Appendix B—State Departments of Transportation

Alabama Department of Transportation
1409 Coliseum Boulevard
Montgomery, AL 36130
(334) 242-6311
(334) 262-8041 (fax)

Alaska Department of Transportation & Public Facilities
3132 Channel Drive
Juneau, AK 99801-7898
(907) 465-3900
(907) 586-8365 (fax)

Arizona Department of Transportation
206 S. 17th Avenue
Phoenix, AZ 85007
(602) 255-7011
(602) 256-7659 (fax)

Arkansas State Highway and Transportation Department
State Highway Department Building
P.O. Box 2261, 10324 Interstate 30
Little Rock, AR 72203
(501) 569-2000
(501) 569-2400 (fax)

California Department of Transportation
1120 N Street
P.O. Box 942673
Sacramento, CA 94273-0001
(916) 654-5266

Colorado Department of Transportation
4201 East Arkansas Avenue
Denver, CO 80222
(303) 757-9201
(303) 757-9149 (fax)

Connecticut Department of Transportation
P.O. Box 317546 / 2800 Berlin Turnpike
Newington, CT 06131-7546
(860) 594-3000

Delaware Department of Transportation
Bay Road, Route 113, P.O. Box 778
Dover, DE 19903
(302) 739-5811
(302) 739-4329 (Dover Office)

Florida Department of Transportation
605 Suwannee Street
Tallahassee, FL 32399-0450
(850) 488-8541
(850) 277-3403 (fax)

Georgia Department of Transportation
2 Capital Square
Atlanta, GA 30334
(404) 656-5206
(404) 657-8389 (fax)
Internet address: j@dot.state.ga.us

Hawaii Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097
(808) 587-2150
(808) 587-2167 (fax)

Idaho Transportation Department
3311 W. State Street
P.O. Box 7129
Boise, ID 83707
(208) 334-8000
(208) 334-3858 (fax)

Illinois Department of Transportation
2300 S. Dirksen Parkway
Springfield, IL 62764
(217) 782-5597
(217) 782-6828 (fax)

Indiana Department of Transportation
Indiana Government Center North
100 North Senate Avenue
Indianapolis, IN 46204-2249
(317) 232-5533
(317) 232-0238 (fax)

Iowa Department of Transportation
800 Lincoln Way
Ames, IA 50010
(515) 239-1101
(515) 239-1639 (fax)

Kansas Department of Transportation
Docking State Office Building
915 Harrison
Topeka, KS 66612-1568
(785) 296-3566
(785) 296-1095 (fax)

Kentucky Transportation Cabinet
State Office Building, 501 High Street
Frankfort, KY 40622
(502) 564-4890
(502) 564-4809 (fax)

Louisiana Department of Transportation
P.O. Box 94245 / 1201 Capital Access Road
Baton Rouge, LA 70804-9245
(504) 379-1200/1201
(504) 379-1851 (fax)

Maine Department of Transportation
Transportation Building
State House Station 16
Augusta, ME 04333-0016
(207) 287-2551
(207) 287-2896 (fax)

Maryland Department of Transportation
P.O. Box 8755 / 10 Elm Road
Baltimore/Washington International Airport
Baltimore, MD 21240-0755
(410) 865-1000
(410) 865-1334 (fax)

Massachusetts Executive Office of Transportation and Construction
10 Park Plaza, Suite 3170
Boston, MA 02116-3973
(617) 973-7000
(617) 523-6454 (fax)

Michigan Department of Transportation
State Transportation Building
425 West Ottawa Street
P.O. Box 30050
Lansing, MI 48913
(517) 373-2114
(517) 373-0167 (fax)

Minnesota Department of Transportation
Transportation Building
395 John Ireland Boulevard
St. Paul, MN 55155
(612) 296-3000
(612) 297-3160 (fax)
Internet address: www.dot.state.mn.us

Mississippi Department of Transportation
Administrative Office Building
P.O. Box 1850
401 North West Street
Jackson, MS 39215-1850
(601) 359-7001
(601) 359-7050 (fax)

Missouri Department of Transportation
105 West Capital Avenue
P.O. Box 270
Jefferson City, MO 65102
(573) 751-2551
(573) 751-6555 (fax)

Montana Department of Transportation
2701 Prospect Avenue
Helena, MT 59620
(406) 444-6201
(406) 444-7643 (fax)

Nebraska Department of Roads
1500 Nebraska Highway 2
P.O. Box 94759
Lincoln, NE 68509-4759
(402) 471-4567
(402) 479-4325 (fax)
Internet address:
DOR28003@VMHOST.CDP.STATE.NE.US

Nevada Department of Transportation
1263 S. Stewart Street
Carson City, NV 89712
(702) 888-7440
(702) 888-7201 (fax)

New Hampshire Department of Transportation
John O. Morton Building
P.O. Box 483 / Hazen Drive
Concord, NH 03301-0483
(603) 271-3734
(603) 271-3914 (fax)

New Jersey Department of Transportation
1035 Parkway Avenue
CN 600
Trenton, NJ 08625
(609) 530-2001
(609) 530-3894 (fax)

New Mexico State Highway and Transportation Department
State Highway Department Building
P.O. Box 1149
Santa Fe, NM 87504
(505) 827-5100
(505) 827-5644 (fax)

New York Department of Transportation
Building 5, State Office Campus
1220 Washington Avenue
Albany, NY 12232
(518) 457-6195
(518) 457-6284 (fax)

North Carolina Department of Transportation
P.O. Box 25201 / 1 South Wilmington Street
Raleigh, NC 27611
(919) 733-2520
(919) 733-9150 (fax)
Internet address: www.dot.state.nc.us

North Dakota Department of Transportation
600 East Boulevard Avenue
Bismarck, ND 58505-0700
(701) 328-2500
(701) 328-4545 (fax)

Ohio Department of Transportation
25 South Front Street
Columbus, OH 43215
(614) 466-7170
(614) 752-6416 (fax)
Internet address: www.dot.state.oh.us

Oklahoma Department of Transportation
200 N.E. 21st Street
Oklahoma City, OK 73105
(405) 521-2631
(405) 521-2453 (fax)

Oregon Department of Transportation
Transportation Building
355 Capital Street
Salem, OR 97310
(503) 986-3200
(503) 986-3432 (fax)

Pennsylvania Department of Transportation
555 Walnut Street
Forum Place
Harrisburg, PA 17101
(717) 787-5574
(717) 787-5491 (fax)

Puerto Rico Department of Transportation and Public Works
Office of the Secretary
P.O. Box 41629, Minillas Station
San Juan, PR 00940-1269
(787) 722-2929
(787) 728-8963 (fax)

Rhode Island Department of Transportation
State Office Building
2 Capital Hill
Providence, RI 02903
(401) 222-2481
(401) 222-6038 (fax)

South Carolina Department of Transportation
Silas N. Pearman Building
955 Park Street
P.O. Box 191
Columbia, SC 29202
(803) 737-1130
(803) 737-2038 (fax)

South Dakota Department of Transportation
700 East Broadway Avenue
Pierre, SD 57501-2586
(605) 773-3265
(605) 773-3921 (fax)

Tennessee Department of Transportation
James K. Polk Building
Fifth and Deaderick
Nashville, TN 37243-0349
(615) 741-2848
(615) 741-2508 (fax)
Internet address: www.state.tn.us/transport/

Texas Department of Transportation
125 East 11th Street
Austin, TX 78701-2483
(512) 305-9500
(512) 475-3072 (fax)

Utah Department of Transportation
4501 South 2700 West
Salt Lake City, UT 84119
(801) 965-4000
(801) 965-4338 (fax)

Vermont Agency of Transportation
State Administration Building
133 State Street
Montpelier, VT 05633-5001
(802) 828-2657
(802) 828-2024 (fax)

Virginia Department of Transportation
1401 East Broad Street
Richmond, VA 23219
(804) 786-2801
(804) 786-2940 / 786-6250 (fax)

Washington Department of Transportation
Transportation Building
310 Maple Park
P.O. Box 47300
Olympia, WA 98504-7300
(360) 705-7000
(360) 705-6808 (fax)

