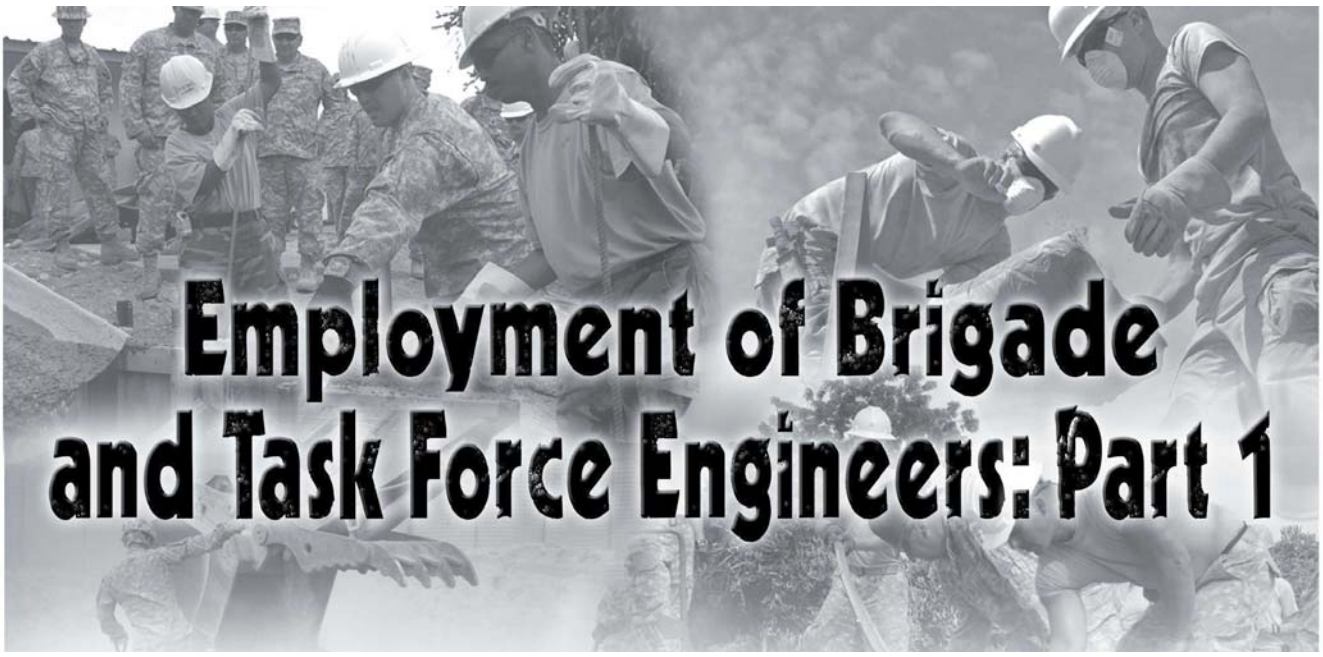

工兵旅及特遣隊之部署:單元一

來源：美軍工兵期刊
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The creation of 32 engineer battalions in the Regular Army over the next 2 years and 28 engineer battalions in the Army National Guard over the next 4 years will give maneuver commanders additional organic engineer capability that they have not recently possessed. Leveraging this capability will require maximizing a resource that maneuver commanders have not had readily available recently: a task force engineer. Even more than this, an engineer battalion commander with lettered subordinate companies in the brigade combat team (BCT) is a muscle that neither the Army nor the Engineer Regiment has exercised in several years. The purpose of this article is to articulate what has changed for the engineer commander in terms of engineer capability over the last 30 years using a doctrine, organization, training, material, leadership and education, personnel, and facilities (DOTMLPF) framework and to describe what this means for the engineer commander. The second part of the article, to appear in the next issue of *Engineer*, will delineate some tactics, techniques, and procedures (TTP) that result from this analysis.

