

# What is really the useful life of your vehicles?

North Carolina Public Transit Association

2016 Annual Meeting

Charlotte, NC

**Ted J. Rieck, AICP**



# Useful life?



# Same Useful Life?



# Factors Affecting Useful Life

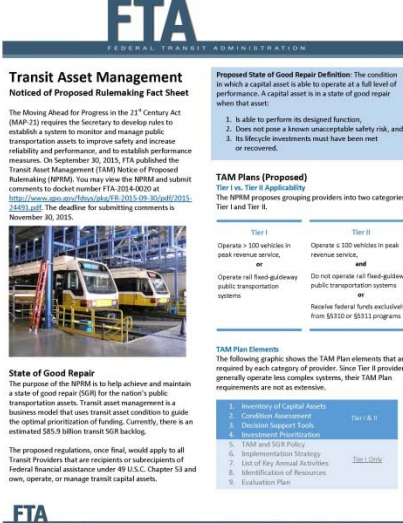
- Miles
- Speed
- Rehab practices



From *Useful Life of Transit Buses and Vans* (Washington DC: Federal Transit Administration, 2007)

# Transit Asset Management


- FTA developing rules for TAM Plans
- Include *(depending on size of fleet)*:
  - Asset inventory
  - Condition Assessment
  - Decision making tools
  - Prioritization Investment plan and policies
  - Identify resources
  - Evaluation of plan



**FTA**  
FEDERAL TRANSIT ADMINISTRATION

### Transit Asset Management Notice of Proposed Rulemaking Fact Sheet

The Moving Ahead for Progress in the 21<sup>st</sup> Century Act (MAP-21) requires the Secretary to develop rules to establish a system to monitor and manage public transportation assets to improve safety and increase reliability and performance, and to establish performance measures. On September 30, 2013, FTA published the Transit Asset Management (TAM) Notice of Proposed Rulemaking (NPRM). You may view the NPRM and submit comments to docket number FTA-2013-09-03 at <http://www.reg.gov/docket/fta/2013-09-03.nprm/2013-14431.pdf>. The deadline for submitting comments is November 30, 2013.



**Proposed State of Good Repair Definition:** The condition in which a capital asset is able to operate at a full level of performance. A capital asset is in a state of good repair when that asset:

1. Is able to perform its designed function,
2. Does not pose a known unacceptable safety risk, and
3. Its lifecycle investments must have been met or recovered.

**TAM Plans (Proposed)**  
Tier I vs. Tier II Applicability  
The NPRM proposes grouping providers into two categories, Tier I and Tier II.

Tier I	Tier II
Operate > 100 vehicles in peak revenue service, <b>or</b> Operate all fixed-guideway public transportation systems	Operate > 100 vehicles in peak revenue service, <b>and</b> Do not operate all fixed-guideway public transportation systems <b>or</b> Receive Federal funds exclusively from §3102 or §3111 programs.

**State of Good Repair**  
The purpose of the NPRM is to help achieve and maintain a state of good repair (SGR) for the nation's public transportation assets. Transit asset management is a business model that uses transit asset condition to guide the optimal prioritization of funding. Currently, there is an estimated \$85.9 billion transit SGR backlog.

The proposed regulations, once final, would apply to all Transit Providers that are recipients or subrecipients of Federal financial assistance under 49 U.S.C. Chapter 53 and own, operate, or manage transit capital assets.

**TAM Plan Elements**  
The following graphic shows the TAM Plan elements that are required by each category of provider. Since Tier II providers generally operate less complex systems, their TAM Plan requirements are not as extensive.

	Tier I & II
1. Inventory of Capital Assets	
2. Condition Assessment	
3. Decision Support Tools	
4. Investment Prioritization	
5. FIM and SGR Policy	
6. Implementation Strategy	
7. List of Key Annual Activities	Tier I Only
8. Identification of Resources	
9. Evaluation Plan	

**FTA**

# Focus on Revenue Vehicles

- Largest on-going capital cost
- Day-to-day impact
- Challenging to get funds
- Long held conceptions about useful life

