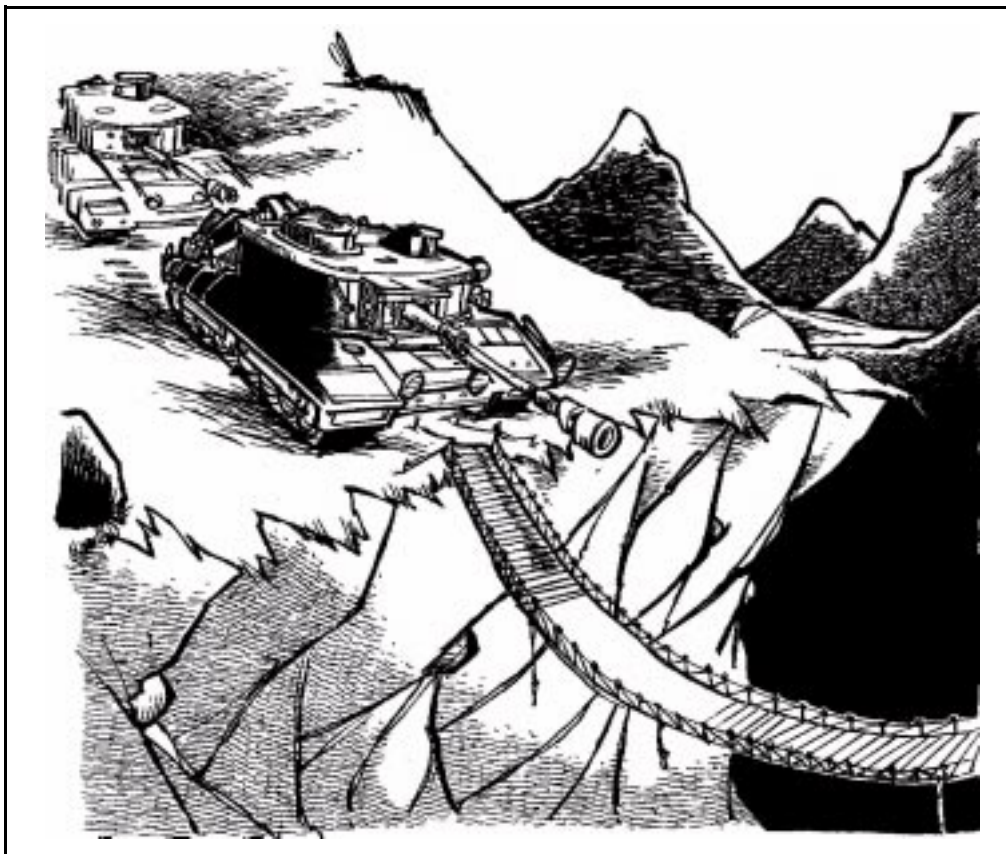


FM 3-34.343 (FM5-446)

Military Nonstandard Fixed Bridging



HEADQUARTERS, DEPARTMENT OF THE ARMY

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Military Nonstandard Fixed Bridging

Contents

	Page
PREFACE.....	vii
PART ONE BASIC CONSIDERATIONS	
Chapter 1 BACKGROUND INFORMATION	1-1
General Concepts	1-2
Bridge Design	1-4
Army Facilities Components System	1-4
Classification Information.....	1-5
Engineer Responsibilities.....	1-6
Supporting Information.....	1-6
Chapter 2 RECONNAISSANCE AND PRELIMINARY INVESTIGATIONS.....	2-1
Hasty Reconnaissance	2-1
Deliberate Reconnaissance	2-1
Repair or Reconstruction	2-1
New-Bridge Construction	2-2
Site Requirements	2-3
Survey Control	2-6
Survey Drawings.....	2-6
PART TWO CLASSIFICATION, REINFORCEMENT AND REPAIR, AND POSTING	
Chapter 3 CLASSIFICATION.....	3-1
Section I - Bridge-Classification Considerations.....	3-2
Section II - Expedient Classification	3-2