這幾年旅戰鬥隊下轄工兵營與工兵連是陸軍工兵的主力，為加強戰鬥部隊指揮官的基礎工兵能力，陸軍將在未來兩年編成32個工兵營，國民兵也將在未來的四年編成28個工兵營。對於指揮官影響甚大的改變就在於工兵的專案任務編組，這篇文章強調的是過去30年工兵指揮官使用準則針位工兵部隊組織，訓練，教材，領導與教育，人事與設施的架構的修訂，單元二的文章中，將分析工兵部隊的戰術，技術及程序手冊。

Before beginning the DOTMLPF analysis, the following terms must be defined:

- **Task force.** A temporary grouping of units, under one commander, designed to accomplish a particular mission. In the U.S. Army, a task force is usually a battalion-size, ad hoc unit formed by attaching smaller elements of other units.
- **Company team.** A company-size unit with an armored or mechanized infantry unit attached. (A similar unit at the brigade level is a BCT.)
- **Task organization.** The design of an operating force, support staff, or sustainment package of specific size and composition to meet a unique task or mission.

在實施準則，組織，訓練，裝備，領導與教育，人資與設施分析前，必須遵循以下條文:

- **特遣隊：**美軍的臨時編組特遣隊，通常由一個營組成，並在指揮官統一指揮下完成特定任務，特遣隊由配屬方式編組。
- **連編制：**以連級大小配屬在裝甲及步兵單位下(聯兵旅內同性質連隊)。
- **編裝：**任務方案，支援人員編組在特殊任務及組成的考量下設計符合任務特性

Doctrine

AirLand Battle was the conceptual framework that formed the basis of the Army's doctrine from 1982 .into the late 1990s, replacing the 1976 active defense doctrine. (See Figure 1) AirLand Battle emphasized close coordination between land forces, acting as an aggressive maneuvering force with air forces attacking the rear-echelon forces that supply frontline enemy forces. It emphasized close coordination between land forces acting as an

aggressively maneuvering force and air forces attacking the rear-echelon forces that supply frontline enemy forces. AirLand Battle was subsequently replaced in 1993 with a doctrine that emphasized major combat operations and military operations other than war. In 2008, Field Manual (FM) 3-0, Operations, emphasized that conflict involved more than combat between armed opponents. Full spectrum operations applied combat power through simultaneous and continuous combinations of four elements: offense, defense, stability, and the defense support of civil authorities. Army Doctrine Publication (ADP) 3-0, *Unified Land Operations*, superseded FM 3-0 in October 2011 and introduced the Army's new operational concept: unified land operations.5 ADP 3-0 defines unified land operations as the way the Army seizes, retains, and exploits the initiative to gain and maintain a position of relative advantage in sustained land operations. It accomplishes this through simultaneous offensive, defensive, and stability operations to prevent or deter conflict prevail in war, and create the conditions for favorable conflict resolution. The engineer capabilities to support this doctrine are combat engineering, general engineering, and geospatial engineering. The lines of engineer support include—

準則

地空作戰的基礎概念在1976年積極防衛準則中更新並架構於1982到1999年的陸軍準則中(見表一)。地空作戰首重強化與陸地部隊的協調，並在擊潰敵軍前線後勤支援上與空戰部隊扮演聯合機動打擊武力。在1993年地空作戰準則修改，內容轉為強調主戰行動與戰爭以外的軍事行動，爾後在2008年的野戰手冊上(FM3-0)強調戰鬥行為內容，不僅涵括了武裝衝突，全方位作戰，同步武力等，同時將攻擊、防禦、維穩及民政機關防務支援應用於以上戰鬥行為中。陸軍準則期刊(ADP3-0)，聯合地面作戰取代了2011年10月發布的行動準據(FM3-0)並介紹新的陸軍行動概念，聯合地面作戰(ADP3-0)為陸軍的特性修訂了一套具攻擊、防禦、維穩等優勢的聯合地面作戰方案，已利爾後武裝衝突排解。在此準則中工兵任務包含戰鬥工兵、工程工兵與地形工兵。支援能量如以下：

- Assure mobility.
- Enhance protection.
- Enable force projection and logistics.
- Build partner capability and develop infrastructure.

