The Evolution of the Engineer Force: Part II

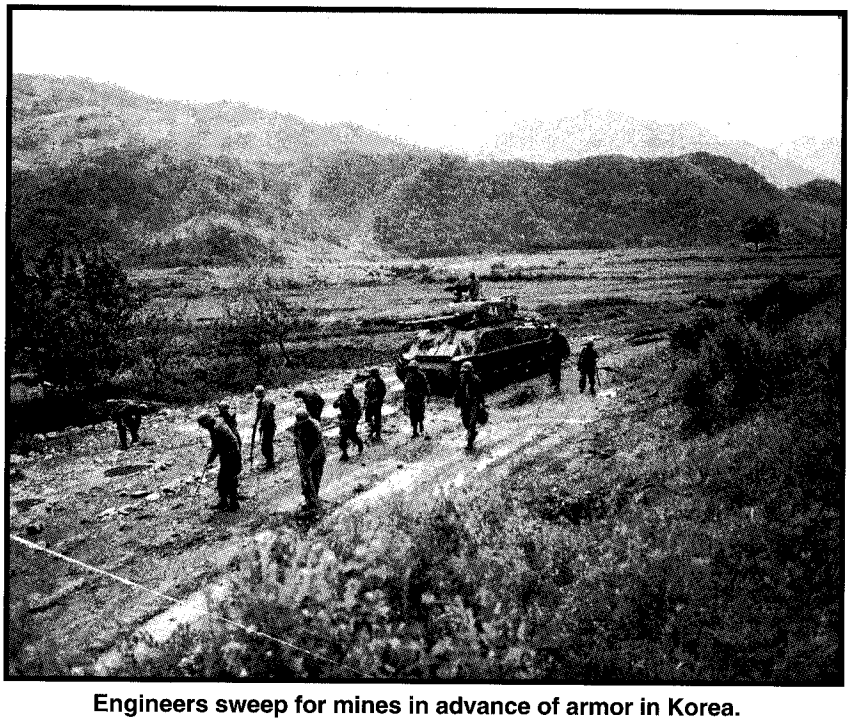
By Dr. Larry Roberts

This is the second of a two-part article. Part I (Engineer, April 2002, page 44) covered force structure during World War I, the interwar period from 1919-1941, World War II, and the period from 1946-1950. Part II begins with force structure during the Korean War and continues through the 20th century, to include Vietnam, Desert Storm, and the Engineer Restructure Initiative (ERI).

Korea

The outbreak of hostilities in Korea in June 1950 tested the new engineer structure. However, it was a flawed test. The first engineer units, especially the first units deploying to Korea from Japan, were severely undermanned and inadequately equipped. The postwar demobilization of the Army had cut deeply into the manpower of divisional and nondivisional organizations. It was not until 1951 that engineer units in Korea had anything close to their authorized strength. Equipment available in the Far East was largely left over from World War II and in poor repair, if not totally worn out. New equipment from the United States had to compete with other items for space in the storage holds of naval transports. Korea was in every respect a "come-as-you-are" war. The American Army, and the Corps of Engineers, was not prepared for the conflict.

There was one other aspect of the war in Korea that tended to blur any determination of the viability of the engineer force structure at that time. Korea was not seen as the most strategically important area in the contest between the democracies and communism. Senior military commanders and the National Command Authority continued to see Europe as the most critical strategic area. Indeed, a number of Army units, to include engineers, were sent to Europe during the period of hostilities in Korea to reinforce the North Atlantic Treaty Organization and deter any Russian move to the west. This overtaxed the armed forces and forced a partial mobilization of Reserve Component units.



Engineers sweep for mines in advance of armor in Korea.

It is possible, however, to glean some basic facts concerning engineer force structure from operations in Korea. First, the divisional engineer battalion, even with its post-World War II augmentation, was still not capable of handling the engineer work in the division. Numerous commanders in Korea noted the need to continue applying an additional combat engineer battalion asset to the support of the division. In some instances, this was for a specific operation, such as a river crossing. In most instances, it was to handle the massive amount of roadwork required. Unfortunately, the slow rate of deployments to Korea in the first 6 months of the war meant that there were often no additional battalions to call on. Those that did exist were often consumed by line-of-communication work. The 36th Engineer Combat Group spent its first 6 months in Korea performing the work of a construction or depot group at Pusan.

