

Shameless Plug



NEBRASKA 2018

IHEEP 2018

Hosted by Nebraska DOT

IHEEP 2018 President – Jon Starr

23-27 September 2018



North Carolina Department of Transportation

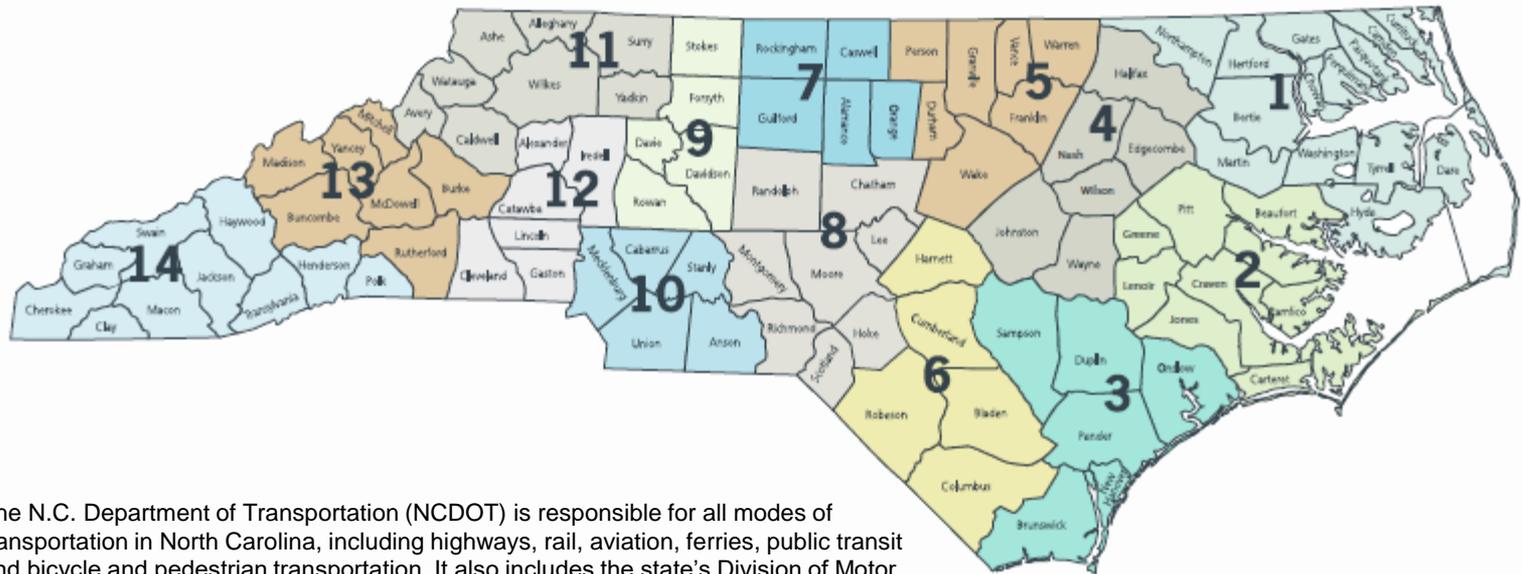
Asset Management, Polices and Tools for Bridges



2018 HEEP Area V / TEM meeting May 28-30 Prague, Czech Republic



14 Transportation Divisions



The N.C. Department of Transportation (NCDOT) is responsible for all modes of transportation in North Carolina, including highways, rail, aviation, ferries, public transit and bicycle and pedestrian transportation. It also includes the state's Division of Motor Vehicles (DMV), which oversees driver license issuance and vehicle registration along with other operations related to motor vehicles in our state, and the Governor's Highway Safety Program, which promotes safety awareness to reduce roadway crashes and fatalities. In addition, NCDOT also helps expand economic growth opportunities through oversight of the State Ports, the N.C. Global TransPark and N.C. Turnpike Authority.

one of the largest

state-maintained highway systems in the nation with nearly 80,000 miles of road

more than 13,500 bridges



Inspectors check about 9,000 of these bridges and culverts each year.

nearly **15,000 miles** of primary highways (Interstate, US and NC routes)

nearly **65,000 miles** of secondary roads

Every year, **more than 56 million passengers fly to and from North Carolina** and over **1.3 billion pounds of cargo** pass through the state's airports.



