

Metallizing Steel Bridges in New England - It's Growing!

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ABSTRACT

The use of metallized coating on bridges in New Hampshire years ago was limited to small special strategic steel locations. The metallizing option was severely limited by lack of shop applicators. Rhode Island pioneered duplex metallized bridges, research, and interest. The past two decades have seen a rapid growth of industry facility investment for application and Owner selection of the metallizing coating. This paper presents signature New England bridges and several New Hampshire bridges with metallized coating representing the growing popularity of thermal spray coating for steel bridges.

Key words: bridge, metallizing, signature bridge, New England

INTRODUCTION

Bridge Owners are always on the lookout for a coating system for steel bridges that will perform for the longest time, and at a reasonable price. Metallizing has long been considered one of the best coating systems but the lack of qualified applicators simply has not made it available as an economical option. The success of early metallizing encouraged the investment in metallizing for Owners and bridge fabricators, and spurred on its significant growth over the past decade.

PIONEERS OF METALLIZING

It is the author's view that the seed of the growth of metallizing in New England was planted in Rhode Island during a meeting of the RI DOT with Federal Highway Administration (FHWA) in the early 1980's. In that meeting FHWA pointed to the success of metallizing in a 19-year American Welding Society (AWS) study ⁽¹⁾ published in 1974, and recommended metallizing to RI DOT.

In 1987 Rhode Island DOT implemented that recommendation by metallizing their first steel

⁽¹⁾ American Welding Society, C1.14-1974, Corrosion Test of Flame Sprayed

bridge, Acorn Street over the Woonasquatucket River, a small beam bridge (Figure 2) located out of sight a few blocks from the heart of downtown Providence. The growth of metallizing steel bridges in Rhode Island all started with that Acorn Street bridge.

In 1993 a metallizing and paint duplex coating was selected for two pedestrian bridges (Figure 3) in a highly visible location at Providence Mall Waterplace Park, in the center of an important shopping venue and in the shadow of the State Capitol Building.

In 1999 RI DOT sponsored a metallizing conference for delegates from New England DOT's. This author first heard of metallizing from Joe Butler, metallizing expert telling about the Ohio metallizing program starting in 1985, Robert Kogler from FHWA, and Terry Lester from Great Britain describing extensive use of metallizing in the UK and Europe since the 1950's -60's.

The Connecticut DOT also conducted research on metallizing, including an experimental study⁽²⁾ published in 1995 regarding the field metallizing in 1987-1988 of four bridges, and evaluation after seven years of service.

CTDOT made a major investment in metallizing when it erected on May 3, 2003 the signature metallized 320-foot truss in New Haven over the rail yard (Figure 4) using the largest mobile-land crane in the world during a three-hour shutdown of the yard.

RIDOT's first signature highway bridge was the I-195 Providence River Arch bridge (Figure 5) with a metallized and painted duplex coating, opened in 2005 as a gateway signature bridge at the river entrance to the City of Providence.

BRIDGE FABRICATION SHOPS

The author is not familiar with where these aforementioned bridges were fabricated and coated, but is aware that the metallizing capability of major bridge fabrication shops in New England dramatically improved in 2010 with the expansion of facilities at a Claremont, NH bridge shop.

Prior to 2010 metallizing was performed in specialty shops rather than major bridge fabrication shops, or by qualified applicators brought in to a bridge fabrication shop to do the work.

The Claremont, NH shop was followed within a few years by two other major bridge fabrication shops in Maine who invested in and expanded their metallizing capabilities. Together these three shops have made the selection of metallizing economically feasible for Owners, and they have performed most of the metallizing on bridges listed in this report.

A fourth metallizing shop in NE, located in Maine, fabricated two of the signature 3-D complex space-frame pedestrian bridges (Figures 10, 11) also listed in the following pages.

