

ENGINEER DOCTRINE UPDATE

U.S. Army Maneuver Support Center Training and Doctrine Development Department Doctrine Division, Engineer Branch

Publications Currently Under Revision

Publication Number	Title	Date	Description (and Current Status)
FM 3-34	<i>Engineer Operations</i>	10 Mar 03	<p>As the engineer keystone manual, this field manual (FM) encompasses all engineer doctrine; integrates the three engineer functions of combat, general, and geospatial engineering; and addresses engineer operations across the entire spectrum of operations and at all echelons. While embracing the concept of modularity, this manual is being updated to fully integrate the modular engineer force (MEF). The new versions of Joint Publication (JP) 3-34, <i>Joint Engineer Operations</i>; JP 3-0, <i>Joint Operations</i>; FM 3-0, <i>Full Spectrum Operations</i>; and other manuals drove the requirement for this manual to be updated. All other Army engineer doctrinal manuals are based on the principles and tenets found in this manual.</p> <p>Revision Highlights: MEF, warfighting functions, explosive ordnance clearance agent (EOCA), and the maneuver enhancement brigade (MEB).</p> <p>Status: Under revision in FY 08. The revision is linked to the FM 3-0 revision and its finalization; the final draft staffing is complete, the comments have been received, and adjudication of the comments is ongoing.</p>
FM 3-34.22 (FM 3-34.221) (FM 5-71-2) (FM 5-71-3) (FM 5-7-30)	<i>Engineer Operations – Brigade Combat Team and Below</i>	Pending (Jan 05) (Jun 96) (Oct 95) (Dec 94)	<p>This new manual will encompass engineer operations in support of all three types of brigade combat teams (BCTs) (heavy, infantry, and Stryker—the armored cavalry regiment) and their primary subordinate units. It combines the current manuals that guide engineer operations in BCTs, and will integrate the significant changes caused by transformation. Changes in the structure of the force have caused adjustments to the command and control (C2) structure and tailoring of engineer forces to support the BCTs. Engineer augmentation of each of the BCTs now occurs on a regular basis. Recent lessons learned in security and reconstruction operations; infrastructure reconnaissance; clearing operations; and engineer support to intelligence, surveillance, and reconnaissance (ISR) operations will also be incorporated. This manual will support the BCT doctrine found in FM 3-90.6 and include key engineer employment principles and C2 procedures found in FM 3-90.61.</p> <p>Revision Highlights: MEF and warfighting functions.</p> <p>Status: Preparing the final draft.</p>
Combat Engineering			
FM 3-90.11 (FM 3-34.2)	<i>Combined Arms Mobility Operations</i>	Aug 00	<p>This is a full revision, to include renaming and renumbering of FM 3-34.2, <i>Combined Arms Breaching Operations</i>. Changes in the structure of the force have not changed the principles of breaching, but they have required adjustment of the tactics, techniques, and procedures (TTP) associated with breaching and clearance operations. Recent lessons learned in clearance operations are being incorporated into this revision, as well as selected information on improvised explosive device (IED) defeat and gap crossing operations. The numbering for this manual reflects its critical relationship to the keystone manual FM 3-90, <i>Tactics and Combined Arms Operations</i>.</p>