72

publicly owned airports and nearly 300 privately owned airports, heliports and other landing areas; more than 7,000 registered aircraft and 14,000 licensed pilots

nearly **3,300**

miles of mainline railroad track and **6,218 total at-grade railroad crossings** in North Carolina

2nd

largest state-operated ferry system and the

largest

on the East Coast

about 2 million passengers rely on this service



21

ferries that serve

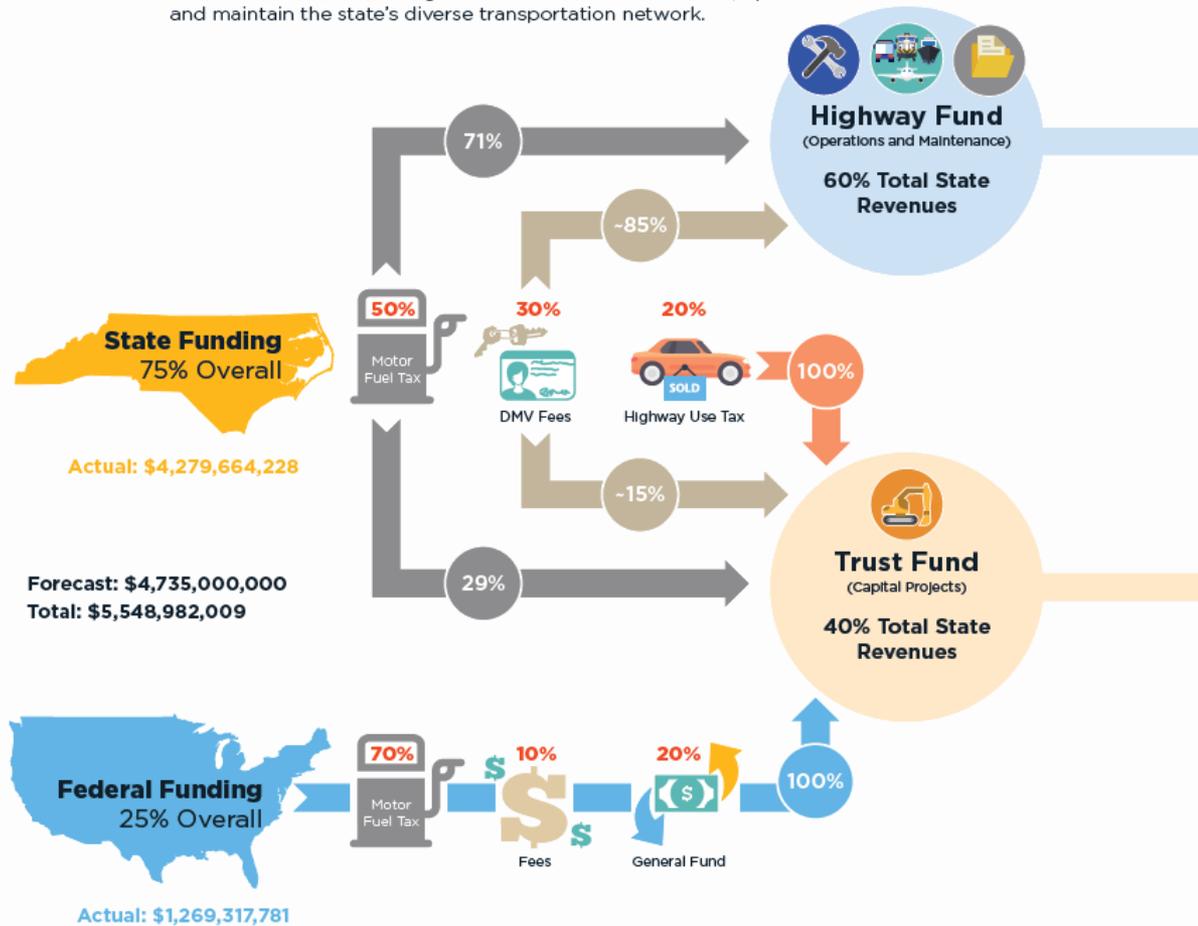
7

routes

more than **5,000** miles of regional or statewide bicycle and pedestrian routes planned

funding sources and allocation

NCDOT has an annual budget of about \$4.7 billion to build, operate and maintain the state's diverse transportation network.



expenses

Maintenance Actual: \$1,411,365,816



25%

Primarily supports projects that help take care of the state's existing transportation system. This includes resurfacing highways, replacing bridges and paving unpaved secondary roads. Funds are distributed across North Carolina based on need.

Modes Actual: \$357,175,513



8%

The Highway Fund also supports the Powell Bill Program, which provides state aid to municipalities for pedestrian, bicycle and road improvements.

Administrative Actual: \$738,002,444



17%

Forecast: \$5,171,000,000

Total: \$5,285,722,504

Construction Actual: \$2,779,178,730



50%

Primarily funds new construction and expansion projects across all modes of transportation. Funding is allocated on local, regional and statewide levels based on data and input from local planning organizations and NCDOT divisions. Federal funding accounts for about 45 percent of NCDOT's available funding for these types of projects.

NCDOT is responsible for the second largest state-maintained road network in the United States and continues to grow its asset portfolio. North Carolina's highway assets have a value of roughly \$575 billion and the Department is responsible for ensuring this value is retained for future generations. Figure 4 below summarizes the quantity of major assets being managed and their value:

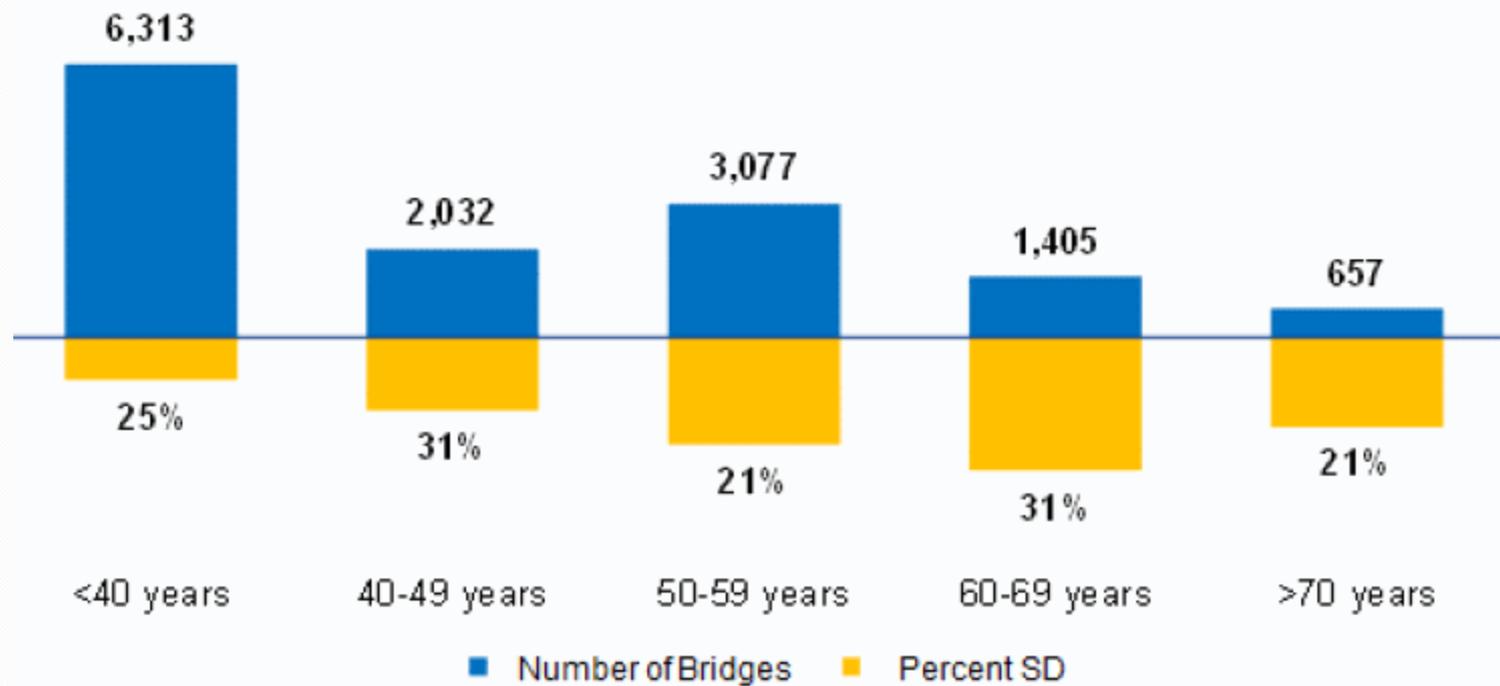
Figure 4: Highway Asset Portfolio

Highway Asset Type	Approximate Quantity	Estimated Asset Value
Bridges (number)	13,500	\$60 billion
Pavement (lane miles)	163,000	\$62 billion
Other Roadway Assets (centerline miles)	80,000	\$446 billion
Large Pipes and Culverts (each)	27,000	\$7 billion
Total	NA	\$575 billion

Much of the system is growing and the committed portion, or the first 5 years of the 2016-2025 State Transportation Improvement Plan (STIP) will add roughly 1,200 lane miles of new capacity and 170 new bridges to the system, which in turn entail growing maintenance and operations responsibilities. This growth is further increased by the vast and growing subdivision routes that DOH also maintains. This growing portfolio underlines the importance of a robust and effective maintenance and operations program.

Most of the bridges on the state system were designed for a useful life between 50-60 years.

Structurally Deficient Bridges by Age



North Carolina's bridge portfolio consists of approximately 13,500 bridges statewide of which 13% are considered SD

Percent SD Bridges Comparison, 2013 vs. Current (2016)

System / Year	2013	Current (2016)	Impact / Change
Interstate	6%	4%	-2%
Primary	11%	9%	-2%
Secondary	24%	17%	-7%
Statewide (weighted average)	19%	13%	-6%

Section Summary – Bridges

This section describes the BMIP – the planning process, work performed by Divisions, and funding implications. A summary of key observations are provided below:

- State funding of \$250 million annually meets the need for structurally deficient bridge improvement.
- However, to mitigate risks, managing deterioration of “high value” bridges is important
 - There are 185 high value bridges each with an estimated replacement cost between \$20 million and \$300 million.
 - If allowed, continued deterioration will require replacement of these bridges.
 - The number of substantially deficient bridges will increase and Bridge Program funding would be consumed at a faster pace, resulting in an inability to meet established SD targets by 2030.
 - High value bridge preservation of \$30 million annually can significantly extend the service life – preventing them from becoming structurally deficient and in need of replacement.

RMIP and Inspections for Routine Bridge Maintenance Activities

The Department performs a safety inspection on each of its bridges and NBIS culverts every 24 months. Through this process, maintenance needs are identified and prioritized by the Structures Management Unit. In addition, division bridge maintenance offices perform annual reviews of each bridge to identify maintenance needs. These bridge maintenance needs are categorized into the following priorities:

- **Critical Finds** – Needs that require immediate response to ensure safety, or restore necessary weight limits.
- **Priority Maintenance** – Needs that may result in a safety concern or reduce the posted weight limit in the near term.
- **Planned and Routine Maintenance** – Needs, that if addressed, will slow deterioration and reduce future lifecycle costs and unplanned service disruptions.