■確保機動路線暢通

■工事防禦(進階)

■確保兵力投射及後勤

■增進友軍能力與發展基礎設施

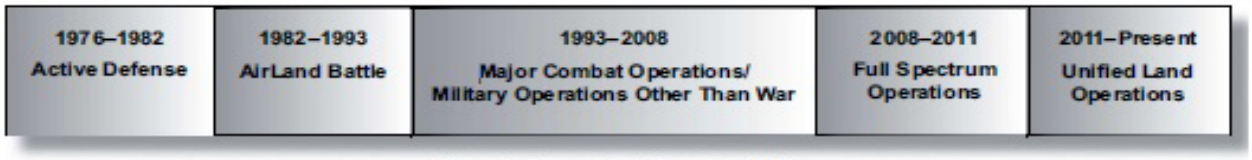


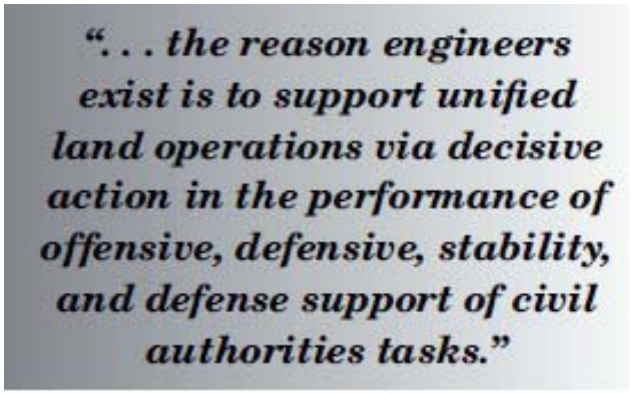
Figure 1. Army Doctrine Since 1976

1976-1982 主動防禦 時期	1982-1993 地空作戰	1993-2008 主戰行動/ 戰爭以外軍事行動	2008-2011 全方位 作戰	2011-現今 聯合 地面作戰

圖一 1976至今年陸軍準則

Finally, the reason engineers exist is to support unified land operations via decisive action in the performance of offensive, defensive, stability, and defense support of civil authorities tasks.7 Doctrine in the last 30 years has evolved to reflect the simultaneous complexity of the modern battlefield, such as non-nation-state actors, conventional and nonconventional forces, and nonlinear and noncontiguous areas of operation.

最後工兵存在之目的在透過決勝行動支援聯合地面作戰，並附有防禦、攻擊、維穩及民政機關防務等任務，準則在過去30年裡因應複雜多變的戰場如境外行動，傳統與非傳統作戰以及不對稱非持續戰爭行為將持續修訂。



"…工兵部隊存在的目的是為了確保任務行動前進路線並在攻擊，防禦，維穩及民政機關防務支援等達成最佳行動表現。"

Organization

In March 1991, the Chief of Staff of the Army (CSA) approved the Engineer Restructuring Initiative (ERI) for implementation across the Army. The concept called for three divisional battalions under the mission command of a divisional engineer brigade commander within heavy divisions. While assigned to the divisional engineer brigade, the subordinate engineer battalions maintained a habitual support relationship with one of the division's combat brigades. A continuing movement to reduce the manpower of the Army and the application of scarce resources to other programs, such as modernization, prompted a number of engineer unit inactivation. In addition, the reorientation of the Army from a forward-deployed force to a continental U.S.-based force placed a premium on the ability to deploy quickly to a distant region. As in the past, the ability to meet certain deployment criteria sometimes became more important than the ability to perform required missions and tasks in the area of operations.

組織

1991年3月，陸軍參謀長核准了工兵組織再造計畫以利任務遂行，這次的編裝概念區分為兩方面，一方面是將重裝師內編制一個工兵旅下轄三個工兵營並常態性的實施戰鬥支援以因應任務需求，另一方面持續減少部隊人力，強化應用稀有資源，促使工兵部隊現代化，此外，主要軍事能力從前進武力部署躍昇為美國本土區域遠距離快速部署，一如以往，實現特定區域部署的能力有時甚至比執行任務或區域行動的能力等要求更為重要。

The Army transformation, which began in 2003, was a modernization plan to move the Army from its Cold War divisional orientation to a full spectrum

capability with fully manned, equipped, and trained brigades.8 this was the most comprehensive reorganization since World War II and included modular brigades and a rebalancing of the Regular Army and Reserve Components. This transformation changed the Army from mostly mechanized divisions of around 15,000 Soldiers to modular brigades of 3,000 to 4,000 Soldiers, with the aim of being able to deploy into different parts of the world. It effectively organized the Army closer to the way it fought.9 The engineer portion of transformation created specific modular engineer formations such as clearance, mobility augmentation, sapper, and horizontal and vertical construction companies organized under a common engineer battalion headquarters design. Transformation reduced organic engineer capability within a BCT, which ranged from a sole engineer company under the special troops battalion for the infantry BCT to combat engineer companies (Echo companies) in the heavy BCT combined arms battalions. Engineer planning and mission command in the BCT experienced the biggest reduction, with only a small engineer staff section remaining in the BCT headquarters. The one engineer highlight of this formation was the creation of the five-person geospatial cell as part of the BCT headquarters.