The second fact was that the distinction between combat and construction units blurred or even dissolved due to the demands of the time. As has been noted, the 36th initially performed the duties of a construction group. Conversely, the 84th Engineer Construction Battalion built defensive positions in the Pusan Perimeter during its initial days in Korea. Five of the

construction battalions ultimately sent to Korea performed road- and bridgework in support of the three corps, a task more appropriate to a combat battalion-army or a specialized company, such as a light equipment or bridge company.

In spite of these facts, the lessons and experiences of the conflict in Korea, the general engineer force structure, and the doctrine for employing engineer units changed little in the early 1950s. The next major shift in force structure would be occasioned by a perceived need to shift the Army to a force capable of fighting on an atomic battlefield.

From Pentomic to ROAD

In 1954, Army Chief of Staff General Matthew Ridgway directed a review of the Army's organizational structure with recommendations on the organization of the Army from 1960-1970. He wanted a mobile force, capable of fighting on both atomic and nonatomic battlefields, that took advantage of new technology. A United States Army War College study recommended a total departure from the triangular division. In its place, the study recommended a small division of approximately 8,600 men organized into five small, self-sufficient battle groups—a pentomic division. The division would be completely air transportable. In spite of vigorous opposition, Ridgway's successor, General Maxwell Taylor, the study in 1956. When th ntal Army Command complete κon the pentomic division, it n to more than 13,000 officers and men. However, it retained the focus on the five self-sufficient battle groups.

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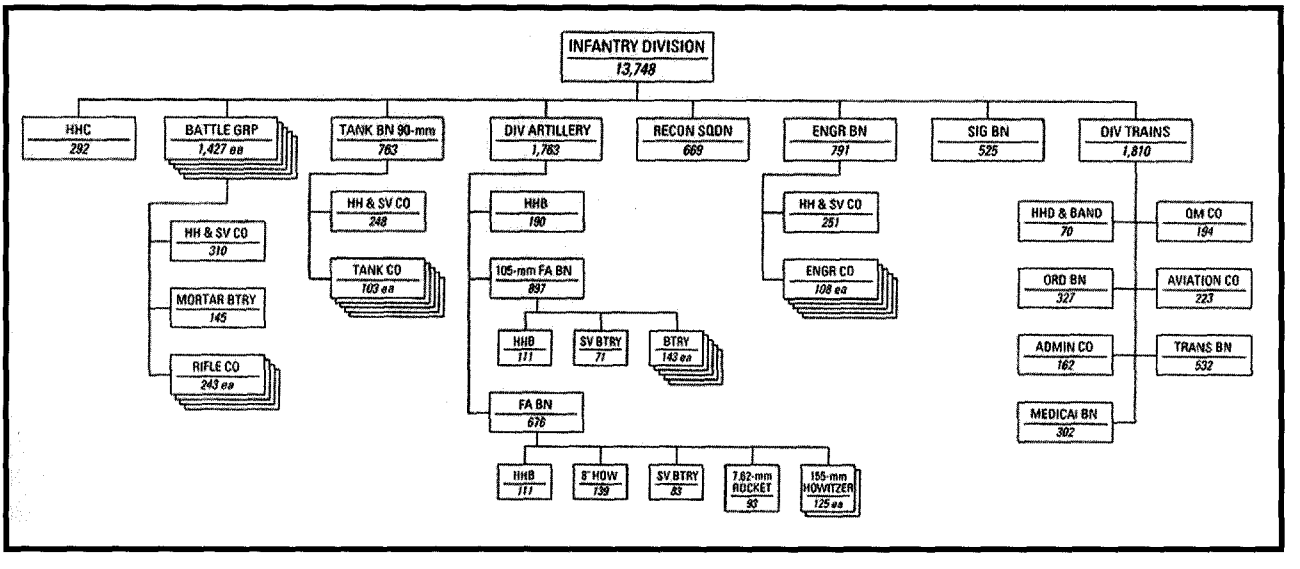
The projected force structure for a corps increased by a combat engineer group and three associated battalions, totaling three and nine respectively. The corps also added a panel bridge company, a float bridge company, and a light equipment company. There was a corresponding increase at field army level. The Department of the Army added a three-battalion engineer construction group and additional construction support—dump truck units. The field army's camouflage company became a camouflage battalion. The field army also retained its three-battalion combat groups.

