

**NATO UNCLASSIFIED**

**NATO STANDARD**

**AJP-3.12**

**ALLIED JOINT DOCTRINE  
FOR MILITARY ENGINEERING**

**Edition C, Version 1**

**JANVIER 2021**



**NORTH ATLANTIC TREATY ORGANIZATION**

**ALLIED JOINT PUBLICATION**

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**NORTH ATLANTIC TREATY ORGANIZATION (NATO)**

**NATO STANDARDIZATION OFFICE (NSO)**

**NATO LETTER OF PROMULGATION**

20 January 2021

1. The enclosed Allied Joint Publication AJP-3.12, Edition C, Version 1, ALLIED JOINT DOCTRINE FOR MILITARY ENGINEERING, which has been approved by the nations in the Military Committee Joint Standardisation Board, is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 2238.
2. AJP-3.12 Edition C, Version 1, is effective upon receipt and supersedes AJP-3.12, Edition B, Version 1, which shall be destroyed in accordance with the local procedure for the destruction of documents.
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4. This publication shall be handled in accordance with C-M (2002) 60.



Zoltán GULYÁS  
Brigadier General, HUNAF  
Director, NATO Standardization Office

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**RECORD OF SPECIFIC RESERVATIONS**

[nation]	[detail of reservation]
BEL	<p>BEL will ratify this AJP-3.12 and the covering STANAG 2238, with next reservation linked to EOD C<sup>2</sup>:</p> <p>“BEL submits the following reservation with regard to the C2 relationship described at para 2.6.f.: EOD Technical authority remains a national responsibility, which is not delegated to the CJEODCC nor to the CMILENG. As mentioned in AJP-3.18, National policies for EOD may differ in requirements for compliance with procedural and safety regulations. The CJEODC has a sole responsibility as coordinating authority of the EOD assets in accordance with the appropriate nation’s transfer of authority letters for their EOD elements, which is not delegated to other authorities.”</p>
CAN	<p>Reservations: Canada does not agree with the wording of the first sentences of paragraph 1.4 (Chapter 1, Section 2) and paragraph 1.16 (Chapter 1, Section 4) in that it is implied that there are exactly five areas of MILENG expertise.</p> <p>This contradicts paragraph 7 of MC 0560/2 which lists five areas of expertise as examples. (The term “such as”, used in MC 0560-2, is defined as for example” in the Concise Oxford Dictionary.) Canada asserts that the wording in MC 0560/2 intentionally leaves the number of MILENG areas of expertise open-ended. Hence, the wording in AJP-3.12 is in conflict with MC 0560/2. Canada proposes that other areas of MILENG expertise that have not been specifically identified could include geomatics and fire protection.</p>
CZE	<p>a) In the Czech Armed Forces the Geospatial engineering support (mentioned in para 4.16), Environmental protection (mentioned in para 1.10) and Management of infrastructure (mentioned in para 1.12 - 1.14) are not engineer support tasks. The Czech Armed Forces will not implement these paragraphs.</p> <p>b) The Czech Armed Forces will not implement paragraph 4.21. Power supply is logistics responsibility in the Czech Armed Forces, corps of engineers fulfil partial tasks only.</p> <p>c) The Czech Armed Forces will defer implementation of paragraphs 5.11 and 5.12 a) and b) until equipment is procured and expertise are acquired for the support of the air forces.</p> <p>d) The Czech Armed Forces will not implement paragraph 5.14.</p>

<p>DEU</p>	<p>DEU reserves the right to perceive the environmental protection management and fire protection by other than MILENG personnel.</p> <p>DEU reserves the right to ensure the management of infrastructure totally or partially by a non-military organization.</p> <p>DEU reserves the right to have comprehensive leadership and/or the coordination of the “Military Search” capability not carried out exclusively by MILENG personnel as a “Single Point of Contact”. MP forces, in particular, are specifically trained and equipped for military search operations so as to, for instance, ensure that any evidence gathered during such operations may be used as evidence in court.</p>
<p>DNK</p>	<p>“Chapter 5.12: The Danish Air Force consider countering the whole range of threats associated with explosive hazards influencing air operations within the MILENG support to air component.”</p>
<p>ESP</p>	<p>Military Search and Environmental Protection are not led by Spanish Army Engineer branch. Thus these tasks will be carried out in accordance with Spanish doctrine.</p>
<p>HRV</p>	<p>In accordance with established structure of Croatian Armed Forces environmental protection, infrastructure management and energy efficiency mentioned in Chapter 1, Section 3 (paragraph 1.10, 1.12, 1.13 and 1.14), Chapter 4, Section 3 (paragraph 4.21 and 4.22) are not under the responsibility of MILENG in Croatian Armed Forces. Croatian Armed Forces provide appropriate environmental protection and energy efficiency according to national legislative acts. MILENG in Croatian Armed Forces can provide support with available capacities to other institutions and forces.</p> <p>Republic of Croatia signed Ottawa Convention.</p>
<p>ITA</p>	<p>Italy, in accordance with national law, will not use any device which may be classified as antipersonnel mine according to the following definition "An antipersonnel mine is defined as a device which may be placed above, under, inside or next to any surface and adjusted or adapted with specific measures in order to explode, cause an explosion or release incapacitating substances as the result of the presence, the proximity or contact by a person". Moreover, considering military activities in a multinational scenario, cooperation of the Italian Armed Forces also with no signatory Nations of the Ottawa Convention is permitted, with the proviso that activities by Italian servicemen are compatible to the Ottawa regulations; Italy, in accordance with national regulation, considers environmental protection (EP) an all Commanders responsibility, led by logistic branch. The support of Military Engineering encompasses all the necessary technical</p>

	activities, assessed by the logistic and by the EP advisors, in order to prevent or mitigate adverse environmental impacts.
LVA	In National Armed Forces of Latvia the Geospatial engineering support (para 4.16.), Management of infrastructure (para 1.12.-1.14.), water, energy efficiency, real estate management (para 1.17.) are not under the responsibility of MILENG. LVA reserves the right to have the “Military Search” capability not carried out exclusively by MILENG personnel (MP units, in particular, are specifically trained and equipped for military search operations).
SVK	In accordance with the Slovak legislation the tasks of Environmental Protection (EP) and infrastructure management, listed in STANAG 2283 assigned to MILENG are fulfilled via different organizations, out of MILENG community. The responsibility for Environmental Protection (EP) is the responsibility of the military logistics. The infrastructure management is in a portfolio of the SVK ministry of defense. The SVK MILENG is supporting element to the abovementioned tasks.
USA	<p>Reservation 1. The United States rejects glossary/lexicon terms and definitions and shortened word forms (abbreviations, acronyms, initialisms) that are neither NATO Agreed, quoted verbatim from NATOTerm, correctly cited IAW AAP-47 Allied Joint Doctrine Development, correctly introduced/revised IAW AAP-77 NATO Terminology Manual, nor have terminology tracking forms submitted. This reservation will be lifted when the relevant terms, definitions, and shortened word forms are corrected (see matrix for any specificity with terms).</p> <p>Reservation 2. The United States rejects content that is not harmonized with capstone and operations keystone AJPs. United States personnel are directed to use national joint doctrine to overcome variances. This reservation will be lifted when the relevant term usage is corrected [see matrix for any specificity with terms (ex. command authority terms)].</p> <p>Reservation 3. The United States rejects content usage of activities that are not part of a function of joint engineer operations. This reservation will be lifted when the relevant term usage is corrected (see matrix for any specificity with terms).</p> <p>Reservation 4. The United States rejects the incorrect usage of certain terms and usage of the term “technical authority”. This reservation will be lifted when the relevant term usage is corrected or removed (see matrix for any specificity with terms).</p> <p>The following reservation details are provided as well as other details for consideration/ future revisions in the memo.</p>


Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.

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## Related documents

MC 0319/3 MC 0469/1	<i>MC Policy for NATO Principles and Policies for Logistics NATO Military Principles and Policies for Environmental Protection</i>
MC 0560/2 MC 0656	<i>MC Policy for Military Engineering MC Policy for Force Protection for Alliance Forces</i>
AJP-01 AJP-2	<i>Allied Joint Doctrine Allied Joint Doctrine for Intelligence, Counter-Intelligence and Security</i>
AJP-3	<i>Allied Joint Doctrine for the Conduct of Operations</i>
AJP-3.1	<i>Allied Joint Doctrine for Maritime Operations</i>
AJP-3.2	<i>Allied Joint Doctrine for Land Operations</i>
AJP-3.3	<i>Allied Joint Doctrine for Air and Space Operations</i>
AJP-3.5	<i>Allied Joint Doctrine for Special Operations</i>
AJP-3.8	<i>Allied Joint Doctrine for Comprehensive Chemical, Biological, Radiological, and Nuclear Defence</i>
AJP-3.9	<i>Allied Joint Doctrine for Joint Targeting</i>
AJP-3.13	<i>Allied Joint Doctrine for the Deployment of Forces</i>
AJP-3.14	<i>Allied Joint Doctrine for Force Protection</i>
AJP-3.15	<i>Allied Joint Doctrine for Countering Improvised Explosive Devices</i>
AJP-3.17	<i>Allied Joint Doctrine for Geospatial Support</i>
AJP-3.18	<i>Allied Joint Doctrine for Explosive Ordnance Disposal Support to Operations</i>
AJP-3.19	<i>Allied Joint Doctrine for Civil-Military Cooperation</i>
AJP-4	<i>Allied Joint Doctrine for Logistics</i>
AJP-4.5	<i>Allied Joint Doctrine for Host Nation Support</i>
AJP-4.6	<i>Allied Joint Doctrine for the Joint Logistic Support Group</i>
AJP-5	<i>Allied Joint Doctrine for the Planning of Operations</i>
AJEPP-6	<i>NATO Camp Environmental File During NATO-Led Operations</i>
ATP-3.12.1	<i>Allied Tactical Doctrine for Military Engineering</i>
ATP-3.12.1.1	<i>Allied Tactical Doctrine for Military Search</i>
AASTP-1	<i>NATO guidelines for the storage of military ammunition and explosives</i>
AASTP-5	<i>NATO guidelines for the storage, maintenance and transport of ammunition on deployed missions or operations</i>
AATMP-03	<i>Airfield Damage Repair (ADR) Capability</i>
AEODP-10	<i>Explosive Ordnance Disposal (EOD) Principles and Minimum Standards of Proficiency</i>
ALP-16	<i>Explosives Safety and Munitions Risk Management (ESMRM) in NATO Planning, Training, and Operations</i>
ACO COPD Bi-SC 85-1	<i>ACO Comprehensive Operations Planning Directive Interim v2.0 Capability Package Directive</i>

Bi-SC 85-5	<i>NATO Approved Criteria and Standards for Airfields Directive</i>
C-M (2002) 60	<i>The Management of Non-classified NATO Information</i>
ISO 9000	<i>International Organisation for Standardisation 9000</i>
	<i>NATO Crisis Response System Manual (2016)</i>
	<i>NATOTerm NATO Glossary of Terms and Definitions</i>
PO(2013)0056	<i>Revised Funding Arrangements for Non-Article 5 NATO-led Operations and Missions</i>
UN ENMOD	<i>United Nations Environmental Modification Techniques (ENMOD) Convention</i>

## Preface

### Scope

1. Allied Joint Publication (AJP)-3.12(C), *Allied Joint Doctrine for Military Engineering*, describes the military engineering (MILENG) function and how it is applied during the planning and conduct of joint operations.