West Virginia Department of Transportation
1900 Kanawha Boulevard East
Charleston, WV 25305-0440
(304) 558-0444
(304) 558-1004 (fax)

Wisconsin Department of Transportation
State Transportation Building
4802 Sheboygan Avenue
P.O. Box 7910
Madison, WI 53707-7910
(608) 266-1114
(608) 266-9912 (fax)

Wyoming Department of Transportation
5200 Bishop Boulevard
P.O. Box 1708
Cheyenne, WY 82003-1708
(307) 777-4375
(307) 777-4163 (fax)

Appendix C—State Historic Preservation Offices

Alabama State Historic Preservation Office
468 South Perry Street
Montgomery, AL 36130-0900
(334) 242-3184
(334) 240-3477 (fax)

Alaska Department of Natural Resources
History and Archeology
Division of Parks and Outdoor Recreation
3601 C Street, Suite 1278
Anchorage, AK 99503-5921
(907) 269-8721
(907) 269-8908 (fax)

Arizona Office of Historic Preservation
Arizona State Parks
1300 West Washington
Phoenix, AZ 85007
(602) 542-4009
(602) 542-4180 (fax)

Arkansas Historic Preservation Program
1500 Tower Building
323 Center Street
Little Rock, AR 72201
(501) 324-9880
(501) 324-9184 (fax)

California Office of Historic Preservation
Department of Parks and Recreation
P.O. Box 942896
Sacramento, CA 94296-0001
(916) 653-6624
(916) 653-9824 (fax)

Colorado State Historic Preservation Office
Colorado History Museum
1300 Broadway
Denver, CO 80203-2137
(303) 866-3355
(303) 894-2534 (fax)

Connecticut State Historic Preservation Office
59 South Prospect Street
Hartford, CT 06106
(203) 566-3005
(203) 566-5078 (fax)

Delaware Division of Historical and Cultural Affairs
Hall of Records
P.O. Box 1401
Dover, DE 19901
(302) 739-5313
(302) 739-6711 (fax)

Florida State Historic Preservation Office
Division of Historical Resources
Department of State
R.A. Gray Building, 500 S. Bronough Street
Tallahassee, FL 32399-0250
(904) 488-1480
(904) 488-3353 (fax)

Georgia Historic Preservation Division
Department of Natural Resources
500 The Healey Building
57 Forsyth Street, NW
Atlanta, GA 30303
(404) 656-2840
(404) 651-8739 (fax)

Hawaii State Historic Preservation Office
Department of Land and Natural Resources
33 South King Street, 6th Floor
Honolulu, HI 96813
(808) 548-6550
(808) 587-0018 (fax)

Idaho State Historic Preservation Office
1109 Main Street, Suite 250
Boise, ID 83702-5642
(208) 334-3890
(208) 334-2775 (fax)

Illinois Historic Preservation Agency
Preservation Services Division
Old State Capital
Springfield, IL 62701
(217) 785-9045
(217) 524-7525 (fax)

Indiana State Historic Preservation Office
Department of Natural Resources
402 West Washington Street, Room W256
Indianapolis, IN 46204
(317) 232-4020
(317) 232-8036 (fax)

Iowa State Historic Preservation Office
State Historical Society of Iowa
600 East Locust Street
Des Moines, IA 50319-0290
(515) 281-8837
(515) 282-0502

Kansas State Historical Society
Cultural Resources Division
6425 Southwest 6th Avenue
Topeka, KS 66615-1099
(913) 272-8681, ext. 227
(913) 272-8682 (fax)

Kentucky State Historic Preservation Office
300 Washington Street
Frankfort, KY 40601
(502) 564-7005
(502) 564-5820 (fax)

Louisiana Office of Cultural Development
P.O. Box 44247
Baton Rouge, LA 70804
(504) 342-8200
(504) 342-8173 (fax)

Maine Historic Preservation Commission
55 Capital Street
Station 65
Augusta, ME 04333-0065
(207) 287-2132
(207) 287-5900 (fax)

Maryland Historical and Cultural Programs
Department of Housing and Community Development
Peoples Resource Center
100 Community Place
Crownsville, MD 21032-2023
(410) 514-7600
(410) 514-7678 (fax)

Massachusetts State Historic Preservation Office
Archives Facility
200 Morrissey Boulevard
Boston, MA 02125
(617) 727-8470
(617) 727-5128 (fax)

Michigan State Historic Preservation Office
Bureau of Michigan History
717 W. Allegan
Lansing, MI 48918
(517) 373-0511
(517) 335-0348 (fax)

Minnesota State Historic Preservation Office
345 Kellogg Boulevard West
St. Paul, MN 55102
(612) 296-2747
(612) 296-1004 (fax)

Mississippi Department of History and Archives
P.O. Box 571
Jackson, MS 39205
(601) 359-6850
(601) 359-6905 (fax)

Missouri State Historic Preservation Office
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102
(314) 751-4732
(314) 526-2852 (fax)

Montana State Historic Preservation Office
Montana Historical Society
1410 8th Avenue
P.O. Box 201202
Helena, MT 59620-1202
(406) 444-7715
(406) 444-2996 (fax)

Nebraska State Historical Society
1500 R Street
Lincoln, NE 68501
(402) 471-4787
(402) 471-3100 (fax)

Nevada State Historic Preservation Office
Department of Museums, Library and Arts
100 South Stewart Street
Carson City, NV 89710
(702) 687-6360
(702) 687-8311 (fax)

New Hampshire State Historic Preservation Office
Division of Historical Resources
P.O. Box 2043
Concord, NH 03302-2043
(603) 271-3483 or 3558
(603) 271-3433 (fax)

New Jersey State Historic Preservation Office
Department of Environmental Protection
NC-402, 401 East State Street
Trenton, NJ 08625
(609) 292-2885
(609) 292-8115 (fax)

New Mexico State Historic Preservation Division
Office of Cultural Affairs
Villa Rivera Building, 3rd Floor
228 East Palace Avenue
Santa Fe, NM 87503
(505) 827-6320
(505) 827-6338 (fax)

New York State Historic Preservation Office
Empire State Plaza
Agency Building, 1, 20th Floor
Albany, NY 12238
(518) 474-0443
(518) 474-4492 (fax)

North Carolina Department of Cultural Resources
Division of Archives and History
109 East Jones Street
Raleigh, NC 27601-2807
(919) 733-7305
(919) 733-8807 (fax)

State Historical Society of North Dakota
North Dakota Heritage Center
Bismarck, ND 58505
(701) 328-2672
(701) 224-3710 (fax)

Ohio State Historic Preservation Division
Ohio Historical Society
1982 Velma Avenue
Columbus, OH 43211-2497
(614) 297-2470
(614) 297-2546 (fax)

Oklahoma State Historic Preservation Office
Wiley Post Historical Building
2100 N. Lincoln Boulevard
Oklahoma City, OK 73105
(405) 521-2491
(405) 521-2492 (fax)

Oregon State Historic Preservation Office
Parks and Recreation Department
1115 Commercial Street NE
Salem, OR 97310-1001
(503) 378-5019
(503) 378-6447 (fax)

Pennsylvania State Historic Preservation Office
Historical and Museum Commission
P.O. Box 1026
Harrisburg, PA 17108-1026
(717) 787-2891
(717) 783-1073 (fax)

Puerto Rico State Historic Preservation Office
La Fortaleza
P.O. Box 82
San Juan, PR 00901
(809) 721-2676 / 721-3737
(809) 723-0957 (fax)

Rhode Island Historical Preservation Commission
Old State House
150 Benefit Street
Providence, RI 02903
(401) 277-2678
(401) 277-2968 (fax)

South Carolina Department of Archives and History
P.O. Box 11669, Capital Station
Columbia, SC 29211
(803) 734-8592
(803) 734-8820 (fax)

South Dakota State Historic Preservation Center
900 Governors Drive
Pierre, SD 57069
(605) 773-3458
(605) 773-6041 (fax)

Tennessee Department of Environment and
Conservation and State Historic Preservation
2941 Lebanon Road
Nashville, TN 37243-0442
(615) 532-0105
(615) 532-1549 (fax)

Texas Historical Commission
P.O. Box 12276, Capital Station
Austin, TX 78711
(512) 463-6100
(512) 475-4872 (fax)