The increase in the nondivisional engineer force reflected the orientation toward operations on a potentially atomic battlefield. The destruction of facilities and transportation possible in this type of environment required a robust engineer force. Doctrine still projected the reinforcement of divisional engineers by combat engineer assets at the corps. Construction engineering remained tied to the field army.

By 1960, the Army had reorganized most of its divisions according to the pentomic concept. However, opposition to the concept remained strong. Some believed that the divisional structure had to be sufficiently flexible to be tailored to certain tactical and geographical environments. A study entitled "Reorganization Objective Army Divisions (ROAD) (1961-1965)" was completed, even while the Army was completing its transformation to the pentomic structure. This approach, termed the ROAD concept,



Pentomic Divison

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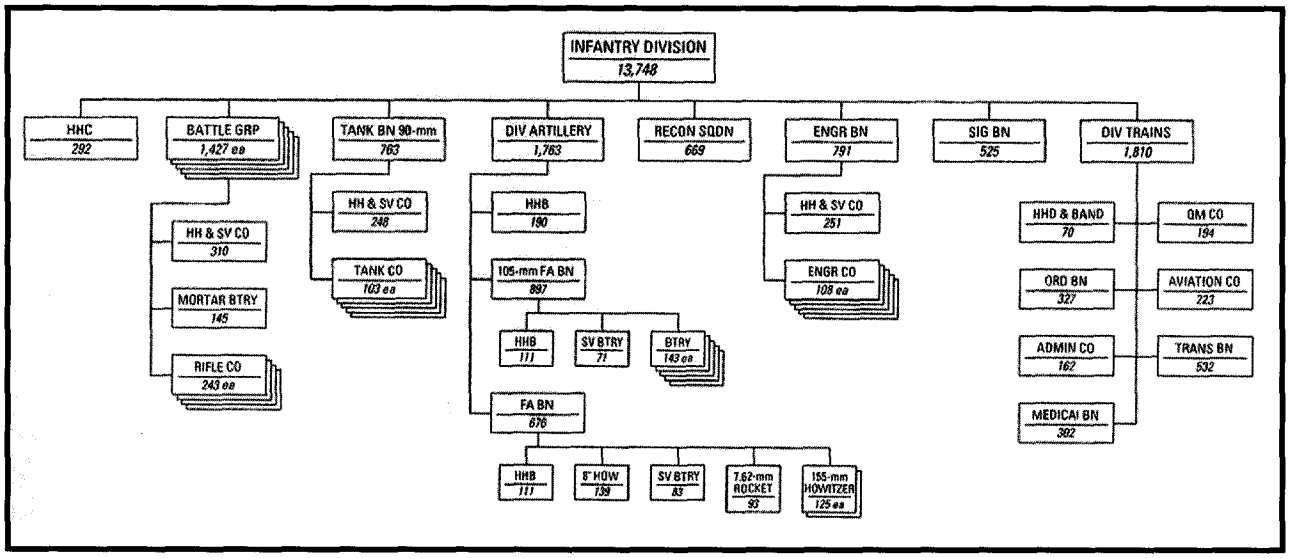
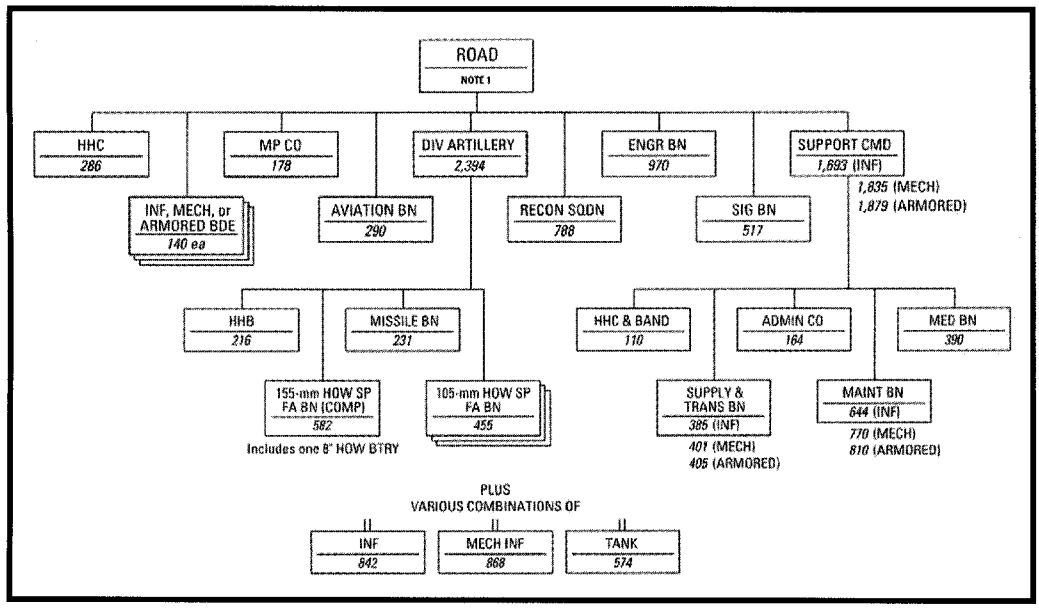


