BSDMS Summary Report

42 Hocking River at S.R. 278 at Nelsonville, OH

Site Location:

Site ID: 42

Site Name: Hocking River at S.R. 278 at Nelsonville, OH

County: Athens

Nearest City: Nelsonville

State: OH

Latitude: 392731

Longitude: 821424

USGS Station ID:

Route Number: 278

Route Class: State

Service Level: Mainline

Route Direction: NA

Highway Mile Point: 2.94

Stream Name: Hocking River

River Mile:

Contact:

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Publication:

Jackson, K.S., 1996, Evaluation of bridge-scour data at selected sites in Ohio: U.S. Geological Survey Water-Resources Investigations Report 97-4182.

Site Description:

The site is located on the Ohio State Route 278 bridge crossing the Hocking River, in Nelsonville, Athens County, Ohio. A railroad bridge is located approximately 200 ft upstream from the S.R. 278 bridge. Flood flows are contracted by the railroad bridge and generally remain contracted through the S.R. 278 bridge.
Bed-material samples were collected during annual low-flow surveys.
Notes: All piers are referenced numerically, increasing from left to right, when viewing the upstream face of the bridge while facing in the downstream direction.
Slope in Vicinity (reported in Stream Site Data) is estimated from USGS 7.5-minute quadrangle topographic maps.
Water-surface slope (if reported in Pier Scour Data comments section) is the measured slope between water surfaces at the approach and bridge sections during the scour measurement.

Elevation Reference

Datum: MSL

MSL (ft): 0

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Description of Reference Elevation:

BM = USGS BM Nelsonville on State Highway 278 at bridge over the Hocking R.
21 ft. NW of, and level with centerline of hwy., in NW end of NE abutment
of bridge, standard tablet stamped "113 JVC 1959 685"
Elevation = 685.439 ft.
Assumed elevation = 100.00 ft. used as datum for scour elevation data
presented (datum conversion to MSL = 585.439 ft).

Stream Data

Drainage Area (sq mi):	576	**Floodplain Width:**	Narrow
Slope in Vicinity(ft/ft):	0.00038	**Natural Levees:**	Little
Flow Impact:	Straight	**Apparent Incision:**	None
Channel Evolution	Premodified	**Channel Boundary:**	Alluvial
Armoring:	Unknown	**Banks Tree Cover:**	Medium
Debris Frequency:	Rare	**Sinuosity:**	Sinuous
Debris Effect:	Local	**Braiding:**	None
Stream Size:	Medium	**Anabranching:**	Locally
Flow Habit:	Perennial	**Bars:**	Unknown
Bed Material:	Sand	**Stream Width Variability:**	Equiwidth
Valley Setting:	Moderate		

Roughness Data

Manning's n Values

	Left Overbank	Channel	Right Overbank
High:	0.042	0.034	0.028
Typical	0.03	0.032	0.028
Low:	0.028	0.032	0.028

Bed Material

Measurement Number	Yr	Mo	Dy	Sampler	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)	SP	Shape	Cohesion
AP-1	1993	6	30		9.5	4.8	1	0.25	2.65		Unknown

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AP-2	1994	7	1		18	7.9	0.76	0.07	2.65	Unknown
BR-1	1990	10	2	HAND	1.7	1.2	0.44	0.07	2.65	Mildly
BR-2	1991	7	18		4.8	2.2	0.47	0.12	2.65	Unknown
BR-3	1992	7	9		42	17	0.86	0.1	2.65	Unknown
BR-4	1993	6	30		1.5	0.9	0.35	0.07	2.65	Unknown
BR-5	1994	7	1		3.9	1.3	0.31	0.07	2.65	Unknown
P1-1	1990	10	2	HAND	6	4.7	2.85	0.86	2.65	Mildly
P1-2	1991	7	18		21.5	16	8.53	1.45	2.65	Unknown
P1-3	1992	7	9		80	55	11.5	0.42	2.65	Unknown
P1-4	1993	6	30		14	8	2.5	0.68	2.65	Unknown
P1-5	1994	7	1		11.5	6.5	2.1	0.49	2.65	Unknown
P2-1	1990	10	2	HAND	0.45	0.3	0.17	0.03	2.65	Mildly
P2-2	1991	7	18		0.38	0.3	0.15	0.07	2.65	Unknown
P2-3	1992	7	9		0.38	0.3	0.15	0.05	2.65	Unknown
P2-4	1993	6	30		0.38	0.3	0.16	0.07	2.65	Unknown

P2-5	1994	7	1		0.46	0.3	0.13	0.05	2.65	Unknown

Bed Material Comments

Measurement No: AP-1

Composite sample from the approach section.