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Combat Engineering (continued)			
FM 3-90.11 (FM 3-34.2)	<i>Combined Arms Mobility Operations, cont.</i>	Aug 00	<p>Revision Highlights: MEF, five areas of mobility (breaching, clearing, gap crossing, combat roads and trails, forward aviation combat engineering [FACE]), IEDs, urban breaching, and warfighting functions.</p> <p>Status: In final draft (on hold to address transition to warfighting functions and awaiting release of the revisions of FM 3-0 and FM 3-90). It likely will require some rework and possibly restaffing.</p>
FM 3-90.12 (FM 90-13)	<i>Combined Arms Gap Crossing Operations</i>	Jan 98	<p>This is a full revision, to include renaming and renumbering of FM 90-13/MCRP 3-17.1, <i>River Crossing Operations</i>. This manual is and will continue to be a dual-designated manual with the Marine Corps. While changes in the structure of the force have not changed the basic principles of river crossing operations, they have required that the TTP associated with river crossing be adjusted. The revised manual incorporates considerations for all gap crossing operations. FM 3-90.11 will be the base manual for discussions on mobility operations, and FM 3-90.12 will be written as a companion manual, taking advantage of the discussion of mobility operations in FM 3-90.11. The numbering for this manual reflects its critical relationship to the keystone manual FM 3-90.</p> <p>Revision Highlights: MEF, engineer reconnaissance, gap crossing definitions, and warfighting functions.</p> <p>Status: The U.S. Army Engineer School Commandant has approved the manual; awaiting Marine Corps approval. The estimated posting to Army Knowledge Online (AKO) is Spring 2008.</p>
FM 3-90.13 (FM 5-102) (FM 90-7)	<i>Combined Arms Obstacle Integration</i>	Sep 94; Mar 85	<p>FM 90-7 was a solid combined arms manual, but was in need of a significant revision. The integration of FM 5-102, <i>Countermobility</i>, into this manual is a logical progression since most of the information is either complementary or redundant. Both manuals needed updating and expansion of their material to incorporate aspects of the contemporary operating environment (COE). It will be renumbered as FM 3-90.13 during revision, reflecting the combined arms nature of these operations. This manual will contain the enduring basic fundamentals associated with countermobility operations.</p> <p>Revision Highlights: MEF, warfighting functions, and intelligent munitions.</p> <p>Status: Preparing program directive and initial draft.</p>
FM 3-34.170 (FM 5-170)	<i>Engineer Reconnaissance</i>	May 98	<p>This manual provides doctrinal guidance for engineer reconnaissance across the full spectrum of operations. It encompasses engineer reconnaissance in support of tactical operations, as well as engineer technical reconnaissance support, and introduces infrastructure reconnaissance. This manual supersedes FM 5-170. Changes in the structure of the force have not changed the basic principles of engineer employment, but they will adjust the C2 structure and tailoring of engineer forces to support the BCT. Recent lessons learned include the need to define, develop, and provide a proponent manual for infrastructure reconnaissance and its memory aid sewage, water,</p>

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FM 3-34.170 (FM 5-170)	<i>Engineer Reconnaissance</i> , cont.	May 98	<p>electricity, academics, trash, medical, safety, and other considerations (SWEAT-MSO).</p> <p>Revision Highlights: The introduction of infrastructure reconnaissance (assessment and survey), environmental reconnaissance (assessment and survey), engineer reconnaissance teams, field force engineering (FFE), and other reachback mechanisms. The manual highlights the creation of the first dedicated engineer reconnaissance element in the engineer company of the heavy brigade combat team (HBCT).</p> <p>Status: U.S. Army Engineer School Commandant and the Marine Corps approved; accepted and approved by the Combined Arms Doctrine Directorate (CADD); and forwarded to the Army Publishing Directorate (APD) for publishing and posting to AKO.</p>
FM 3-34.300 (FM 5-103)	<i>Survivability</i>	Jun 85	<p>This is a full revision, to include renumbering, of FM 5-103, <i>Survivability Operations</i>, which was last published in 1985. The emergence of protection doctrine, coupled with changes to FM 3-0 and FM 3-34, mandated a full revision. It will also relate survivability to the other capability elements of the protection warfighting function, as described and defined in FM 3-0 and FM 3-10. This manual focuses on providing survivability information needed by commanders and their staff at the tactical level, but has applicability for a much larger audience as well. The manual relates the engineer-focused aspects of survivability to the broader use of the terms of survivability and protection. This manual addresses the aspects associated with the six areas of survivability, with a focus on hardening. The manual will expand the discussion of survivability across all echelons.</p> <p>Revision Highlights: Protection, hardening, antiterrorism considerations, and warfighting functions.</p> <p>Status: Preparing final draft for update. It is on hold for release of FM 3-10.</p>
FM 3-34.281 (FM 20-21)	<i>Military Diving</i>	Jan 99	<p>The original manual (FM 20-21) was a complete adoption of the Navy diving manual and a complete reproduction of Change 4 to Navy diving manual SS521-AG-PRO-010, dated Jan 99. This manual, which will be renumbered as FM 3-34.281 during revision, will support one of the modular units of the MEF. Within the Army, this document is used by special operations forces, as well as engineer divers.</p> <p>Revision Highlights: To make the manual more useful and comprehensive for Army use, the entire Navy diving manual will not be adopted; instead, the targeted sections applying to Army diving use will be adopted with other Army-specific considerations being added to the manual, creating an Army-focused diving manual.</p> <p>Status: A sequential effort will begin in detail after the Navy update to the Navy diving operational manual; developing the program directive.</p>

