BSDMS Summary Report

7 Snow River at Seward Highway (S.R. 9) near Seward, AK

Site Location:

Site ID: 7

Site Name: Snow River at Seward Highway (S.R. 9) near Seward, AK

County: Town of Seward

Nearest City: Seward

State: AK

Latitude: 602000

Longitude: 1492100

USGS Station ID:

Route Number: 9

Route Class: State

Service Level: Mainline

Route Direction: NA

Highway Mile Point: 18.5

Stream Name: Snow River

River Mile:

Contact:
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218 E Street, Skyline Building
Anchorage, AK 99501

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Water-Resources Investigations 32-75
Scour at Selected Bridge Sites in Alaska
By Vernon W. Norman
November 1975

Site Description:

This study site is located at bridge 605 over the Snow River at mile 18.5 on the Seward Highway, about 16 miles north of Seward, Alaska. The 648-ft bridge is of girder design consisting of seven spans supported by six round-nosed pedestal-type piers. Two spur dikes force the flow of the river to pass through the opening parallel to the pier alignment.
Upstream from the bridge, the Snow River is a braided channel covering the entire valley width of almost 1 mile. Prior to the 1966 construction of the present bridge, three bridge openings spanned the river's flow. When the present two bridges were constructed, the right channel was blocked completely and bridge 605 was designed to handle the majority of the entire river flow. Downstream from the bridge, the river enters Kenai Lake, which may cause some backwater effect on the flow beneath the bridge when the lake level is high. The surface streambed material in the vicinity of the bridge ranges from fine sand to coarse gravel. The foundation study along the centerline of the bridge conducted by the State of Alaska, Department of Highways, indicates silt and sand containing some gravel to a depth of about 100 ft.
Much of the approximately 150 square miles drainage basin of the Snow River upstream from the bridge is covered by glaciers. One glacier, known locally as the Snow River Glacier, dams an unnamed lake from which water is released, causing flooding. The breakout occurs at 2- to 3-year intervals. During the period 1961-1965, the USGS operated a gaging station about 10 miles upstream from bridge 605. The peak discharge during that period was 25,000 cfs.
During August and September 1970, the USGS operated a temporary gaging station

BSDMS Summary Report

7 Snow River at Seward Highway (S.R. 9) near Seward, AK

3 miles upstream from the bridge. The flood that occured during this period peaked on Sept 22 at a discharge of 17,800 cfs. The majority of data presented in this study were collected during that flood. An estimated peak flood of 55,000 cfs occurred in August 1967.

Elevation Reference

Datum: MSL

MSL (ft): 1

Description of Reference Elevation:

Gage datum is 1.0 ft above mean sea level.

Stream Data

Drainage Area (sq mi):	150	**Floodplain Width:**	Wide
Slope in Vicinity(ft/ft):		**Natural Levees:**	Unknown
Flow Impact:	Straight	**Apparent Incision:**	Unknown
Channel Evolution	Unknown	**Channel Boundary:**	Alluvial
Armoring:	Unknown	**Banks Tree Cover:**	Medium
Debris Frequency:	Unknown	**Sinuosity:**	Sinuous
Debris Effect:	Unknown	**Braiding:**	Generally
Stream Size:	Medium	**Anabranching:**	Generally
Flow Habit:	Flashy	**Bars:**	Wide
Bed Material:	Gravel	**Stream Width Variability:**	Wider
Valley Setting:	High		

Roughness Data

Manning's n Values

	Left Overbank	Channel	Right Overbank
High:			
Typical			
Low:			

BSDMS Summary Report

7 Snow River at Seward Highway (S.R. 9) near Seward, AK

Bed Material

Measurement Number	Yr	Mo	Dy	Sampler	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)	SP	Shape	Cohesion
1	1970	9	23	BM-54	31	18	7.6	3	2.65		Unknown

Bed Material Comments

Measurement No: 1

Streambed material particle sizes varied widely in samples collected along the cross section on the upstream side of the bridge. The analyses of the surface samples collected upstram and between the piers showed that the D50 ranged between 0.1 mm and 9.8 mm. No particular pattern in the distribution was observed, and a computed composite of all samples collected showed the average D50 to be about 3 mm. The samples of fine material probably represented the material being transported in the standing waves. The material which controlled the scour at the piers is that obtained in the samples containing the coarser materials. Only the D90=23 and D50=7.6 were reported with the data. The D95, D84, and D16 were computed from the provided data. The D84 was interpolated from the D90 and D50 using a log-probability interpolation. Sigma was computed as D84/D50. D95 and D16 were computed from the equation D50 * Sigma^(standard normal deviate of 95 or 16).

