

Future of Asset Management

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Asset Management

The future of our nation's transportation infrastructure will be highly dependent on the successful application of asset management principals.

Asset management is not widely understood by either agency or external stakeholders.

Therefore...

It is more important for practitioners to apply the concepts than get hung up on definitions.

...you have to start.



Asset Management Approach

- **Policy Driven** - Decisions based on well defined policy
- **Performance Based** - Policy decisions drive the outcomes
- **Analytical Analysis** - Resource allocation based on modern investment analysis and best value concepts
- **Decisions based on Quality Information** - Investment decision based on accurate and timely data
- **Monitoring for Accountability** - Performance results are monitored for accountability and efficiency improvement

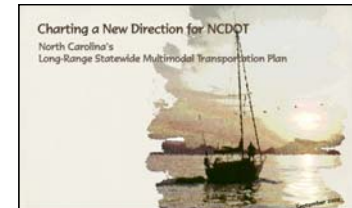


*Allows better communication with stakeholders, legislature and public
Better able to allocate resources to most needed work*



Policy Driven

- Common agency vision and goals



Mission & Goals

NCDOT
OUR MISSION
 "Connecting people and places in North Carolina – safely and efficiently, with accountability and environmental sensitivity"

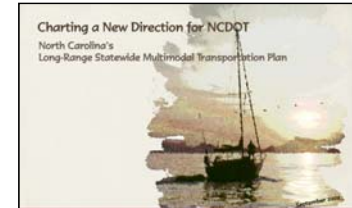
OUR GOALS

- Make our transportation network **safer**
- Make our transportation network move people and goods more **efficiently**
- Make our infrastructure **last longer**
- Make our organization a place that **works well**
- Make our organization a **great place** to work.



Policy Driven

- Common agency vision and goals
- Strategic or long range plan
 - Needs vs. funding availability
 - Prioritization / trade offs
 - Balance capital, modernization, preservation and maintenance




Policy Driven

- Network vs. Project
 - Recognize differences in networks
 - Projects and programs drive network results




Highway System Definition (Tiered Approach)

- **Statewide Tier** - Facilities such as Interstates and major Primary Highways which serve long-distance trips, connect major population centers, have the highest usage and primarily provide a mobility function.
- **Regional Tier** - Minor US and NC designated highways which connect regional centers and typically serve high levels of demand for short distance like commuter travel.
- **Subregional Tier** - Minor NC routes and Secondary Roads which serve localized, short distance movements, have low demand, and provide land access to homes and businesses.




Policy Driven

- Network vs. Project
 - Recognize differences in networks
 - Projects and programs drive network results
 - Establish metrics and targets




Performance Based

- Performance Measurement:
 - Clearly defines organizational objectives or outcomes
 - Uses data/statistical evidence to determine progress toward established goals/outcomes
 - Measures efficiency, effectiveness of organization's programs and operations (condition, quality, timeliness, reliability, etc.)
 - Simple, understandable, logical, repeatable
 - Shows a trend over time