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General Engineering			
FM 3-34.400 (FM 5-104)	<i>General Engineering</i>	Nov 86	<p>This is the primary manual relating the engineer function that bears its name. It provides the linkage between the engineering doctrine contained in FM 3-0, FM 3-34, and JP 3-34. As the implementing manual for general engineering, this manual describes the operational environment (OE) and how to apply and integrate general engineering principals in support of full spectrum operations. This manual is designed primarily to assist Army engineers at all echelons in planning and coordinating general engineering operations at the strategic, operational, and tactical levels. It is the primary doctrinal manual to define the engineer function of general engineering. It links to the FM 3-10 definitions of <i>base camp</i> and the various types of base camps. General engineering tasks are a part of most military operations. The degree of Army engineer involvement in accomplishing these tasks will vary based on the mission, situation, availability of engineer resources and the commander's intent. Planners must recognize that joint and Army transformation has rapidly changed the way we resource and conduct operations, and the application of general engineering is no exception. We have always tailored engineer elements and capabilities to support the force. The provisions of the MEF have provided additional modularity into Army engineer organizations to facilitate the commitment of only the required engineer assets into the theater of operations (TO). Enhancing the capabilities of those assets are reachback capabilities that minimize the footprint of engineers while optimizing the performance of those deployed elements. Planners must apply these improvements and ensure that the general engineering effort is seamlessly woven into the commander's plan in a proactive fashion and accomplishes the commander's intent. This manual is the primary reference for all the other general engineering-related engineer reference manuals.</p> <p>Revision Highlights: Infrastructure reconnaissance, field force engineering (FFE) (reachback), homeland support, MEF, and warfighting functions.</p> <p>Status: Editing of the final electronic file, quality control, staffing for U.S. Army Engineer School Commandant approval, with an estimated posting to AKO as Spring 2008.</p>
FM 3-34.410 Volumes I & II (FM 5-430-00-1 & 5-430-00-2)	<i>Design of Theater of Operations Roads, Airfields and Helipads</i>	Aug 94; Sep 94	<p>This is a full revision and consolidation of FM 5-430-00-1 and FM 5-430-00-2 into one manual that is separated into two volumes. This manual will serve as a reference for engineer planners in support of joint and theater operations in the design of roads, airfields, and helipads. This manual is currently dual-designated with the Air Force designation of AFJPAM 32-8013, Volumes I and II. The Navy plans to participate in this revision and to adopt this manual as well, making it multi-Service. The intent is to update the current FMs with new techniques and procedures for planning and designing roads, airfields, and heliports in support of TO. The revision will integrate recent doctrinal updates. FM 3-34.410 is intended for use as a reference text and training guide for engineer personnel responsible for planning, designing, and constructing roads, airfields, and heliports in the TO. The two current FMs are essentially one manual divided into two separate volumes. Volume 1 is a stand-alone volume for the design of TO roads. This volume also serves as a detailed description of information common to both roads and airfields. Volume II serves as the basis for airfield and heliport design. It covers the complete</p>