2. This edition of AJP 3.12 is a significant change to previous editions in that it reflects the Military Committee (MC) Policy on Military Engineering as a function which supports shaping of the physical operating environment. Whilst recognising that engineering remains predominant, this version addresses the fact that engineering is only one area of expertise of MILENG.

### Purpose

3. Joint operations are complex and unique, and include tasks that span the range of operations across all domains. AJP-3.12(C) focuses on the synchronization and coordination of MILENG capabilities, activities and resources during the preparation, execution and termination of an operation. The key theme underlying this publication is that MILENG is an inherent aspect of each joint function.

4. AJP-3.12(C) serves the national and basic requirements of North Atlantic Treaty Organization (NATO). It does not encompass all the necessary requirements for MILENG at the strategic or higher level of the NATO Command Structure (NCS) as this is covered by Allied Command Operation Directive (AD) 084-001 Military Engineering.

### Application

5. AJP-3.12(C) is intended primarily for joint NATO commanders and staff at the operational level. It also provides guidance for all levels of command and is instructive for coalition and NATO partners.

### Structure

6. This publication consists of five chapters. Chapter 1 describes the fundamentals of MILENG in the context of shaping the physical operating environment. Chapter 2 details the roles and responsibilities of MILENG staff at the strategic, operational and tactical levels. Chapter 3 describes MILENG support to each of the eight joint functions. Chapter 4 details MILENG planning considerations at the operational level. Finally, Chapter 5 explains MILENG support to the various force components during the preparation, execution, termination and transition of allied joint operations.

**Linkages**

7. AJP-3.12(C) is based on the policy set out in MC 0560/2, *MC Policy for Military Engineering*. It supports level-1 NATO doctrine, in particular those describing operations (AJP-3), planning (AJP-5) and logistics (AJP-4), and should be used in conjunction with related level-2 doctrine (AJPs) and subordinate level-3 doctrine (Allied Tactical Publications). See the list of related documents for details.

**Point of contact**

8. Point of contact for AJP-3.12(C) is the NATO Military Engineering Centre of Excellence, Comm.: +49-841-88660-5410, Email: [pcdconcch@milengcoe.org](mailto:pcdconcch@milengcoe.org)

## Chapter 1 – Military engineering fundamentals

### Section 1 – Introduction

**1.1 Physical environment.** Terrain, both natural and manmade, throughout history has played an essential part in warfare. The knowledge of its characteristics and the possibility to use it has been a key aspect of successful operations. The superior ability to shape the physical environment can significantly contribute to one's own advantage or to the disadvantage of an adversary. The importance of being able to use the physical environment requires inherent military capability to preserve or adapt the terrain for military purposes under all conditions. This capability within North Atlantic Treaty Organization (NATO) is functionally organized and described as "military engineering" (MILENG). It requires understanding and knowledge about the physical environment and how it impacts operations, and requires specialized knowledge on how to shape the physical environment for own purposes in ways that all arms are not able. This ranges from advising, executing, supervising and organizing to overseeing and the ability to integrate MILENG capabilities into military operations across the joint functions.

**1.2 Military engineering as a function in NATO.** The wider concept of MILENG – understanding and shaping the physical environment– has always been present throughout history from tactical to strategic level. During the Cold War, NATO concentrated on commanding national forces and, as logistics and preparations were a national responsibility, MILENG in NATO was focused on force preparation, development and interoperability. After the shift to expeditionary operations, the focus changed to tactical and low-operational aspects of operations and multinational formations, sometimes down to tactical level. Shift was also the driver for the force-focused approach of NATO. This included operational installations and related infrastructure preparations. With a significant enlargement of NATO territory, during the last 20 years the security situation has shifted fundamentally, and NATO has adapted accordingly. Adaption has included a refocus towards facing a peer competitor and violent and extremist threats. This complexity required more high-level engagement at the political, strategic and operational level, including a suitable level of coordination and planning by NATO on topics previously the sole responsibility of nations, like deployment and sustainment. The force-oriented planning was already adequately supported with functional approaches, like joint fires, logistics, force protection (FP), et cetera. However, MILENG was initially still focused on organizations and their activities. It was necessary to develop a MILENG function that effectively covered the strategic to tactical level with an appropriate connection to the already established joint functions. This functional approach was first captured within Military Committee Policy on Military Engineering (MC 0560/2) in 2017.

## Section 2 – Definition and description of military engineering

**1.3 Military engineering.** NATO defines MILENG as “a function in support of operations to shape the physical operating environment (POE)”. It is an inherent part of every joint function. The MILENG function exists at all levels of command, in any mission, campaign or operation, and in all phases and is coordinated by a MILENG staff. It achieves desired objectives (shaping the POE) through contributing to joint effects by the three pillars of the MILENG function:

- a. Enabling or preventing manoeuvre or mobility.
- b. Developing, maintaining, and improving infrastructure.
- c. Supporting the survivability and sustainability of forces.

**1.4** Tactical effects are achieved through activities executed at tactical level within one or more of the five areas of expertise of MILENG: engineering, explosives ordnance disposal (EOD), environmental protection (EP), military search and management of infrastructure, including contracted civil engineering. MILENG also makes a significant contribution to countering improvised explosive devices (C-IED), protecting the force and providing life support.<sup>1</sup>

**1.5** For the purpose of brevity, throughout this document, terms such as force elements, capabilities, activities, and resources which support the shaping of the POE in the context of MILENG, are referred to as MILENG force elements, capabilities, activities, resources etc.

**1.6 Coordination.** MILENG staff coordinate the MILENG function. MILENG efforts of military organizations and civilian enablers are coordinated within this function.

## Section 3 – Military engineering areas of expertise

**1.7 Engineering.**<sup>2</sup> Engineering provides commanders technical expertise and means for shaping the POE in a manner that best meets operational and campaign objectives. In the context of MILENG, engineering capabilities are further subcategorized into combat support engineering (predominantly dedicated support to the manoeuvre forces), and general support engineering (wider assistance to the whole force, the host nation (HN), and other non-military actors when agreed and decided by the commander).

**1.8 Engineering roles.** The effects created through the roles of mobility, counter-mobility, survivability, and general engineer support are achieved by conducting engineer activities and are inherent in combined arms operations.

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<sup>1</sup> See *Military Committee (MC) 0560/2 MC Policy for Military Engineering* for details.

<sup>2</sup> See Allied Tactical Publication (ATP)-3.12.1 *Allied Tactical Doctrine for Military Engineering* for details.



- a. **Mobility support.** Mobility support will enable and maintain freedom of movement (FOM) and manoeuvre of own forces and friendly actors.
- b. **Counter-mobility support.** Counter-mobility support will assist in stopping or disrupting an adversary's FOM and manoeuvre through the emplacement of man-made obstacles or enhancement of natural obstacles by manipulation of the POE (terrain, situation and target oriented).
- c. **Survivability support.** Survivability support will facilitate life support and contribute to FP. It includes aspects of physically protecting personnel, weapons, and materiel from the effects of weapons, detection systems, and from environmental conditions.
- d. **General engineering support.** General engineering support provides technical and construction expertise to sustain our own forces

**1.9 Explosive ordnance disposal.**<sup>3</sup> EOD comprises actions taken by specially qualified personnel<sup>4</sup> for countering explosive ordnance (EO) threats. NATO defines EOD “as the detection, accessing, uncovering, identification, mitigation, rendering safe, recovery, exploitation and final disposal of EO, regardless of condition”. EOD extends to explosive remnants of war (ERW) and stockpiles, or other EO that has become hazardous by damage or deterioration. The range of EO threat scenarios on land and in the maritime environment includes:

- d. Conventional munitions.
- e. Improvised explosive devices (IED).
- f. Chemical, biological, radiological and nuclear (CBRN) EO.

EOD supports FOM and the protection of own forces.

**1.10 Environmental protection.** EP is an all arms responsibility, led by MILENG staff, to prevent or mitigate adverse environmental impacts. The impact of operations on the environment must be anticipated and assessed prior to operations. Environmental considerations must be integrated into operation plans to prevent or mitigate potential environmental impacts. Factors that NATO considers in its planning include HN and applicable international law for EP<sup>5</sup>, environmental compliance, pollution prevention, waste management, conservation, heritage protection (natural and man-made), and protection of flora and fauna. By taking appropriate steps to assess, plan, refine and execute the deployment and the mission, commands at the operational-level will more effectively protect human health and essential environmental resources, reduce the occurrence of environmental

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<sup>3</sup> See Allied Joint Publication (AJP)-3.18 *Explosive Ordnance Disposal Support to Operations* for details.

<sup>4</sup> See Allied Explosive Ordnance Disposal Publication (AEODP)-10 *Explosive Ordnance Disposal (EOD) Principles and Minimum Standards of Proficiency* for details.

<sup>5</sup> For instance the 1977 UN Environmental Modification Techniques (ENMOD) Convention, which is also applicable in an armed conflict situation.

accidents, and mitigate any damage that may be caused to the environment, thus limiting NATO's long-term liability. EP is not simply about limiting financial liability, it can contribute to mission success by enhancing HN relationships, helping to establish credibility and gain support from the local population.

**1.11 Military search.**<sup>6</sup> NATO defines military search as “the management and application of systematic procedures and appropriate equipment to locate specified targets in support of military operations”. Specified targets may include people, information and material resources employed by an adversary. Military search is subcategorised as advanced, intermediate and basic. Basic search is an all-arms responsibility.

MILENG staff coordinate and manage military search which can be broken down into two distinct elements: offensive and defensive.

- a. **Offensive search.** The objectives of offensive search are to gather information and material for exploitation, to deprive an adversary resources and to secure material for possible future evidential value.<sup>7</sup>
- b. **Defensive search.** The objective of defensive search is to protect potential targets.

**1.12 Management of infrastructure, including contracted civil engineering.** MILENG supports and coordinates the management and execution, including development, maintenance and improvement of infrastructure as a result of an infrastructure assessment.

**1.13** MILENG staff assess the plans to identify infrastructure requirements and contribute to development of capability packages or urgent requirements. MILENG staff are involved in the funding planning process for theatre infrastructure. The provision of funding for theatre infrastructure required by the operational force will be accomplished using common funding mechanisms if HN or lead nation solutions are not available. Infrastructure requirements to address operational shortfalls may be met by activation and, if necessary, acceleration of existing capability packages or by authorization of engineering projects as crisis response operations urgent requirements.

**1.14** MILENG staff assess and advise on the effects of combat operations on critical national infrastructure (CNI)<sup>8</sup>, mission vital infrastructure (MVI)<sup>8</sup> and key infrastructure (KI)<sup>8</sup> This provides consequence management input as part of the decision cycle advising the Joint Defended Assets Working Group, Joint Targeting Working Group,

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<sup>6</sup> See Allied Tactical Publication (ATP)-3.12.1.1 *Allied Tactical Doctrine for Military Search* for details.

<sup>7</sup> The use of the word “evidence” in this publication refers to an intent to use recovered material and personnel exploitation information for subsequent legal purposes. The term “evidence” is used in a general sense, no attempt is made to define what would constitute evidence in a particular theatre for a nation.

<sup>8</sup> See Lexicon for description.

and the Force Protection Working Group and contributing to the production of the Joint Defended Assets List and No Strike List.

## **Section 4 – Military engineering contribution to other areas**

**1.15 Military engineering contribution to countering improvised explosive devices.**<sup>9</sup> MILENG makes a significant contribution to C-IED. C-IED is an all-arms responsibility and aims to defeat an adversary's IED system. The approach has three mutually supporting and complementary pillars of activity which are: attack the networks; defeat the device; and prepare the force. MILENG areas of expertise may contribute to C-IED in a variety of ways. For example, engineering provides advice and predominantly general support engineering; military search and EOD contribute to attack the network and defeat the device; management of infrastructure provides funding for protective works for all theatre infrastructure; and EP mitigates adverse environmental impacts caused by IEDs. MILENG might also contribute to prepare the force.

