TRANSIT ASSET MANAGEMENT (TAM)

Transit Asset Management (TAM) plans have been employed to inform the distribution of transit funds based on the condition of transit assets, with a goal of achieving and maintaining a state of good repair for agency assets. US DOT has found that nationwide an estimated 40% of busses and 23% of rail transit is considered to be in marginal or poor condition, with a $90 billion backlog in deferred maintenance and replacement. TAM plans allow transit agencies to monitor and manage their assets over time. They can help improve safety and increase performance and reliability. South Carolina has created a Group TAM Plan for rural transit agencies in the state, and larger transit agencies have been tasked with creating their own TAM plans to serve their differing needs.

TAM within the GPATS Region

GPATS has two transit agencies within its boundaries: Greenville Transit Authority dba Greenlink and Clemson Area Transit or CATbus. Each agency has its own needs and assets. Due to this, Greenlink and CATbus have created separate TAM plans. GPATS is not required to create a TAM plan of its own, as the MPO is only the designated recipient of FTA funds and not a transit agency. However, GPATS has adopted one set of TAM targets for the region. These targets have been selected to support both transit agencies equally. This involved GPATS selecting the lesser (or in this case higher value) target of the two transit agency plans to avoid setting too difficult a target for either agency.

TAM Process

Transit Asset Management involves setting performance measures for different asset classes. Agency assets are separated into four different asset categories with established performance measures. These asset categories are:

- Rolling stock
- Equipment
- Facilities
- Infrastructure

Agencies then assign each of their assets to one of these categories and begin measuring which ones have met or exceeded their useful life benchmarks. In other words, agencies are determining which assets are not in a state of good repair. This means that transit agencies are striving for low percentages. As assets age and their conditions deteriorate, performance measure values will go up due to the increased percentage of assets that have met or passed their useful life benchmark. Federal regulations require transit agencies to establish and report yearly targets, at least 5 years into the future, as an attempt to inform funding decisions.

Photograph provided by Clemson Area Transit

Transit Asset Management (TAM) Targets

As was mentioned earlier, each transit agency has different types of assets and, therefore, different needs. Generally, each asset category is split into different asset classes. For example, busses can be a general asset class under rolling stock but can also be broken into differing types of busses, such as articulated busses and cutaway busses. The table below summarizes all asset classes, and their associated targets, listed in three separate TAM plans, the State Group TAM Plan, Greenlink's TAM Plan, and CATbus' TAM plan, followed by the TAM targets adopted by the GPATS Policy Committee on October 15th, 2019. All funding decisions made in the TIP will consider these targets moving forward. In an effort to aid moving transit capital towards the regional targets, GPATS elected to set aside Guideshare funding specifically for transit capital projects.

Photograph provided by Greenlink

TRANSIT ASSET MANAGEMENT TARGETS (2019)

	Bus	Trolleybus	Articulated Bus	Cutaway	Mini-van	Van	Truck	Car	SUV	Non Revenue/ Service Automobile	GPS Units	Terminal/ Administration
SC Group TAM Plan	15%	N/A	N/A	30%	20%	20%	N/A	N/A	N/A	N/A	N/A	N/A
CATbus	80%	N/A	50%	N/A	N/A	5%	30%	N/A	N/A	60%	2%	5%
Greenlink	25%	0%	N/A	13%	N/A	0%	0%	0%	0%	N/A	N/A	0%
GPATS	80%	0%	50%	13%	N/A	5%	30%	0%	0%	60%	2%	5%

Table portrays the percentage of each asset class that has met or exceeded its useful life benchmark

INFRASTRUCTURE CONDITION

South Carolina has one of the largest state owned roadway systems in the United States of America. South Carolina is also in need of extensive infrastructure repair and replacement. When the State Gas Tax was introduced, 80% of state roads were in need of repairs and 750 bridges in the SCDOT inventory were considered structurally deficient. This is an $11 billion problem that not going to solve itself over night, but rather over the course of years. The state has formed a game plan to address as much infrastructure as possible over the next ten years. The process will work in tandem with infrastructure performance measures and will be monitored over time to assess its success.