Utah State Historic Preservation Office
300 Rio Grande
Salt Lake City, UT 84101
(801) 533-3551
(801) 533-3503 (fax)

Vermont Division of Historic Preservation
135 State Street, Drawer 33
Montpelier, VT 05633-1201
(802) 828-3226
(802) 828-3206 (fax)

Virginia Department of Historic Resources
221 Governor Street
Richmond, VA 23219
(804) 786-3143
(804) 225-4261 (fax)

Washington State Historic Preservation Office
Department of Community Development
111 West 21st Avenue, S.W.
Olympia, WA 98504
(360) 753-4011
(360) 586-0250 (fax)

West Virginia State Historic Preservation Office
Division of Culture and History
Capital Complex
Charleston, WV 25305
(304) 558-0220
(304) 558-2779 (fax)

Wisconsin State Historic Preservation Office
Historic Preservation Division
State Historical Society
816 State Street
Madison, WI 53706
(608) 264-6500
(608) 262-5554 / 262-6404

Wyoming State Historic Preservation Office
Department of Commerce
6101 Yellowstone
Cheyenne, WY 82002
(307) 777-7697
(307) 777-6421 (fax)

Appendix D—National Park Service Field Director Offices (FDO) and System Support Offices (SSO)

Alaska SSO
(AK)
Linda Cook
Alaska FDO
National Park Service
2525 Gambell Street
Anchorage, AK 99503-2892
(907) 257-2658
(907) 257-2510 (fax)

Colorado Plateau and Rocky Mountain SSO
(CO, MT, UT, WY, CZ [Canal Zone])
Lysa Wegman-French
Rocky Mountain SSO
National Park Service
12795 W. Alemeda Parkway
Denver, CO 80225-2500
(303) 969-2842
(303) 987-6675 (fax)

Colorado Plateau and Southwest SSO
(AZ, NM, OK, TX)
Bob Spade
Southwest SSO
c/o Intermountain FDO
12795 W. Alemeda Parkway
Denver, CO 80225-2500
(303) 969-2898
(303) 969-2024 (fax)

Midwest FDO and Great Lakes SSO
(IL, IN, OH, MI, MN, WI)
Carol Ahlgren
Architectural Historian
Great Lakes SSO
1709 Jackson Street
Omaha, NE 68102
(402) 221-4649

Great Plains SSO
(AR, IA, KS, MO, ND, NE, SD)
Dean Sanford
Architectural Historian
Great Plains SSO
Midwest Regional Office
1709 Jackson Street
Omaha, NE 68102
(402) 221-3203

Rachel Franklin Weekly
Architectural Historian
Great Plains SSO
Midwest Regional Office
1709 Jackson Street
Omaha, NE 68102
(402) 221-3921

Northeast FDO and Allegheny, Chesapeake, and New England SSO
(CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV)
Kate C. Milley
Northeast FDO
National Park Service
U.S. Customs House, Rm. 251
200 Chestnut Street
Philadelphia, PA 19106
(215) 597-1580
(215) 597-6599 (fax)

Pacific West FDO and Columbia Cascades SSO
(ID, OR, WA)
Mitigation correspondence:
Stephanie Toothman
Pacific West FDO
Program Coordinator SSO
National Park Service
909 First Street
Seattle, WA 98104-1060
(206) 220-4139
(206) 220-4159 (fax)

Pacific/Great Basin SSO
(CA, NV)
David Maul
Pacific West FDO
Pacific/Great Basin SSO
National Park Service
600 Harrison Street
San Francisco, CA 94107-1372
(415) 744-1402
(415) 427-1484

Southeast FDO
Appalachian, Atlantic Coast, and Gulf Coast SSO
(AL, FL, GA, KY, LA, MS, MC, PR, SC, TN VI)
Official correspondence:
Cecil N. McKithin, Chief
National Registration Program Division
Southeast FDO
National Park Service
75 Spring Street SW
Atlanta, GA 30303
(404) 562-3171
(404) 562-3244 (fax)

Deborah Calloway
Southeast FDO
National Park Service
75 Spring Street SW
Atlanta, GA 30303
(404) 562-3172
(404) 562-3244 (fax)

References

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Glossary

This reference glossary contains numerous terms not included in the body of this document. Many of the definitions are from the Federal Highway Administration's *Bridge Inspector's Training Manual*.

A

Abutment—A substructure supporting the end of a single span or the extreme end of a multispan superstructure and, in general, retaining or supporting the approach embankment.

ACHP—Advisory Council on Historic Preservation.

Adverse Effect—When an undertaking adds, alters, or destroys characteristics that qualify a bridge for listing on the NRHP.

Adopt-A-Bridge Program—State DOT program where historic bridges are transferred to local governments or private individuals for adaptive use at other locations. The estimated cost for demolition of the bridge may be awarded to the purchaser. The State DOT is released from all liability associated with the bridge.

Alloy—A mixture of two or more metals to form a new base metal.

Anchorage—The complete assemblage of members and parts designed to hold in correct position the anchor span of a cantilever bridge, the end suspension span cable, or a suspension span backstay; the end of a restrained beam, girder, or truss span; a retaining wall, bulkhead, or other portion or part of a structure.

Anchor Span—The span which counterbalances and holds in equilibrium the fully cantilevered portion of an adjacent span; see *Cantilever Beam*, *Girder*, or *Truss*.

Arch—A curved structural element primarily in compression, producing at its supports reactions having both vertical and horizontal components.

Arch Barrel—A single arch member that extends the width of the structure.

Arch Rib—The main support element used in open-spandrel arch construction; also known as arch ring.

Association—The direct link between an important historic event and the bridge.

B

Backstay—Cable or chain attached at the top of a tower and extending to and secured upon the anchorage to resist overturning stresses exerted upon the tower by a suspended span.

Backwall—The topmost portion of an abutment above the elevation of the bridge seat, functioning primarily as a retaining wall with a live-load surcharge; it may serve also as a support for the extreme end of the bridge deck and the approach slab.

Bascule Bridge—A bridge over a waterway with one or two leaves that rotate from a horizontal to a near vertical position, providing unlimited vertical clearance.

Batter—The inclination of a surface in relation to a horizontal or a vertical plane, the angle is commonly designated on bridge detail plans as number of feet to 1 foot.

Beam—A linear structural member designed to span from one support to another.

Bearing—A support element transferring loads from superstructure to substructure, capable of permitting limited movement.

Bent—A substructure unit made up of two or more column or columnlike members connected at their top most ends by a cap, strut, or other member holding them in their correct positions.

Bowstring Truss—A general term applied to a truss of any type having a polygonal arrangement of its top chord members conforming to or nearly conforming to the arrangement required for a parabolic truss.

Box Beam—A hollow structural beam with a square, rectangular, or trapezoid cross section.

Bracing—A system of tension or compression members, or a combination of these, that maintains the geometric configuration of primary members. It transfers wind, dynamic, impact, and vibratory stresses and gives rigidity throughout the complete assembly.

Breastwall—The portion of an abutment between the wings and beneath the bridge seat; the breastwall supports the superstructure loads and retains the approach fill.

Bridge—A structure spanning and providing passage over a river, chasm, road, etc.

Bridge and Major Culvert Inventory (BMCI)—USDA Forest Service bridge management database.

Built-Up Member—A column or beam composed of plates and angles or other structural shapes united by bolting, riveting, or welding.

Bulkhead—A retaining wall-like structure commonly composed of driven piles supporting a wall or a barrier of wooden timbers or reinforced concrete members.

Buttress—A bracketlike wall, of full or partial height, projecting from another wall; the buttress strengthens and stiffens the wall against overturning forces; all parts of a buttress act in compression.

Buttressed Wall—A retaining wall designed with projecting buttresses to provide strength and stability.

C

Cable—A tension member comprised of numerous individual steel wires twisted and wrapped in such a fashion as to form a rope of steel; see *Suspension Bridge*.

Cable-Stayed Bridge—A bridge in which the superstructure is directly supported by cables or stays, passing over or attached to towers located at the main piers.

Camber—The slightly arched form or convex curvature provided in beams to compensate for dead-load deflection; in general, a structure built with perfectly straight lines appears slightly sagged.