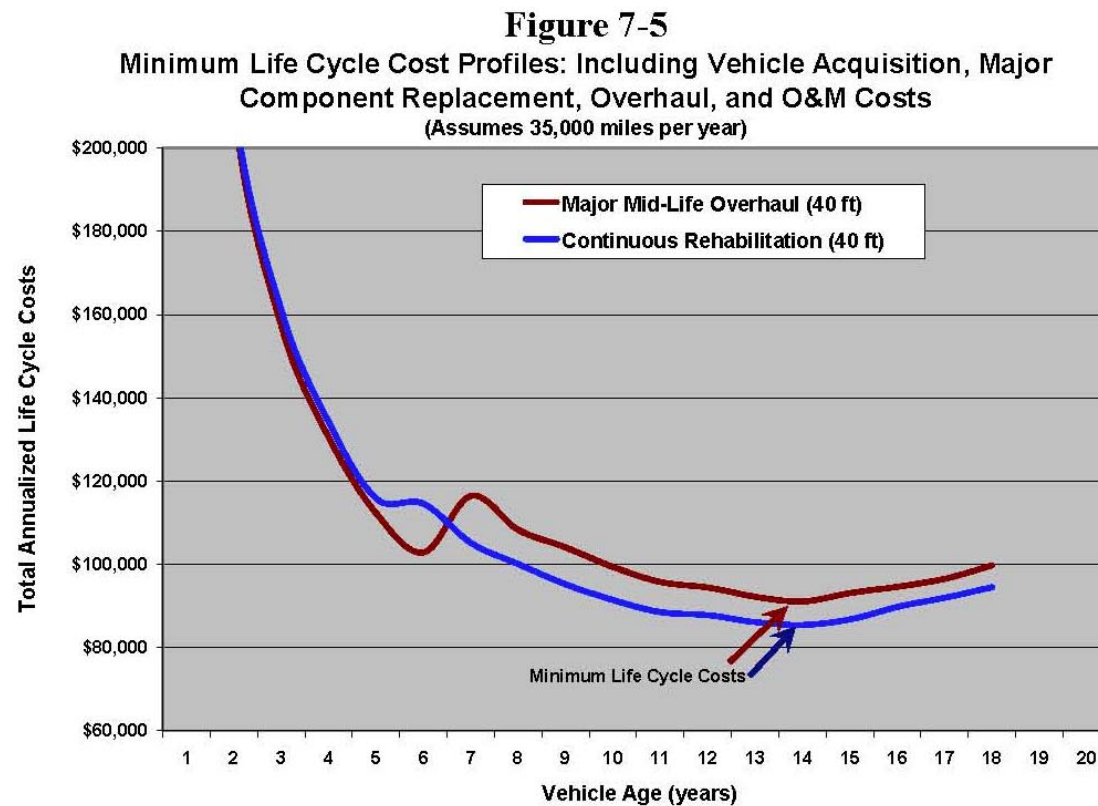


# Vehicle Model Tool

- Projects time and mileage when cost to maintain exceeds replacement cost
  - Based on your agency's experience
  - Spreadsheet
- *TCRP Report 157— State of Good Repair: Prioritizing the Rehabilitation and Replacement of Existing Capital Assets and Evaluating the Implications for Transit (2012)*
- *FTA's Useful Life of Transit Buses and Vans (2007)*

# How Does VMT Work

- Financial analysis tool





# Applications

- High Point Transit System
  - High Point, NC

North Carolina



- Saginaw Transit Authority Regional Service
  - Saginaw, MI

Michigan



# Saginaw

Year	Make/Model	Number	Average Life Miles/Vehicle	Average Miles per Bus/Year
1998	Orion II	2	389,145	22,891
1999	Orion II	5	462,735	28,921
2000	Orion II	1	364,452	24,297
2000	Orion V	3	412,017	27,468
2001	Orion V	4	362,986	25,928
2005	Orion V	2	310,793	31,079
2010	Orion VII	5	198,302	39,660
<b>Total/Weighted Average</b>		<b>22</b>	<b>352,614</b>	<b>30,057</b>