Measurement No: AP-2

Composite sample from the approach section

Measurement No: BR-1

Bridge-section composite sample, collected along the upstream bridge face.

Measurement No: BR-2

Bridge-section composite sample, collected along the upstream bridge face.

Measurement No: BR-3

Bridge-section composite sample, collected along the upstream bridge face.

Measurement No: BR-4

Bridge-section composite sample, collected along the upstream bridge face.

Measurement No: BR-5

Bridge-section composite sample, collected along the upstream bridge face.

Measurement No: P1-1

Sample collected at the upstream face of pier 1.

Measurement No: P1-2

Sample collected at the upstream face of pier 1

Measurement No: P1-3

Sample collected at the upstream face of pier 1

Measurement No: P1-4

Sample collected at the upstream face of pier 1

Measurement No: P1-5

Sample collected at the upstream face of pier 1

Measurement No: P2-1

Sample collected at the upstream face of pier 2.

Measurement No: P2-2

Sample collected at the upstream face of pier 2

Measurement No: P2-3

Sample collected at the upstream face of pier 2

Measurement No: P2-4

Sample collected at the upstream face of pier 2

Measurement No: P2-5

Sample collected at the upstream face of pier 2

Bridge Data

Structure No: ATH-278-0294

Length(ft): 223

Width(ft): 28

Number of Spans: 3

Vertical Configuration: Horizontal

Low Chord Elev (ft): 681.2

Upper Chord Elev (ft): 684.5

Overtopping Elev (ft): 684.5

Skew (degrees): 20

Guide Banks: None

Waterway Classification: Main

Year Built: 1985

Avg Daily Traffic: 1130

Plans on File: Yes

Parallel Bridges No

Upstream/Downstream: Unknown

Continuous Abutment: No

Distance Between Centerlines:

Distance Between Pier Faces:

Bridge Description:

Thebridge is constructed of concrete and steel I-beams, and has solid-wall round-nose piers. The site plans are dated 1984. The piers are referenced from the left the right abutments when looking downstream.

Abutment Data

Left Station: 9.0788

Right Station: 11.33

Left Skew (deg): 0

Right Skew (deg) 0

Left Abutment Length (ft): 50

Right Abutment Length (ft) 50

Left Abutment to Channel Bank (ft): 50

Right Abutment to Channel Bank (ft): 55

Left Abutment Protection:

Right Abutment Protection

Contracted Opening Type: III

Embankment Skew (deg): 20

Embankment Slope (ft/ft): 3

Abutment Slope (ft/ft) 2.5

Wingwalls: No

Wingwall Angle (deg): 0

Pier Data

Pier ID	Bridge Station(ft)	Alignment	Highway Station	PierType	# Of Piles	Pile Spacing(ft)

1	69	20	10.6294	Single	0
2	154	20	9.7794	Single	0

Pier ID	Pier Width(ft)	Pier Shape	Shape Factor	Length(ft)	Protection	Foundation
1	2.5	Round		30	None	Piles
2	2.5	Round		30	None	Piles

Pier ID	Top Elevation(ft)	Bottom Elevation(ft)	Foot or Pile Cap Width(ft)	Cap Shape	Pile Tip Elevation(ft)
1	657.62	654.62	9	Square	
2	657.24	654.24	9	Square	

Pier Description

Pier ID 1

This is a solid-wall concrete pier with round nose.

Pier ID 2

This is a solid-wall concrete pier with round nose.