Pentomic Divison

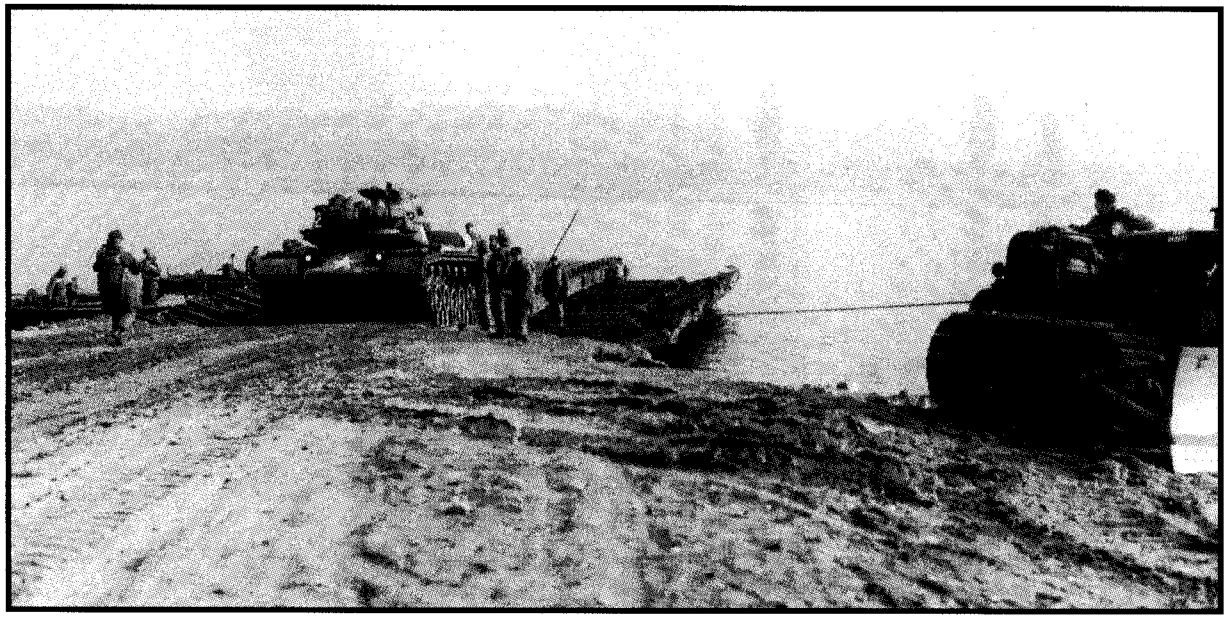


Divisional Base—ROAD Concept

reflected a thought process much like that which prompted the creation of the "group" versus the regiment. All divisions would have a common base of units, such as signal, transportation, and reconnaissance. However, the division's fighting elements—battalions and brigades—would be added or deleted as the tactical or geographical situation demanded. The ROAD concept was approved in late 1961. After delays occasioned by the Berlin Crisis and the Cuban Missile Crisis, the Army began reorganizing its divisions.

While the ROAD concept accepted the mixing of combat arms battalions according to tactical or situational needs, the generally accepted structure of a ROAD division had three combat arms brigades. In a sense, this returned the Army to the triangular division. For the engineers, the