2003年的現代化轉型計畫是將陸軍由冷戰時期的初階作戰能力轉型成為具戰法、裝備訓練的全方位作戰能力，這是自從第二次世界大戰後各模組化旅，一般部隊，後備部隊最為配套完善的組織重整。轉型計畫特別將陸軍機械化師的15000士兵分配成3000-4000人的模組化旅並部署至全球各不同駐地，也是陸軍最有效率的戰爭編組。一般工兵部隊以營為單位編組區分為機動阻絕，戰鬥工兵以及工程工兵連。這轉型減少了旅戰鬥隊的基礎工兵作業能力及編組內工兵的成員，因此，工兵計畫及指揮管制方面的經驗也因此削弱，影響範圍包括了步兵特戰部隊內的戰鬥工兵連(E連)。另外在旅戰鬥隊中新增五個地形工兵小組是本次轉型的亮點。

In 2009 and 2010, the Engineer Regiment developed the brigade engineer battalion (BEB) initiative. This force design update was designed to support the two maneuver battalions in the BCT. By the time the BEB was approved, however, the Army decided to increase the BCTs by adding a third maneuver battalion. The BEB did not include a third engineer company for two critical reasons. First, there was not enough echelon-above-brigade (EAB)

force structure to pay the bill; and second, the CSA limited the size of the BCT. The engineer battalion assigned to each BCT will provide increased engineer capability with two companies, but will have limited capacity to support the third maneuver battalion. Additional engineer capacity and capability (such as defensive operations, engagement area development, offensive operations, lodgment expansion, stability operations, partner capacity building, defense support of civil authorities, port construction and repair, and mission command headquarters) for these EAB enablers will need to be anticipated, requested, and allocated for home station training, training center rotations, and support to contingency operations.

2009年與2010年，陸軍調整了旅戰鬥隊成立了三個機動營，為強化工兵能力，工兵群也調整編裝在旅戰鬥隊中新增了兩個工兵支援營，各營只編制兩個工兵連並以這樣的編裝分配支援三個機動營，裁編一個工兵連有兩個重要的原因，第一，沒有足夠的旅級以上部隊單位支援，第二，旅戰鬥隊的編裝是受限制的。此外，工兵編裝與任務(如防禦行動，交戰地區部署，攻擊行動，區域擴張，維穩作戰，盟軍聯合作戰能力建立，民政機關防務支援，港口構築與修復以及指揮管制總部的成立)在旅級戰鬥整備上是不可或缺的，並且配屬至訓練中心實施整訓並隨時支援偶發性的戰鬥行動。

The bulk of engineer force structure now resides in the Reserve Component, with 19 percent in the Regular Army, 50 percent in the Army National Guard, and 31 percent in the U.S. Army Reserve. Upon completion of active BEB overmodularization conversion in fiscal year 2015, the Regular Army force will be 48 percent BEB and 52 percent EAB. While table of organization and equipment organizations are generally designed to meet Phase III requirements to dominate the enemy, the strategic impact of this force mix demands recurrent, assured, and predictable access to Army National Guard and U.S. Army Reserve units through all phases of the operation (shape the environment, deter the enemy, seize the initiative, dominate the enemy, stabilize the environment, and enable civil authority).