NEW ENGLAND METALLIZED BRIDGES

Tables 1 and 2 list the number and type of metallized bridges in New England, followed by a dozen signature bridges (Figures 3-14), and several NHDOT 'ordinary' bridges (Figure 15).

⁽²⁾ Field Evaluation of Zinc-Based Protective Coatings for Structural Steel- FINAL REPORT, CT DOT, Eric Lohrey, Oct 1995

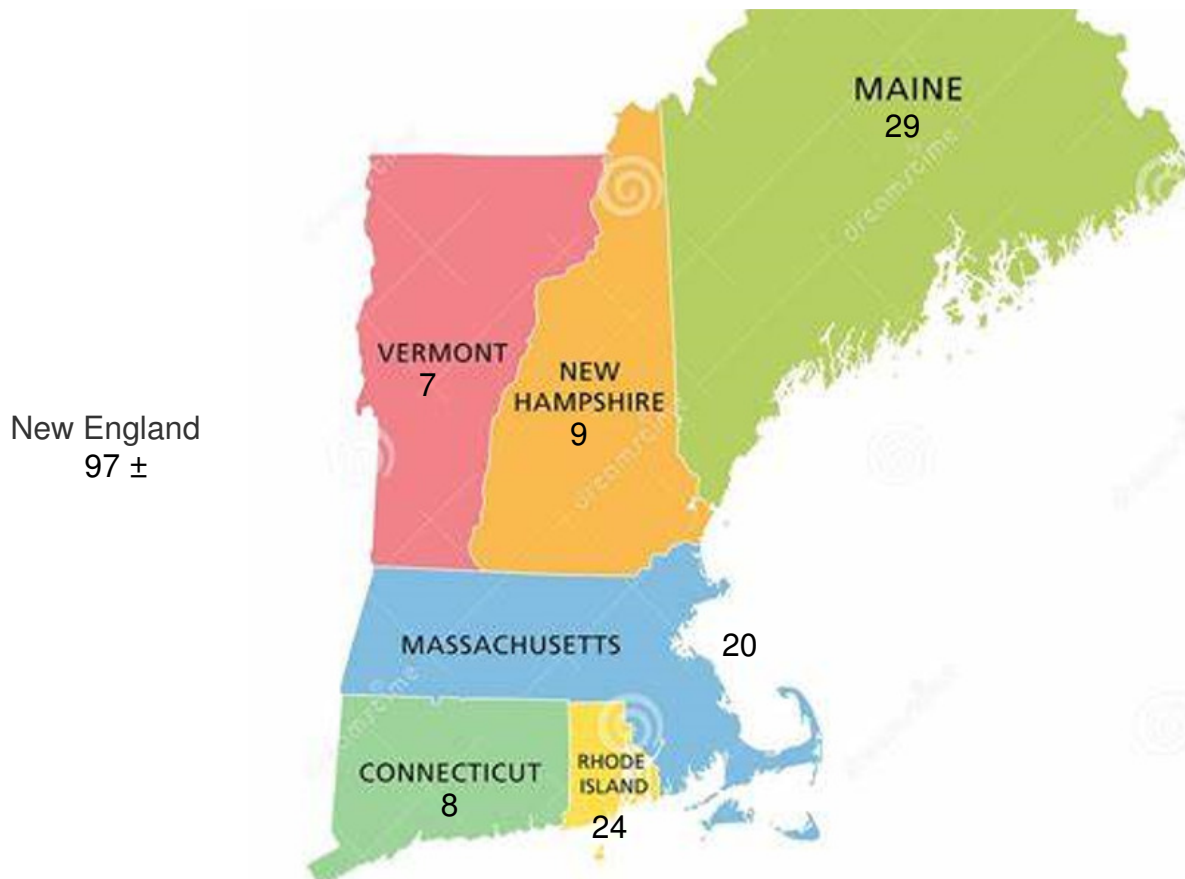


Figure 3: Approx. Number of Metallized Bridges in New England by State (2022)