Division bridge maintenance crews are responsible for addressing these needs with their GMR allocation.

What are our Service Levels (bridge.

Target	Condition Element	Performance Measure	Interstate	Primary	Secondary
			2	6	15
BRIDGES AND OTHER STRUCTURES	Percent of SD Bridges	Percent of structurally deficient bridges by system and statewide target of 10% by 2030	4	9	17
			85	80	75
	NBIS Culverts	Condition Rating ≥ 6	99	98	97
			80	75	70
	Non-NBIS Culverts	Condition Rating = Good	96	94	85
			90	90	
	Overhead Sign Structures	Condition Rating = Good	98	97	N/A

How were they established?

Carefully – Trial and Error

Do you make cost-benefit Analysis when establishing service levels in Maintenance- to decide what should be the service level and how it influence lifetime value of the asset? How do you measure this service level?

Not Really

Do you IT tools to support the processes of performance measurement?

BMS – Bridge Management System Agile Assets module

BDS – Bridge Design System

Wiggins – Bridge Inspection, Inventory and Prompt Action system

MMS – Maintenance Management System

CARS – Citizen Action Request

SAP – Financial System

Do you have more –Output service levels & KPIs (quantity of work i.e. km maintained, # of culverts cleared).

Transitioning to. NCDOT is more concerned with Level of Service i.e. # signs replaced, miles paved etc.

Or more outcome service levels & KPIs (so results i.e. m²of deficient pavement,% of culverts plugged)

Rather report what is working rather than amount that isn't

Do you use life cycle planning to support asset management (as stated in the FHWA document from November 2017?)

Transitioning to Slowly

Recent allocations have been sufficient to address Critical Finds, Priority Maintenance, and emergency pipe replacements, but **most planned and routine maintenance needs have lacked attention because of their relative low priority.**

The **RMIP (Routine Maintenance Improvement Plan)** was established in 2016 as a planning and communication tool for Divisions to identify production goals and allocate funding based on targets and objectives.

Key objectives of the RMIP are outlined below:

The RMIP holds divisions accountable to their budget allocation.

Each Division allocates 75% of their GMR funds to specific planned and reactionary activities in their plan. In addition, Divisions also commit to meeting their production goals expending their allocation by the end of the fiscal year. This unplanned allocation provides divisions with flexibility to support reactionary needs that cannot be anticipated during development of plans at the beginning of each year.

The RMIP verifies that divisions are allocating funds to planned activities.

Plans drive performance and communicate where Divisions will spend their funds. The RMIP will also identify the type of activity (i.e. planned or reactive), and focus on defining and reducing unit cost. These plans will be developed by the Divisions and County Engineers relying on local/ historical knowledge to ensure work is being performed on routes and assets that will better the system condition.

Few closing observations:

- Know who your audience is.
- Remember there are no magic numbers.
- Just because you have the money doesn't mean you have the means.
- Use common sense and listen to your staff.

2016-17 performance scorecard

Highway Performance Profile:

INFRASTRUCTURE HEALTH CONDITION SCORES

BRIDGE HEALTH INDEX (% GOOD)

Division	Interstate	Primary	Secondary	Total
1	100.0	78.1	68.0	73.1
2	N/A	87.7	68.1	77.2
3	100.0	85.3	64.3	75.2
4	97.4	85.5	66.9	78.0
5	97.1	85.9	76.4	82.8
6	75.0	83.9	70.6	76.4
7	92.1	70.6	67.1	72.2
8	87.5	83.0	68.8	74.7
9	94.9	67.0	78.6	75.7
10	90.7	79.5	74.7	79.0
11	94.3	79.2	58.2	62.3
12	71.8	83.6	72.8	75.8
13	85.4	78.6	69.2	72.3
14	71.1	84.6	66.1	69.7
Statewide	89.5	81.3	68.3	73.9