Average fleet age about  
12.5 years in 2015



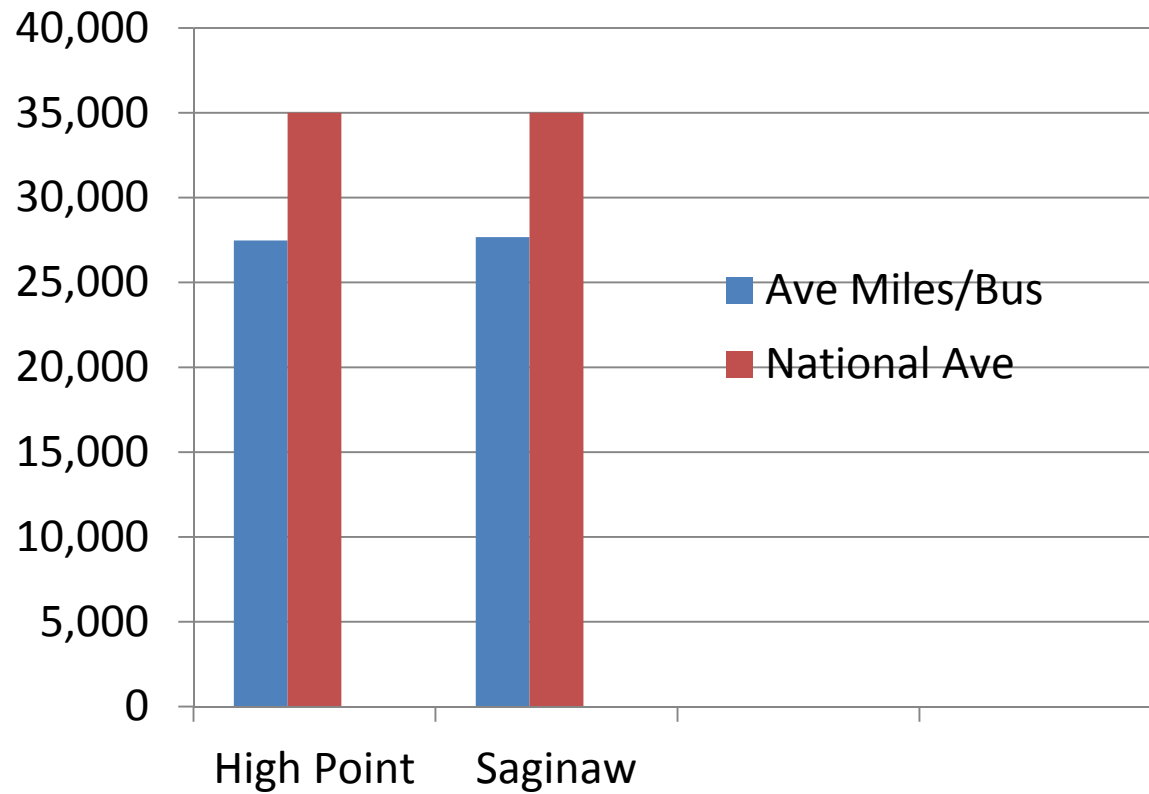
# High Point

Year	Make	Number	Average Life Miles/Vehicle
2004	Daimler	15	299,603
2005	Daimler	1	16,788
2010	Orion	1	112,284
<b>Total/Weighted Average</b>		17	271,948

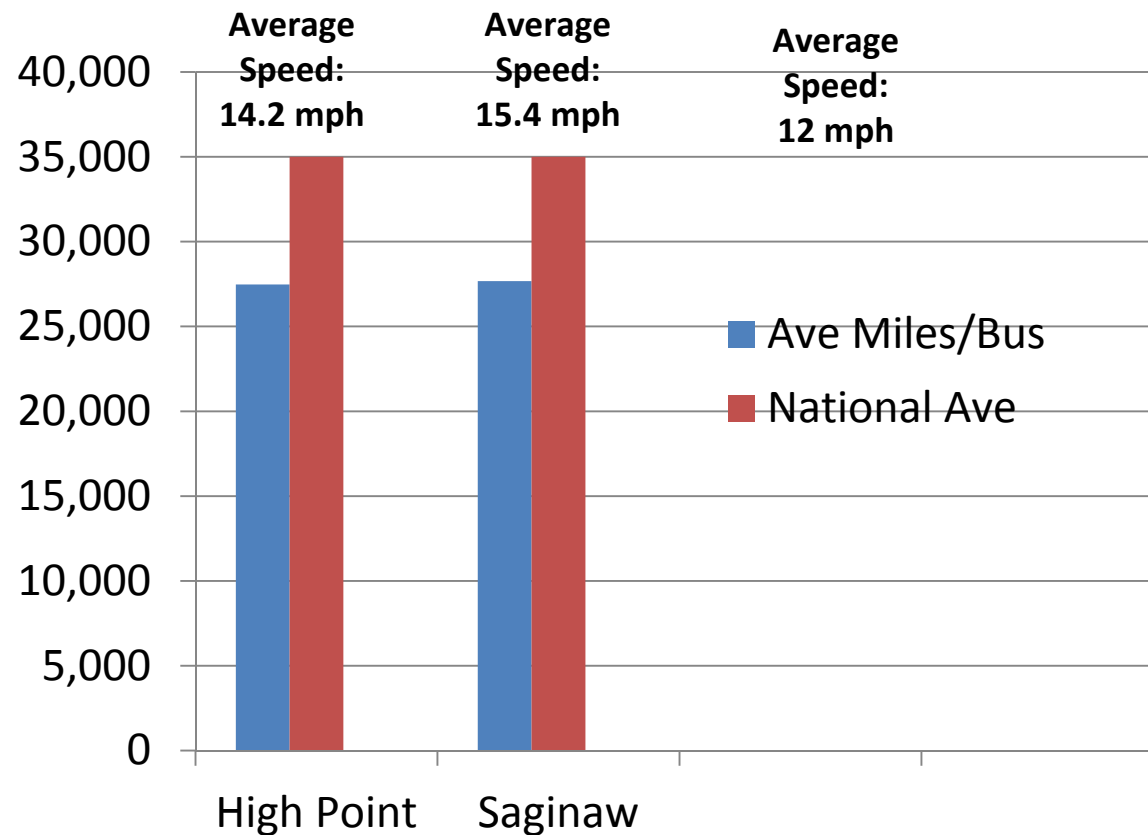
Average fleet age about  
11 years in 2015