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General Engineering (continued)			
FM 3-34.410 Volumes I & II (FM 5-430-00-1 & 5-430-00-2)	<i>Design of Theater of Operations Roads, Airfields and Helipads, cont.</i>	Aug 94; Sep 94	<p>process of airfield and heliport construction. It is not a stand-alone volume. Volume 1 contains much of the information required to design the substructure of an airfield or a heliport.</p> <p>Revision Highlights: This is a collaborative effort with the Engineer Research and Development Center (ERDC) and the U.S. Army Corps of Engineers (USACE) Transportation Center of Excellence (Omaha), Air Force, Air Force Civil Engineering Support Agency (AFCESA), and the Navy. It includes the newest technologies, current practices, and revision of formulas.</p> <p>Status: Initiating the program directive and developing the initial draft.</p>
FM 3-34.428 (FM 5-424)	<i>Theater of Operations Electrical Systems</i>	Jun 97	<p>This manual is intended to be used as a reference text and training guide for engineer personnel who are responsible for planning and executing (TO) construction. The five major parts of this manual provide practical information for military personnel in the design, layout, installation, and maintenance of exterior and interior electrical wiring, and power-generation and distribution systems. The manual will be renumbered as FM 3-34.428 during this revision. While not currently designed to support a specific module of the MEF, this manual does support the general engineering function and typical vertical construction efforts.</p> <p>Revision Highlights: This manual needs to be revised to make it more comprehensive and includes more details on tactical power generation below prime power, power distribution, the newest technologies, and current practices in the deployed environments.</p> <p>Status: Developing the program directive.</p>
FM 3-34.451 (FM 5-472)	<i>Materials Testing</i>	Dec 92	<p>This manual is intended to provide technical information necessary for military personnel to obtain samples and perform engineering tests and calculations on soils, bituminous paving mixtures, and concrete. These tests and calculations are required to achieve proper design with these materials and adequate control over their use in military construction. The manual covers soils, aggregates, bituminous cements, bituminous paving mixtures, portland-cement concrete, and stabilized soil—including stabilizing agents such as bitumens, cements, lime, fly ash, and chemical modifiers. The current manual (FM 5-472) gives detailed instructions for taking adequate representative test samples tests and for recording, calculating, and evaluating test results. The test procedures and terminology used in this manual conform to the latest methods and specifications of the American Society for Testing and Materials (ASTM), the American Concrete Institute (ACI), and the Portland Cement Association (PCA), with alternate field testing methods and sampling techniques when complete lab facilities are unavailable or impractical to use. This manual is currently a multi-Service publication with the Navy and the Air Force (NAVFAC MO 330/AFJMAN 32-1221(I)). The manual will be renumbered as FM 3-34.451 during its revision.</p> <p>Revision Highlights: It a collaborative effort with ERDC and USACE Transportation Center of Excellence (Omaha), the Air Force, AFCESA, and the Navy. Newest technologies, current practices, and revision of formulas.</p> <p>Status: Initiating the program directive and developing the initial draft.</p>

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General Engineering (continued)			
FM 3-34.465 (FM 3-34.465 & FM 3-34.468)	<i>Quarry Operations</i>	Mar 05; Dec 03 (Apr 94)	<p>This manual emphasizes the aspects of pit and quarry layout, design, and operation. It outlines the methods and procedures used in the exploration for and operation of pits and quarries. It provides information on the equipment required for operating pits and quarries and for supplying crushed mineral products, but does not cover the operation of the stated types of equipment. The revised manual will contain the revision and consolidation of the material in this manual, and the material contained in FM 3-34.468, <i>Seabee Quarry Blasting Operations and Safety Manual</i>.</p> <p>Revision Highlights: It is a collaborative effort with the Navy, with an Army lead and possible Air Force participation as well. The intent is to combine the two existing manuals into one manual containing the newest technologies, current practices, and revision of formulas, with an overall update of the materials contained within.</p> <p>Status: Staffing the program directive and initiating development of the initial draft.</p>
FM 3-34.469 (FM 5-484)	<i>Multi-Service Well Drilling Operations</i>	Mar 94	<p>This manual is a guide for engineer personnel responsible for planning, designing, and drilling wells. It focuses on techniques and procedures for installing wells and includes expedient methods for digging shallow water wells, such as hand-dug wells. This manual, currently a multi-Service publication with both the Navy and the Air Force (NAVFAP P-1065/AFMAN 32-1072), will support one of the modules of the MEF.</p> <p>Revision Highlights: This is a collaborative effort with the Navy, with Navy lead and Air Force participation. The intent is to update the material with the newest technologies, current practices, and revised formulas, making the main body of the document multi-Service in nature with specific appendixes to address Service differences in capabilities and equipment.</p> <p>Status: The initial draft is out for staffing and comment.</p>
FM 3-34.485 (FM 5-415)	<i>Firefighting Operations</i>	Feb 99	<p>The purpose of FM 5-415 is to give a commander and members of firefighting teams direction on deploying and using engineer firefighting teams. Engineer firefighting teams provide fire prevention/protection, aircraft crash/rescue, natural cover, and hazardous material (HAZMAT) (incident) responses within a TO. Normally, there are not enough firefighting assets within the TO; therefore, commanders must prioritize assets and facilities that are mission-essential and deploy firefighting assets accordingly. The manual will support one of the modular units of the MEF. It will be renumbered as FM 3-34.485 during revision.</p> <p>Revision Highlights: This is a parallel effort with the revision of the firefighting Army regulation (AR) to bring both policy and doctrine current with required certifications, newest technologies, and current practices.</p> <p>Status: Initiating the program directive and developing the initial draft subsequent to the revision of the AR and the conduct of the convoy firefighting integrated capabilities development team (ICDT).</p>