大部分的工兵部隊是以後備部隊所編成的，其中有19%的現役軍人，50%的國民兵與31%的後備軍人。根據2015年旅級工兵營所完成的編裝，旅級工兵營現役軍人將提昇至48%，旅級以上部隊單位將提昇至52%。這些編裝的設計是要讓國民兵與後備部隊在行動上(戰場控制，威懾敵軍，爭取主動權，牽制敵

軍，維穩戰場及確保民政機關防務能力)能夠符合第三階段針對假想敵的戰略及綜合性的戰場評估的要求。

Three engineer organizational trends derive from the above. First, the divisioncentric Army has been reshaped to a BCTcentric force and will remain the key building block for the Army moving forward. Second, maneuver brigade commanders have clamored for more engineers during combat operations and this need has often been forgotten when inactivations and reduced budgets have reduced Army strength and engineer force structure.12 Finally, engineer planners have generally based their organizational structures on the nature and quantity of work to be done in a given area, while Army planners have been in influenced by the dictates of deployability and unique operational requirements forcing in-lieu-of solutions to meet global demands. This trend resulted in EAB engineer organizations that were not available or optimized to augment BCT formations. As we build the Army of 2020, the Engineer Regiment will reshape and optimize the remaining EAB force structure. For example, the construction force design update is under evaluation at Headquarters, Department of the Army. This update will correct some of the overmodularization in the force and ensure that all construction companies have vertical, horizontal, and survey design capabilities. The goal will be the creation of multifunctional combat and construction units, designed to augment the BEB and BCT while ensuring the flexibility to support unified land operations in the division and corps areas.

三個工兵部隊編裝的趨勢直接引導了兩個重要的轉型，第一，旅戰鬥隊的配屬讓陸軍師級部隊前進戰場取得先機，第二，各機動部隊旅級指揮官，常反映工兵部隊在作戰行動上的配屬常被忽略，造成作戰力量的削減與取得戰場先機的機會，最後，陸軍整體作戰計畫為因應全球部署的任務要求，行動的結果常被任務獨特性及部署能力所影響，因此，為達成區域作戰任務，工兵作戰計畫擬定必須考量其基本編裝及作戰能量。這樣的編裝結果對旅級以上部隊或旅戰鬥隊的工兵組織是不再有效的。2020年的陸軍，工兵群將組織重整並有效利用旅級以上部隊的戰鬥架構，例如，工程工兵將被編制在陸軍司令部底下，這樣的調整可將過度模組化的部隊導正，並使所有的工程工兵連擁有全方位及測繪設計的能力。目標是強化師級與軍團內的旅戰鬥隊與旅工兵營全方位戰鬥與工程的能力並確保能夠靈活運用。