Cantilever—A structural member which has a free end projecting beyond its supporting wall or column; length of span overhanging the support.

Cantilever Abutment—An abutment that resists the lateral thrust of earth pressure through the opposing cantilever action of a vertical stem and horizontal footing.

Cantilever Bridge—A general term applying to a bridge having a superstructure utilizing cantilever design.

Cantilever Span—A superstructure span composed of two cantilever arms, or a suspended span supported by one or two cantilever arms.

Cap—The topmost piece of a *pier* or *pile bent* serving to distribute the loads upon the columns or piles and to hold them in their proper relative positions; see *Pier Cap*, *Pile Cap*.

Capstone—The topmost stone of a masonry pillar, column, or other structure requiring the use of a single capping element.

Cast-In-Place—The act of placing and curing concrete within formwork to construct a concrete element in its final position.

Cast Iron—Relatively pure iron, smelted from iron ore, containing 1.8 to 4.5 percent free carbon, and cast to shape.

Catenary—The curve obtained by suspending a uniform rope or cable between two points.

Cement—A powder that hardens when mixed with water; an ingredient used in concrete.

CCC (Civilian Conservation Corps)—A work program established by the Federal government during the Great Depression (1929–1942) existing from 1933 to 1942. The CCC built roads, bridges, and structures and completed many conservation projects throughout the United States. Many CCC constructed structures are historically significant.

Cement Mortar—A mixture of four parts sand to one part cement with enough water added to make it plastic.

Chord—A horizontal member of a truss.

Clear Span—The unobstructed space or distance between support elements of a bridge or bridge member.

Closed Spandrel Arch—A stone or reinforced-concrete arch span having spandrel walls to retain the spandrel fill or to either entirely or in part support the floor system of the structure when the spandrel is not filled.

Coating—A material that provides a continuous film over a surface; a film formed by the material.

Column—A general term applying to a vertical member resisting compressive stresses and having, in general, a considerable length in comparison with its transverse dimensions.

Component—A general term reserved to define a bridge deck, superstructure, or substructure; subcomponents, e.g., floor beams are considered elements.

Compression Members—Stiff, heavy members that withstand the pressure tending to push them together.

Concrete—A mixture of aggregate, water, and a binder, usually portland cement, that hardens to a stonelike mass.

Concrete Beam—A structural member of reinforced concrete.

Concrete Pile—A pile constructed of reinforced concrete either precast and driven into the ground or cast-in-place in a hole bored into the ground.

Consultation—The formal process of seeking comments from SHPO's, Tribal Historic Preservation Offices, and the Advisory Council on Historic Preservation (when necessary) for undertakings that may affect historic properties. Consultation is necessary to fulfill the requirements of Section 106 of the National Historic Preservation Act.

Continuous Beam—A general term applied to a beam that spans uninterrupted over one or more intermediate supports.

Continuous Bridge—A bridge designed to extend without joints over one or more interior supports.

Continuous Spans—Spans designed to extend without joints over one or more intermediate supports.

Continuous Truss—A truss having its chord and web members arranged to continue uninterrupted over one or more intermediate points of support.

Coping—A course of stone laid with a projection beyond the general surface of the masonry below it and forming the topmost portion of a wall; a course of stone capping the curved or V-shaped extremity of a pier, providing a transition to the pier head proper; when so used, it is commonly termed the "starling coping," "nose coping," the "cutwater coping," or the "pier extension coping."

Corbel—A piece constructed to project from the surface of a wall, column, or other portion of a structure to serve as a support for another member.

Counterfort—A bracketlike wall projecting from a retaining wall on the side of the retained material to stabilize it against overturning; a counterfort, as opposed to a buttress, acts entirely in tension.

Counterforted Abutment—An abutment which develops resistance to bending moment in the stem by use of conterforts; this permits the breast wall to be designed as a horizontal beam or slab spanning between counterforts, rather than as a vertical cantilever slab.

Counterweight—A weight which is used to balance the weight of a movable member; in bridge applications, counterweights are used to balance a movable span so that it rotates or lifts with minimum resistance.

Covered Bridge—An indefinite term applied to a wooden bridge having its roadway protected by a roof and enclosed sides.

Crib—A structure consisting of a foundation grillage combined with a superimposed framework providing compartments or coffers which are filled with gravel, concrete, or other material, satisfactory for supporting the structure to be placed thereon.

Criteria of Evaluation—The four legal criteria for determining eligibility of a property for listing in the National Register of Historic Places.

Cross Bracing—Transverse bracings between two main longitudinal members; see *Diaphragm*.

Cross Girders—Girders that supply transverse support for longitudinal beams or girders.

Crown of the Roadway—The vertical dimension describing the total amount of the surface that is convexed or raised from gutter to centerline; this is sometimes termed the cross fall of the roadway.

Cultural Resource Site Form—A standard form used by agencies for initial documentation and recording of historic properties. The form is available in many variations. It includes information such as location, description, historical significance, and potential for listing on the NRHP.

Curb—A short barrier paralleling the outside edge of the roadway to guide the movement of vehicle wheels and safeguard constructions and pedestrian traffic existing outside the roadway limit from collision with vehicles and their loads.

D

Deck—The portion of a bridge that provides direct support for vehicular and pedestrian traffic.

Deck Bridge—A bridge in which the supporting members are all beneath the roadway.

Design—For NRHP eligibility, design is the unique historic function and technology.

Determination of Effect—The result an undertaking will have on the historic characteristics of a property (eligible for NRHP listing). Effect is determined in consultation with each respective SHPO, THPO, and ACHP using the Criteria of Effect (36 CFR 800.9).

Determination of Eligibility—The process of determining if a property is eligible for NRHP listing. Properties are evaluated against the National Register of Historic Place's Criteria for Evaluation (36 CFR 60.4) in consultation with the respective SHPO, TPO, etc. If the agency and SHPO fail to concur on NRHP eligibility, the "Keeper" of the National Register makes the final determination of eligibility.

Diagonal—A sloping structural member of a truss or bracing system.

Diagonal Stay—A cable support in a suspension bridge extending diagonally from the tower to the roadway system to add stiffness to the structure and diminish the deformations and undulations resulting from traffic service.

Diagonal Tension—The principal tensile force due to horizontal and vertical shear in a beam.

Diaphragm—A member placed within a member or superstructure system to distribute stresses and improve strength and rigidity; see *Bracing*.

Diaphragm Wall—A wall built transversely to the longitudinal centerline of a spandrel arch serving to tie together and reinforce the spandrel walls and providing a support for the floor system in conjunction with the spandrel walls; also known as cross wall.

Dolphin—A group of piles placed close together to protect portions of a bridge from collisions with river or marine traffic.

E

Effect—The result of the proposed undertaking.

Embankment—A bank of earth constructed above the natural ground surface to carry a road or to prevent water from passing beyond desirable limits; also known as bank.

End Post—The end compression member of a truss, either vertical or inclined in position and extending from the top chord to the bottom chord.

Expansion Joint—A joint designed to provide means for expansion and contraction movements produced by temperature changes, load, or other forces.

Exceptional Significance—A qualifying criterion for NRHP listing for properties less than 50 years old that have unique historical significance.

Eyebar—A member consisting of a rectangular bar with enlarged forged ends having holes through them for engaging connecting pins.

F

Fascia—An outside covering member designed on the basis of architectural effect rather than strength and rigidity, although its function may involve both.

Feeling—The expression of the aesthetic or historic sense of a particular time period.

Field Recording—The initial documentation by the heritage resource specialist on the cultural resource site form. Field recording includes a description of the resource, historical significance, and levels of integrity for NRHP listing.

Fish Belly—A term applied to a girder or a truss having its bottom flange or its bottom chord constructed either haunched or bow-shaped with the convexity downward; see Lenticular Truss.

Flange—The horizontal parts of a rolled I- beam or built-up girder extending transversely across the top and bottom of the web.

Footing—The enlarged, lower portion of a substructure that distributes the structure load either to the earth or to supporting piles; the most common footing is the concrete slab; footer is a local term for footing.

Foundation—The supporting material upon which the substructure portion of a bridge is placed.