**1.16 Military engineering contribution to force protection.**<sup>10</sup> MILENG contributes to the overall FP effort by the execution of activities related to all five MILENG areas of expertise and providing advice on appropriate physical protective measures. These measures may include: obstacles, observation points, warning and detection systems, camouflage, mitigation of weapons effects on structures, and protective measures required to mitigate the effect caused by nature such as hurricanes, tornados, floods, and earthquakes.

**1.17 Military engineering contribution to life support.** MILENG contribution to life support is an integral part of MILENG support to survivability, and to some extent additional MILENG support in terms of sustainment. It focuses on, but is not limited to, the provision of shelter, water, power and real estate management.

## **Section 5 – Principles of military engineering**

**1.18 Military engineering advisor at all levels.** The chief of MILENG (CMILENG) is the principal advisor to the commander in all aspects of the MILENG function. This is implemented at all levels. The overall commander's priority for the MILENG effort and the resulting allocation of MILENG resources must be communicated to and appropriately supported by other functional areas. The CMILENG exercises coordination authority on behalf of the commander over the allocation of MILENG resources to ensure that capabilities and resources are used most effectively. Priorities for MILENG activities and associated allocation of resources will be determined in the operational-level planning process. Well-structured and independent MILENG staff are essential at headquarters (HQ) at all levels.

**1.19 Centralized control, decentralized execution.** The most effective use of MILENG resources and capabilities will be achieved by a CMILENG and staff able to task-organize multinational assets in accordance with the overall commander's

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<sup>9</sup> See AJP-3.15 *Allied Joint Doctrine for Countering Improvised Explosive Devices* for details.

<sup>10</sup> See AJP-3.14 *Allied Joint Doctrine for Force Protection* for details.

intent throughout an operation. Responsibility for executing tasks should be delegated to the lowest appropriate level of command. Central coordination is essential to the efficient employment of specialist MILENG capabilities. Consideration should always be given to retaining control of scarce specialist MILENG resources, potentially through a dedicated command and control (C2)-node, at the highest practical level. Such resources include bridging capabilities, geomatics, well drilling, power generation and distribution, pipeline, railway construction and repair, dredging, and technical reconnaissance. National caveats regarding the employment of contributed specialist MILENG capabilities can adversely impact the ability of the joint force commander (JFC) to employ them. As such, caveats should be identified as early as possible so that mitigation measures can be created.

**1.20 Military engineering is an integral part of the planning process.** Early identification of required MILENG capabilities is critical and demands the involvement of MILENG staff in the planning and reconnaissance process from the outset, and throughout the whole operation. MILENG support is required to ensure that factors such as terrain and infrastructure, which may constrain the planning options, are fully considered. Essential information, such as which non-military capabilities will be available, and when available, will influence the force generation process.<sup>11</sup>

**1.21 Prioritization of resources.** There are generally insufficient MILENG resources to meet all of the commander's requirements simultaneously. Therefore, it is essential that the commander, advised by a CMILENG, provides clear priorities for MILENG effort and resources. These priorities must be continually reviewed as part of the joint coordination process.

**1.22 Task Organization.** MILENG groupings will normally include a range of capabilities drawn from a number of units and may be complex organizations with different roles and procedures, using specialist equipment and materiel. Task organising and reorganising is necessary to create the right force package for different situations.

**1.23 Integration.** MILENG support is required at all levels and it is essential that assigned MILENG assets are properly integrated to ensure that they operate effectively with other elements of the force.

## **Section 6 – Military engineering forces and resources**

**1.24** Assigned MILENG theatre capabilities are essential to ensure that the JFC has the resources at their disposal to execute theatre-level MILENG tasks. Troop-contributing nations will generally provide MILENG forces and resources to support their national requirements. Theatre-level MILENG force and resource requirements will be identified by MILENG staff through the operations planning and force generation processes. The degree of reliance upon host-nation support (HNS)<sup>12</sup> will vary according to the joint operations area (JOA), the nature of

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<sup>11</sup> See AJP-5 *Allied Joint Doctrine for the Planning of Operations* for planning details. In addition the Allied Command Operations (ACO) *Comprehensive Operations Planning Directive* (COPD) and the respective *Functional Planning Guides* are the tools to be used for the planning process.

<sup>12</sup> See AJP-4.5 *Allied Joint Doctrine for Host Nation Support* for details.

the operation and the content of the HNS agreement if any. The force must also be prepared to integrate other partner and non-NATO nation's forces, including MILENG elements.

**1.25** Assigned forces to each component and the joint logistic support group (JLSG)<sup>13</sup> will include a range of MILENG capabilities appropriate to the mission. A flexible approach is needed to provide cross-component MILENG support when necessary to meet the JFC's intent. This will be particularly critical if MILENG support is required to reinforce other components at key stages in the campaign. Coordination of cross-component MILENG support is the responsibility of the joint force (JF) CMILENG and their staff at the operational level.

## **Section 7 – Comprehensive approach**

**1.26** A comprehensive approach contributes to:

- a. Common purpose and resolve between military and non-military actors.
- b. Mutual understanding and situational awareness.
- c. Collaboration and appropriate resourcing.

**1.27** Recent operations have continued to highlight the importance of MILENG throughout all stages of an operation in supporting, enabling and sustaining the force. Demands for resources to support MILENG are likely to exceed capacity so the approach to providing MILENG support has always been inherently complex, bringing diverse resources to bear to accomplish the mission.

**1.28** In coordination with civil-military cooperation (CIMIC), MILENG staff will establish relationships with allied MILENG formations, national authorities, civil populations, national and international organizations (IOs), and other agencies as part of a comprehensive approach. These will be both complex and interdependent. Operational success is predicated upon effective cooperation. Integrated planning and the development of close and effective relationships at all levels between MILENG staff and the relevant civilian organizations and agencies should precede a military deployment and be maintained throughout an operation. In keeping with the comprehensive approach mindset, regular coordination, training integration, and exercise involvement help maintain and ensure effective relationships. This requires individual understanding and engagement.

## **Section 8 – Legal considerations**

**1.29** National, HN and applicable international law will frame and often constraint the conduct of operations. The international legal framework especially includes authorizations and restrictions for the use of certain weapons (such as mines and explosives), the protection of cultural property, and the protection of the environment. The compliance with and implementation of applicable law by nations and appropriate civilian organizations supporting MILENG activities must be fully understood

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<sup>13</sup> See AJP-4.6 *Allied Joint Doctrine for the joint logistic support group* for details.

by MILENG staff to ensure appropriate advice is provided to the operational commander.

## Chapter 2 – Chief of military engineering and staff roles and responsibilities

### Section 1 – Introduction

**2.1** In accordance with Military Committee (MC) 0560/2 *Military Committee Policy for Military Engineering*, the provision of effective military engineering (MILENG) support requires appropriate command and staff structures and command and control (C2) arrangements at all levels.

### Section 2 – Chief of military engineering

**2.2 Military engineering advisor at all levels.** MC 0560/2 states that commanders require a MILENG advisor supported by a staff to ensure the efficient employment of scarce MILENG resources and capabilities. The effectiveness of the chief of military engineering (CMILENG) and staff at each level will depend on close cooperation and coordination between staff at all levels and across all components.

**2.3 Chief of military engineering at strategic level.** MILENG contributes to defence and operations planning by providing the necessary subject matter expertise. This advice ensures that appropriate MILENG capabilities will be generated in a timely manner to meet North Atlantic Treaty Organization (NATO) short, medium- and long-term requirements. MILENG planners and subject matter experts at the Strategic Command level must work closely with the International Staff, the International Military Staff and the Senior National MILENG Representatives to ensure that the requirement for MILENG capabilities is adequately addressed. MILENG planners also work with national planning staff to enable the theatre MILENG capabilities.

**2.4 Chief of military engineering at operational level.** The CMILENG of the joint force (JF) is the principal advisor to the joint force commander (JFC) on all MILENG issues. The JF CMILENG balances and coordinates the allocation of MILENG resources to meet campaign objectives.<sup>14</sup> Key roles for the JF CMILENG are to identify the requirements for MILENG support, advise the JFC on available MILENG capabilities and resources, and coordinate the MILENG effort across the components. On behalf of the JFC, the JF CMILENG will have coordinating authority throughout the JF to ensure most effective use of capabilities and resources. Such forces may include wide gap crossing assets; counter-mobility assets; specialized explosive ordnance disposal (EOD) capabilities; and specialist construction capabilities. The JF CMILENG must ensure that strategic direction and guidance are communicated clearly to the MILENG forces in the form of unambiguous missions and policies. Priorities must be clear to commanders at all levels to ensure the effective use of MILENG resources. To ensure optimum efficiency, use of available resources is to be planned centrally. It is of the utmost importance that the JF CMILENG and MILENG staff are fully integrated early in the planning and execution of operations. In most cases, execution of tasks will be decentralized and

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<sup>14</sup> Including infrastructure development, host-nation support, support to forward presence

delegated to the lowest appropriate level of command. This may include MILENG capabilities of own forces, host nations, contractors, international organizations (IOs), other organizations and agencies, as available and willing to support. At any given stage of an operation the JFC may shift the main effort of MILENG support between components in alignment with the campaign main effort. This may include the allocation of assets normally seen supporting manoeuvre to infrastructure development and sustainment or mobility support in the joint operations area (JOA).

**2.5 Chief of military engineering at tactical level.** At the tactical level the CMILENG is responsible for coordinating with MILENG related organizations that execute tasks effecting the operating environment. If a dedicated MILENG advisor is not available, a commander of an assigned MILENG related organization can temporarily assume the role of the MILENG advisor, limited to the scope and nature of the mission or operation.

### **Section 3 – Military engineering staff capabilities**

**2.6 Joint force military engineering staff organization.** Well-structured and robust MILENG staff are essential at all levels of headquarters (HQ). At the operational level the JF MILENG staff is an independent staff division and should, as a minimum, include the following staff capabilities:

- a. **Plans.** The MILENG staff contributes to the joint HQ's planning through participation in the Joint Operations Planning Group (JOPG) for all potential operations in the frame of collective defence and crisis management.<sup>15</sup> The MILENG staff should be a robust, well structured, independent organization capable of advising, planning, executing and reporting MILENG activities across the full spectrum of MILENG staff capabilities. It may be necessary, dependent on the tactical situation and type of operation, to augment the staff with specialist expertise. The involvement of MILENG staff in planning activities from the beginning is essential for all operations to determine MILENG resources required. This includes the development of an infrastructure plan, and the advice for infrastructure used in operations.
- b. **Operations.** The MILENG staff is responsible for synchronising MILENG efforts and advising on the appropriate employment of subordinate MILENG units. It gathers critical MILENG information to support the joint HQ's current operations planning and execution efforts. As needed, and in accordance with NATO security policies, it shares information with key non-NATO actors in theatre to optimize MILENG support. This includes support to infrastructure and coordinating project management executed at the tactical level.

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<sup>15</sup> See Allied Joint Publication (AJP)-01 *Allied Joint Doctrine* for details.