Pier Scour Data

Pier ID	Date	Time	USOrDS
1	12/31/90	13:00	Upstream
1	7/14/92	10:50	Upstream
1	7/17/92	12:40	Upstream
1	1/29/94	13:50	Upstream
2	12/31/90	13:00	Upstream
2	7/14/92	10:50	Upstream
2	7/17/92	12:40	Upstream
2	1/29/94	13:50	Upstream

Pier ID	Scour Depth	Accuracy (ft)	Side Slope (ft/ft)	TopWidth (ft)	Apprch Vel (ft/s)	Apprch Depth(ft)	Effective Pier Width	Skew to Flow(deg)
1	2.5	0.5	4.9	17	5	17.5	2.5	22

1	2.7	0.5	4.4	20	3	11.8	2.5	31.8
1	2.2	0.5	4.6	20	3.8	11.5	2.5	20
1	2.3	0.5	4.7	21	5.8	16.9	2.5	14
2	1.1	0.5	3.1	7	2.2	13.9	2.5	16
2	1.1	0.5	2.3	9	2	7.6	2.5	12
2	0.9	0.5	6.9	8	3.8	6.6	2.5	8
2	0.5	0.5	2.5	11	2.6	12	2.5	0

PierID	Sediment Transport	Bed Material	BedForm	Trough (ft)	Crest (ft)	Sigma	Debris Effects
1	Live-bed	Non-cohesive	Unknown			2.3	Insignificant
1	Live-bed	Non-cohesive	Unknown			11.4	Insignificant
1	Live-bed	Non-cohesive	Unknown			11.4	Insignificant
1	Live-bed	Non-cohesive	Unknown			3.43	Unknown
2	Live-bed	Non-cohesive	Unknown			2.8	Insignificant
2	Clear-water	Non-cohesive	Unknown			6.25	Insignificant
2	Live-bed	Non-cohesive	Unknown			6.25	Insignificant
2	Live-bed	Non-cohesive	Unknown			1.98	Unknown

PierID	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)
1	6	4.7	2.85	0.86
1	80	55	11.5	0.42
1	80	55	11.5	0.42
1	14	8	2.5	0.68
2	0.45	0.25	0.17	0.032
2	0.38	0.3	0.15	0.048
2	0.38	0.3	0.15	0.048
2	0.38	0.26	0.16	0.066

Pier Scour Comments

Pier ID 1 **Time:** 13:00 **US/DS:** Upstream

Bed-material samples were collected during low-flow on 10/2/90.
Water-surface slope was 0.00065.

Pier ID 1 **Time:** 10:50 **US/DS:** Upstream

The bed-material sample was collected during low flow on 7/9/92.
The water-surface slope was 0.00299.

Pier ID 1 **Time:** 12:40 **US/DS:** Upstream

The bed-material sample was collected during low flow on 7/9/92.
The water-surface slope was 0.00091.

Pier ID 1 **Time:** 13:50 **US/DS:** Upstream

The bed-material sample was collected during low flow on
The water-surface slope was 0.00780.

Pier ID 2 **Time:** 13:00 **US/DS:** Upstream

Bed-material samples were collected during low-flow on 10/2/90.
Water-surface slope was 0.00065.

Pier ID 2 **Time:** 10:50 **US/DS:** Upstream

The bed-material sample was collected during low flow on 7/9/92.
The water-surface slope was 0.00299.

Pier ID 2 **Time:** 12:40 **US/DS:** Upstream

The bed-material sample was collected during low flow on 7/9/92.
The water-surface slope was 0.00091.

Pier ID 2 **Time:** 13:50 **US/DS:** Upstream

The bed-material sample was collected during low flow on XXXXXX
The water-surface slope was 0.00780.

Abutment Scour

ContractionScour

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Stage and Discharge Data

Peak Discharge					Flow		Peak Stage					Stage	Water	Return
year	mo	dy	hr	mi	(cfs)	Qacc	year	mo	dy	hr	mi	(ft)	Temp (C)	Period(yr)
1994	1	29	13:50		10200								4	2
1992	7	17	12:40		4430								24	1
1992	7	14	10:50		4500								24	1
1990	12	31	13:00	0	8660	8					0		4	2

Hydrograph

Hydrograph Number	Year	Month	Day	Hr	Min	Sec	Stage(ft)	Discharge (cfs)

Supporting Files