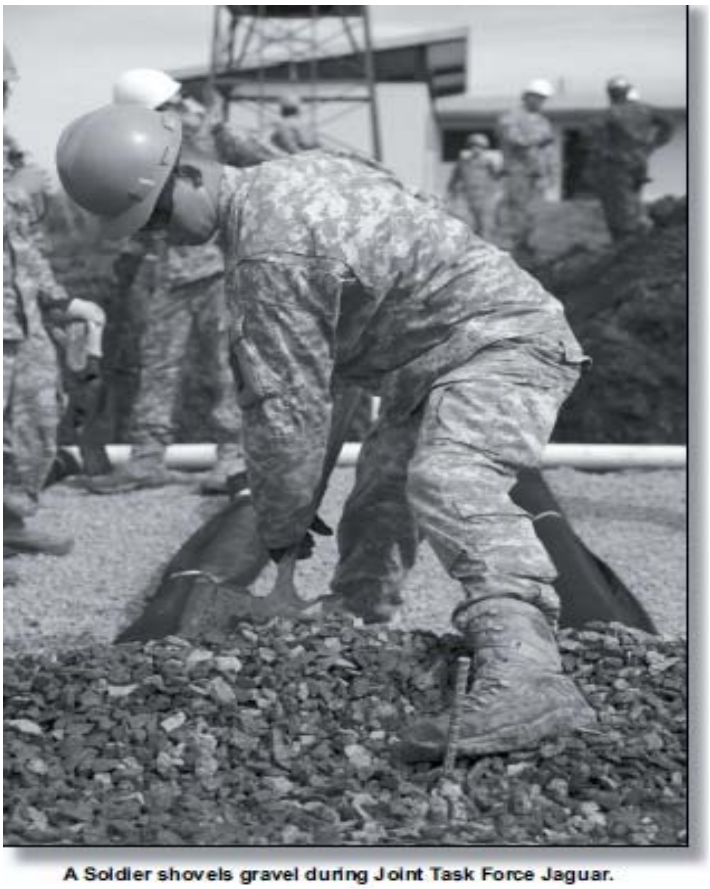
Training

Readiness in the 1990s was based on a tiered readiness system with some units kept at higher manning, maintenance, and training standards than other units. These units included XVIII Airborne Corps and subordinate units (such as 82d Airborne Division and 24th Infantry Division), while units at lower readiness levels included I Corps, III Corps, and their subordinate units (such as 1st Armored Division and 1st Infantry Division). This readiness system was predictable and kept all units at a stable level of readiness (although it reflected haves and have-nots within the force structure). The Army force generation model was approved by the Secretary of the Army and CSA in 2006. It was the Army process for meeting combatant commander requirements by synchronizing the building of trained and ready units. The underlying idea was to tap into the total strength of the Army, leveraging Regular Army and Reserve Component units, while sustaining the process by employing a rotational, predictable deployment plan. This placed units on a tiered readiness duty roster and rotated units through high readiness as they prepared to deploy. This was necessary to meet wartime requirements but led to vast swings as units went from the trained/ready pool into RESET. Enablers such as EAB engineers were forced to operate at a higher operational tempo than the supported BCT forces and were typically out of cycle with the units they would support in combat. In addition, the focus of engineer training in the 1990s was on the broad spectrum of mobility/countermobility/survivability. This broad focus narrowed in the 2000s almost exclusively on explosive-hazard defeat. This has degraded other combat engineer skill sets.

訓練

戰訓整備的基礎建立於1990年代，目的在維持第18空降團與其所屬單位(如第82空降師及第24步兵師)優質人力，裝備維保及訓練標準，當基幹第一團與第三團的所屬部隊在低編裝的運作下(例如第一裝甲師及第一步兵師)，這戰訓整備系統可預劃並保持最低戰備能量(即使在未滿編的狀況下)，陸軍戰鬥編裝模組是在2006年時由陸軍參謀長及陸軍部長所核准的，所有戰鬥程序的建立與訓練要求都必須符合作戰指揮官的要求，預置部署計畫及輪調的制度是維持一般部隊及後備部隊戰力來源，也是建立鋼鐵勁旅陸軍的理念基礎。戰備部隊必須保持

戰備狀態並建立戰備輪值機制，這機制必須符合戰時的要求並讓訓練有素的戰備部隊因為有輪值制度獲得充分的重整與休息。1990年的工兵訓練著眼放在戰線上的機動力/反機動力/生存力等技能，旅級以上工兵部隊必須要能符合節奏快速的行動並有效支援傳統編組的旅戰鬥隊。



A Soldier shovels gravel during Joint Task Force Jaguar.

士兵在獵豹專案行動中鏟掘砂礫圖

Material

Much of the key material that was available within the ERI in the 1990s was rarely used in Iraq and Afghanistan. (See Table 1.) Currently, the primary engineer material includes some of what was used in Iraq and Afghanistan and some of the material used in the 1990s. The older material, however, was rarely operated during the War on Terrorism and will require significant repair parts, money, and resources to regain full operability. In addition, material in the BEB is largely an Army-wide redistribution. The BEB was designed with no personnel growth and minimal equipment growth to the Army. Because of this, there are some aspects of the BEB tables of organization and equipment that are suboptimal.

軍品

在1990年代的工兵組織重整中有許多的主要軍品還是堪用的，卻少被運用於恐怖攻擊戰爭中，因為光是修復這些物件就得花費重大的金錢及資源才能使用運轉，但其中有一小部分還是被運用在伊拉克及阿富汗，除此之外，因應旅工兵營當初編裝，只有少量的人，及少量裝備，因此陸軍這些老舊軍用裝備將

大部分都重新分配在工兵營，但其實這樣的分配及編裝方式是不太理想的。在2000年代以來，戰線的縱深幾乎都是以應用雷區來抵禦，戰鬥工兵部隊配屬在陸軍戰鬥列隊裡，專業工兵技能可增進指揮官指揮部隊在區域前進的作戰能力，編制在戰鬥列隊裡的專業工兵技能包含六個地形作戰指揮與三個戰鬥工兵指揮人員，他們可直接提供支援單位預先保障任務路線的捷徑，區域訓練，作戰任務、戰地文化的要求，雙邊與多邊的軍事演習以及戰場合作保障行動。

Leadership and Education

Leader development changes have been substantial and involve more than just name changes. (See Table 2.) Each of these courses is shorter and covers less functionally specific topics than their predecessors, resulting in a shift from institutional responsibility to operational responsibility and self-responsibility that have never been fully realized. Additionally, the CSA and the commander of U.S. Army Training and Doctrine Command have noted that the combat training centers historically have been the primary leader development training sites. The War on Terrorism, overseas contingency operations, and Army force generation requirements forced the Army to use the centers as “readiness factories” rather than for their intended purpose. Going forward, leader development will again revert to the combat training centers. Some task force engineer skills were once taught in the institutional force but are no longer. Some were once practiced in the operational force but are no longer. Also, opportunities for self-study for the task force engineer are less readily available than they once were.