Infrastructure Needs within the GPATS Region

The State as a whole has varying needs depending on the region in question. The GPATS region needs extensive repairs to its non-Interstate National Highway System. GPATS' baseline condition for the non-Interstate NHS is much lower than the state's and will need serious repairs to meet the State's 2-year and 4-year targets. The GPATS region's Interstates and bridges are above the State baseline conditions as a whole. GPATS bridge conditions are already well above the State's 2-year and 4-year targets.

Infrastructure Strategies

GPATS Guideshare funding does not typically cover repaving. That is handled by a separate SCDOT program. However, any GPATS project that is programmed and completed will improve the infrastructure in that area.

If coordinated well, GPATS funded projects can help cover more ground than the SCDOT Resurfacing program alone. Opportunities include looking for overlap between areas in need of infrastructure repair and areas in need of improvements consistent with GPATS funding policies, such as:

- Access management projects
- Widening projects
- Intersection and general improvement projects

A need for infrastructure repair, especially if it causes a safety issue, combined with any of the needs sited above will be considered in the GPATS ranking process. Infrastructure repairs completed with GPATS funds will open up SCDOT funding to repave and repair other roadway segments.
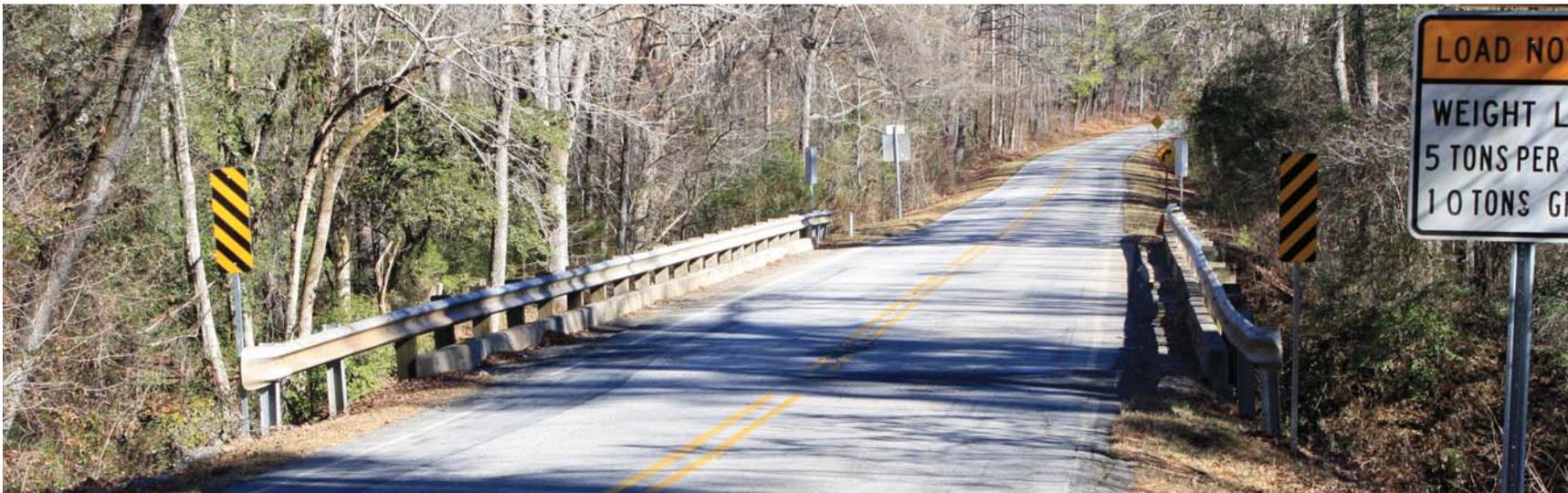
Infrastructure Condition Targets

Federal Regulations required state departments of transportations (DOTs) to establish and report quadrennial (4-year) targets for six infrastructure condition performance measures by May, 20th 2018.