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General Engineering (continued)			
FM 3-34.500 (FM 3-100.4)	<i>Environmental Considerations in Military Operations</i>	Jun 00	<p>FM 3-100.4, <i>Environmental Considerations in Military Operations</i>, guides the Army and the Marine Corps in applying appropriate environmental protection procedures during all types of operations. It also provides basic techniques and procedures for units at the company, battalion, and brigade/regiment levels. This manual states the purposes of military environmental protection, a description of legal requirements, and a summary of current military programs. It also describes the growing strategic significance of environmental factors in the 21st century. As a unit procedures manual, it describes how to apply risk management methods to identify actions that may harm the environment and appropriate steps to prevent or mitigate damage. This manual is currently a dual-designated manual with the Marine Corps and is under revision by the Directorate of Environmental Integration. When this revision is complete, the manual will have an Army number of FM 3-34.500.</p> <p>Revision Highlights: The revision will contain information and lessons learned from current operations. It will continue to be a dual-designated manual with Marine Corps involvement.</p> <p>Status: Staffing for U.S. Army Engineer School Commandant and Marine Corps approval and posting to AKO.</p>

NOTE: All current engineer publications can be accessed and downloaded in electronic format from the MSKN Engineer Doctrine website at <<https://www.us.army.mil/suite/page/500629>> or the Reimer Digital Library at <<http://www.adtdl.army.mil/>>. The manuals discussed in this article are currently under development. Drafts may be obtained during the staffing process or by contacting the Engineer Doctrine Branch at <leon.mdottddengdoc@conus.army.mil>. The development status of these manuals was current as of 1 February 2008.

Engineer Doctrine Contact Update

The Engineer Doctrine team would like to introduce to the Regiment its newest member, Mr. Jeff Beacham, who is taking over from Mr. Les Hell as the Engineer Senior Doctrine Analyst as Les moves up to assume the duties of the Deputy Doctrine Chief for the Maneuver Support Center (MANSCEN). Good luck and best wishes are extended to Les as he makes his transition to MANSCEN, and a warm welcome is extended to Jeff as he comes onboard. Jeff's Army Knowledge Online (AKO) contact information is <jeffery.beacham@us.army.mil>. If you haven't already, you will soon begin to see the staffing of draft doctrine coming to you from Jeff.

A new Maneuver Support Knowledge Network (MSKN) website has been established for Engineer Doctrine. There you can download the current manuals in the Engineer Doctrinal Hierarchy, as well as drafts of the various manuals under revision, and can stay updated on the status of those revisions and view the final comment matrices on each draft.

The page may be reached through the MSKN homepage or via this link, which goes directly to the Engineer page vice the MSKN homepage after AKO login: <<https://www.us.army.mil/suite/page/500629>>.

The Engineer Doctrine element is the lead for the Regiment's doctrine. The Engineer School's Doctrine Division is consolidated at the MANSCEN level within the MANSCEN Directorate of Training (MDoT) Doctrine Division. The telephone numbers for Engineer Doctrine are—Doctrine Chief, (573) 563-8161; Senior Doctrine Analyst, (573) 563-0003 (DSN prefix, 676-).