The U.S. Army Engineer School has worked to mitigate this trend within the institutional force through several initiatives such as increasing the number of small-group leader exchanges with the Maneuver Center of Excellence, extending the Engineer Captains Career Course from 21 to 23 weeks, and reestablishing the combat training center/ Engineer School linkage to cross-level information among these organizations.

領導與教育

領導課程的發展及轉變已經實質大於象徵，這些領導課程的授課內容以單位責任，行動責任及以身作責等取代了以往只侷限於特定科目或經驗結果。另外陸軍參謀長和教育準則發展部指揮官共同指出，在戰鬥訓練中心發展歷史中，已培育及開發出許多優秀領導者及訓練場地，對於恐怖攻擊，國際海外馳

援行動，一般陸軍行動這些訓練，訓練中心要有完善的戰場模擬訓場來因應未來任務。在未來的領導課程中，特遣工兵部隊曾經在過去專案任務經驗中所得的寶貴經驗或實際應用於戰鬥行動中的部分技能也將在戰鬥訓練中心內再次授課，美國陸軍工兵學校也將採取幾個積極作為例如小部隊工兵領導幹部與頂尖的機動部隊幹部實施輪調，並延長軍官正規班訓期從21週改為23週，重建戰鬥訓練中心及工兵學校連結，並建立跨組織的資訊分享。

1990s ERI Equipment	War on Terrorism Equipment
Armored vehicle-launched bridge	RG31 mine-resistant, ambush-protected vehicle
Combat engineer vehicle*	Buffalo mine-protected clearance vehicle
Wolverine heavy assault bridge	Husky mounted detection system
Armored personnel carrier	Up-armored, high-mobility, multipurpose, wheeled vehicle
Bradley fighting vehicle	
Armored combat earthmover	
Small emplacement excavator*	
Deployable universal combat earthmover	
Mine-clearing line charge	
Volcano mine dispenser	
Modular pack mine system	
High-mobility, multipurpose, wheeled vehicle	

Legend:
ERI – Engineer Restructuring Initiative
*No longer in inventory

Table 1. Engineer Equipment Changes

1990 年代組織重整後工兵裝備	恐怖攻擊戰鬥裝備
履帶機動橋	RG31 掃雷助手，抗伏擊悍馬車
戰鬥工兵車	水牛式掃雷裝備
狼灌式重型履帶機動橋	赫斯基掃雷偵測系統
裝甲運兵車	裝甲高機動型多功能輪型裝備
布雷德力步兵戰車	
戰鬥推土機	
多功能工兵車	
通用戰鬥推土機	
雷帶清除裝備	
火山散撒布雷系統	
模組化雷群系統	
悍馬車	

表一 工兵裝備編制轉換表

Old	New
Primary Leader Development Course	Warrior Leader Course
Basic Noncommissioned Officer Course	Advanced Leader Course
Advanced Noncommissioned Officer Course	Senior Leader Course
Engineer Officer Basic Course	Engineer Basic Officer Leader Course
Engineer Officer Advanced Course	Engineer Captains Career Course
Command and General Staff College	Intermediate-Level Education

Table 2. Changes to Leader Development Courses

過去	現在
幹部領導發展課程	戰士領導課程
基礎士官教育	幹部進階教育
士官進階教育	高階幹部課程
工兵軍官基礎教育	工兵軍官基礎領導課程
工兵軍官進階課程	工兵正規班
指揮與參謀學院	中階教育