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	Page
Hasty Method	3-2
Track Commander’s Bridge-Crossing Booklet	3-3
Section III - Correlation-Curve Classification	3-3
Correlation-Curve Applications.....	3-8
Bridge Condition.....	3-8
Span Length.....	3-8
Correlation-Curve Uses.....	3-9
Section IV - Analytical Bridge Classification	3-10
Classification Assumptions.....	3-10
Moment Classification for Simple Spans.....	3-15
Moment Classification for Continuous Spans.....	3-16
Roadway-Width Classification and Clearance Restrictions.....	3-18
Solid-Sawn and Glue-Laminated Timber-Stringer Bridges	3-18
Steel-Stringer Bridges	3-22
Composite-Stringer Bridges	3-26
Steel-Girder Bridges.....	3-29
Truss Bridges	3-46
Reinforced Concrete Slab Bridges	3-55
Reinforced Concrete T-Beam Bridges	3-59
Reinforced Concrete Box-Girder Bridges.....	3-64
Prestressed Concrete Bridges	3-65
Arch Bridges.....	3-74
Movable Bridges.....	3-81
Suspension Bridges	3-82
Other Bridges	3-83
 Chapter 4 REINFORCEMENT AND REPAIR.....	 4-1
Basic Considerations.....	4-1
Hasty or Emergency Repairs	4-4
Stringer Supports	4-7
Stringer Reinforcement	4-9
Steel Floor-Beam Reinforcement.....	4-11
Truss Reinforcement and Repair	4-11
Flooring Repair.....	4-17
Masonry-Pier and -Abutment Repair.....	4-18
Masonry-Arch-Bridge Repair.....	4-20
 Chapter 5 POSTING	 5-1
Bridge-Classification Signs.....	5-1
Traffic Controls.....	5-5

PART THREE DESIGN

Chapter 6	BRIDGE SUPERSTRUCTURES	6-1
	Design Phases.....	6-1
	Design Sequence.....	6-1
Chapter 7	SUBSTRUCTURE DESIGN	7-1
	Abutment Design Procedure.....	7-1
	Abutment Designs.....	7-12
	Intermediate-Support Design.....	7-34
Chapter 8	SUSPENSION-BRIDGE DESIGN	8-1
	Descriptions.....	8-1
	Bridge Sites.....	8-2
	Design Factors.....	8-3
	Live Load.....	8-4
	Panels.....	8-4
	Suspenders.....	8-8
	Main Cables.....	8-9
	Backstays.....	8-13
	Towers.....	8-13
	Anchorage.....	8-16
Chapter 9	CONNECTIONS	9-1
	Timber Connections.....	9-1
	Steel Connections.....	9-9
Chapter 10	CONSTRUCTION	10-1
	Planning Process.....	10-1
	Material Preparation, Timber Framing.....	10-9
	Material Preparation, Steel Fabrication.....	10-9
	Safety.....	10-11
	Erection-Equipment Capacity.....	10-12
	Special Equipment.....	10-13
	Truck- and Crawler-Mounted Cranes.....	10-13
	Derricks.....	10-14
	Cableways.....	10-14
	Hoists.....	10-14
	Jacks.....	10-14
	Falsework.....	10-15
	Erection-Equipment Techniques.....	10-15