- c. **Intelligence**<sup>16</sup>. The MILENG staff must have a permanent, formalized link with the intelligence staff branch (J2) and manages all MILENG related information. It supports all phases of the operation by providing MILENG intelligence about the JOA (such as adversary MILENG capabilities, the explosive ordnance threat, host nation (HN) capabilities, lines of communications (LOC), bridges, terrain analysis, ports of debarkation, infrastructure). The MILENG staff contributes to the common operational picture.
- d. **Infrastructure**. The MILENG staff manages infrastructure within the JOA. It supports the planning process through the development of infrastructure assessments, infrastructure development plans, and contingency plans relating to the availability, capacity and reliability of infrastructure. It also has a key role in NATO common funding mechanisms (e.g. NATO Security Investment Programme) and urgent requirements processes in crisis response operations.
- e. **Logistics**. The MILENG staff identifies and manages theatre engineer resource requirements. This includes the tracking of the availability of Class IV materiel and of national MILENG assets to support the JFC's intent and MILENG priorities.
- f. **Explosive ordnance disposal**. The MILENG staff must establish the combined joint explosive ordnance disposal cell (CJEODC). Within the JOA the CJEODC is responsible for coordinating all EOD matters between troop-contributing nations (TCN), component commands, the HN and other organizations. The CMILENG, via the CJEODC, has technical and coordinating authority for any EOD assets.<sup>17</sup>

## Section 4 – Military engineering staff relationship between the strategic, operational and tactical levels

**2.7 Relationship between the strategic and operational levels.** At the strategic level, MILENG staff facilitates collaboration and synchronisation of MILENG activities to maintain coherence in coordination with the political military and operational levels as well as with other non-NATO organizations such as commercial contractors and non-governmental organizations (NGOs). The CMILENG within the strategic command HQ gives directions on the following issues:

- a. Force planning for MILENG capabilities within the framework of the NATO Defence Planning Process.
- b. MILENG related policy and doctrine developments.

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<sup>16</sup> See AJP-2 *Allied Joint Doctrine for Intelligence, Counter-Intelligence and Security* for details.

<sup>17</sup> See AJP-3.18 *Allied Joint Doctrine for Explosive Ordnance Disposal Support to Operations* for details.

- c. Infrastructure aspects within the framework of the NATO Security Investment Programme (NSIP).
- d. Planning and conduct, at the strategic level, of the MILENG aspects of operations and exercises.

**2.8** Strategic MILENG planning will define the MILENG general operational requirements for NATO operations and ensure that appropriate MILENG capabilities will be available for the operational commander in an acceptable quantity. MILENG advice on operational infrastructure requirements will assist financial controller staff at the strategic level in determining disbursement of funding authorized by the NATO Investment Committee. Requirements, normally generated at the tactical level, are validated and endorsed at the operational level and then submitted to the strategic level. The strategic level screens, harmonizes and consolidates minimum military requirements (MMR) before submitting them to NATO HQ. Generic HN support Memorandums of Understanding are established to facilitate operations.

**2.9** The activities described in the paragraph above enable the strategic level to provide direction and guidance to operational-level commanders and allows their planning process to proceed. This direction and guidance from the strategic level should include: limitations on the conduct of the joint campaign and the targeting process, the strategic deployment of forces, consideration of participation by non-NATO countries, EOD, environmental protection (EP) plans, priorities, resources and resource limitations. All of these will be captured in the MILENG support annex (usually Annex EE) to the operation plan (OPLAN). See figure 2.1 for a schematic overview of the interaction between the various levels of command.

**2.10 Relationship between the operational and tactical levels.** At the operational level, based on the strategic military directive, operations are planned, conducted, sequenced, synchronized, directed and sustained, including MILENG activities, to achieve the required military strategic objectives. At the tactical level, missions and tasks are planned and executed in accordance with the OPLAN, and subsequent orders.<sup>18</sup>

**2.11** Following the MILENG principle of centralized control, decentralized execution, the JF CMILENG will advise the JFC on the MILENG task organization and priorities. The JF CMILENG will give guidance and direction to the components on all MILENG areas of expertise and will allocate related MILENG resources. JF CMILENG will only have technical and coordinating authority over the MILENG assets of subordinate commands. MILENG tactical activities will create effects, and these must support the achievement of operational objectives from which they are originated, contributing to the attainment of the end state. The CMILENG at the tactical level is expected to deliver MILENG intelligence, their requirements and constraints according to the OPLAN, and deliver reports and returns as ordered in the MILENG annex.

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<sup>18</sup> See AJP-3 *Allied Joint Doctrine for the Conduct of Operations* for details.

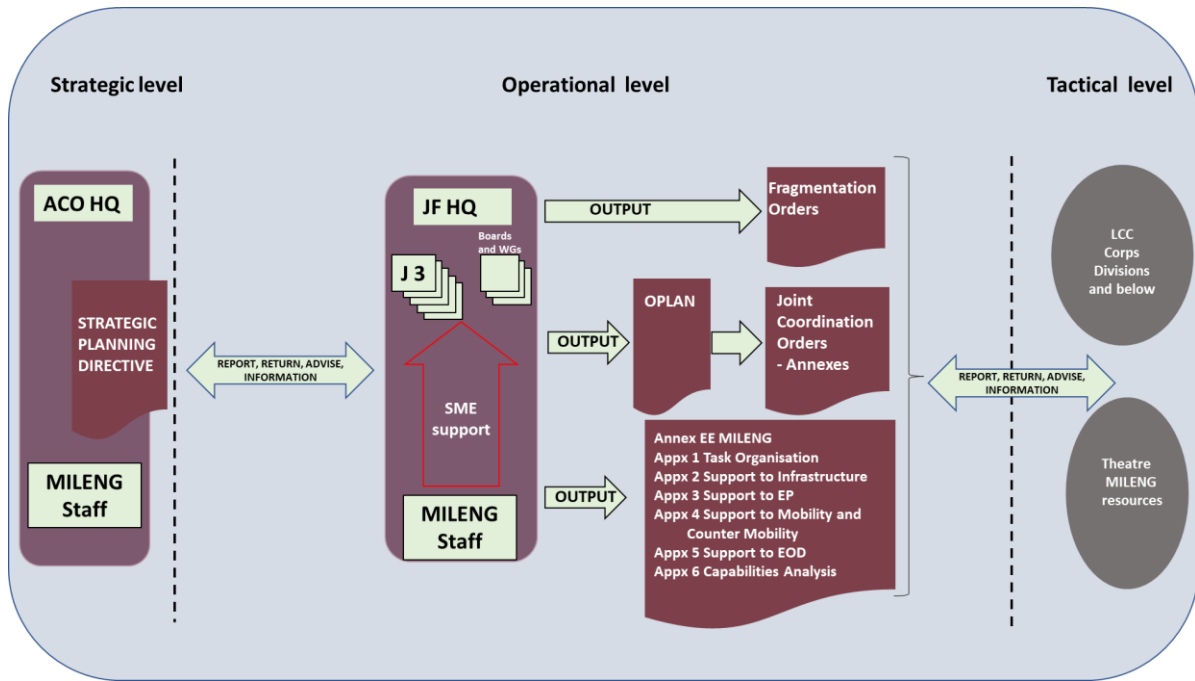


Figure 2.1 MILENG interaction between the strategic, operational and tactical levels.

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## Chapter 3 – Military engineering support to the joint functions

### Section 1 – Introduction

**3.1** Common to joint operations at all levels are the joint functions: manoeuvre, fires, command and control (C2), intelligence, information, sustainment, force protection (FP) and civil-military cooperation (CIMIC). Joint functions<sup>19</sup> provide a sound framework of related capabilities and activities grouped together to assist joint force commanders (JFC) to integrate, synchronise and direct various capabilities and activities in joint operations. Using joint functions, commanders, in conjunction with the strategic level of command, can determine force requirements.

**3.2** Military engineering (MILENG) pillars (see sub-para 1.4), capabilities and related effects on the physical environment are applied across all the joint functions and support each of them. MILENG is an inherent aspect of each joint function. The commander may choose from a wide variety of joint and service capabilities and combine them in various ways to perform joint functions and accomplish the mission.

**3.3** MILENG staff produce a MILENG annex to the headquarters (HQ) plan which directs synchronization and integration of MILENG activities and capabilities. MILENG activities are conducted to shape the physical operating environment.

### Section 2 - Manoeuvre

**3.4** A range of MILENG capabilities are available to achieve success in joint operations to gain positional advantage in respect to the adversary from which force can be threatened or applied. At the operational level, manoeuvre is the means by which a commander sets the terms in time and space, declines or joins combat, or exploits emerging developments. It is the process by which combat power is focused where it can have a decisive effect, to pre-empt, dislocate, or disrupt adversary operations. MILENG contribution in this regard focuses on enabling or preventing manoeuvre or mobility. MILENG support to this joint function is primarily provided through the MILENG areas of expertise engineering and military search. MILENG activities which support this joint function include:

- a. Conducting mobility tasks, including gap crossing.
- b. Conducting counter-mobility tasks, including demolitions and area or route denial.
- c. Conducting military search tasks.

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<sup>19</sup> See Allied Joint Publication (AJP)-3 *Allied Joint Publication for the Conduct of Operations* for details.

## Section 3 - Fires

**3.5** MILENG contribution to the joint targeting process consists of advice on preventing an adversary's manoeuvre or mobility, and advice on sustainability and mitigating collateral damage to the environment and infrastructure in the joint operations area (JOA).<sup>20</sup> The joint force (JF) MILENG staff will participate in the joint targeting working groups and coordination boards to provide MILENG subject matter expertise and advice to the Joint Targeting Cell during the targeting process. MILENG staff will provide advice on:

- a. Consequence management for targeting that could change the physical operating environment.
- b. Selection of targets so that they serve the operational purpose without constraining any future operations.
- c. Early appreciation of damage that may raise a requirement for additional equipment, such as bridging, which may have to be acquired from North Atlantic Treaty Organization (NATO) common funds.
- d. Re-evaluation of the physical operating environment (POE) based on battle damage assessment.

## Section 4 – Command and control

**3.6** MILENG supports the C2 joint function by advising the JFC on MILENG matters and by executing coordinating and technical authority of theatre-level MILENG resources. MILENG also supports C2 by providing engineering support to develop the C2 infrastructure and improve its survivability and sustainability.

## Section 5 – Intelligence

**3.7** The role of intelligence is to contribute to continuous and coordinated understanding in a complex global environment, to enable appropriate decisions.<sup>21</sup> MILENG aspects of intelligence are information concerning adversary MILENG activities and resources, environmental conditions, military geographic information, terrain and explosive ordnance (EO) threats. However, the ability for NATO to act effectively within a comprehensive approach requires information and knowledge regarding the capabilities, interaction and influences of all key actors within the operating environment. As a result, MILENG subject matter experts contribute to the analysis of the different actors and systems across the political, military, economic, social, information and infrastructure systems, as well as the specific aspects of the region and operating environment. This helps the HQ to

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<sup>20</sup> See AJP-3 *Allied Joint Doctrine for the Conduct of Operations* and AJP-3.9 *Allied Joint Doctrine for Targeting* for details.

<sup>21</sup> See AJP-2 *Allied Joint Doctrine for Intelligence, Counter-Intelligence and Security* for details.

develop a much broader and more comprehensive understanding of the engagement space.

## Section 6 – Information

**3.8** The information joint function helps commanders and staff understand and leverage the nature of information, its military uses, and its application during all NATO operations. This joint function provides NATO commanders and forces the ability to generate, preserve, and integrate friendly information while leveraging the inherent informational aspects of all military activities to achieve the commander's objectives and attain the end state. If an information activities coordination board is established within a HQ, a MILENG officer will take part in the meetings and provide advice on MILENG related activities that have an impact on information operations. MILENG forces involved in support tasks should establish relationships with a variety of civilian authorities and agencies and thereby generate a valuable source of information to assist in the planning of information activities. However, due care must be taken to avoid overt use of these activities being perceived as intelligence gathering.

