

HAMPTON ROADS REGIONAL BRIDGE STUDY – PART I



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BACKGROUND

- **The Regional Bridge Study was included in the FY08 UPWP after a request from the City of Chesapeake.**
- **This study has taken on higher priority since the I-35W bridge collapse.**

REPORT OUTLINE

- Introduction
- **Regional Bridge Summary**
- **Bridge Inspections and Ratings**
- **Sufficiency Rating**
- **Structurally Deficient Bridges**
- **Functionally Obsolete Bridges**
- **Bridges Needing Repair or Rehabilitation**
- **Fracture and Scour Critical Bridges**
- **Bridge Funding**
- **Bridge Projects**
- **Previous Bridge Closures**
- **Major Regional Bridge Analysis**
- **Conclusions**

BRIDGE DEFINITION

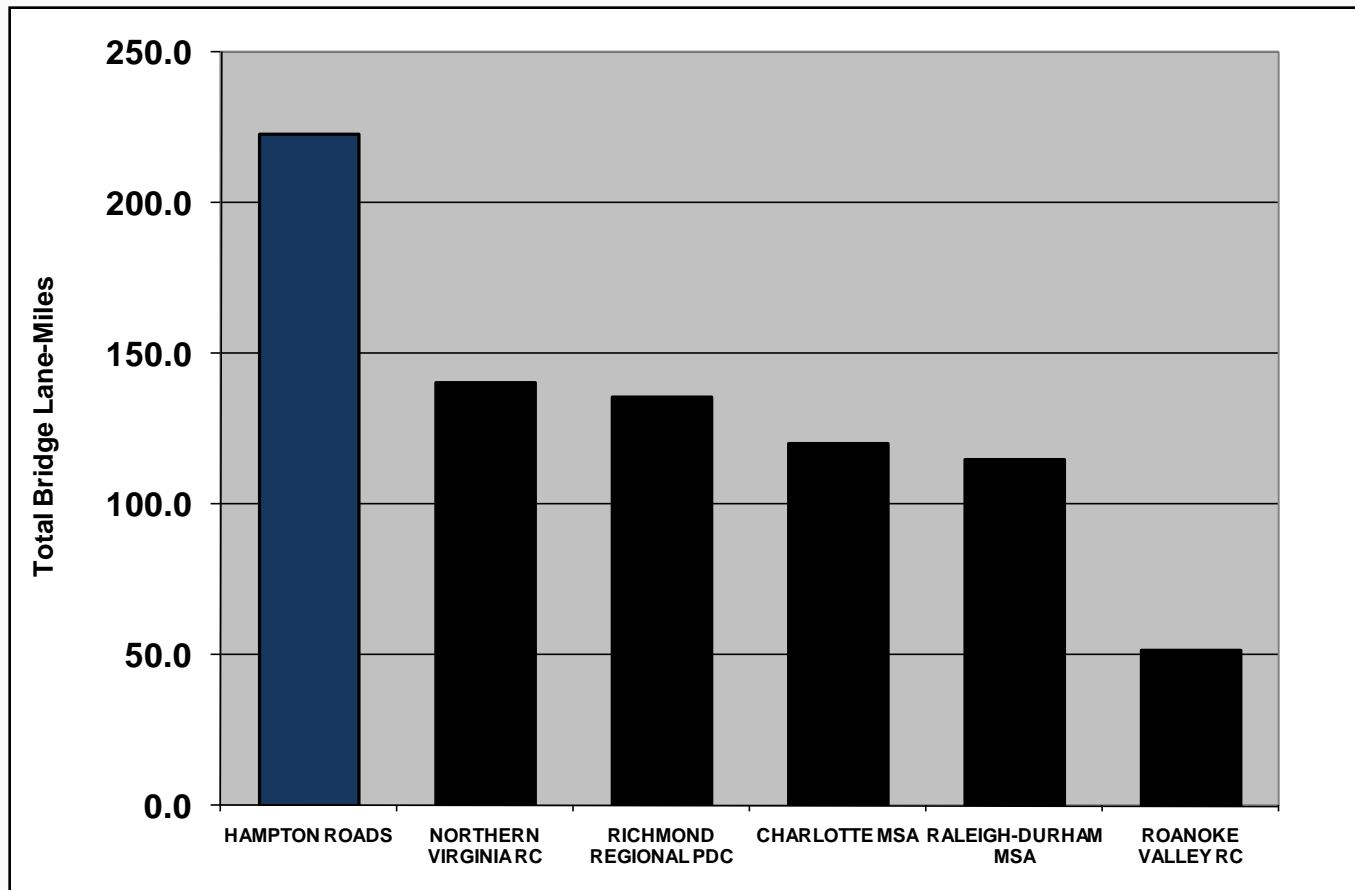


Coleman Bridge

- This study uses the FHWA National Bridge Inventory (NBI) definition.
 - Carries or crosses a public roadway
 - > 20' in length
 - Includes tunnels
- 1,237 bridges in Hampton Roads, 13,400 bridges in Virginia.