	Page
Derrick Elevation	10-19
Special Launching Methods (Steel Erection)	10-22
Precautions	10-27
Suspension-Bridge Construction	10-29
Chapter 11 INSPECTION AND MAINTENANCE	11-1
Inspection	11-1
Maintenance	11-5
Chapter 12 BRIDGING IN ARCTIC AND SUBARCTIC ENVIRONMENTS	12-1
Permafrost	12-1
Transportation	12-2
Thaw Effects	12-3
Explosives	12-3
Steel	12-4
Wood	12-4
Concrete	12-4
Engineer Equipment	12-4
Construction Schedules	12-4
Bridge Foundations and Substructures	12-4
Native Materials	12-6
Foundation Survey	12-7
Intermediate Supports	12-8
Abutments	12-10
Ice Removal	12-12
Superstructure Principles	12-14
Panel-Truss Bridges	12-14
Timber-Truss Bridges	12-14
Steel-Truss Bridges	12-14
Fords	12-14
Ice Crossings	12-16
Expedient Ice-Bridge Construction	12-18
Expedient Ice-Bridge Reinforcement and Repair	12-19
Appendix A CONVERSION CHARTS	A-1
Appendix B VEHICLE CLASSIFICATION	B-1
Hypothetical Vehicles	B-1
Standard Classification Curves	B-14
Analytical Classification Procedure	B-14

	Page
Expedient Classification Procedure	B-20
Vehicle-Classification Signs.....	B-20
Appendix C TIMBER PROPERTIES	C-1
Civilian-Design Stress.....	C-1
Military-Design Stress	C-1
Appendix D STEEL PROPERTIES	D-1
All-Purpose Steel	D-1
High-Strength, Low-Alloy Steel.....	D-1
Quench- and Tempered-Alloy Steel.....	D-1
Steel Strengths	D-2
Structural Shapes	D-2
Unlisted-Beams Section Properties	D-12
Appendix E STRUCTURAL MECHANICS.....	E-1
Dead, Live, and Impact Loads	E-1
Stresses	E-1
Static Equilibrium	E-6
Internal Reactions	E-8
Shear and Moment Diagrams.....	E-10
Appendix F CLASSIFICATION EXAMPLES	F-1
Notations.....	F-1
Timber-Stringer Bridge.....	F-4
Steel-Stringer Bridge.....	F-8
Composite Steel-Concrete Stringer Bridge.....	F-11
Steel-Girder Bridge	F-17
Truss Bridge.....	F-24
Reinforced Concrete-Slab Bridge	F-31
Reinforced Concrete T-Beam Bridge.....	F-35
Reinforced Concrete-Box-Girder Bridge	F-39
Prestressed Concrete Bridge.....	F-43
Masonry-Arch Bridge	F-48
Appendix G CONCRETE PROPERTIES.....	G-1
General Properties.....	G-1
Cement Types.....	G-2
Mass-Concrete Structures	G-4
Steel-Reinforced Concrete.....	G-4

	Page
Appendix H	
SOIL PROPERTIES	H-1
Appendix I	
SUPERSTRUCTURE DESIGN EXAMPLES	I-1
Notations	I-1
Timber-Stringer Superstructure with a Timber Deck	I-3
Steel-Stringer Superstructure with a Concrete Deck.....	I-9
Glossary	Glossary-1
Bibliography	Bibliography-1
Index	Index-1

Preface

This manual provides essential technical information on nonstandard fixed bridges for engineer staff officers. It is the doctrinal source of information for the United States (US) Army on the North Atlantic Treaty Organization (NATO) Bridge and Vehicle Classification System. This manual also provides various methods for classifying and designing nonstandard fixed bridges in military theaters of operation (TOs).

This manual provides detailed technical data on the classification (analysis) and design of bridges. It is NOT intended to replace civilian classification or analysis codes and procedures and should NOT be used for civilian construction or classification. Engineer officers should note that the methods shown in this manual are for conservative classification and design. Qualified engineers also might use appropriate civilian methods for military classification and design.

Appendix A contains an English-to-metric measurement conversion chart.

The proponent for this publication is HQ TRADOC. Send comments and recommendations on *Department of the Army (DA) Form 2028* directly to the US Army Engineer School (USAES), Attention: ATSE-DOT-DD, Directorate of Training, 320 Maneuver Support Center (MANSCEN) Loop, Suite 336, Fort Leonard Wood, Missouri 65473-8929.