## Section 7 – Sustainment

**3.9** MILENG support to sustainment encompasses the full range of MILENG planning and provision of MILENG capabilities to maintain the force's capabilities throughout all stages of an operation and can involve all MILENG activities simultaneously. However, MILENG support to sustainment is mostly provided by general engineering support. Providing appropriate advice, the MILENG staff contribute to the freedom of action for the commander's operations framework to shape, engage, exploit, protect and sustain. From a JFC's perspective this includes reception, staging, onward movement and integration, the assembly and movement of reserves or echelon forces, the redeployment, host-nation support (HNS), and the establishment of operating bases and lines of communications (LOC). It includes but is not limited to deployed force infrastructure, real estate management, environmental protection (EP) and support to logistics.<sup>22</sup>

## Section 8 – Force protection<sup>23</sup>

**3.10** FP is a joint function<sup>24</sup> to minimize the vulnerability of personnel, facilities, equipment, materiel, operations and activities from threats and hazards to preserve freedom of action and operational effectiveness thereby contributing to mission success. The fundamental elements of FP are security, MILENG support to FP, air defence, force health protection, consequence management, resilience, tactical area of responsibility control, cyber defence, and chemical, biological, radiological and nuclear (CBRN) defence. MILENG contribution to this joint function focuses on

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<sup>22</sup> See Allied Tactical Publication (ATP)-3.12.1 *Allied Tactical Doctrine for Military Engineering* for details.

<sup>23</sup> See AJP-3.14 *Allied Joint Doctrine for Force Protection* for details.

<sup>24</sup> See MC 656 *Policy for Force Protection for Alliance Forces* and AJP-3 *Allied Joint Doctrine for the Conduct of Operations* for details.

developing, maintaining, and improving infrastructure including hardening of facilities, repairing airfields and routes, EOD, military search, EP and management of infrastructure, including contracted civil engineering. MILENG activities and effects to be created are mainly executed by the engineering roles of survivability support and general engineering support. MILENG contributes to the overall FP effort by providing advice on topics such as physical protective measures (including obstacles, observation points, warning and detection systems, camouflage, concealment and deception), support to countering improvised explosive devices (IED), military search, route and area clearance, mitigation of weapons effects on structures, and protective measures required to mitigate the effect caused by nature such as hurricanes, tornados, floods and earthquakes.

## **Section 9 – Civil-military cooperation<sup>25</sup>**

**3.11** NATO contributes to a comprehensive approach through four key areas: military planning and conduct of operations; lessons learned, training, education and exercises; interaction with non-military actors; and strategic communications. This is achieved through extensive civil-military interaction (CMI) of JFs to ensure thorough communication, mutual planning and coordination with non-military actors. CIMIC is the principal facilitator of CMI and will serve as the focal point of coordination between MILENG staff and relevant non-military actors. MILENG capabilities can provide effective assistance to non-military actors through, for example, general support engineering and infrastructure related efforts and subject matter advice. Crises from natural disaster or military conflict can burden civilian capabilities and increase civilian vulnerability. The HN maintains primacy to provide essential services and develop infrastructure. MILENG areas of expertise can augment civil capabilities, or vice versa, where critical gaps exist that impact operations. However, the JFC must balance between requirements for MILENG efforts in support of operations and assistance to non-military actors.

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<sup>25</sup> See AJP-3.19 *Allied Joint Doctrine for Civil-Military Cooperation* for details.



## Chapter 4 – Military engineering planning

### Section 1 – Introduction

**4.1 Planning at the strategic level.** Military Engineering (MILENG) staff defines the MILENG operational requirements and ensures that appropriate capabilities are available. Operational-level plans and resource requirements are reviewed, approved and requested from nations. Critical national infrastructure, mission vital infrastructure and key infrastructure are identified in coordination with operational-level staff. This will be incorporated in the infrastructure assessment.

### Section 2 – Operational-level planning

**4.2 Planning at the operational level.** MILENG staff contributes to the operations planning process (OPP) by providing subject matter expertise to operations planning groups<sup>26</sup> as required. They are responsible for identifying operational-level MILENG requirements and tasks,<sup>27</sup> and assist in the development of the operation plan (OPLAN).<sup>28</sup> Their contribution is normally captured in the MILENG annex and elements of the main body. The production of an effective and achievable OPLAN is dependent on continuous coordination with the strategic and tactical levels.<sup>29</sup>

**4.3** The level of MILENG involvement in the OPP will be determined by the operational requirement. In all cases however, MILENG engagement and advice to support the OPP must be provided and be available if required.<sup>30</sup> MILENG staff support the analysis of the operating environment through a mutual understanding of its physical characteristics (terrain and infrastructure) and contribute to the identification of its key elements, which may impact on the execution on the operation. This inherent understanding will be an integral part of the OPLAN (decisive conditions, lines of operations) and forms the basis of further course of action (COA) and plan development. MILENG staff will also ensure that planning for all phases of the operation considers availability of adequate MILENG support and advise on the right mixture of sources (assets inherent to the force, host-nation support (HNS) or contracted solutions) for its provision.<sup>31</sup> The sub-paragraphs below describe the sequence of planning activities in the OPP and the MILENG staff contribution.

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<sup>26</sup> See Allied Joint Publication (AJP)-5 *Allied Joint Doctrine for the Planning of Operations* for details on the operations planning group and their activities.

<sup>27</sup> MILENG requirements can also be covered, or partially covered, by HNS, civilian organizations or contractors.

<sup>28</sup> MILENG Staff contributes to other products, such as Combined Joint Statement of Requirements (CJSOR), Theatre Capabilities Statement of Requirements (TCSOR), Rules of Engagement (ROE) request, Crisis Response Measures (CRM) request and Crisis Establishment (CE).

<sup>29</sup> Requirements originating at the operational level may require action at the strategic level; conversely, information needed at the strategic level may only be available within the JOA.

<sup>30</sup> AJP-5 *Allied Joint Doctrine for the Planning of Operations* presents an overarching framework of the key planning principles, considerations and processes that are followed in planning. AJP-5 guides and informs a series of planning tools, notably the ACO COPD and functional planning guides.

<sup>31</sup> See AJP-5 *Allied Joint Doctrine for the Planning of Operations* for details.

- a. **Situational awareness.** Development of MILENG situational awareness is an ongoing process that relies on the regular maintenance of intelligence databases and collection of MILENG information and intelligence. After initial situational awareness, the joint force headquarters will commence the joint intelligence preparation of the operating environment<sup>32</sup> process. This should include the development of an infrastructure assessment to provide the basis of the infrastructure input to the comprehensive preparation of the operating environment.
- b. **Initiation.** The OPP is initiated on receipt of strategic direction, typically a Supreme Allied Commander Europe (SACEUR) warning order. The process is then conducted by a Joint Operations Planning Group (JOPG) that will initially seek to understand the strategic situation and the nature of the problem. Involvement by MILENG staff at this stage is important to comprehend the entirety of the crisis and, if required, should contribute to the operational advice submitted to the strategic level and initial guidance to the tactical level. Additional information expected at this stage of the OPP include SACEUR's Strategic Assessment and the Military Response Options. In cooperation with the JOPG these are assessed and any MILENG implications highlighted.
- c. **Mission analysis.** Analysing the problem, crisis situation in depth, and the mission, assist the commander to determine what is required for mission success. MILENG staff provides operational advice to assist the analysis of the crisis situation. As a result, operationally framing the problem from a MILENG perspective supports the development of feasible COAs. If relevant, the mission analysis should seek to identify as a minimum:
- (1) The constraints and freedoms caused by the physical operating environment.
  - (2) MILENG activities.
  - (3) MILENG constraints and restraints.<sup>33</sup>
  - (4) MILENG aspects of commander's critical information requirements (CCIRs).<sup>34</sup>
- d. **Courses of action development.** A concept of MILENG support is required for each COA. The differences and feasibility from a MILENG perspective should be assessed. Regular consultation and coordination with the subordinate commands is necessary to ensure

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<sup>32</sup> Ibid

<sup>33</sup> ACO COPD: A constraint is a requirement placed on a commander that dictates an action. A restraint is a requirement placed on a commander that prohibits an action.

<sup>34</sup> ACO COPD: CCIRs comprise information required for the commander to make timely decisions as required for mission accomplishment.

that the COA development remains supportable and within the given means.

- e. **Courses of action analysis, courses of action validation and comparison, commander's course of action decision.** The COAs are refined and analysed based on direction from the joint force commander (JFC). These are war gamed and compared against each other. The advantages, disadvantages and risks relating to each COA are recorded and the commander selects the most appropriate COA. Throughout this process the concept of the COAs could change and any significant MILENG support issues should be highlighted as well as a comparison of the COA supportability.
- f. **Plan development.** MILENG input to the OPLAN depends on a thorough understanding of the concept of operations, the desired MILENG effects, and assets required. The MILENG staff is responsible for articulating this to the subordinate commands through general and MILENG specific areas of the OPLAN.
- g. **Execution.** Throughout the execution of an operation MILENG staff will oversee operational MILENG activity and deconflict, prioritize and allocate assets at the joint level. They will also participate in the periodic assessment and review of existing plans.
- h. **Transition.** Planning for the disengagement of North Atlantic Treaty Organization (NATO) forces must be initiated well in advance and depending on the operation could require additional North Atlantic Council (NAC) approval.<sup>35</sup> Effective coordination between stakeholders (both internal and external to NATO) is essential to prevent the exit of NATO forces becoming a destabilising influence in the joint operations area (JOA). It could include strategic advice to Supreme Headquarters Allied Powers Europe (SHAPE) to assist decision making as well as support, direction and guidance to component commanders. The MILENG contribution will include advice to commanders and planning groups, particularly regarding the handover of infrastructure and ongoing MILENG support contracts.

### Section 3 – Military engineering planning considerations

**4.4 Crisis response measures in the OPP.** Throughout the planning process the MILENG related crisis response measures (CRM) to the NATO Crisis Response System Manual need to be continually assessed and if required their release requested. Particular attention should be paid to authorizing the early deployment of enabling elements.

**4.5 Finance.** Funding mechanisms for NATO operations are usually a combination of national funding, multinational funding, joint funding, and common

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<sup>35</sup> Ibid

funding. MILENG planning will be restricted by these funding mechanisms and procedures<sup>36</sup>. Common funding eligibility and approvals require the identification of the problem to be solved and the effect to be created. It is critical that the urgent requirement is justified under NATO funding arrangements to provide only the minimum military requirement (MMR). The staffing process to request common funding begins as soon as requirements are identified. For MILENG, example requirements may include infrastructure development, theatre logistic bridges, lines of communications (LOC) or seaport of debarkation (SPOD) development, or Class IV materiel.

**4.6** MILENG staff coordinate with HQ's contracting organization to support delivery of SHAPE-delegated NATO Security Investment Programme (NSIP) projects and for procurement of MILENG services and materiel funded through the NATO military budget. For major capital projects contracted directly by the NATO agencies, MILENG staff will support the agencies through provision of advice regarding operational requirements, support to design reviews, input regarding contract evaluation criteria and technical assessment of contractor proposals.