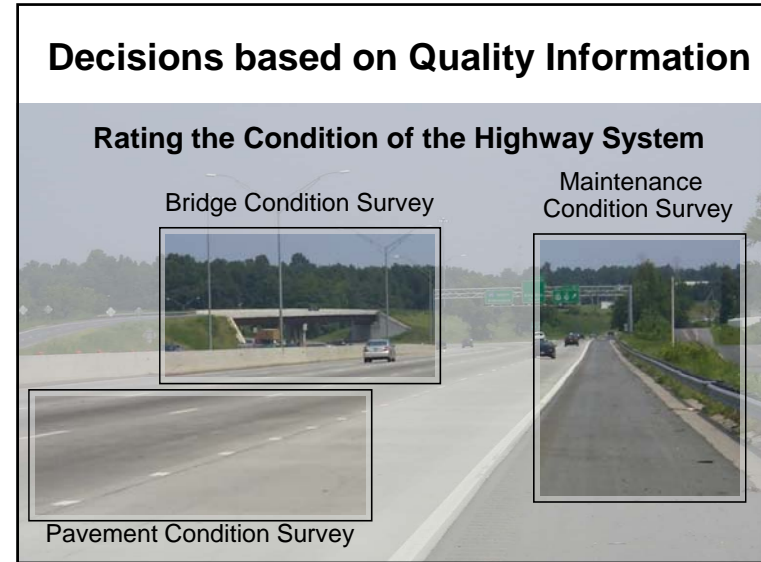
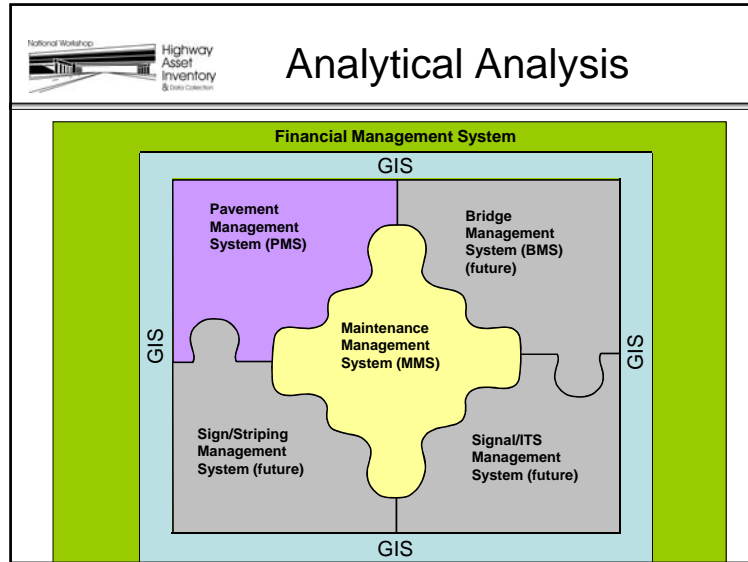
Performance Based

SHEET NO.	ASSET	PERFORMANCE MEASURE	SW TIER		REG TIER		SUB TIER	
			SCORE	LOS	SCORE	LOS	SCORE	LOS
B-5	NBIS Culverts	% of Culverts rating greater than or equal to 6	90	A	85	B	80	C
B-6	Non-NBIS Culverts	% of culverts in good condition	80	A	70	B	60	C
B-7	Overhead Signs Structures	% of overhead sign structures in good condition	95	A	92	B	88	C
F-8	Drawbridge Maintenance	Condition Rating >= 4	100	B	100	B	100	B
B-9	Tunnel	Tunnel Condition Rating >= 6	100	B	100	B	100	B
RM-1	Unpaved Shoulders (Low Shoulder)	No dropoff greater than 2 inches	95	B	95	B	92	C
RM-2	Unpaved Shoulders (High Shoulder)	No shoulders higher than 1 inch	95	B	95	B	92	C
RM-3	Ditches (Lateral Ditches)	No blocked, eroded or non-functioning ditches	95	B	95	B	92	C
RM-4	Crossing Pipes (Blocked)	Greater than 50% diameter open	95	A	90	B	85	C
RM-5	Crossing Pipes (Damaged)	No damage or structural deficiency	95	A	90	B	85	C
RM-6	Curb & Gutter (Blocked)	No obstruction greater than 2 inches for 2 feet	95	B	92	C	92	C
RM-7	Curb & Gutter (Damaged)	No damage	95	B	92	C	92	C
RM-8	Drop Inlets, Catch Basins etc. (Blocked)	Grates and inlets not blocked greater than 50%	95	A	95	B	92	B
RM-9	Drop Inlets, CB's etc. (Damaged)	Inlets and outlets are not damaged	98	A	95	B	92	C
RM-10	Guardrail/Cable Rail/Concrete Median Rail	Rail is functional	95	A	97	B	95	C
RM-11	Impact Attenuators	Properly functioning as designed and operational	95	A	97	B	97	B
R-1	Vegetation (Mastrol)	Grass height not to exceed 15 inches	90	A	85	B	80	C
R-2	Vegetation (Brush & Tree Management)	of ditch or shoulder point	90	A	85	B	80	C
R-3	Vegetation (Turf Condition)	Free of bare, dead, diseased, distressed, or weedy areas	90	A	85	B	80	C
R-4	Vegetation (Uncontrolled Growth)	Bottom of rail, and uniform with roadside at signs	70	A	65	B	60	C
R-5	Litter & Debris	Less than 100 pieces of litter or debris	90	A	85	B	80	C
R-6	Storm Water Devices (NPDES)	Functioning as designed	90	B	90	B	90	B
R-7	Landscaping Plant Beds	much, unwanted vegetation	90	B	90	B	90	B
R-8	ROW Fence	Functioning as designed and undamaged	94	B	94	B	94	B
T-1	Long Line Pmt. Markings	Present, visible and reflective at night	95	A	90	B	80	C
T-2	Words and Symbols	Present, visible and reflective at night	95	A	90	B	80	C
T-3	Pavement Markers	Present and reflective	95	A	85	B	80	C
T-4	Ground Mounted Signs (Including Inlets)	Visible and legible	92	A	85	B	80/77	B/C*
T-5	Overhead Signs	Visible and legible	92	A	85	B	80/77	B/C*
T-6	Roadway Lighting	Operational	90	A	85	B	NA	NA
T-7	Traffic Signal Systems	Composite score (Operational)	90	B	90	B	90	C
T-8	Traffic Signals	Composite score (Routine Maintenance)	90	B	90	B	90	C
T-9	Traffic Signals	Composite score (Emergency Response)	90	B	90	B	90	C
T-12	Dynamic Message Sign	Composite score	90	B	NA	NA	NA	NA