- Percent of Interstate pavements in Good condition
- Percent of Interstate pavements in Poor condition
- Percent of non-Interstate National Highway System (NHS) pavements in Good condition
- Percent of non-Interstate NHS pavements in Poor condition
- Percent of NHS bridges by deck area in Good condition
- Percent of NHS bridges by deck area in Poor condition

INFRASTRUCTURE CONDITION TARGETS BASELINE (2016 AVERAGE)

	Pavement (Interstate)	Pavement (Non-Interstate NHS)	Bridges
SC Baseline	61.4% Good 1.7% Poor	10% Good 2.6% Poor	41.6% Good 4.2% Poor
SC 2-Year Targets	N/A	14.9% Good 4.3% Poor	42.2% Good 4% Poor
SC 4-Year Targets	71% Good 3% Poor	21.1% Good 4.6% Poor	42.7% Good 6% Poor
GPATS Baseline	68.67% Good 0.36% Poor	2.98% Good 28.75% Poor	95.9% Good 4.1% Poor

SCDOT created 4 –year targets for Interstate pavement condition and 2- and 4-year targets for non-Interstate pavement condition and bridge conditions. Like the other National Goal areas, MPOs are required to either adopt the State targets or create their own 180 days after a state announces its targets. GPATS Policy Committee elected to adopt and support the State targets on October 15th, 2018.

Pavement

Pavement condition was calculated using multiple thresholds, including the International Roughness Index (IRI), percent cracking, rutting, and faulting. A determination of good, fair, or poor condition depends on where 0.1 mile road segments fall along the thresholds. If all metrics rated "Good" a segment was considered in good condition. If 2 or more metrics rated "Poor," the segment was considered poor condition. Any combination in between was considered fair condition. These segment rankings were used to calculate the percentage of pavements in good and poor condition across the State and used to generate the State's targets. The targets are the median projected conditions based on the average deterioration rates of the system and planned construction projects that will be finished within the time frame.

Bridges

Bridge condition was calculated using the following thresholds: deck condition, superstructure condition, substructure condition, and culvert condition on a scale of 0 – 9. Scores 4 or below on a bridge feature were considered "Poor." A score of 5 or 6 was considered "Fair," and a score of 7 – 9 was considered "Good." These bridge component scores were then used to determine the percentage of NHS bridges in good and poor condition throughout the system. The State selected its targets using average bridge deterioration rates along with construction projects expected to be finished within the target time frame.

Next steps

Monitoring and Analysis

In two years SCDOT will have the opportunity to reevaluate their targets and decide whether to maintain them or change them. Once this has been done, GPATS will have the opportunity to do the same.

This will involve monitoring progress towards the targets over time to determine if the targets were reached, or will be reached, and why or why not. The Long Range Transportation Plan will house these analyses as the monitoring begins. These progress reports will follow the LRTP review schedule unless specified otherwise.

SYSTEM & FREIGHT RELIABILITY

System reliability refers to the amount of time a user spends traveling through a roadway and whether this time is consistent with the travel time the road is expected to facilitate. This directly impacts the daily lives of those living and working within a region and regional economic wellbeing as a whole. System reliability impacts commutes and other trip travel times, as well as freight movement. All three of these impact a business' decision to locate in one region over another. The State of South Carolina and the Upstate are highly involved in manufacturing. The South Carolina Inland Port is situated strategically along I-85 to facilitate both National and International commerce through the State. Due to this, ensuring a reliable transportation network is maintained is a high priority for both South Carolina and GPATS.

System Reliability within the GPATS Region

The GPATS region houses a large number of unreliable state and federal roadways, third behind only COATS and CHATS MPOs. GPATS sees most of its unreliability on the Interstate system, largely due to ongoing construction projects and/or capacity deficiencies. Many construction projects are scheduled over the following years to fix the capacity deficiencies, but the construction will have its own adverse effects for its duration as well. GPATS non-Interstate National Highway System (NHS) reliability is above the State's baseline, but similarly as more construction projects come into the region, the reliability of some of these roads could temporarily be impacted.