**4.7 Prioritization of MILENG effort and resource.** Experience shows that there are rarely enough MILENG capacities available to execute all MILENG activities simultaneously. MILENG staff at the operational level is responsible for recommending operational priorities for MILENG effort and resources for JFC approval. Shortfalls can be managed through the use of:

- a. **Alliance operations and missions' requirements and resources plan.**<sup>37</sup> The Alliance operations and missions' requirements and resources plan (ARRP) provides commanders with an overall view of the resources required to support a particular operation. It incorporates not only infrastructure but also those support requirements related to communication and information systems, manpower, and operating budgets. MILENG plan staff should ensure that MILENG resources requirements, where appropriate, are included in the ARRP.
- b. **Support contracts.** A shortage of MILENG assets may be partially overcome by the use of civilian construction and service contractors. Such contracts may be prearranged as part of routine contingency planning where the execution of the contract is linked with the activation of the plan by the NAC. Coordination must occur between strategic and operational-level MILENG staff, the appropriate component commands and the host nation (HN). Quality management<sup>38</sup> must be accounted for in task planning and manning levels. At the operational-level, the finance branch (J8) is responsible for contracting and will lead on the development of support contracts, supported by MILENG staff.

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<sup>36</sup> PO (2013)0056 dated 05 February 2013 provides the basic framework for *Funding Policy for Non-Article 5 NATO-Led Operations and Missions*.

<sup>37</sup> See Bi-SC Directive 85-1 Edition 5 *Capability Package Directive*.

<sup>38</sup> See *International Organization for Standardization (ISO) 9000* for details.

- c. **Task organization.** Supporting components must be prepared to provide MILENG support to other components as directed by the JFC. Advising the JFC on such requirements and possibilities is the role of the JF chief of MILENG (CMILENG) .

**4.8 Employment of military engineering capabilities.** There will be a constant requirement to ensure concentration of MILENG capabilities on the main effort as determined by the JFC.

**4.9 Theatre military engineering materiel (class IV supplies) and resources.** MILENG materiel required to support common funded theatre-level capabilities will be procured, managed and distributed in close coordination with the MILENG staff. This materiel will either have to be purchased, transferred from another JOA, released from operational or strategic reserve stocks, or are available within the HN. At each level of command, when the CMILENG formulates their plan, they should ensure adequate allocation of MILENG materiel and resources for its implementation. It is a MILENG staff responsibility to identify the requirements, establish the appropriate controls and coordinate these measures with the respective component, joint logistic staff and strategic command or JF HQ staff and the HN.

**4.10 Military engineering and host-nation support.** NATO defines HNS as “civil and military assistance rendered in peace, crisis or war by a HN to NATO and/or other forces and NATO organizations, which are located on, operating on/from, or in transit through the HN's territory”. Although logistics branch (J4) is the lead for many aspects of HNS, some HNS capabilities are of direct interest to MILENG. To enable effective support, engagement with the HN by MILENG staff should be established at the earliest opportunity in accordance with the commander’s liaison directive.

**4.11** MILENG staff must be aware of the potential strengths and limitations for HNS assets in supporting the overall MILENG plan. Key aspects to consider include:

- a. MILENG force capabilities.
- b. Available resources.
- c. Construction standards.
- d. Environmental regulations and guidelines.
- e. Contractor capabilities and contracting law and procedures.
- f. Socio-economic concerns.
- g. Force protection (FP) concerns.
- h. HN defence plans (including barrier planning).

**4.12 Host nation legal consideration.** HN sovereignty must be respected in the planning and execution of MILENG activities on its territory. Compliance with

applicable law will be required as a minimum, as well as with HN, engineering standards and codes of practice if needed.

**4.13** MILENG activity may need to be coordinated with, and approved by HN authorities. If there are no HN standards, or these standards are inadequate, the CMILENG is responsible for advising the JFC on the MMR for standards for construction, safety and environmental protection (EP) to be adopted in the JOA. Critical HN civil and MILENG resources need to be identified early to allow the CMILENG to coordinate and prioritize their allocation.

**4.14 Barriers.** NATO defines a barrier as a coordinated series of obstacles designed or employed to detect, channel, direct, restrict, delay or stop the movement of an opposing force, and to impose additional losses in personnel, time and equipment on the opposing force. An obstacle is a natural or man-made object that creates a physical impediment to or hazard for the movement of vehicles, personnel or formations. The effects of obstacles on the physical operating environment contribute to putting an adversary at a disadvantage and can be a key element of defensive operations. The MILENG staff must be involved throughout the barrier planning process as it is responsible to ensure that implementation of barriers is in line with nations restrictions and properly executed by the joint force.

A NAC initiating directive which will start strategic planning in general, will also start barrier planning. Guidance and authority to conduct barrier planning will then be provided by SHAPE to the operational-level JFCs. SHAPE will coordinate with NMRs to receive nations' respective host nations' limitations (caveats, restraints, constraints), critical national infrastructure and points of contact for host nation coordination and synchronisation of barriers and obstacle planning. SHAPE will act as an initial hub for providing guidance regarding effected host nations' restrictions and authorizing the JFCs (captured within the Strategic Planning Directive) to conduct barrier planning with host nations within their area of responsibility. Afterwards the JFCs are responsible for integration of host nations' national limitations into the operational-level barrier planning. JFCs will coordinate the specific barrier plan with effected HN through liaison with designated point of contact from the respective nation. The JFCs' OPLAN will contain a broad idea of a barrier plan and related effects. NATO tactical level HQ's (i.e. multi-national corps or below) will, based on operational level guidance, conduct detailed obstacle planning with effected HNs' liaison element in coordination their national defence plans and provide the results to the operational level. JFCs must now ensure affected HNs' consent to this barrier plan with obstacles and will officially notify SHAPE once finalized. This official notification is a prerequisite for the authorization for barrier preparation and execution.

**4.15** The execution of a barrier plan is controlled through the use of CRM. Release authorization is held at the NAC level and controlled through SACEUR. In certain situations, CRMs may be pre-authorized enabling a faster, more coordinated and approved response. Based on the notification of the nations' consent provided from JFC to SHAPE, CRMs related to barriers can be released. Once CRMs are released, SACEUR can authorize or delegate authorization authority to lower-level commands.

**4.16 Military engineering support to geospatial support and geomatics.**

Geospatial<sup>39</sup> support encompasses all activities that ensure geospatial information is available and exploited when and where it is needed, including the associated staff effort to identify requirements and coordinate activity. MILENG support to geospatial support is commonly covered through MILENG input to geomatics. In many nations the provision of geospatial support is a MILENG responsibility, while in NATO this support is frequently functionally organized within J2. The support to geomatics comes from activities to ensure geospatial information is updated continuously for the purpose of analysis and potential exploitation. MILENG activities, mainly reconnaissance and survey, will provide inputs to geomatics and encompass tasks that provide geographic information to enhance awareness, understanding, and effective use of the operating environment for commanders and staff across the full range of operations. Up to date geospatial information is essential for MILENG staff understanding of the physical environment. It is the foundation upon which all other information on the operating environment is layered, to form the common operational picture.

**4.17** The MILENG and geomatics staff work closest in the development of the terrain analysis. MILENG is involved in the mobility assessments, while the geomatics staff is involved in the development, management, analysis, dissemination and display of accurate topographic and geospatial information to assist the military decision-making process. Operational requirements for geospatial support and geomatics are determined by the commander through advice from the designated Chief Geospatial Officer in coordination with the CMILENG and other key staff.

**4.18** Terrain analysis conducted by MILENG staff and others may include, but is not limited to:

- a. Assessment of cross-country movement and mobility corridors, incorporating effects of weather and load capacity.
- b. Intervisibility and field-of-view analysis for observation posts, covered approaches, sensors and communication.
- c. Identification of potential key terrain.
- d. Obstacle crossing studies.
- e. Assessment of the impact of explosive ordnance (EO) threat on operations.
- f. Identifying resources.
- g. Status or condition of facilities and infrastructure systems.

Other geospatial products such as maps and geospatial data are also provided to support movement, manoeuvre, construction and FP.

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<sup>39</sup> See AJP-3.17 *Allied Joint Doctrine for Geospatial Support* for details.

**4.19 Military engineering in support of chemical, biological, radiological and nuclear defence.** The aim of chemical, biological, radiological and nuclear (CBRN) defence is the prevention of CBRN incidents, the protection of populations, territories and forces against, and the assistance in recovering from, such incidents and their effects. Consequently, the commander will have to plan, coordinate and execute operations with multiple organizations.<sup>40</sup> MILENG supports CBRN defence by providing resources such as explosive ordnance disposal (EOD) capabilities, the construction and maintenance of expedient facilities for decontamination sites, search and extraction in a CBRN environment, EP measures, and collective protection.

**4.20** The disposal of CBRN EO is a MILENG responsibility, conducted by specialised CBRN EOD teams. The managing of CBRN EO incidents and advice to the commander have to be executed in close cooperation between MILENG and CBRN defence staff elements and a combined joint explosive ordnance disposal cell (CJEODC).

**4.21 Military engineering and energy efficiency.** MILENG is involved in energy efficiency aspects of deployed force infrastructure. In this regard MILENG responsibilities include infrastructure management, including camp design and set-up, construction, support to contracting, and utilities (water, power). In addition, MILENG can provide support to fixed or already existing facilities, e.g. HN installations. The CMILENG, as the focal point for infrastructure, EP, and utilities, is responsible for ensuring the force's compliance with energy policies, standards and standing operating procedures; the management, technologies and metering of energy; and the promotion of best practices and behavior to deliver energy efficiency (see figure 4.1).

**4.22** Therefore, MILENG staff have to consider energy efficiency based on the strategic guidance in the earliest stage of the operations planning process. MILENG staff need to anticipate and adapt energy efficiency considerations, in terms of location, environmental impacts, equipment used, material for construction works, and HN capacity for the operation.

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<sup>40</sup> See AJP-3.8 *Allied Joint Doctrine for Comprehensive Chemical, Biological, Radiological, and Nuclear Defence* for details.



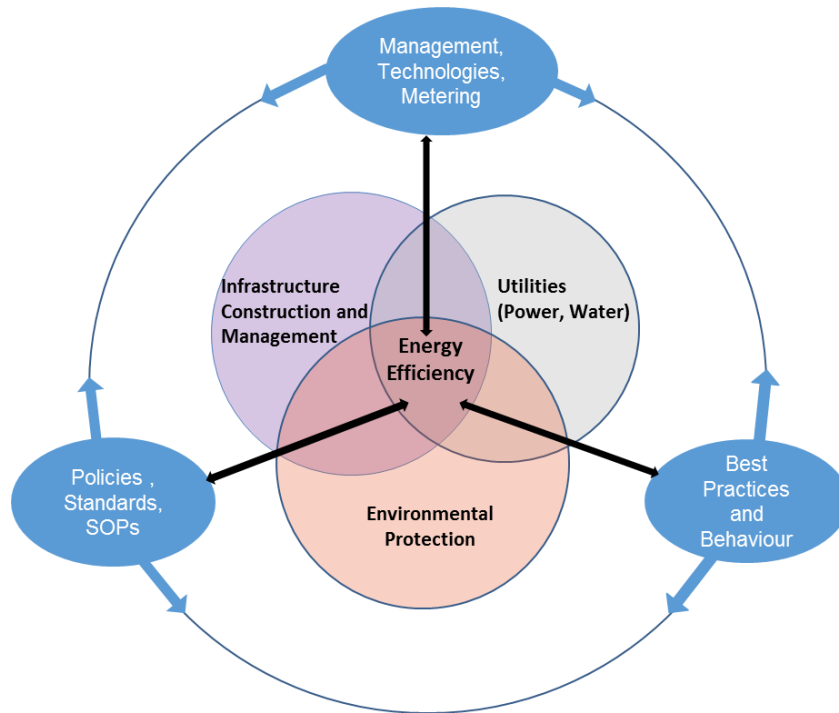


Figure 4.1: Energy efficiency enabling capabilities

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## Chapter 5 – Military engineering support to Allied joint operations

### Section 1 – Introduction

**5.1** This chapter explains the military engineering (MILENG) contribution to all components in the preparation, execution, termination and transition of Allied joint operations. It describes the execution of MILENG support to a joint force (JF) throughout the full range of potential North Atlantic Treaty Organization (NATO) operations.