Analytical Analysis

Resource allocation based on modern investment analysis and best value concepts



Decisions based on Quality Information

		Data Collection Method	RELATIVE IMPORTANCE	ELEMENT VALUE	2008 TARGET EL POINTS	State Average EL POINTS			
DRAINAGE	RM-1	Low Shoulder	MCA	8	0.048	85	391	98	4.98
	RM-2	High Shoulder	MCA	7	0.040	85	3.42	92	3.72
	RM-3	Lateral Ditches	MCA	6	0.034	85	2.93	96	3.31
	RM-4	Crossline Pipe (Blocked) < 54"	MCA	6	0.034	85	2.93	88	2.95
	RM-5	Crossline Pipe (Damaged) < 54"	MCA	7	0.040	85	3.42	97	3.91
	RM-6	Curb & Gutter (Blocked)	MCA	5	0.028	85	2.44	95	2.74
	RM-7	Curb & Gutter (Damaged)	MCA	4	0.023	85	1.95	89	2.27
	RM-8	Drop Inlets, CB's, etc (Blocked)	MCA	5	0.028	85	2.44	89	2.57
	RM-9	Drop inlets, CB's, etc (Damaged)	MCA	4	0.023	85	1.95	95	2.19
	RM-10	Guardrail/Cable/Median Barrier/Conv	MCA	9	0.052	97	5.02	99	5.12
ROADSIDE	R-6	Stormwater Devices	Roadside	4	0.020	90	1.82	91	1.84
	RM-11	Impact Attenuators	None Currently	9		97			
ROADSIDE	R-1	Mowing	MCA	7	0.040	85	3.42	91	3.67
	R-2	Brush & Tree Control	MCA	6	0.034	85	2.90	91	1.76
	R-3	Turf Condition	MCA	4	0.023	80	1.84	97	2.90
	R-4	Uncontrolled Growth	MCA	4	0.023	85	1.46	94	0.77
	R-5	Litter & Debris Control	MCA	4	0.023	85	1.95	93	1.43
	R-7	Landscape Beds	Roadside	3		90		74	
	T-1	Long line pavement markings	MCA	8	0.048	85	3.91	98	4.30
TRAFFIC SIGNS	T-2	Words % Symbols	MCA	5	0.028	85	2.44	94	2.43
	T-3	Pavement Markers	MCA	7	0.040	85	3.42	88	2.60
	T-4	Signs around	MCA	6	0.034	85	3.25	95	3.63
	T-5	Overhead Signs	Bridge Maint.	6	0.034	80	2.93	98	3.95
	T-6	Ready, Bridge & IC lighting	None Currently	4		85			
	T-7	Traffic Signal Systems	None Currently	9		90			
	T-8	Traffic Signal Maintenance	None Currently	9		90			
	T-9	Traffic Signal Emergency	None Currently	9		90			
	T-10	Dynamic Message Sign	None Currently	9		NA			
	BRIDGES	B-2	Bridge Decks	Bridge Maint.	9	0.052	80	4.14	78
B-3		Superstructure	Bridge Maint.	9	0.052	80	4.14	62	4.26
B-4		Substructure	Bridge Maint.	9	0.052	80	4.14	76	3.94
B-5		NB/C Culvert	Bridge Maint.	7	0.040	70	2.93	95	3.41
B-6		Pipes & Culverts > 54"	Bridge Maint.	7	0.040	85	3.42	71	2.94
B-7		Overhead Sign Structures	Bridge Maint.	6	0.034	92	3.17	98	3.39
P/MT		P-1	P/MT Shoulder Condition	None Currently	6		85		
	P-2	Asphalt pavement repair	None Currently	9		90			
	P-3	Concrete pavement repair	None Currently	9		90			
Total				174	1.17		81.66		82.69