Table 1 Metallizing Practice in New England for Steel Bridges						
Type	100% Zinc			85% Zn-15% AL		
Sealer/ paint	(unsealed)	(w Sealer)	(Duplex w Paint)	(unsealed)	(w Sealer)	(Duplex w Paint)
ME	--	18	--	--	12	--
NH	--	8	1 fascias	--	--	--
VT	--	6	--	--	1	--
MA	--	--	--	1	--	19 fascias
CT	--	--	--	--	1	7
RI	--	1	23	--	--	--

Table 2
Timeline and Location of Metallized Bridges In New England

RI	x	● 1	x	● 3	● 5	xxx xxx	xxx xxx	● 11	24
CT	xxx x	x	● 2				x x		8
MA					x ● 6	● 8 xxx xx ● 10 xx		● 12	20
VT					● 4	x xxxx	xx		7
NH					● 7 x	x x x x x x	x x		9
ME						● 9 x xxxx	xxxx xxxx		29
NE Bridge Fab Shops			D		A	B	C		
Year	1985	1990	1995	2000	2005	2010	2015	2020	97

Category	Year	ID	shop	state	Location / Name of Bridge	
Signature Bridges	1993	● 1		RI	Providence Waterplace Park pedestrian bridges	(Fig. 3)
	2003	● 2		CT	New Haven Church St South Extension truss over Rail Yard	(Fig. 4)
	2005	● 3		RI	Providence I-195 Providence River Arch bridge	(Fig. 5)
	2011	● 4		NY	VT Lake Champlain Network Arch bridge	(Fig. 6)
	2012	● 5	A	RI	Pawtucket River Spandrel-Braced Arch bridge over Blackstone River	(Fig. 7)
	2012	● 6	D	MA	Boston Northbank pedestrian bridge over MBTA rail line	(Fig. 8)
	2013	● 7	A	NH	Portsmouth-Kittery, ME Memorial Bridge (lift) over Piscataqua River	(Fig. 9)
	2017	● 8	A	MA	Newburyport-Amesbury I-95 Whittier Bridge over Merrimack River	(Fig. 10)
	2018	● 9	B	ME	Kittery-Portsmouth, NH Sarah M. Long Bridge over Piscataqua River	(Fig. 11)
	2018	● 10	D	MA	Boston Frances Appleton pedestrian bridge over Storrow Drive	(Fig. 12)
	2023	● 11	B	RI	Providence US 6 / RI 10 Interchange (ramps, flyover bridges)	(Fig. 13)
	2023	● 12	B	MA	Boston North Washington Street Bridge (tub girder) over Charles R	(Fig. 14)
Bridge Fab'n Shops	2010	A		NH	CANAM Bridge, 386 River Road, Claremont, NH	
(w TSC Application)	2015	B		ME	Casco Bay Steel Structures, Inc., 1 Wallace Ave., S. Portland, ME	
	2019	C		ME	ARC Enterprises, Inc., 27 Commercial Road, Kingfield, ME	
AESS Fab'n Shop	1997	D		ME	Newport Industrial Fabrication, Inc., 445 Elm St., Newport, ME	

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Figure 2: 1987 Experimental Bridge

RI - Providence Acorn Street over Woonasquatucket River

100% Zinc wire (at 8-10 mils)	plus	two coats paint
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The Acorn Street bridge was the Rhode Island DOT experimental project to test the use of metallizing. As such Acorn Street holds the distinction as the first metallized bridge in RI. The coating is a duplex coating with two coats of paint over the metallizing.

Figure 3: 1993 Signature Bridge #1

RI - Providence Waterplace Park pedestrian bridges over Woonasquatucket River

100% Zinc wire (at 8-10 mils)	plus	two coats paint
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The two pedestrian bridges at Providence Place are located at a high profile site in the heart of downtown Providence. Their maintenance illustrates the advantage of repairing a duplex paint coating over metallizing, for graffiti removal, etc. while maintaining the metallizing integrity.