Frame—A structure having its parts or members arranged and secured so that the entire assemblage is not distorted when supporting the loads, forces, and physical pressures considered in its design.

G

Gauge—The distance between parallel lines of rails, rivet holes, etc; a measure of thickness of sheet metal, or wire; also known as gage.

Girder—A flexural member that is the main or primary support for the structure and usually receives loads from floor beams and stringers; any large beam, especially if built up.

Girder Bridge—A bridge whose superstructure consists of two or more girders supporting a separate floor system, as differentiated from a multibeam bridge or a slab bridge.

Gravity Abutment Wall—A heavy abutment wall which resists horizontal earth pressure through its own dead weight.

Grid Flooring—A steel floor system comprising a lattice pattern that may or may not be filled with concrete.

Groin—A wall built out from a river bank to check scour.

Grout—A mortar having a sufficient water content to render it a free-flowing mass, used for filling (grouting) the joints in masonry, for fixing anchor bolts, and for filling cored spaces where water may accumulate.

Guardrail—A stuctural element designed to redirect an errant vehicle onto the roadway (guiderail).

Gusset—A plate connecting the members of a structure and holding them in correct position at a joint.

H

Hammerhead Pier—A pier with a single cylindrical or rectangular shaft and a relatively long, transverse cap; also know as a tee pier.

Hand Rail—Commonly applied only to sidewalk railing having a latticed, barred, balustered, or other open web construction.

Hanger—A tension member serving to suspend an attached member.

Haunch—An increase in the depth of a member usually at points of support; the outside areas of a pipe between the spring line and the bottom of the pipe.

H-Beam—A rolled steel member having an H-shaped cross section and commonly used for piling; also H-pile.

Hinge—A point in a structure at which a member is free to rotate.

Hinged Joint—A joint constructed with a pin, cylindrical segment, spherical segment, or other device permitting movement by rotation.

HAER—Historic American Engineering Record.

Historically Significant—If a property is historically significant, it complies with Section 106 and is eligible for NRHP listing.

Howe Truss—A type of bridge truss having parallel chords, vertical (tension) rods at the panel points, and diagonals forming an X-pattern.

I

I-Beam—A structural member with a cross-sectional shape similar to the capital letter "I."

Integral Abutment—An abutment cast monolithically with the end diaphragm of the deck; such abutments usually encase the ends of the deck beams and are pile supported.

Integral Deck—A deck designed to share the load-carrying capabilities of the bridge with the superstructure and not merely to transfer loads to the superstructure.

Iron—A metallic element used in cast or wrought iron and steel.

J

Joint—In stone masonry, the space between individual stone; in concrete, a division in continuity of the concrete; in a truss, the point at which members of a truss frame are joined.

K

Keeper of the National Register—The National Park Service as the lead agency for Historic Preservation, administers the National Register program and is the Keeper of the NRHP. The Keeper makes final decisions about eligibility of historic properties if the agency and the SHPO cannot agree. The Keeper lists historic properties on the NRHP if a formal nomination is submitted.

Keystone—The symmetrically shaped, wedgelike stone located in the head ring at the crown of an arch; the final stone placed, thereby closing the arch.

King-Post Truss—Two triangular panels with a common center vertical; the simplest design for a triangular truss.

Kip—A unit of weight equal to 1,000 pounds; convenient unit for structural calculations.

Knee Brace—A short member engaging two other members at its ends that are joined to form a right angle or a near-right angle to strengthen and stiffen the connecting joint.

K-Truss—A truss having a web system wherein the diagonal members intersect the vertical members at or near the midheight; the assembly in each panel forms a letter "K."

L

Laminated Timber—Small timber planks glued together to form a larger member.

Lateral Bracing—The bracing assemblage engaging a member perpendicular to the plane of the member; intended to resist lateral movement and deformation; also provides resistance against raking of primary parallel elements in truss bridges and girder bridges; see *Bracing*.

Lattice—A crisscross assemblage of diagonal bars, channels, or angles on a truss; also know as latticing, lacing.

Lattice Truss—In general, a truss having its web members inclined, but more commonly, the term is applied to a truss having two or more web systems composed entirely of diagonal members at any interval and crossing each other without reference to vertical members.

Lenticular Truss—A truss having parabolic top and bottom chords curved in opposite directions with their ends meeting at a common joint; also know as a fish belly truss.

Location—The original location of a bridge or where a historic event occurred.

Lower Chord—The bottom horizontal member of a truss.

M

Macadam—Uniformly sized stones rolled to form a road.

Main Beam—A beam which supports the span and bears directly onto a column or wall.

Masonry—That portion of a structure composed of stone, brick, or concrete block placed in layers and in some cases cemented with mortar.

Materials—The elements originally combined to make the structure.

Member—An individual angle, beam, plate, or built piece intended to become an integral part of an assembled frame or structure.

Mitigation—The steps taken to resolve, or minimize, the adverse effects of an undertaking. In the case of removing a historic bridge, this might include HABS/HAER documentation, moving the bridge through the Adopt-A-Bridge program, or interpreting the bridge. Mitigation measures are determined for an adverse effect in consultation with the SHPO and ACHP.

Monolithic—Forming a single mass without joints.

Mortar—A paste of cement, sand, and water laid between bricks, stones, or blocks.

N

NHPA—National Historic Preservation Act of 1966.

No Adverse Effect—A determination made by the agency and SHPO as specified in *Criteria of Effect* (36 CFR 800. 9 [a]) where the undertaking will have an effect, but the effect will not be adverse.

No Effect—A determination made by the agency and SHPO as specified in *Criteria of Effect* (36 CFR 800.9 [a]) where the undertaking will have no effect, and may proceed in full compliance with Section 106, NHPA.

NRHP—National Register of Historic Places.

O

Open Spandrel Arch—A bridge having open spaces between the deck and the arch members allowing “open” visibility through the bridge.

Open Spandrel Ribbed Arch—A structure in which two or more comparatively narrow arch rings, called ribs, function in the place of an arch barrel; the ribs are rigidly secured in position by arch rib struts located at intervals along the length of the arch; the arch ribs support the columns that support the floor system and its loads.

Orthotropic—A description of the physical properties of a material that has pronounced differences in two or more directions at right angles to each other; see *Anisotropic*.

Overpass—A bridge structure where the major thouroughfare is the upper roadway; see *Underpass*.

P

Panel—The portion of a truss span between adjacent points of intersection of web and chord members.

Panel Point—The point of intersection of primary web and chord members of a truss.

Parabolic Arch—An arch in which the inside surface is a segment of a symmetric parabola (common in concrete arches).

Parabolic Truss—A polygonal truss having its top chord and end post vertices coincident with the arc of a parabola, its bottom chord straight and its web system either triangular or quadrangular; also known as a parabolic arched truss.

Parapet—A low wall along the outmost edge of the roadway of a bridge to protect vehicles and pedestrians.

Pier—A substructure unit that supports the spans of a multispan superstructure at an intermediate location between its abutments.

Pier Cap—The topmost portion of a pier that distributes the concentrated loads from the bridge uniformly over the pier.

Pile—A shaftlike linear member that carries loads through weak layers of soil to those which are capable of supporting such loads.

Pile Bent—A row of driven or placed piles with a pile cap to hold them in their correct positions; see *Bent*.

Pile Bridge—A bridge resting on piles or pile bents.

Pile Cap—The uppermost portion of a pile that acts to secure the piles in position and provides a bridge seat to receive and distribute superstructure loads.

Pin—A cylindrical bar used to connect.

Pin-Connected Truss—A general term applied to a truss of any type having its chord and web members connected at the panel points by pins.

Plain Concrete—Concrete with no structural reinforcement except light steel to reduce shrinkage and temperature-related cracking.

Plate Girder—A large I-beam composed of a solid web plate with flange plates attached to the web plate by flange angles or fillet welds.

Pony Truss—A through truss having insufficient height to use a top chord system of lateral bracing.

Portal—The clear, unobstructed space of a through-truss bridge forming the entrance to the structure.

Post—A member resisting compressive stresses located vertical to the bottom chord of a truss and common to two-truss panels; sometimes used synonymously with vertical column; see *Column*.