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- Decisions based on Quality Information**
- Level of service
 - Condition
 - MCAP
 - PCR
 - Infrastructure Health Index
 - Performance
 - Delay
 - V/C Ratio
 - Reliability
 - Safety
 - Crash rates



Monitoring for Accountability

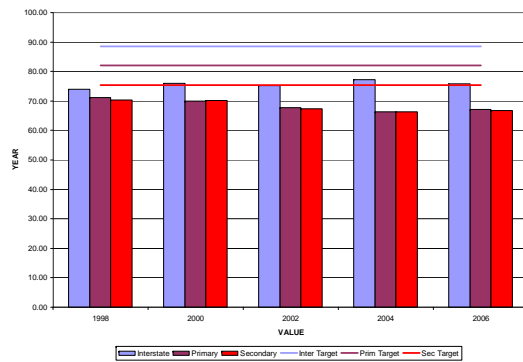
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Infrastructure Health Index

INTERSTATE											
ELEMENT	Date Collection	RELATIVE IMPORTANCE	ELEMENT WT VALUE	2006		2004		2002		1998	
				SCORE	EL. POINTS	SCORE	EL. POINTS	SCORE	EL. POINTS	SCORE	EL. POINTS
RM-1 Low Shoulder	MCA	7	0.09	95	5.25	95	5.25	95	5.25	95	5.25
RM-2 High Shoulder	MCA	7	0.09	95	5.25	95	5.25	95	5.25	95	5.25
RM-3 Gutter Checks	MCA	6	0.08	95	4.20	95	4.20	95	4.20	95	4.20
RM-4 Concrete Pipe Blockade - SF	MCA	6	0.08	95	4.50	95	4.50	95	4.50	95	4.50
RM-5 Concrete Pipe Blockade - CF	MCA	6	0.08	95	4.50	95	4.50	95	4.50	95	4.50
RM-6 Curb & Gutter Blockade	MCA	5	0.06	95	3.75	95	3.75	95	3.75	95	3.75
RM-7 Curb & Gutter Blockade	MCA	5	0.06	95	3.75	95	3.75	95	3.75	95	3.75
RM-8 Drop Inlet, C/P, w/ Blockade	MCA	5	0.06	95	3.75	95	3.75	95	3.75	95	3.75
RM-9 Drop Inlet, C/P, w/ Channel	MCA	5	0.06	95	3.75	95	3.75	95	3.75	95	3.75
RM-10 Concrete/Gravel/Asphalt/Stone/Gravel	MCA	9	0.12	95	7.20	95	7.20	95	7.20	95	7.20
R-1 Mowing	MCA	7	0.09	90	5.00	90	5.00	90	5.00	90	5.00
R-2 Brush & Tree Control	MCA	6	0.08	95	4.20	95	4.20	95	4.20	95	4.20
R-3 Fuel Control	MCA	4	0.05	90	2.80	90	2.80	90	2.80	90	2.80
R-4 Uncontrolled Growth	MCA	4	0.05	70	2.20	70	2.20	70	2.20	70	2.20
R-5 Utility & Other Control	MCA	4	0.05	90	2.80	90	2.80	90	2.80	90	2.80
T-1 Long Run pavement overlays	MCA	9	0.09	95	6.00	95	6.00	95	6.00	95	6.00
T-2 Wides 'N' Symbols	MCA	5	0.06	95	3.75	95	3.75	95	3.75	95	3.75
T-3 Pavement Markings	MCA	7	0.09	95	5.25	95	5.25	95	5.25	95	5.25
T-4 Gate closed	MCA	8	0.08	90	5.40	90	5.40	90	5.40	90	5.40
B-2 Bridge Checks	Bridge Maint.	9	0.07	80	4.50	80	4.50	80	4.50	80	4.50
B-3 Superstructure	Bridge Maint.	9	0.07	95	4.40	95	4.40	95	4.40	95	4.40
B-4 Substructure	Bridge Maint.	9	0.07	95	4.40	95	4.40	95	4.40	95	4.40
USE				95	60.00	95	60.00	95	60.00	95	60.00
OTHER IMPORTANT MEASURES											
PKP2	Pavement Condition Rating	PMU		90	4.50	90	4.50	90	4.50	90	4.50
Bridge	Bridge Health Index			95	4.75	95	4.75	95	4.75	95	4.75
TOTAL INFRASTRUCTURE HEALTH INDEX				95	72.0	95	72.0	95	72.0	95	72.0