Bridge Data

Structure No: 605

Length(ft): 648

Width(ft):

Number of Spans: 7

Vertical Configuration: Horizontal

Low Chord Elev (ft):

Upper Chord Elev (ft):

Overtopping Elev (ft):

Skew (degrees): 0

Guide Banks: Elliptical

Waterway Classification: Main

Year Built: 1966

Avg Daily Traffic:

Plans on File: No

Parallel Bridges No

Upstream/Downstream: N/A

Continuous Abutment: No

Distance Between Centerlines:

Distance Between Pier Faces:

Bridge Description:

This bridge is of girder design consisting of seven spans supported by six round-nosed pedestal-type piers 3.2 ft wide and spaced 92 ft apart, center to center. The total length of the bridge is 648 ft. Two spur dikes, each 300 ft long, force the flow of the river to pass through the opening parallel to the pier alignment. The channel conveys the water during high flows.

Abutment Data

Left Station: 0

Right Station: 0

Left Skew (deg): 0

Right Skew (deg) 0

Left Abutment Length (ft):

Right Abutment Length (ft)

Left Abutment to Channel Bank (ft):

Right Abutment to Channel Bank (ft):

Left Abutment Protection:

Right Abutment Protection

Contracted Opening Type: Unknown

Embankment Skew (deg): 0

Embankment Slope (ft/ft):

Abutment Slope (ft/ft)

Wingwalls: No

Wingwall Angle (deg): 0

Pier Data

BSDMS Summary Report

7 Snow River at Seward Highway (S.R. 9) near Seward, AK

Pier ID	Bridge Station(ft)	Alignment	Highway Station	PierType	# Of Piles	Pile Spacing(ft)
5	510	0	0	Single	0	

Pier ID	Pier Width(ft)	Pier Shape	Shape Factor	Length(ft)	Protection	Foundation
5	3.2	Round			Unknown	Unknown

Pier ID	Top Elevation(ft)	Bottom Elevation(ft)	Foot or Pile Cap Width(ft)	Cap Shape	Pile Tip Elevation(ft)
5				Unknown	

Pier Description

Pier ID 5

This pier (the only one with complete scour data) is identical to the other 5 piers. It is a pedestal-type pier, 3.2 ft wide and spaced 92 ft apart from piers 4 & 6. Information on the piers was sketchy in the report, containing no data on the footings, caps, etc.

Pier Scour Data

Pier ID	Date	Time	USOrDS
5	9/23/70	0:00	Unknown

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)
5	2.5	0.5			5.3	5	3.2	0

PierID	Sediment Transport	Bed Material	BedForm	Trough (ft)	Crest (ft)	Sigma	Debris Effects
5	Live-bed	Non-cohesive	Ripple			3	Insignificant

PierID	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)
5	31	18	7.6	3

Pier Scour Comments

Pier ID 5 **Time:** 0:00 **US/DS:** Unknown

Fathometer traces show that this scour hole at pier 5 was probably the maximum scour that occurred at the bridge although shallow depths prevented accurate readings at the other piers. NOTE: The report contains data for remnant scour holes at other piers during low flow, but insufficient detail for entry here.

Abutment Scour

BSDMS Summary Report

7 Snow River at Seward Highway (S.R. 9) near Seward, AK

ContractionScour

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)
1970	9	22		0	17800	none	1970	9	22		0	441.8		
1970	9	19		0	8170	none	1970	9	19		0	440.4		
1967	8			0	55000	none					0			

Hydrograph

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

BSDMS Summary Report

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Supporting Files