The provisions of this publication are the subject of the following international standardization agreements (STANAGs) and Quadripartite STANAG (QSTAG): *STANAG 2010 Engineer (ENGR) (Edition 5)*, *STANAG 2021 ENGR (Edition 5)*, *STANAG 2101 Land Force Tactical Doctrine and Operational Procedures (TOP) (Edition 10)*, and *QSTAG 180 (Edition 4)*.

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

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PART ONE

Basic Considerations

A bridge is a structure that is erected over obstacles such as a river or other watercourse, a chasm, or a railroad to make a passageway from one bank to the other. A bridge is usually constructed of wood, stone, brick, concrete, steel, or iron. This book identifies methods and procedures for performing bridge reconnaissance, vehicle and bridge classification, and analytical design of superstructures and substructures; constructing bridge connections; and repairing or reinforcing existing bridges.

Reconnaissance is critical to any military operation and for analyzing existing and potential bridge sites. Information must be gathered for bridge use and construction that might normally be overlooked. The engineer and reconnaissance elements must be knowledgeable and prepared for the mission. Proper vehicle and bridge classification is also an important engineer responsibility that helps keep lines of communication (LOC) through the preservation of existing bridges in the TOs.

The purpose of bridge reconnaissance is to collect data that is necessary to support operational planning and movement. Existing bridges are inspected to determine their load-carrying capacity and the requirement for repair and reinforcement. The alternatives might revolve around the erection of a new semipermanent bridge or the repair of a damaged permanent structure. When a demolished bridge is to be replaced, reconnaissance should include a report of the serviceability of structural members and accessories, which might be useful for the contemplated construction.

<p>This chapter implements STANAGs 2010 (Edition 5) and 2021 (Edition 5) and QSTAG 180 (Edition 4).</p>

Chapter 1

Background Information

Rapid movement on the battlefield requires existing road networks or natural high-speed avenues that cross an assortment of wet and dry gaps. Many existing bridges in the TOs will adequately support military loads and only need to be classified for safe use. Gap crossings might be needed where none currently exist. Reinforcing or repairing a bridge can serve tactical purposes; however, mobility of the force is the key issue.

GENERAL CONCEPTS

1-1. To maintain a high momentum, the forces must use bridges in the order discussed below. Each method has specific benefits.

EXISTING BRIDGES, INTACT

1-2. Engineers should first consider the bridges in the TO that do not need repair. Engineers must classify them for military use before using. The classification depends on the type of construction (concrete, steel, timber, or suspension) and the bridge's intended use. The bridge and vehicle classification systems established by *STANAGs 2010* and *2021* and *QSTAG 180* permit the use of bridges at their maximum safe military capacities. The classification systems relate bridge capacity to the overall loading effect a vehicle might impose on a bridge. The classification systems—

- Protect existing bridges from overload and subsequent damage or failure.
- Prevent loss or damage of equipment and costly time-consuming delays due to bridge failure.

DETOURS AND BYPASSES

1-3. Engineers should consider detours and bypasses after analyzing the existing bridges. The assumption is that finding and using detours and bypasses is quicker than reinforcing or repairing existing bridges. The engineer commander will determine the best alternative. Road and approach conditions (along with detours and bypasses) are important considerations. The work necessary to make the roads usable might outweigh the advantages of a detour or bypass. Traffic-supporting properties, grade and alignment, and sharp curves or corners involving clearances are also important considerations. Usually, detours and bypasses are—

- Alternate routes over undamaged bridges.
- Alternate routes over minimally damaged bridges.
- Alternate highway routes over railroad bridges.
- A grade crossing around an overpass.
- Fords.
- Local ferries, rafts, or barges.
- Ice bridges.

EXISTING BRIDGES, REINFORCED OR REPAIRED

1-4. The third consideration is to reinforce or repair existing bridges. Frequently, military load-carrying requirements will necessitate this action.

TACTICAL BRIDGES

1-5. The fourth consideration is tactical bridges, which are generally used in an assault and provide a rapid means of crossing gaps. The bridges' assets are temporary, and advancing forces should remove and carry the bridges forward as they advance. Sustained mobility of forces and logistical support depend on