Infrastructure Health Index



PERFORMANCE DASHBOARD AND APPRAISAL WORKSHEET

Goal	Metric	Metric Definition	Target	Data Source	Sub t	Wt (%)
1	Crash Rate	Reduce 5 Yr. Statewide Avg. (Crash Rate per 100M VMT)		Traffic Eng.		5
2	System Reliability		Composite			5
	A) Incident Clearance	% of Incidents Cleared within 90 Minutes of Standard	70-85%	TIMS	1.5	
	B) Signal Timing and Maintenance	% of Signals Meeting Timing and Maintenance Standards	80-94%	Signal Mgmt. System	3.5	
3	Infrastructure Health and Performance		Composite			40
	A) Infrastructure Health	Improve Index Score (3 year avg.) toward Goal	68-72	Asset Management	28	
	B) Facility Health	Statewide Avg. Condition Scores of Rest Areas and Welcome Centers	90-92	Asset Management	4	
	C) Construction Quality	% of Projects Meeting Construction Quality Index Standard	70-85	Construction Unit	8	
4	Programs/Projects/Services Meeting Standards		Composite			40
	A) Projects and Programs on Schedule					
	1) % Central Let Projects Completed on Time		70-85%	HICAMS	6.4	
	2) % Div. Let/Built Projects Completed on Time		70-85%	SAP	4.8	



Monitoring for Accountability

Results, Benefits and Expectations

- Uniformly constructed, maintained & operated Highway System
- Data drives decision making
- Shift to Outcome Based approach with clear goals
 - Move from a reactive to a planned approach
 - Increased focus on preventive maintenance
 - Target LOS by tier
 - Emphasis on planning & scheduling
- Highest & best use of resources
- Clearly defined performance expectations
- Increased accountability and flexibility
- Challenging and rewarding workplace



Workshop Observations

- Asset condition data collection has to be safe and efficient
- Collect the data once, accurately
- Collect the right, good quality data to drive decision making
- Data must be “agency data” to serve all agency needs & satisfy external stakeholders as well
- Avoid decisions based on poor or incomplete data
- Equipment technology & software exists today to collect asset condition & inventory data efficiently, accurately, and reliably
 - Continues to evolve



Workshop Observations

- New data collection needs are being identified as agency’s shift toward preservation
 - Examples: friction, texture, etc.
- Much of state’s existing data can be migrated into automated data collection and analysis systems to provide long term trends
- Agencies and industry need to collaborate and partner - common national standards and measures are needed
- Definitions, specifications, and calibration
- Today’s technology is not the end all, but it is a state of the practice tool for practitioners



Workshop Observations

- If we wait until everything is perfect to accept & implement technology solutions, we will never move forward
- Sound, reliable data must serve both engineering and financial interests & must drive effective communication with decision makers, and the general public
- We have a huge investment in our infrastructure – the cost associated with collecting quality data to accurately assess its condition and performance is negligible in comparison
- Needs identification for new research
- Continue to search for new technologies



Questions?