表二 幹部課程發展調整表

Personnel

Personnel changes in the last 30 years have had minimal impact in terms of engineer personnel and the capability they bring to a BCT. Most of the changes have involved military occupational specialty (MOS) number changes to facilitate understanding and consolidation. In the warrant officer ranks, for example, MOS 210A, utilities operation and maintenance technician, changed to MOS 120A, construction engineering technician. MOS 215D, terrain analysis technician, changed to MOS 125D, geospatial engineering technician. In the enlisted general construction ranks, MOS changes included construction equipment operators, surveyors, quarry specialists, plumbers, and vertical construction engineers. Two of the most substantial changes involved geospatial engineers and component mix. Changes were made for geospatial engineers to leverage the quantum leaps in technology in this area. Geospatial engineers have changed from MOS 81Q, terrain analyst; 81C, cartographer; and 81L, lithographer, to the current consolidated MOS 12Y,

geospatial engineer. In addition, the Engineer School has partnered with the Intelligence Center of Excellence to form geospatial intelligence cells with imagery analysts and geospatial engineers at the BCT, division, and corps headquarters levels. The Engineer Regiment now consists of 17 enlisted MOSs, two warrant officer MOSs, and three commissioned officer areas of concentration.

在過去的30年，工兵人事對於獨立戰鬥旅的工兵部隊而言並沒有帶來太大的衝擊，大部分的改變都為了能使軍職專長代號更佳化作調整，例如，專業軍官准尉，MOS210A(操作保養技術員)，變成MOS120A(專業工程工兵)，而MOS215D(地形分析員)，變成MOS125D(地理空間技術員)，一般工程工兵，軍職專長代號的改變包括了裝備操作手，地形分析員；採礦員，水電工，全方位的工兵，其中最大的改變有兩個，第一個改變是地理空間技術員搭配儀器，提升特定區域內專業技術，而環境工程作業員是由軍職專長代號81Q的地形分析員、軍職專長代號81L的測繪員與平版印刷員合併為的軍職專長代號12Y的環境工程兵。

The other substantial change has been the migration of much of the Engineer Regiment from the Regular Army to the Reserve Component. Some specialties, such as quarrying specialist, are entirely in the Reserve Component, while the prime power production specialty resides exclusively in the U.S. Army Corps of Engineers.

此外，工兵學校和情報中心從旅戰鬥隊、師及軍團指揮部層級，將地形情報，圖像分析與環境工程工兵實施交流合作，並將工兵群內專長人員包含17位具有圖項分析跟環境工程作業專長兵，兩個專業軍官及3位領導軍官組成的工程研究組織。第二個改變是將後備專長及採礦員等一般的陸軍單位移編到後備部隊，而這些專長人員的養成也唯有陸軍工兵部隊提供訓練。

Facilities

Engineers in the 1990s were organized into engineer battalions and brigades, which were consolidated in facilities such as brigade and battalion headquarters, company operating facilities, motor pools, and barracks. This consolidation facilitated vertical and horizontal information sharing. Transformation from 2004 to 2008, however, separated engineer formations organizationally and in terms of facilities. This separation inhibited engineer

cross talk and information sharing. The creation of BEBs in BCTs will help integrate the engineer battalion with its subordinate lettered companies, assuming that install

設施

1990年代工兵部隊被編為工兵營與工兵旅並各自成立指揮部及各項作業設施，如集用場，兵舍，這樣的編制對工兵部隊的運用及資訊交流容易，然而2004年至2008年的政策轉變，工兵組織調整以及重新分配；編裝的改變對工兵運用及資訊交流的靈活度造成了嚇阻，因此，將旅戰鬥隊內配屬數個工兵營將幫助指揮官更靈活運用其所屬連隊。

Conclusion

This is the first of a two-part article. The second part, which will appear in the September–December 2014 issue of Engineer, will delineate specific, recommended TTP for the employment of brigade and task force engineers. Understanding the DOTMLPF changes that have occurred in the past 30 years, however, is essential to putting the recommended TTP into the proper context and will enhance their applicability in the field by the operational force.

結論

本文兩文章的第一部分，第二部分將會在2014年9月到12月的工兵期刊中刊登，內容會具體的描述旅戰鬥隊的及特遣隊之戰術，技術及程序手冊的編撰，瞭解準則，組織，訓練，物資，領導與教育，人資與設施，分析在過去30年發生了哪些改變，而這些改變對於戰術，技術及程序手冊是不可或缺的，這會加強機動部隊的能力，使其保持最佳狀態。