BRIDGE LANE-MILES

Bridge Lane-Miles in Selected Areas



Excludes CBBT. Data sources: VDOT, FHWA. Data as of 2007.

BRIDGES BY YEAR BUILT

Bridges in Hampton Roads by Jurisdiction and Year Built

JURISDICTION	NUMBER OF BRIDGES	NUMBER OF BRIDGES BY YEAR CONSTRUCTED				Median Age (years)
		< 1940	1940-1959	1960-1979	1980-2007	
CHESAPEAKE	160	9	5	43	103	23.5
GLOUCESTER	24	6	5	9	4	46.5
HAMPTON	85	2	14	19	50	25
ISLE OF WIGHT	84	3	30	21	30	38
JAMES CITY	63	8	11	24	20	33
NEWPORT NEWS	83	5	3	29	46	24
NORFOLK	203	2	16	111	74	36
POQUOSON	0	-	-	-	-	-
PORTSMOUTH	42	0	3	19	20	31
SOUTHAMPTON/FRANKLIN	138	28	11	63	36	39
SUFFOLK	141	10	20	58	53	34
SURRY	32	9	8	11	4	49.5
VIRGINIA BEACH	118	4	2	58	54	32.5
WILLIAMSBURG	11	4	2	4	1	51
YORK	53	7	11	28	7	43
HAMPTON ROADS	1,237	97	141	497	502	34

Data source: VDOT. Data as of August 2007.

BRIDGE INSPECTIONS

- **Every bridge throughout the state is inspected at least once every two years.**
- **Some bridges are inspected more frequently based on their condition or design.**
- **VDOT inspects VDOT-maintained structures while cities inspect their own bridges.**



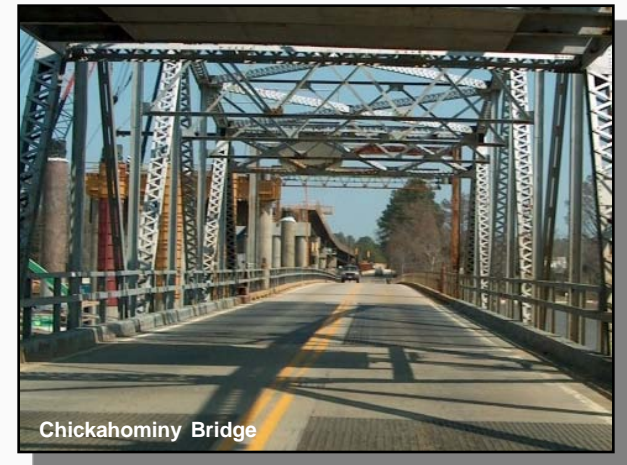
Photo: VDOT

BRIDGE RATINGS

- **Bridge inspectors rate various components of each bridge.**
- **Rated bridge components**
 - Deck condition
 - Superstructure cond.
 - Substructure condition
 - Culvert condition
 - Deck geometry
 - Underclearances
 - Waterway adequacy
 - Approach roadway alignment
- **These components are rated from 0 (failed) to 9 (excellent).**

BRIDGE RATINGS & CLASSIFICATIONS

- **Selected Bridge Ratings and Classifications**
 - **Structurally Deficient**
 - **Functionally Obsolete**
 - **Sufficiency Rating**



Chickahominy Bridge

STRUCTURALLY DEFICIENT

- A structurally deficient bridge is a structure with elements that need to be monitored, inspected and maintained. Eventually they need to be rehabilitated or replaced.
- *A structurally deficient bridge is not necessarily unsafe.* Bridge inspectors will close or impose weight limits on bridges they feel are unsafe.
- Bridge component ratings determine if a bridge is classified as structurally deficient.