ROAD division was remarkably like the 1948 division. The basic difference was that the ROAD divisional engineer battalion had three letter companies and a bridge company in addition to the headquarters and headquarters company (HHC). The advent of the combat engineer vehicle negated the need for an assault platoon in the HHC. The tremendous increase in the number and weight of divisional vehicles increased the need for bridging, hence the strengthening of the battalion's bridging capabilities. Those units equipped with the mobile floating assault bridge had slightly fewer personnel than those using either the M4T6 or the Class 60 divisional bridge.

Under the ROAD concept, most of the Army's divisions were either armor or



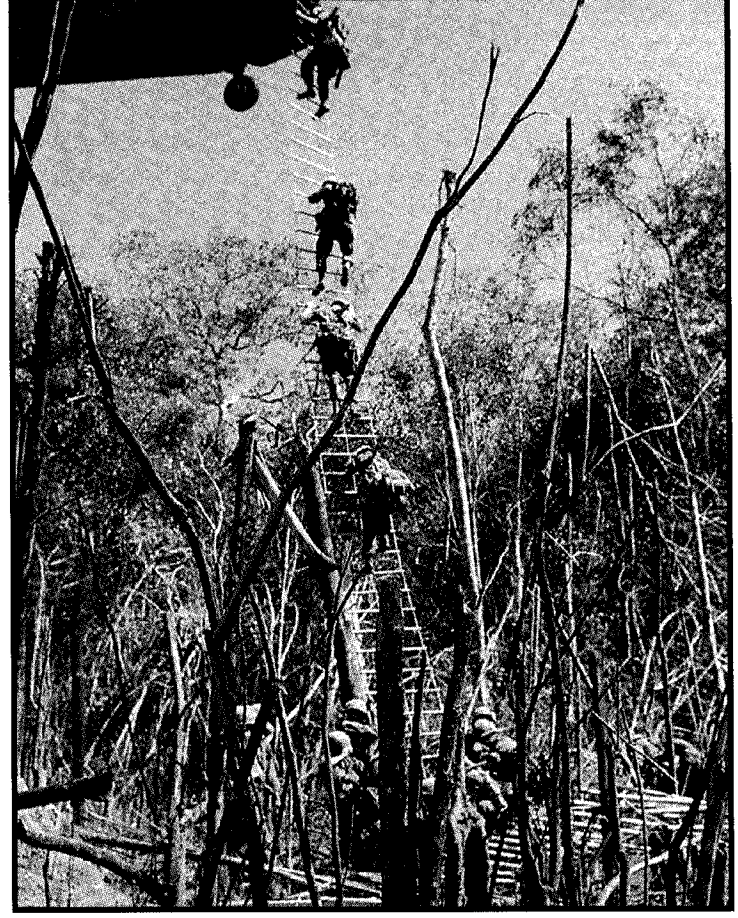
A 3d Armored Division tank prepares to cross the Rhine River on a 12th Engineer Battalion raft (1959).