# Average Annual Miles



# Average Annual Miles



# Other Key Data *(2015 Annual)*

## High Point

- 250 road calls *(est.)*
  - 10 minutes to recover
- \$27,941 maint. cost/bus
- \$13,706 fuel cost
- New bus \$500,000

## Saginaw

- 99 road calls
  - 60 minutes to recover
- \$34,036 maint. cost/bus
- \$13,295 fuel cost
- New bus \$420,000

# Data Inputs

**TCRP E-09  
TRANSIT STATE OF GOOD REPAIR  
VEHICLE REPLACEMENT MODEL - INPUTS  
HIGH POINT FIXED ROUTE**

**INSTRUCTIONS**

Note: this model is used to predict the average annual cost, the cost-minimizing replacement age, and prioritization data for transit vehicles.  
To use this model please follow these instructions, and see the TCRP E-09 report for more information.

1. Open the spreadsheet with macros enabled
2. Select an asset type from the dropdown or select "User-Specified" if developing a new model.
3. Enter accumulated mileage (per vehicle) and number of vehicles for up to 20 subfleets of the same vehicle type.
4. Enter the base year and base year fleet statistics.
5. Enter the cost of a new vehicle.
6. If desired enter an estimate of other replacement benefits per vehicle mile (e.g., reduced emissions).
7. If desired enter the delay cost, typical schedule headway, recovery time, vehicles per consist, and/or the discount rate.
8. If desired click the "Click to Edit Details" button to edit additional details (necessary only for a new model).
9. To view results click the "Click for Results" button.

**REQUIRED INPUTS**

Vehicle Type: Motor Bus -Direct Ops

**Inventory Description:**

Group	Accumulated Mileage	Number of Vehicles	Group	Accumulated Mileage	Number of Vehicles
2004 Daimler	299,603	15	11		
2010 Orion	112,284	1	12		
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4			14		
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17

**Base Year Statistics:**

	Default	Override Value	Notes
Base Year	2009	2015	
Passenger Miles (000)	1	4,280	at 5 miles/rider (placeholder)
Unlinked Trips (000)	1	856	
Vehicle Miles (000)	1	534	31,412 per bus
Revenue Vehicle Miles (000)	1	467	27,471 per bus
Revenue Vehicle Hours (000)	1	33	1,941 per bus/yr
Number of Road Calls (buses) or Failures (rail)	1	250	14.71 per bus est
Energy Cost for Vehicle Operations (000)	1	233	\$13,706 per bus
Vehicle Maintenance Cost (000)	1	475	\$27,941 per bus

**OPTIONAL INPUTS**

	Default	Override Value	Notes
New Vehicle Cost (\$ per vehicle)	397,000	500,000	
Other Benefits of Replacement (\$/vehicle mile)	0.00		results in higher benefit for replacement
Passenger Delay Cost (\$ per hour)	48.40	48.40	
Typical Schedule Headway (min)	30	45	
Typical Recovery Time After Road Call/Failure (min)	60	10	estimated; leave blank for default
Vehicles per Consist	1		leave blank for buses
Discount Rate (%)	7%	5%	placeholder

[Click to Edit Details](#)

[Click for Results](#)

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Life Mileage



Vehicle Type



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Vehicle Type

Life Mileage

Passengers, hours, miles, road calls, costs

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Life Mileage

Passengers, hours, miles, road calls, costs

Vehicle Type

New vehicle cost, headway, road call recovery, cost of funds

# Results

## High Point

- Replacement Miles:
  - **565,412**
- Replacement Age:
  - **18 years**

## Saginaw

- Replacement Miles:
  - **689,344**
- Replacement Age:
  - **21 years**

# Results

## High Point

- Replacement Miles:
  - **565,412**
- Replacement Age:
  - **18 years**

## Saginaw

- Replacement Miles:
  - **689,344**
- Replacement Age:
  - **21 years**

## FTA

Minimum Replacement miles: **500,000**

Minimum Replacement age: **12 years**

# Tempering Results

- High Point difficulty in getting parts
- Tolerating road calls
- Cosmetic issues
- Other



# Observations

- VMT gives a data point; don't rely on one-size fits all standard
- Can help make the case for capital funding; concrete information
- Puts spotlight on maintenance programs.



# Questions

*TCRP Report 157— State of Good Repair: Prioritizing the Rehabilitation and Replacement of Existing Capital Assets and Evaluating the Implications for Transit (2012)*

<http://www.trb.org/Main/Blurbs/167637.aspx>

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