Pratt Truss—A truss with parallel chords and a web system composed of vertical posts with diagonal ties inclined outward and upward from the bottom-chord panel points toward the ends of the truss; also know as N-truss.

Precast Concrete—Concrete members which are cast and cured before being placed into their final position on a construction site.

Prestressed Concrete—Concrete in which cracking and tensile forces are greatly reduced by compressing it with tensioned cables or bars.

Q

Queen-Post Truss—A parallel-chord type of truss having three panels with the top chord occupying only the length of the center panel; unless center panel diagonals are provided, it is a trussed beam.

R

Railing—A fencelike construction built at the outermost edge of the roadway or the sidewalk portion of a bridge to protect pedestrians and vehicles; see *Handrail*.

Reinforced Concrete—Concrete with steel reinforcing bars bonded within it to supply increased tensile strength and durability.

Reinforcement—Rods or mesh embedded in concrete to strengthen it.

Retaining Wall—A structure designed to restrain and hold back a mass of earth.

Rib—Curved structural member supporting a curved shape or panel.

Rigid Frame Bridge—A bridge with moment resistant connections between the superstructure and the substructure to produce an integral, elastic structure.

Rip-Rap—Gabions, stones, blocks of concrete, or other protective covering material of like nature deposited upon river and stream beds and banks, lake, tidal, or other shores to prevent erosion and scour by water flow, wave, or other movement.

Rivet—A metal fastener used in pre-1970 construction; made with a rounded preformed head at one end and installed hot into a predrilled or punched hole; the other end was hammered into a similar shaped head, thereby clamping the adjoining parts together.

Riveted Connection—A rigid connection of metal bridge members that replaced pin connections using rivets. The riveted connection increases the strength of the structure.

Roadway—The portion of the road intended for the use of vehicular traffic.

Rolled-Steel Section—Any hot-rolled steel section including wide flange shapes, channels, angles, etc.

Roller—A steel cylinder intended to provide longitudinal movements by rolling contact.

S

Saddle—A member located upon the topmost portion of the tower of a suspension bridge that acts as a bearing surface for the catenary cable passing over it.

Scupper—An opening in the floor portion of a bridge to provide means for rain or other water accumulated upon the roadway surface to drain through it into the space beneath the structure.

Seat—A base on which an object or member is placed.

Secondary Member—A member that is carried by other members and does not resist traffic loads.

Section 106—(Section 106 of the National Historic Preservation Act, as amended in 1992); Section 106 of the NHPA requires Federally funded agencies to consider the effects of their actions on properties listed, or eligible for listing, on the National Register of Historic Places. Requires the SHPO and, if necessary, the ACHP an opportunity to comment on such actions.

Segmental—Constructed of individual pieces or segments that are collectively joined to form the whole.

Setting—The character of a place and how the bridge is situated in relationship to other features, such as the roadbed and landforms.

Simple Span—The span of a bridge or element that begins at one support and ends at an adjacent support.

Slab Bridge—A bridge having a superstructure composed of a glue-laminated timber slab or a reinforced concrete slab constructed either as a single unit or as a series of narrow slabs placed parallel to the roadway and spanning the space between the supporting abutments.

Soldier Beam—A timber or steel pile driven into the earth with its projecting butt end used as a cantilever beam.

Span—The distance between piers, towers, or abutments.

Spandrel—The space bounded by the arch extrados and the horizontal member above it.

Spandrel Column—A column constructed on the rib of an arch span and serving as a support for the deck construction of an open spandrel arch; see *Open Spandrel Arch*.

Spur Dike—A projecting jettylike construction placed upstream and adjacent to an abutment to prevent stream scour and undermining of the abutment foundation and to reduce the accumulation of stream debris against the upstream side of the abutment.

SHPO—State Historic Preservation Officer or Office.

State Historic Bridge Inventory—A list of bridges within a State that have been determined eligible for listing on the NRHP. These lists result from statewide evaluations of bridges for historic significance.

Stay-In-Place Forms—A prefabricated metal concrete-deck form that will remain in place after the concrete has set; see *Forms*.

Steel—An alloy of iron, carbon, and various other elements and metals.

Stiffening Girder—A girder incorporated into a suspension bridge to distribute the traffic loads uniformly among the suspenders and reduce local deflections; see *Girder*.

Stiffening Truss—A truss incorporated into a suspension bridge to distribute the traffic loads uniformly among the suspenders and reduce local deflections; see *Truss*.

Stirrup—U-shaped bar providing a stirruplike support for a member in timber and metal bridges; U-shaped bar placed in concrete construction to resist diagonal tension (shear) stresses.

Stone Masonry—The portion of a structure composed of stone.

Stringer—A longitudinal beam supporting the bridge deck.

Structural Member—An individual piece, such as a beam or strut, that is an integral part of a structure.

Structure—Something, such as a bridge, that is built and designed to sustain a load.

Strut—A piece or member acting to resist compressive stress.

Stub Abutment—A short abutment often supported upon piles or on gravel fill, the embankment, or natural ground itself.

Superelevation—The difference in elevation between the inside and outside edges of a roadway in a horizontal curve; required to counteract the effects of centripetal force.

Superstructure—The entire portion of a bridge structure that primarily receives and supports traffic loads and in turn transfers these loads to the bridge substructure.

Suspended Span—A simple span supported from the free ends of cantilevers.

Suspender—A wire cable, a metal rod, or bar connecting to a catenary cable of a suspension bridge at one end and the bridge floor system at the other, thus transferring loads from the road to the main suspension members.

Suspension Bridge—A bridge in which the floor system is supported by catenary cables that are supported upon towers and are anchored at their extreme ends.

Suspension Cable—A catenary cable that is one of the main members upon which the floor system of a suspension bridge is supported.

Sway Anchorage—A guy, stay cable, or chain attached to the floor system of a suspension bridge and anchored upon an abutment or pier to increase the resistance of the suspension span to lateral movement; also know as sway cable.

Sway Bracing—Diagonal bracing located at the top of a through truss, perpendicular to the truss itself, usually in a vertical plane, and designed to resist horizontal forces.

Swing Span Bridge—A movable bridge in which the span rotates in a horizontal plane on a pivot pier to permit passage of marine traffic.

T

Tendon—A prestressing cable, strand, or bar.

Tension Members—Slender members of a bridge that resist forces that pull them apart.

THPO—Tribal Historic Preservation Office or Officer.

Three-Hinged Arch—An arch that is hinged at each support and at the crown.

Through Bridge—A bridge where the floor elevation is nearly at the bottom of the superstructure and traffic travels “through” the supporting parts.

Tie—A member carrying tension.

Timber—Wood suitable for building purposes.

Tower—A pier or frame supporting the catenary cables of a suspension bridge.

Travel Way—The roadway.

Trestle—A bridge structure consisting of spans supported upon frame bents.

Truss—A jointed structure made up of individual members arranged and connected, usually in a triangular pattern, so as to support longer spans.

Truss Bridge—A bridge having a pair of trusses for the superstructure.

Trussed Beam—A beam stiffened to reduce its deflection by a steel tie-rod which is held at a short distance from the beam by struts.

Tunnel—An underground passage open to daylight at both ends.

Turnbuckle—A long, cylindrical, internally threaded nut used to connect the elements of adjustable rods and bar members.

Two-Hinged Arch—A rigid frame that may be arch-shaped or rectangular, but is hinged at both supports.

U

U-Bolt—A bar bent in the shape of the letter "U" and fitted with threads and nuts at its ends.

Underpass—A bridge structure where the principal, or subject, transportation facility is the lower roadway; see *Overpass*.

Undertaking—As defined in NHPA, Section 106, any project, activity, or program that can result in the changes of, or use of, historic properties. The project, activity, or program must be under the direct or indirect jurisdiction of a Federal agency or licensed or assisted by a Federal agency. Undertakings include new and continuing projects, activities or programs, and any of their elements not previously considered under Section 106 of 36 CFR 800.2 [0].

Upper Chord—The top longitudinal member of a truss.

V

Viaduct—A series of spans carried on piers at short intervals.

Vierendeel Truss—A Pratt truss without diagonal members and with rigid joints between top and bottom chords and the verticals.