mechanized infantry. The airborne division was the only organization at this echelon that was specialized. The airborne division engineer structure went through all of the various restructurings from 1948-1962. Following World War II, the airborne divisional engineer battalion had three companies, each with three platoons of three squads. The headquarters company, in addition to normal signal and logistical personnel, had an equipment platoon and a bridge platoon. The aggregate strength of the unit was 753 officers and men. In the restructuring associated with the pentomic concept, the battalion trimmed down to two companies with four platoons each. It lost its bridge platoon and 280 personnel slots. Unlike the infantry battle groups, the airborne battle groups did not have engineer platoons embedded in the group's headquarters company. With the ROAD reorganization, the battalion gained almost 100 personnel, with most of the gain going to battalion headquarters. The three line companies had three platoons with three squads each. There was no appreciable change in basic equipment.

There were some changes in key nondivisional units. The engineer combat battalion-army (doctrine manuals now included corps) picked up a fourth company. In addition, the combat groups in the corps and field army contained four battalions instead of the three in previous force structures. While the number of groups per corps and field army declined to two and three respectively, the total number of combat companies at these levels actually increased. In addition, an engineer combat brigade headquarters was authorized at both corps and field army levels. Construction had a minor increase in personnel with no change in either their structure or mission. Construction battalions and groups remained focused on the communications zone. Doctrinally, none were found in the corps or field armies.

Vietnam

The nation's involvement in Southeast Asia marked a test, of sorts, of the ROAD concept.



Engineers descend from a Chinook helicopter in Vietnam.

Generally, the three-brigade division was seen as sufficiently flexible to adapt to the requirements of unconventional warfare. Attachment of supporting organizations, especially aviation units, was well within the spirit of the ROAD idea. However, the divisions that did deploy to Vietnam were largely mechanized or light infantry divisions. No armored divisions went to Southeast Asia, although smaller armored units did serve in the theater. The 1st Cavalry Division, reorganized as an airmobile organization, was the only nonstandard unit of that size in the country.

Vietnam cannot be seen as a total affirmation of the ROAD concept. This was due to the fact that the Army, especially the engineers, did not fight according to doctrine—even the emerging unconventional warfare doctrine of the time. The major reason for this was the limitations on the numbers and types of engineer units that could be deployed to Southeast Asia. Major General Robert Ploger, the senior engineer in Vietnam and first commander of U.S. Army Engineer Command-Vietnam, noted:

"Early planning for the buildup and operations in Vietnam had little more to go on than tentative indications of the number of maneuver battalions that might be deployed. There was no generally accepted tactical concept, campaign plan, or scheme of logistical support upon which effective engineer planning could be based."

When senior Army leaders did begin to appreciate the magnitude of the engineer requirement, political decisions forced the Army to make nondoctrinal adjustments. At that time, 50 percent of the Army's engineers and engineer equipment was in the Reserve Components. However, the nation's leaders decided against a selective call-up of Army Reserve or National Guard personnel. This, coupled with the continuing demand for forces in Europe to deter the Warsaw Pact, meant that senior engineer officers had to send CONUS units to Vietnam in spite of their organizational type. Consequently, the engineer force in Vietnam, at its peak, had two brigade headquarters, six group headquarters—of which only one was a combat group headquarters—and 28

nondivisional battalions. Thirteen of these battalions were combat battalions; the remaining 15 were construction battalions. This engineer force was in addition to the organic engineers of the seven divisions and seven separate brigades deployed to Vietnam.

The nature of operations in Vietnam tended to negate established engineer doctrine and its associated force structure. The need for both combat and construction engineer support meant that both combat and construction units did both tasks. The traditional practice of placing a combat engineer battalion in support of a division was also modified. In the first place, the supporting battalion might be a construction battalion and not a combat battalion. Second, the tactical situation and the mobility offered by the helicopter could result in different battalions providing support at different times.

MG Ploger noted that maneuver units using helicopters were far more mobile than their engineers. Consequently, operational support came from whatever engineer unit was closest to the area of operations. Ploger went so far as to subdivide South Vietnam into operational areas for his groups. These groups, and their battalions, supported whoever entered their area. This was in addition to tasks directed by higher headquarters, such as improvements in the lines of communications and airfield construction.