STRUCTURALLY DEFICIENT

- **54 of the 1,237 bridges in Hampton Roads are classified as structurally deficient (4.4%).**
- **Notable structurally deficient bridges**
 - Gilmerton Bridge
 - Jordan Bridge
 - Denbigh Blvd over I-64
 - 22nd Street Bridge
 - Lesner Bridge
 - Churchland Bridge
- **By comparison, 9% of bridges in Virginia and 12% of bridges in the United States are classified as structurally deficient.**

STRUCTURALLY DEFICIENT

Structurally Deficient Bridges by Jurisdiction

JURISDICTION	NUMBER OF BRIDGES	STRUCTURALLY DEFICIENT BRIDGES		MAINTENANCE RESPONSIBILITY		
		Number	Percent	Locality	VDOT	Other
CHESAPEAKE	160	12	7.5%	11	-	1
GLOUCESTER	24	2	8.3%	-	2	-
HAMPTON	85	1	1.2%	1	-	-
ISLE OF WIGHT	84	6	7.1%	-	6	-
JAMES CITY	63	3	4.8%	-	3	-
NEWPORT NEWS	83	2	2.4%	1	1	-
NORFOLK	203	1	0.5%	1	-	-
POQUOSON	0	-	-	-	-	-
PORTSMOUTH	42	1	2.4%	1	-	-
SOUTHAMPTON/FRANKLIN	138	13	9.4%	-	13	-
SUFFOLK	141	8	5.7%	8	-	-
SURRY	32	1	3.1%	-	1	-
VIRGINIA BEACH	118	3	2.5%	3	-	-
WILLIAMSBURG	11	0	0.0%	-	-	-
YORK	53	1	1.9%	-	1	-
HAMPTON ROADS	1237	54	4.4%	26	27	1

Data sources: VDOT, FHWA. Data as of August 2007.

FUNCTIONALLY OBSOLETE

- **A functionally obsolete bridge is a structure that was built to geometric standards that are not used today.**
- **Functionally obsolete bridges have inadequate:**
 - **Lane and/or shoulder widths**
 - **Vertical clearances for the current traffic levels**
 - **They may also occasionally be flooded**
- **Bridge component ratings determine if a bridge is classified as functionally obsolete.**

DEFICIENT BRIDGES

- **284 of the 1,237 bridges in Hampton Roads are classified as functionally obsolete (23.0%).**
- **338 bridges in Hampton Roads are classified as either structurally deficient or functionally obsolete (27.3%).**
- **By comparison, 26% of the bridges in Virginia and 25% of the bridges in the United States are classified as either structurally deficient or functionally obsolete.**

DEFICIENT BRIDGES

Combined Structurally Deficient/Functionally Obsolete Bridges by Jurisdiction

JURISDICTION	NUMBER OF BRIDGES	COMBINED STRUCTURALLY DEFICIENT & FUNCTIONALLY OBSOLETE BRIDGES		MAINTENANCE RESPONSIBILITY		
		Number	Percent	Locality	VDOT	Other
CHESAPEAKE	160	36	22.5%	32	2	2
GLOUCESTER	24	9	37.5%	-	9	-
HAMPTON	85	19	22.4%	12	7	-
ISLE OF WIGHT	84	33	39.3%	-	33	-
JAMES CITY	63	14	22.2%	-	13	1
NEWPORT NEWS	83	22	26.5%	10	12	-
NORFOLK	203	75	36.9%	17	58	-
POQUOSON	0	-	-	-	-	-
PORTSMOUTH	42	9	21.4%	3	6	-
SOUTHAMPTON/FRANKLIN	138	29	21.0%	-	28	1
SUFFOLK	141	26	18.4%	25	1	-
SURRY	32	5	15.6%	-	5	-
VIRGINIA BEACH	118	39	33.1%	21	12	6
WILLIAMSBURG	11	6	54.5%	2	-	4
YORK	53	16	30.2%	-	8	8
HAMPTON ROADS	1237	338	27.3%	122	194	22

Data sources: VDOT, FHWA. Data as of August 2007.

SUFFICIENCY RATING

- **Contrary to popular belief, sufficiency ratings are not ratings based solely on the structural condition of the bridge.**
- **Sufficiency ratings are based on the structural condition of the bridge, the bridge geometry, and traffic considerations.**
- **Sufficiency ratings are percentages that range between 0 and 100%, with 100% representing an entirely sufficient bridge.**

SUFFICIENCY RATING

- **Bridges with low sufficiency ratings are not necessarily unsafe.**
- **Sufficiency ratings were developed and are used by FHWA as a method of prioritizing federal bridge funds for allocation.**

SUFFICIENCY RATING

- **75 bridges (6.1%) in Hampton Roads have a sufficiency rating < 50 .**
- **403 bridges (32.6%) in Hampton Roads have a sufficiency rating ≥ 50 and ≤ 80 .**
- **729 bridges (58.9%) in Hampton Roads have a sufficiency rating of > 80.0 .**