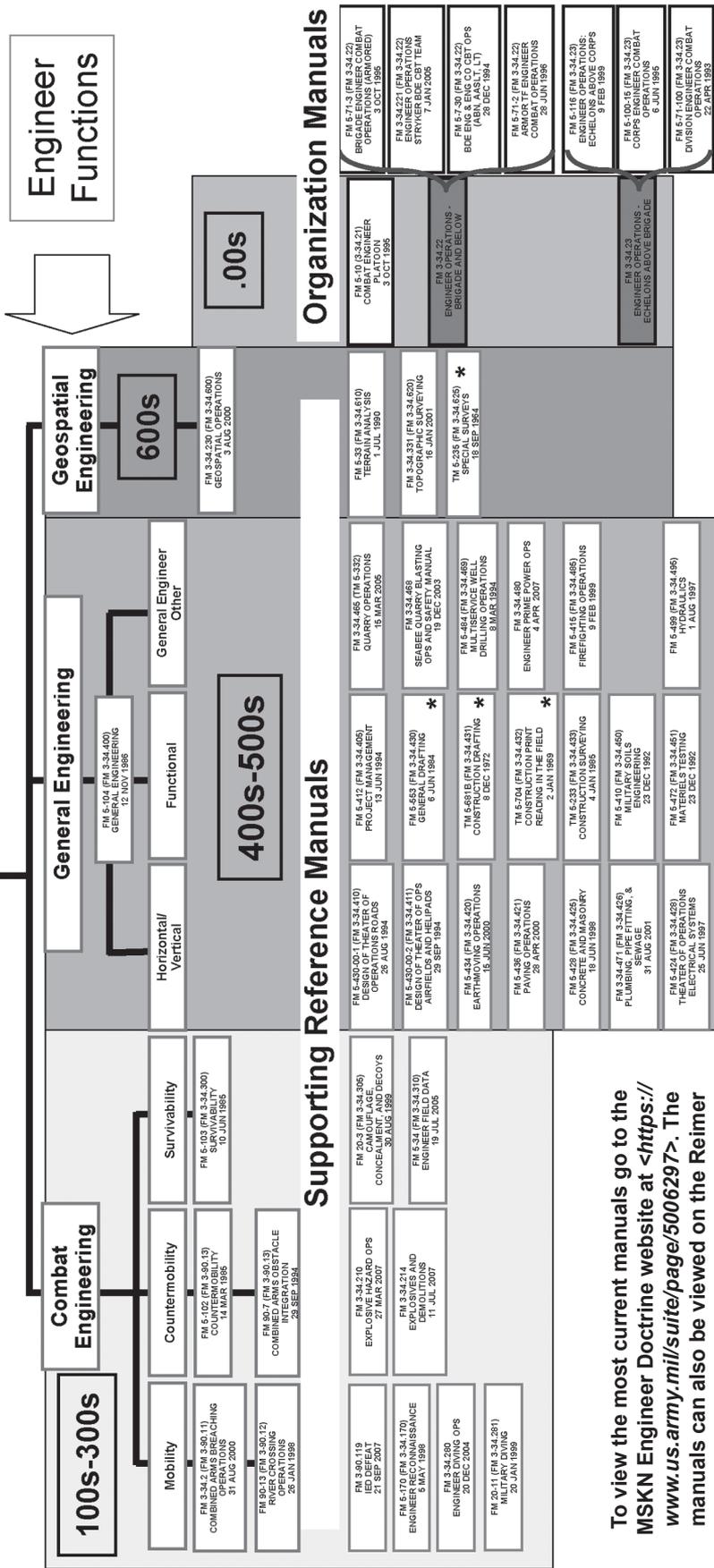
The mailing address for written correspondence is: Commandant, United States Army Engineer School, ATTN: ATZT-TDD-E, 320 MANSCEN Loop, Suite 220, Fort Leonard Wood, Missouri 65473-8929.

For electronic correspondence, the generic NIPR e-mail address has changed to <leon.mdottddengdoc@conus.army.mil>.

Army Engineer Publications Hierarchy

FM 3-34

Keystone



Engineer Functions

.00s

600s

400s-500s

Supporting Reference Manuals

Organization Manuals

To view the most current manuals go to the MSKN Engineer Doctrine website at <<https://www.us.army.mil/suite/page/5006297>>. The manuals can also be viewed on the Reimer Digital Library at <<http://www.train.army.mil>>.

To find the RDL page go to the Training Homepage and click on the "LOGIN" button (upper right corner). Use your AKO login.

* Asterisk denotes manuals currently not in digital format in the **Reimer Digital Library**

As of 1 Mar 08