution,” he said, “but we are thinking about it. It’s not in our mind to penalize folks who did a good job. But at some point we need to bite the bullet and look at the \$80 billion in state of disrepair.”

Schruth pointed to the distribution of funds among some New Starts projects: 50% New Starts, 30% of formula funds or rail mod funds, and 20% local funding. “I feel we are raiding the other programs that are intended to be used to maintain the system at optimum performance. It really is an insidious pattern that has developed, nobody intended it that way but because there is so much demand for New Starts it gets the same amount as rail mod. “”

Reflection and Next Steps

In closing, Libberton encouraged participants to join the working group to continue dialogue and share practices. “We’ve been working with half a dozen agencies in the working group and 13 others from last August. We need to expand.” He closed the session with a summary of issues raised during the Roundtable and a set of action items—

- *Sustaining the Dialogue – FTA and the transit agencies should actively continue the dialogue on State of Good Repair (SGR)*
- *FTA Support – FTA will provide the necessary support in areas of Research, Reporting and Workforce Development to advance the SGR*
- *Defining State of Good Repair – The FTA-Industry workgroup should work and partner with all others to adopt a standard definition for the SGR*
- *Safety –We need as an industry to define Safety Critical Items*
- *Next SGR Roundtable – During the course of the next year, we should be thinking about holding another SGR roundtable.*

The First State of Good Repair Roundtable was adjourned.