### Section 2 – Military engineering support during joint operations<sup>41</sup>

**5.2 Military engineering support to logistics.**<sup>42</sup> The JF chief of MILENG (CMILENG) and their staff are the focal point for the planning and execution of all aspects of MILENG support to logistics within the assigned joint operations area (JOA). At any given stage of an operation the joint force commander (JFC) may shift the main effort of MILENG support entirely to logistics. The CMILENG of the subordinated commands including the joint logistic support group (JLSG) are responsible for the prioritization and coordination of the MILENG support within their areas of operations. Logistic activities are supported by a number of specialists, including MILENG staff. Such support includes the acquisition, restoration, repair, construction, maintenance and disposal of those infrastructure facilities required to mount, deploy, accommodate, sustain, and redeploy military forces, including the construction, restoration and maintenance of lines of communications (LOC) and facilitation of environmental protection (EP). An effective working relationship between MILENG and logistics staff is key to ensure shared logistic situational awareness, appropriate prioritization for the acquisition, delivery and maintenance of MILENG materiel stocks, and early identification of MILENG activities required to support operational logistics.

**5.3 Preparation of the force, including build-up.** Based on the force planning, MILENG forces are provided by the troop-contributing nations (TCN) to fulfil the approved combined joint statement of requirements. Agreements with the host nation (HN) on status of forces and provision of materiel, manpower and services are to be concluded. Contracts for provision of materiel and services from both outside the theatre and from HN contractors are to be put in place to cover any remaining gaps. If necessary, staging bases outside the theatre are to be constructed to support the reception, staging, and onward movement (RSOM) process.

**5.4 Deployment.**<sup>43</sup> Early in the deployment stage the main effort for MILENG support is to upgrade and maintain theatre infrastructure, including logistic facilities and installations to continue the RSOM process. MILENG support is essential to the deployment process and often a greater MILENG effort will be needed

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<sup>41</sup> See Allied Joint Publication (AJP)-3 *Allied Joint Doctrine for the Conduct of Operations* for details.

<sup>42</sup> See AJP-4 *Allied Joint Doctrine for Logistics* for details.

<sup>43</sup> See AJP-3.13 *Allied Joint Doctrine for the Deployment of Forces* for detail.

than for some other stages, sometimes necessitating a surge of MILENG forces. The HN may provide all or some of this support where capable. MILENG support will include but is not limited to:

- a. Assessing and recommending the most efficient use of existing infrastructure.
- b. Any necessary (re)construction and maintenance of airports, seaports or railway stations.
- c. Development, preparation, reinforcement and maintenance, including clearance, of all routes, areas and installations which must be used by the force during RSOM, and later as LOC.
- d. Countering explosive ordnance (EO) threats.
- e. Support to force protection (FP).
- f. Environmental impact assessments and environmental baseline studies.<sup>44</sup>

**5.5 Execution of operations.** During the execution phase the balance of the MILENG effort may shift between the areas of expertise depending on the type and progress of the operation. MILENG forces will support combat and sustainment but may also be shifted to support stabilization if needed to advance the campaign.

**5.6 Operation termination and transition.** An operation will include a termination and transition stage before redeployment. MILENG support typically includes infrastructure repair, environmental remediation<sup>45</sup>, liaison with non-governmental organizations (NGOs), international organizations (IOs), national authorities or other organizations, and possibly even support to dislocated civilians. A complete record of all MILENG related activities must be handed over. There is an increased risk that the mission parameters will begin to expand during this stage. The JF MILENG staff must ensure that close coordination is maintained with civil-military cooperation (CIMIC) and financial control staff, and that NATO resources are used only in tasks supporting the NATO mission and within relevant eligibility criteria.

**5.7 Redeployment of the force.** When the redeployment takes place in a secure environment, JF MILENG staff must plan to dismantle or hand over redundant NATO infrastructure at an early stage. When the redeployment takes place in a hostile environment JF MILENG staff must be prepared to support manoeuvre and movement until the very end of the campaign. JF MILENG staff must also be prepared to support FP during redeployment when large numbers of personnel and equipment will gather in the points of embarkation. The JF CMILENG may assess that

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<sup>44</sup> See also Allied Joint Environmental Protection Publication (AJEPP)-6 *NATO Camp Environmental File During NATO-Led Operations* for detail.

<sup>45</sup> Environmental remediation will be executed based on the *Environmental Closeout Study (ECS)* as per *AJEPP-6 NATO Camp Environmental File During NATO-Led Operations*.

MILENG support requirements necessitate a surge of additional MILENG forces during this stage.

**5.8 Lessons learned.** Quality control of the way military forces operate is difficult to achieve but one of the most reliable measures must be their performance during operations. The identification of lessons for a multinational force can be difficult when some lessons will be a national responsibility and others will be for the Alliance to address. Commanders must recognise from the outset that provision must be made for monitoring and recording force performance in all its aspects for subsequent analysis and critical review. The purpose is to learn efficiently from experience and to provide validated justifications for amending doctrine and best practices, to improve performance, both during the course of an operation and for subsequent operations. CMILENG and the MILENG staff must gather lessons identified throughout the operation where they impact on the delivery of MILENG support. These lessons should be compiled at all levels and include observations from subordinate tactical formations where they are relevant to Alliance operations. All Observations are to be inserted in the NLLP (NATO Lessons Learned Portal), as the single NATO Alliance tool for collection, managing, tracking, monitoring and sharing of lessons. NLLP is accessible through the link: <http://nllp.jallc.nato.int/Pages/default.aspx>. The NLLP on the NS WAN (NATO Secret Wide Area Network) is the only place in NATO where uploaded lessons can be tracked throughout the NATO Lessons Learned Process and is accessible to all NATO bodies. These may include national lessons identified which may be important to planning for future Alliance operations.

### **Section 3 – Military engineering support to components**

**5.9** Military success relies on a joint and multinational effort, usually with components and other force elements brought together under a unified command structure. Few operations are carried out by one component alone. Successful joint operations require an inclusive approach to maximise the overall effect of the JF. This will ensure the best use of the complete range of capabilities<sup>46</sup> including MILENG.

**5.10 Military engineering support to the land component.** MILENG support to land operations is executed through the MILENG pillars, supporting all the joint functions during all phases of Allied joint operations as described in this publication. MILENG supports all components for their land related activities, including all those listed in the following paragraphs.

**5.11 Military engineering support to the air component.** Air operations are dependent on sufficient infrastructure and secure basing. From well-established to austere, airfield basing is required to accommodate the forces necessary to achieve all air related deployment, operating, sustainment and recovery objectives. Infrastructure, capacity and the strategic LOC must be protected to retain the ability to support multiple, simultaneous air operations and enablement activities, including support to operational and training missions. This must include the capability to

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<sup>46</sup> See AJP-3 *Allied Joint Doctrine for Conduct of the Operations* for details.

maintain airfield functionality in a degraded, contested and operationally limited operating environment and in all anticipated climatic conditions.<sup>47</sup>

**5.12** MILENG support to the air component includes:

- a. Assessing, restoring, maintaining, and, if necessary, constructing or installing mission related aerodrome infrastructure (also comprising permanent, semi-prepared and unpaved runways) to deliver air operations.
- b. Countering EO threats on airfields, restoration of airfield operating surfaces, including runways, taxiways, parking aprons, aircraft manoeuvring areas and access tracks, restoration of essential services and facilities (RESF).
- c. Provision of FP engineering or field defences as part of the wider airfield FP measures.

**5.13** This encompasses services and facilities required to continue air operations.<sup>48</sup> Once EO threats are removed, operating surfaces repaired, RESF is complete and the airfield certified operational, they must be monitored and sustained.<sup>49</sup> Damage to mission-critical airfield installations could lead to closure of the airfield and reduction of airpower availability to the JFC. MILENG activities and resources need to be integrated with the airbase's planning and command and control (C2) arrangements. MILENG aerodrome damage repair capabilities are scarce resources and can become mission-critical assets.

**5.14 Military engineering support to the maritime component.** MILENG support to maritime operations<sup>50</sup> is to monitor, maintain, restore, and if necessary provide mission related maritime infrastructure to maximize maritime operations, and survivability and sustainment of maritime installations and forces. The CMILENG within Allied Maritime Command is the principal advisor to the commander in all aspects of MILENG, not limited to infrastructure. MILENG expertise is required to establish and/or maintain maritime operational capability. MILENG support to maritime operations includes early identification of a potential seaport of debarkation (SPOD); reconnaissance, information gathering; analysis, assessment and definition of force requirements; analysis and assessment of capabilities, capacities and shortfalls, and planning and initiation of necessary mitigation measures. It can enable restoration of minimum port facilities, including improving beaches and port facilities to increase cargo and personnel throughput; shore stabilisation; site grading; mine clearance on land; explosive ordnance disposal (EOD); drainage; facility construction and improvements at SPODs; environmental damage mitigation; and utility installation. Tasks will be processed in accordance with HN, national and NATO procedures. Unforeseen damages or

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<sup>47</sup> See AJP-3.3 *Allied Joint Doctrine for Air and Space Operations* for detail.

<sup>48</sup> See Bi-SC Directive 85-5 *NATO Approved Criteria and Standards for Airfields* for detail.

<sup>49</sup> See Allied Air Traffic Management Publication (AATMP)-03 *Airfield Damage Repair (ADR) Capability* for detail.

<sup>50</sup> See AJP-3.1 *Allied Joint Doctrine for Maritime Operations* for detail.

limitations at mission critical maritime installations could ultimately lead to closure of the SPOD, which could lead to a reduction of capability for the JFC.

#### **5.15 Military engineering support to the special operations force component.**

Special operations forces (SOFs) operating under NATO will normally conduct operations in a JOA with other air, land and maritime forces. Above and beyond organic assets and combat service support elements, SOF may require support from specialists due to the scope of the tasks related to their mission. There are some crucial phases of a special operation for which MILENG support may be required, for example during insertion or extraction, when the integral capabilities are not sufficient (or may be required for other specific parts of a SOF mission). MILENG staff at the operational level may also be required to provide specialist advice to SOF elements on matters such as terrain and infrastructure. Normally MILENG specialists will be assigned to non-conventional groupings under specific command relationships. The potential of engaging MILENG in a special operation should be considered from the very early stages of planning by dispatching liaison elements as required to all necessary levels.

#### **5.16 Military engineering support to joint logistic support groups.<sup>51</sup>**

Each JLSG will have a significant requirement for MILENG support. A MILENG staff will be established in each JLSG headquarters (HQ) to plan and coordinate the provision of MILENG support to the JLSGs within the supported JFC's JOA. The JLSG's CMILENG will advise the JLSG commander and must coordinate with the JF CMILENG to ensure conformity with the JFC's operational MILENG priorities and to optimize MILENG capabilities. One of the primary tasks of the JLSG's MILENG branch is to plan, prioritize and coordinate MILENG support for theatre logistics. MILENG staff within the JLSG will cover all areas of MILENG current operations and plans and provide advice on all MILENG related matters to facilitate RSOM the process, the sustainment, and redeployment of all forces. The MILENG staff of the JLSG, with its mission tailored assigned force package, will mainly focus on supporting the improvement of infrastructure and coordination of EOD efforts.