System Reliability Strategies

There are numerous strategies that can be utilized to improve system reliability. A few examples are:

- Improved emergency response times
- Widenings and other capacity improvements
- Interchange and intersection improvements
- Transportation Demand Management (TDM)
- Transportation System Management (TSM)
- Improved signal timings

GPATS decided to split its Guideshare funding into separate pots with funds allocated specifically to roadway projects, intersection and interchange projects, and signal retimings. The remaining strategies listed above are not in GPATS' control, but when combined with GPATS' efforts, they could help move the baseline and keep GPATS meeting future targets.

Rendering provided by SCDOT

System & Freight Reliability Targets

Federal regulations also required state DOTs to establish and report 4-year targets for three system and truck travel time reliability performance measures by May, 20th 2018.

- Percent of reliable person-miles traveled on the Interstate

- Percent of reliable person-miles traveled on the non-Interstate NHS

- Percent of Interstate system mileage providing for reliable truck travel time

SCDOT created 4 –year targets for non-Interstate NHS travel time reliability and 2- and 4-year targets for Interstate travel time reliability and truck travel time reliability. MPOs are required to either adopt the State targets or create their own 180 days after a state announces its targets. GPATS Policy Committee elected to adopt and support the State targets on October 15th, 2018.

Travel Time Reliability

Road segments were measured based on four different time categories: 6am – 10 am (morning), 10 am – 4 pm (day), 4 pm – 8 pm (evening) on weekdays, and weekends. Travel time measurements were collected and sorted into their corresponding time categories. Once complete, the 80th percentile was divided by the 50th percentile to create a ratio. A value of 1 meant the segment was reliable, while a value of 0 meant the segment was unreliable. The percentage of segments that are reliable was then calculated and split into Interstate and non-Interstate NHS segments. Targets were then selected with careful consideration of ongoing and expected construction projects in the state. The state gas tax will be generating many construction projects over

the next ten years, which are expected to reduce travel reliability. This is why the targets get lower vs higher.

Truck Travel Time Reliability

Truck travel time reliability was calculated similarly, but used the Truck Travel Time Reliability (TTTR) Index. After splitting the travel time measurements into their different time categories, travel time ratios were calculated by dividing the 95th percentile by the 50th percentile for each segment. These were sorted to get the maximum TTTR ratio per segment for each time period. This involved taking the largest ratio for each segment and multiplying it by the segment length. The sum of all the length-weighted segments was then divided by the total length of the Interstate to get the TTTR Index number. Future targets were selected with consideration of ongoing and expected construction projects in the state as before.

SYSTEM & FREIGHT RELIABILITY TARGETS BASELINE

	Travel Time Reliability (Interstate)	Travel Time Reliability (Non-Interstate NHS)	Truck Travel Time Reliability
SC Baseline	94.8% person-miles traveled that are reliable	89.8% person-miles traveled that are reliable	1.34 on TTTR Index
SC 2-Year Targets	91% person-miles traveled that are reliable	N/A	1.36 on TTTR Index
SC 4-Year Targets	90% person-miles traveled that are reliable	81% person-miles traveled that are reliable	1.45 on TTTR Index
GPATS Baseline	89% person-miles traveled that are reliable	92% person-miles traveled that are reliable	1.58 on TTTR Index

Next steps

Creating a Monitoring Template

As the monitoring process begins, GPATS will develop a template for what this process will look like and look into multiple strategies for relaying information and data to the public. This will include written documentation and graphics within the LRTP, but can also include other avenues of public outreach. This could include, but is not limited to, including performance measure status updates on GPATS social media and the GPATS website. For the time being, more details on the target setting methodologies can be found at http://www.gpats.org/plans/horizon2040.