Voussoir—One of the truncated wedge-shaped stones of which a stone arch is built; also know as ring stone.

Voussoir Arch—An arrangement of wedge-shaped blocks set to form an arched bridge.

W

Warren Truss—A triangular truss consisting of sloping members between the top and bottom chords and having no vertical members; members form the letter W.

Waterway—The available width for the passage of water beneath a bridge.

Wearing Surface—The topmost layer of material applied upon a roadway to receive the traffic loads and to resist the resulting disintegrating action; also known as wearing course.

Web—The portion of a beam located between and connected to the flanges; the stem of a dumbbell type pier.

Web Members—The intermediate members of a truss, not including the end posts, usually vertical or inclined.

Welded Bridge Structure—A structure whose metal elements are connected by welds.

Welded Joint—A joint in which the assembled elements and members are united through fusion of metal.

Wheel Guard—A raised curb along the outside edge of traffic lanes to safeguard constructions outside the roadway limit from collision with vehicles.

Whipple Truss—A double-intersecting through Pratt truss where the diagonals extend across two panels.

Wide Flange—A rolled, I-shaped member having flange plates of rectangular cross section, differentiated from an S-beam (American Standard) in that the flanges are not tapered.

Wind Bracing—The bracing systems that function to resist the stresses induced by wind forces.

Wingwall—The retaining wall extension of an abutment intended to restrain and hold in place the side-slope material of an approach roadway embankment.

Workmanship—The evidence of the craft skills and technology of the builders.

About the Authors

Merv Eriksson has a bachelor's degree in civil engineering from the University of North Dakota. He worked as a highway and bridge engineer with the Federal Highway Administration before becoming a structural engineer with the Forest Service's Northern Region in 1979. He was leader of the Region One Bridge Design and Construction Group from 1986 until 1997. He is now the western coordinator for the Wood in Transportation Program. He is stationed at the Missoula Technology and Development Center and is employed by Northeastern Area State and Private Forestry and the Forest Products Laboratory. About 25 percent of his time is currently devoted to road- and trail-bridge project work for the Missoula and San Dimas Technology and Development Centers.

C. Milo McLeod is the forest archeologist for the Lolo National Forest in Missoula, MT, where he is professionally active in archeology and historic preservation. He has a bachelor's degree in anthropology and history from the University of New Mexico and a master's degree in anthropology from the University of Montana. He has participated in archeological research projects in the American Southwest, Alaska, the Northern Rockies and South Carolina. Since 1997 McLeod has spent about 25 percent of his time detailed to the Forest Service liaison at the Army Environmental Center, Aberdeen Proving Grounds, MD. He has worked for the Army Environmental Center throughout the United States and within the Republic of Korea.

Dan Gard is a historian for the Lolo National Forest. He has a bachelor's degree in history and a master's degree in historical archaeology, both from the University of Montana. For the past 5 years, Dan has worked closely with the Nez Perce (Nee-Me-Poo) National Historic Trail, the only national historic trail managed by the USDA Forest Service. Before joining the Forest Service, Dan worked as a seasonal backcountry ranger and firefighter in Glacier and Yellowstone National Parks.

Library Card

Eriksson, Mervin; McLeod, C. Milo; Gard, Dan. 2000. Identifying and preserving historic bridges. 0071-2854-MTDC. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center. 90 pp.

Describes techniques to evaluate bridges for their historic significance under the National Historic Preservation Act of 1966. The U.S. Department of Agriculture Forest Service manages over 8,000 bridges, many of which need substantial maintenance or should be replaced. Any bridge that is 50 years old or older must be treated as if it is eligible for listing on the National Register of Historic Places unless an evaluation has determined that it is ineligible. The report is intended as a reference for evaluating Forest Service bridges for their historic significance. It includes a brief history of bridges built by the Forest Service and a summary of the different types of bridges. Some alternatives discussed for historic bridges that can no longer serve their original purpose are leaving them in place with reduced loads (such as pedestrian traffic), moving them, or reconstructing them with materials similar to those used originally. Appendixes include information on potentially historic bridges from the Forest Service's Bridge and Major Culvert Inventory Data Base, a list of addresses and phone numbers for the State Departments of Transportation, and a glossary.

Keywords: historic preservation, historical records, National Historic Preservation Act

Additional single copies of this document may be ordered from:

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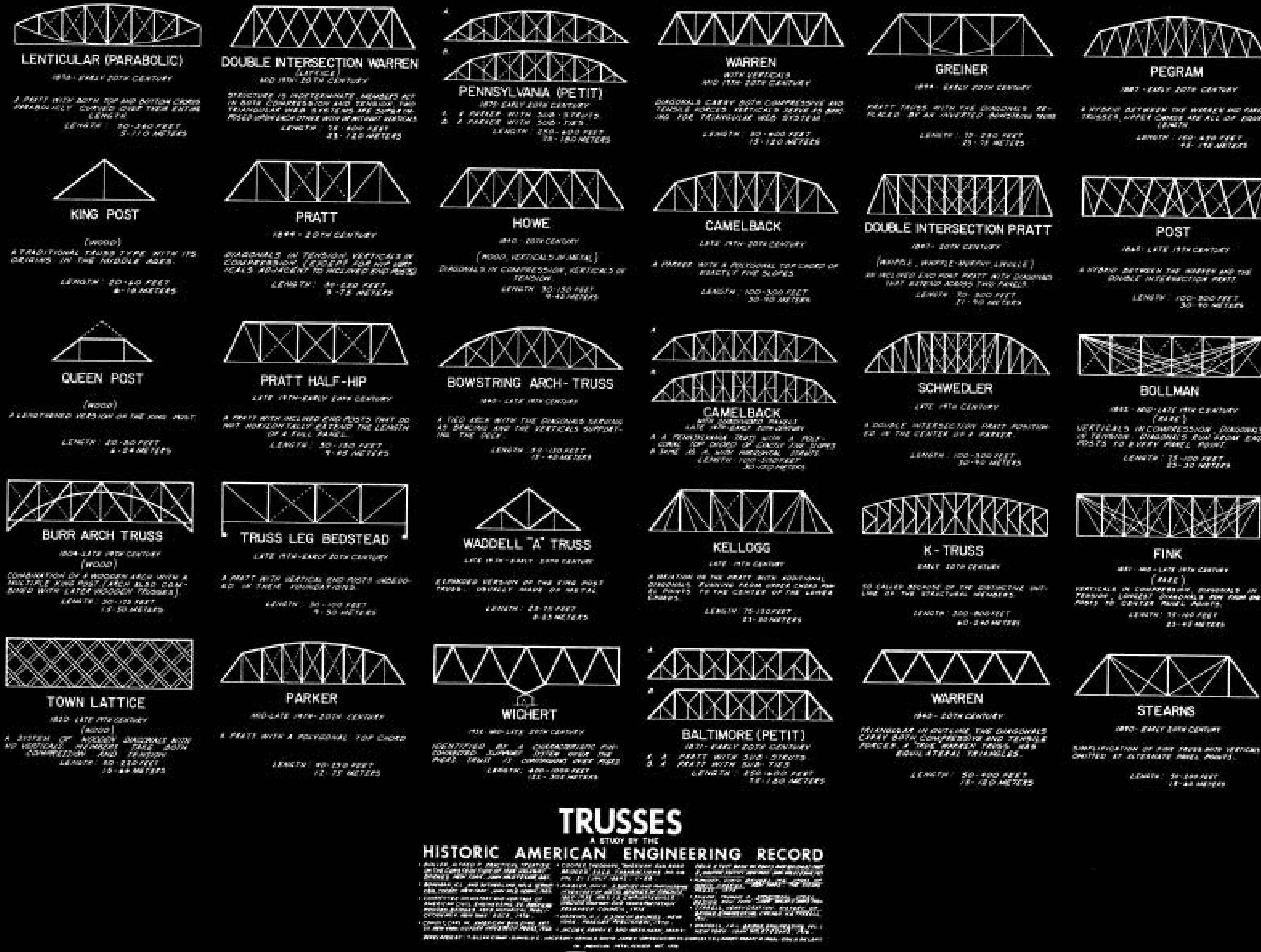
LENTICULAR (PARABOLIC)
1878 - EARLY 20TH CENTURY
A PRATT WITH BOTH TOP AND BOTTOM CHORDS PARABOLICALLY CURVED OVER THEIR ENTIRE LENGTH.
LENGTH: 50-360 FEET 15-110 METERS
DOUBLE INTERSECTION WARREN
(LATTICE)
MID 19TH-20TH CENTURY
STRUCTURE IS INDETERMINATE. MEMBERS ACT IN BOTH COMPRESSION AND TENSION. TWO TRIANGULAR WEB SYSTEMS ARE SUPERIMPOSED UPON EACH OTHER WITH OR WITHOUT VERTICALS.
LENGTH: 75-400 FEET 23-120 METERS
PENNSYLVANIA (PETIT)
1875 - EARLY 20TH CENTURY
A. A PARKER WITH SUB-STRUTS
B. A PARKER WITH SUB-TIES
LENGTH: 250-600 FEET 75-180 METERS
WARREN
WITH VERTICALS
MID 19TH-20TH CENTURY
DIAGONALS CARRY BOTH COMPRESSIVE AND TENSILE FORCES. VERTICALS SERVE AS BRACING FOR TRIANGULAR WEB SYSTEM.
LENGTH: 50-400 FEET 15-120 METERS
GREINER
1894 - EARLY 20TH CENTURY
PRATT TRUSS WITH THE DIAGONALS REPLACED BY AN INVERTED BOWSTRING TRUSS.
LENGTH: 70-250 FEET 23-75 METERS
PEGRAM
1887 - EARLY 20TH CENTURY
A HYBRID BETWEEN THE WARREN AND PARKER TRUSSES, UPPER CHORDS ARE ALL OF EQUAL LENGTH.
LENGTH: 150-450 FEET 45-135 METERS
KING POST
(WOOD)
A TRADITIONAL TRUSS TYPE WITH ITS ORIGINS IN THE MIDDLE AGES.
LENGTH: 20-60 FEET 6-18 METERS
PRATT
1844 - 20TH CENTURY
DIAGONALS IN TENSION, VERTICALS IN COMPRESSION (EXCEPT FOR HIP VERTICALS ADJACENT TO INCLINED END POSTS).
LENGTH: 30-250 FEET 9-75 METERS
HOWE
1840 - 20TH CENTURY
(WOOD, VERTICALS OF METAL)
DIAGONALS IN COMPRESSION, VERTICALS IN TENSION.
LENGTH: 30-150 FEET 9-45 METERS
CAMELBACK
LATE 19TH-20TH CENTURY
A PARKER WITH A POLYGONAL TOP CHORD OF EXACTLY FIVE SLOPES.
LENGTH: 100-300 FEET 30-90 METERS
DOUBLE INTERSECTION PRATT
1847 - 20TH CENTURY
(WHIPPLE, WHIPPLE-MURPHY, LINVILLE)
AN INCLINED END POST PRATT WITH DIAGONALS THAT EXTEND ACROSS TWO PANELS.
LENGTH: 70-300 FEET 21-90 METERS
POST
1865 - LATE 19TH CENTURY
A HYBRID BETWEEN THE WARREN AND THE DOUBLE INTERSECTION PRATT.
LENGTH: 100-300 FEET 30-90 METERS
QUEEN POST
(WOOD)
A LENGTHENED VERSION OF THE KING POST.
LENGTH: 20-80 FEET 6-24 METERS
PRATT HALF-HIP
LATE 19TH-EARLY 20TH CENTURY
A PRATT WITH INCLINED END POSTS THAT DO NOT HORIZONTALLY EXTEND THE LENGTH OF A FULL PANEL.
LENGTH: 30-150 FEET 9-45 METERS
BOWSTRING ARCH-TRUSS
1840 - LATE 19TH CENTURY
A TIED ARCH WITH THE DIAGONALS SERVING AS BRACING AND THE VERTICALS SUPPORTING THE DECK.
LENGTH: 50-130 FEET 15-40 METERS
CAMELBACK
WITH SUBDIVIDED PANELS
LATE 19TH-EARLY 20TH CENTURY
A. A PENNSYLVANIA TRUSS WITH A POLYGONAL TOP CHORD OF EXACTLY FIVE SLOPES
B. SAME AS A. WITH HORIZONTAL STRUTS
LENGTH: 100-300 FEET 30-100 METERS
SCHWEDLER
LATE 19TH CENTURY
A DOUBLE INTERSECTION PRATT POSITIONED IN THE CENTER OF A PARKER.
LENGTH: 100-300 FEET 30-90 METERS
BOLLMAN
1852 - MID-LATE 19TH CENTURY
(RARE)
VERTICALS IN COMPRESSION, DIAGONALS IN TENSION. DIAGONALS RUN FROM END POSTS TO EVERY PANEL POINT.
LENGTH: 75-100 FEET 23-30 METERS
BURR ARCH TRUSS
1804 - LATE 19TH CENTURY
(WOOD)
COMBINATION OF A WOODEN ARCH WITH A MULTIPLE KING POST (ARCH ALSO COMBINED WITH LATER WOODEN TRUSSES).
LENGTH: 50-175 FEET 15-50 METERS
TRUSS LEG BEDSTEAD
LATE 19TH-EARLY 20TH CENTURY
A PRATT WITH VERTICAL END POSTS IMBEDDED IN THEIR FOUNDATIONS.
LENGTH: 30-100 FEET 9-30 METERS
WADDELL "A" TRUSS
LATE 19TH-EARLY 20TH CENTURY
EXPANDED VERSION OF THE KING POST TRUSS. USUALLY MADE OF METAL.
LENGTH: 25-75 FEET 8-23 METERS
KELLOGG
LATE 19TH CENTURY
A VARIATION OF THE PRATT WITH ADDITIONAL DIAGONALS RUNNING FROM UPPER CHORD PANEL POINTS TO THE CENTER OF THE LOWER CHORDS.
LENGTH: 75-150 FEET 23-50 METERS
K-TRUSS
EARLY 20TH CENTURY
SO CALLED BECAUSE OF THE DISTINCTIVE OUTLINE OF THE STRUCTURAL MEMBERS.
LENGTH: 200-800 FEET 60-240 METERS
FINK
1851 - MID-LATE 19TH CENTURY
(RARE)
VERTICALS IN COMPRESSION, DIAGONALS IN TENSION. LONGEST DIAGONALS RUN FROM END POSTS TO CENTER PANEL POINTS.
LENGTH: 75-100 FEET 23-45 METERS
TOWN LATTICE
1820 - LATE 19TH CENTURY
(WOOD)
A SYSTEM OF WOODEN DIAGONALS WITH NO VERTICALS. MEMBERS TAKE BOTH COMPRESSION AND TENSION.
LENGTH: 50-220 FEET 15-66 METERS
PARKER
MID-LATE 19TH-20TH CENTURY
A PRATT WITH A POLYGONAL TOP CHORD.
LENGTH: 40-250 FEET 12-75 METERS
WICHERT
1930 - MID-LATE 20TH CENTURY
IDENTIFIED BY A CHARACTERISTIC PIN CONNECTED SUPPORT SYSTEM OVER THE PIERS. TRUSS IS CONTINUOUS OVER PIERS.
LENGTH: 400-1000 FEET 122-305 METERS
BALTIMORE (PETIT)
1871 - EARLY 20TH CENTURY
A. A PRATT WITH SUB-STRUTS
B. A PRATT WITH SUB-TIES
LENGTH: 250-600 FEET 75-180 METERS
WARREN
1848 - 20TH CENTURY
TRIANGULAR IN OUTLINE. THE DIAGONALS CARRY BOTH COMPRESSIVE AND TENSILE FORCES. A TRUE WARREN TRUSS HAS EQUILATERAL TRIANGLES.
LENGTH: 50-400 FEET 15-120 METERS
STEARNS
1890 - EARLY 20TH CENTURY
SIMPLIFICATION OF FINK TRUSS WITH VERTICALS OMITTED AT ALTERNATE PANEL POINTS.
LENGTH: 50-200 FEET 15-60 METERS
TRUSSES
A STUDY BY THE
HISTORIC AMERICAN ENGINEERING RECORD