**5.17** Provision and sustainment of ammunition is a national responsibility in NATO operations. Military ammunition and munitions-related activities such as maintenance, distribution and storage pose inherent and significant risk to the operation. When requirements of the Allied Ammunition Storage and Transportation Publication<sup>52</sup> cannot be met, the explosives safety and munitions risk management (ESMRM) risk assessment and management process<sup>53</sup> has to be applied. MILENG staff on all levels supports the ESMRM process with expertise covering EO threat and mitigation measures. When a JLSG is not established as part of the JF, the JF CMILENG and their MILENG staff provide these functions and capabilities.

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<sup>51</sup> See AJP-4.6 *Allied Joint Doctrine for the Joint Logistic Support Group* for detail.

<sup>52</sup> See Allied Ammunition Storage and Transportation Publication (AASTP)-1 and AASTP-5 *Allied Ammunition Storage and Transport Publication* for detail.

<sup>53</sup> See Allied Logistic Publication (ALP)-16 *Explosives Safety and Munitions Risk Management (ESMRM) in NATO Planning, Training, and Operations* for detail.

## **Section 4 – Specific military engineering considerations for operations**

**5.18 Military engineering support to combat operations.** MILENG support to combat is executed through MILENG activities associated with the direct support to current or imminent operations. They are conducted by the MILENG forces of any service or component to support land, air, maritime, information, space and SOF operations, with the emphasis on speed of execution.

**5.19 Military engineering support to crisis response operations.** MILENG forces can contribute significantly to all types of crisis response operations. Typical support includes infrastructure repair; liaison with NGOs, IOs and national authorities on MILENG specific issues; and support to displaced persons. The level of assistance can vary from small, highly specialized teams to complete units. Small teams may be used to assess damage or estimate engineering repair and can assist in specialized support such as power supply and distribution, utilities repair work, water purification, and well drilling activities. MILENG forces can provide advice and consequence management on hazardous materials and areas affected by explosive remnants of war (ERW). In large humanitarian assistance operations MILENG forces may provide essential civil, electrical, and mechanical engineering support including facility construction, structural repair, debris clearance, emergency repairs to restore utilities, and camp construction for deployed forces and dislocated civilians. MILENG support to stabilization will focus on engineering to assist the deployed force in its primary responsibility of delivering a safe and secure environment and may include training local forces. Alliance forces must be able to perform and support the execution of some of the tasks required, when asked for and mandated, in case the primary non-military actor is not able, available or the requirement exceeds civil capacities.

**5.20 Military engineering support to cyberspace, space and information activities.** MILENG might be requested to provide support to cyber, space and information activities by building, maintaining and restoring specific infrastructure, and the provision of power used for information technology systems and cyber and space activities. MILENG staff should be integral to operational-level cyber consequence management planning to provide technical advice on the impact of cyber across infrastructure sectors and interdependencies.



## Lexicon

### Part 1 – Acronyms and abbreviations

ACO	Allied Command Operations
AJEPP	Allied joint environmental protection publication
AJP	Allied joint publication
ARRP	Alliance operations and missions requirements and resources plan
ATP	Allied Tactical Publication
Bi-SC	Bilateral Strategic Commands
C2	command and control
CBRN	chemical, biological, radiological and nuclear
CCIR	commander's critical information requirement
C-IED	countering improvised explosive devices
CIMIC	civil-military cooperation
CJEODC	combined joint explosive ordnance disposal cell
CMI	civil-military interaction
CMILENG	chief of military engineering
COA	course of action
COPD	Comprehensive Operations Planning Directive
CRM	Crisis Response Measures
EO	explosive ordnance
EOD	explosive ordnance disposal
EP	environmental protection
ERW	explosive remnants of war
ESMRM	explosives safety and munitions risk management

FOM	freedom of movement
FP	force protection
HN	host nation
HNS	host-nation support
HQ	headquarters
IED	improvised explosive devices
IO	international organization
JF	joint force
JFC	joint force commander
JLSG	joint logistics support group
JOA	joint operations area
JOPG	Joint Operations Planning Group
LOC	lines of communications
MC	Military Committee
MILENG	military engineering
MMR	minimum military requirement
NAC	North Atlantic Council
NATO	North Atlantic Treaty Organization
NGO	non-governmental organization
NSIP	NATO Security Investment Programme
OPLAN	operation plan
OPP	operations planning process
POE	physical operating environment
RESF	restoration of essential services and facilities
RSOM	reception, staging and onward movement

SACEUR	Supreme Allied Commander Europe
SHAPE	Supreme Headquarters Allied Powers Europe
SOF	special operations force
SPOD	seaport of debarkation
TCN	troop-contributing nations

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## Part 2 – Terms and definitions

### **barrier**

A coordinated series of obstacles designed or employed to detect, channel, direct, restrict, delay or stop the movement of an opposing force, and to impose additional losses in personnel, time and equipment on the opposing force.

(NATO agreed)

### **barrier plan**

A map or overlay on which all coordinated obstacles are marked, together with an obstacle list.

(Not NATO agreed)

### **chemical, biological, radiological and nuclear (CBRN) defence**

The plans, procedures and activities intended to contribute to the prevention of chemical, biological, radiological and nuclear incidents, to protect forces, territories and populations against, and to assist in recovering from, such incidents and their effects.

(NATO agreed)

### **civil-military cooperation (CIMIC)**

A joint function comprising a set of capabilities integral to supporting the achievement of mission objectives and enabling NATO commands to participate effectively in a broad spectrum of civil-military interaction with diverse non-military actors.

(NATO agreed)

### **Class IV**

Supplies for which initial issue allowance are not prescribed by approved issue table. Normally includes fortification and construction materials, as well as additional quantities of items identical to those authorized for initial issue (Class II) such as additional vehicles.

(Not NATO agreed)

### **combat support engineering**

Engineering tasks associated with the direct support to current or imminent operations.

### **combined arms**

In land operations, relating to the synchronized or simultaneous application of several arms to achieve an effect on the enemy that is greater than if each arm were used against the enemy in sequence.

(NATO agreed)

### **countering improvised explosive device (C-IED)**

The collective efforts to defeat an improvised explosive device system by attacking networks, defeating devices and preparing a force.

(NATO agreed)

**cyberspace**

The global domain consisting of all interconnected communication, information technology and other electronic systems, networks and their data, including those which are separated or independent, which process, store or transmit data.

(NATO agreed)

**environment**

The surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelations.

(NATO agreed)

**environmental protection (EP)**

The prevention or mitigation of adverse environmental impacts.

(NATO agreed)

**explosive ordnance disposal (EOD)**

The detection, accessing, uncovering, identification, mitigation, rendering safe, recovery, exploitation and final disposal of explosive ordnance, regardless of condition.

Note: Explosive ordnance disposal extends to explosive remnants of war and stockpiles, or other explosive ordnance that has become hazardous by damage or deterioration.

(NATO agreed)

**force protection (FP)**

All measures and means to minimize the vulnerability of personnel, facilities, equipment and operations to any threat and in all situations, to preserve freedom of action and the operational effectiveness of the force.

(NATO agreed)

**general support engineering**

Engineering associated with deliberate tasks, long-term preparation for and indirect support to ongoing or future operations, as well as the sustainment and survivability of a force throughout all stages of an operation. General support engineering assists the whole force, and the host nation (HN), and other non-military actors when agreed and decided by the commander.

**geomatics**

The science and technology of geospatial information management, including the acquisition, storage, analysis and processing, display and dissemination of georeferenced information.

(NATO agreed)

**geospatial support**

All activities that ensure geospatial information is available and exploited when and where it is needed, including the associated staff effort to identify requirements and coordinate activity.

(NATO agreed)

**host nation (HN)**

A nation which, by agreement:

- a. receives forces and materiel of NATO or other nations operating on/from or transiting through its territory;
  - b. allows materiel and/or NATO organizations to be located on its territory; and/or
  - c. provides support for these purposes.
- (NATO agreed)

**host-nation support (HNS)**

Civil and military assistance rendered in peace, crisis, or war by a host nation to NATO and/or other forces and NATO organizations that are located on, operating on/from, or in transit through the host nation's territory.

(NATO agreed)

**infrastructure**

The buildings, facilities and other temporary or permanent installations required to support military capabilities.

- a. **Critical national infrastructure.** Infrastructure assets (physical or electronic) identified by the host nation or NATO that are vital to the continued delivery and integrity of the essential services upon which the country relies, the destruction or compromise of which would lead to severe economic or social consequences or loss of life. Such effects may also have a severe impact on the operation or campaign. Some or all designated CNI may also be categorised by NATO as mission vital infrastructure or key infrastructure.
- b. **Mission vital infrastructure.** HN, or Force deployable, Infrastructure facilities, systems, sites and networks within the JOA upon which the Force relies for deployed capability and/or the destruction or disruption of which makes the mission untenable.
- c. **Key infrastructure.** HN, or force deployable, infrastructure facilities, systems, sites and networks necessary for the functioning of the HN and/or NATO Force and the delivery of essential services upon which the HN and/or NATO Force depends, the destruction or disruption of which, either singularly or collectively, provides a significant disadvantage to the HN, deployed NATO Forces, troop-contributing nation or the mission.

**international organization (IO)**

An intergovernmental, regional or global organization governed by international law and established by a group of states, with international juridical personality given by international agreement, however characterized, creating enforceable rights and obligations for the purpose of fulfilling a given function and pursuing common aims.

Note: Exceptionally, the International Committee of the Red Cross, although a non-governmental organization formed under the Swiss Civil Code, is mandated by the international community of states and is founded on international law, specifically the Geneva

Conventions, has an international legal personality or status on its own, and enjoys some immunities and privileges for the fulfilment of its humanitarian mandate.  
(NATO agreed)

**military engineering (MILENG)**

A function in support of operations to shape the physical operating environment.  
(NATO agreed).

**mobility**

A quality or capability of military forces which permits them to move from place to place while retaining the ability to fulfil their primary mission.  
(NATO agreed)

**non-governmental organization (NGO)**

A private, not for profit, voluntary organization with no governmental or intergovernmental affiliation, established for the purpose of fulfilling a range of activities, in particular development-related projects or the promotion of a specific cause, and organized at local, national, regional or international level. Notes:

1. A non-governmental organization does not necessarily have an official status or mandate for its existence or activities.
2. NATO may or may not support or cooperate with a given non-governmental organization.  
(NATO agreed)

**operation**

A sequence of coordinated actions with a defined purpose.

Notes:

1. NATO operations are military.
2. NATO operations contribute to a wider approach including non-military actions.  
(NATO agreed)

**operational level**

The level at which campaigns and major operations are planned, conducted and sustained to accomplish strategic objectives within theatres or areas of operations.  
(NATO agreed)

**reconnaissance**

A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy, or to secure data concerning the meteorological, hydrographical or geographic characteristics of a particular area.  
(NATO agreed).

**strategic level**

The level at which a nation or group of nations determines national or multinational security objectives and deploys national, including military, resources to achieve them.  
(NATO agreed)



**survivability**

All aspects of protecting personnel, weapons, and supplies while simultaneously deceiving the enemy.

(Not NATO agreed)

**tactical level**

The level at which activities, battles and engagements are planned and executed to accomplish military objectives assigned to tactical formations and units.

(NATO agreed)

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