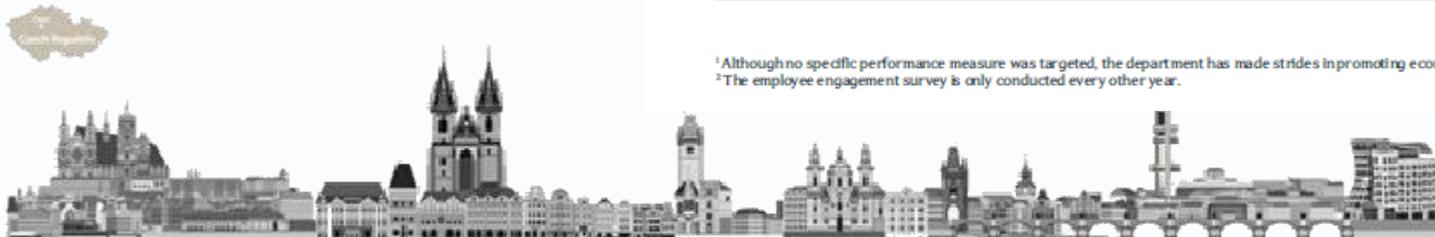
Notes:

1. Bridge Condition is defined as the percentage of bridges rated in good condition as of June 30, 2017.
2. Division 2 does not maintain any Interstate mileage.

✓ Measure has been met ✗ Measure has not been met

Goal: PERFORMANCE MEASURE	Previous Result	Current Result	Target Met
Make transportation safer: FATALITY RATE Reduce fatalities by at least 2 percent or greater	1.26	1.21	✓
Provide GREAT customer service: CUSTOMER SURVEY SCORE Achieve an overall customer satisfaction result of 85 percent or greater	84%	84%	✗
Deliver and maintain our infrastructure effectively and efficiently: COMBINED INFRASTRUCTURE HEALTH SCORE Achieve an infrastructure health composite index of 75 percent or greater	74%	74%	✗
Improve the reliability and connectivity of the transportation system: HIGHWAY TRAVEL TIME INDEX Increase the percentage of time when travel times are met based on highway speed limits to 80 percent or greater	0.98	1.00	✓
Improve the reliability and connectivity of the transportation system: PUBLISHED SCHEDULE SUCCESS RATE (ON-TIME PERFORMANCE OF FERRY AND PASSENGER RAIL SERVICE) Increase the percentage of time when trips with published schedules are met to 80 percent or greater	75%	74%	✗
Promote economic growth through better use of our infrastructure: ECONOMIC INDICATORS Increase the economic vitality of North Carolina ¹	N/A	N/A	N/A
Make our organization a great place to work: EMPLOYEE SURVEY Achieve an employee engagement survey score of 5.25 or greater ²	5.30	N/A ²	N/A

¹ Although no specific performance measure was targeted, the department has made strides in promoting economic growth.
² The employee engagement survey is only conducted every other year.



2016 Maintenance Operations and Performance Analysis Report (MOPAR)

December 2016



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION



2017
annual report
PERFORMANCE

THANKS FOR ATTENDING

Any Questions,
Comments or
Derogatory Statements?



EMAIL ME



at either of the following addresses



rjrobinson@ncdot.gov



rande robinson@gmail.com



Czech Republic



2018 HEEP Area V / TEM meeting May 28-30 Prague, Czech Republic

SOCIAL CONTACTS



Randall Robinson

<http://rjrcubed.blogspot.com/>



@randerobinson



Randall (Rande)Robinson



NEBRASKA 2018

Hope to see everyone at the
60th annual International
Highway Engineering
Exchange Program Conference
in Lincoln, Nebraska

23-27 September 2018



2018 HEEP Area V / TEM meeting May 28-30 Prague, Czech Republic

Final Shameless Plug



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In Lincoln, Nebraska