SUFFICIENCY RATING

Bridge Sufficiency Ratings by Jurisdiction

JURISDICTION	TOTAL BRIDGES	SUFFICIENCY RATING			
		0-49.9	50.0-80.0	80.1-100	N/A
CHESAPEAKE	160	15	29	116	0
GLOUCESTER	24	3	10	11	0
HAMPTON	85	1	35	45	4
ISLE OF WIGHT	84	10	34	40	0
JAMES CITY	63	3	27	33	0
NEWPORT NEWS	83	3	35	42	3
NORFOLK	203	2	43	143	15
POQUOSON	0	-	-	-	-
PORTSMOUTH	42	2	11	28	1
SOUTHAMPTON/FRANKLIN	138	17	43	78	0
SUFFOLK	141	12	40	84	5
SURRY	32	2	14	16	0
VIRGINIA BEACH	118	3	52	61	2
WILLIAMSBURG	11	0	6	5	0
YORK	53	2	24	27	0
HAMPTON ROADS	1,237	75	403	729	30

Data sources: VDOT, FHWA. Data as of August 2007.

N/A indicates that Sufficiency Ratings are not available for those bridges. In most cases, bridges with no sufficiency ratings listed are railroad or pedestrian bridges or tunnels.

SUFFICIENCY RATING

Bridges in Hampton Roads with the Lowest Sufficiency Ratings

#	JURIS	FED BRIDGE ID	ROUTE	FACILITY	CROSSING	YEAR BUILT	YEAR RECN VDOT	SUFFICIENCY RATING
1	CHES	21879	166	22ND STREET	SEABOARD AVENUE & N&W R/R	1938		2.0
2	CHES	21829	13	GILMERTON BRIDGE	S BR ELIZABETH RIVER	1938	1958	3.0
3	CHES	21931	337	JORDAN BRIDGE	S BR ELIZABETH RIVER	1926		4.0
4	JCC	4801	5	JOHN TYLER HWY	CHICKAHOMINY RIVER	1939		6.0
5	CHES	1826	165	MOUNT PLEASANT ROAD	CHESAPEAKE & ALBEMARLE CANAL	1951		17.5
6	NN	20727	173	DENBIGH BLVD	I-64 & CSX R/R	1965	1977	18.5
7	NN	20659		WASHINGTON AVENUE	FORMER SHIPYARD R/R SPUR	1946		20.9
8	SH	17755	189	SOUTH QUAY ROAD	BLACKWATER RIVER	1940	1962	21.4
9	GLO	8535	602	BURKE'S POND ROAD	BURKES POND	1940		24.2
10	HAM	20294		BRIDGE STREET	SALTERS CREEK	1934	1996	25.6
11	CHES	21811		BELLS MILL ROAD	BELLS MILL CREEK	1974		27.0
12	CHES	21830	13	MILITARY HIGHWAY	NS R/R	1938		27.0
13	CHES	21838	17	GEORGE WASHINGTON HWY	YADKINS ROAD & N&W R/R	1992	1992	27.6
14	SH	17865	671	GENERAL THOMAS HWY	NOTTOWAY RIVER	1960		28.3
15	SH	17866	671	GENERAL THOMAS HWY	NOTTOWAY RIVER OVERFLOW	1960		28.3
16	PORT	21199	17	HIGH STREET	W BR ELIZABETH RIVER	1951	1975	30.2
17	SUF	22159	688	TURLINGTON ROAD	BR KILBY CREEK-SPILLWAY	1957		30.8
18	SUR	18239	40	MLK HWY	BLACKWATER RIVER	1952		30.9
19	IW	10383	602	LONGVIEW DRIVE	PAGAN CREEK	1945		31.8
20	SH	17751	58	CAMP PARKWAY	BLACKWATER RIVER	1932	1961	35.2

Data sources: VDOT, FHWA. Data as of August 2007.

PART I CONCLUSIONS

- **Hampton Roads has more lane-miles of bridges than other metropolitan areas.**
- **Bridges in HR are on average slightly older than those in other metropolitan areas, but not as old as national and statewide averages.**
- **Hampton Roads has fewer structurally deficient bridges than other metropolitan areas but more functionally obsolete bridges.**
- **75 of the 1,237 bridges in Hampton Roads have a sufficiency rating < 50 , and 403 have a sufficiency rating ≥ 50 and ≤ 80 .**

NEXT STEPS

- **Part II presentation in August will include:**
 - **Bridge Funding (Federal, state, and local)**
 - **Bridge Projects**
 - **Major Regional Bridge Analysis**
 - **Conclusions**
- **Approval of the final report**