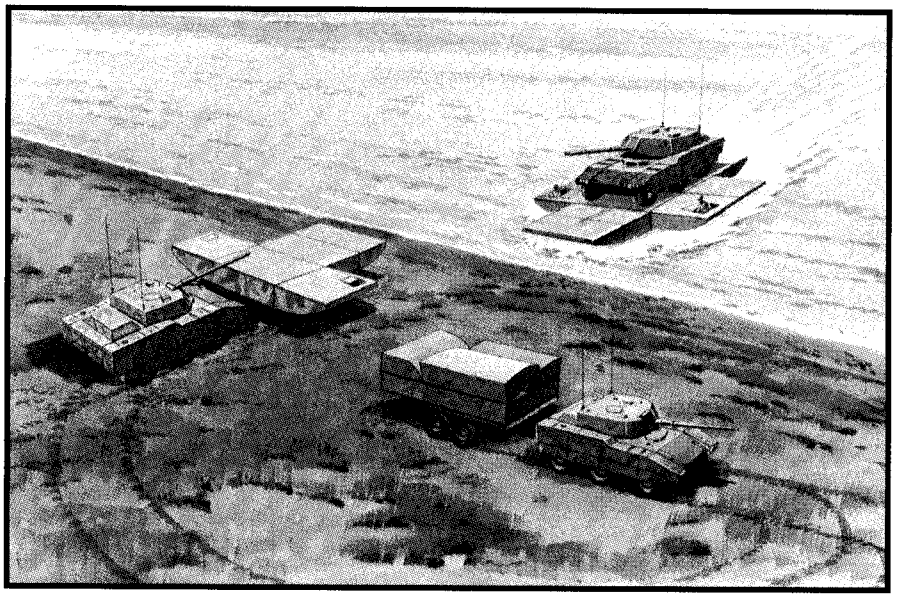
Airmobile operations were the major tactical innovations associated with the Vietnam War. The 1st Cavalry Division was the Army's first division structured around the airmobile concept. From an engineer standpoint, this division was analogous to the airborne division. Neither had the ability to move heavy equipment. Therefore, these engineers relied on light dozers and engineer equipment. The airmobile division engineer battalion was larger than its airborne counterpart by 150 men. The difference was found in a fourth letter company and an additional equipment platoon in the headquarters company.

1975-1990

Although the 1st Cavalry Division had validated the airmobile concept and ensured its place in future force structures, the Army turned its attention back to Europe and heavy forces in the years following Vietnam. The continuing perception that confrontation with the Soviet Union remained the greatest challenge explained part of this orientation. A second factor was the Yom Kippur War. In the midst of the American Army's efforts to create lighter and more mobile forces, such as the 1st Cavalry, the Middle East erupted in a conventional war characterized by armored and mechanized war on a level not seen since World War II.

In 1975, the Department of the Army directed the Training and Doctrine Command (TRADOC) to analyze the heavy division. The basic premise was that technology had been applied as "add-ons" rather than doctrinally incorporated into the structure and war-fighting doctrine of the division. The advent of the "active defense" concept reinforced the need to reexamine the role and organization of the heavy division. The objective was to apply new technology, primarily in the form of new weapons and support systems, to achieve greater mobility, firepower, and maneuverability. The resulting Division Restructuring Study recommended several changes in the composition of the division. One of the recommendations was to remove the bridge company from the engineer battalion and move it to the corps. This suggestion was somewhat puzzling. An increase in the weights of divisional equipment—especially armored vehicles—and the need for greater maneuverability logically argued strongly for the retention of the bridge company. In addition, the survivability of divisional forces, an obvious facet of the reality of fighting "outnumbered," should have called for additional engineer assets.

Parallel to this reevaluation of the heavy division was the Army's attempt to respond to the congressionally mandated requirement to alter the "tooth-to-tail" ration. A number of analysts and congressmen believed that the support forces in the Army had grown out of proportion to the combat forces. This reinforced the desire of General Creighton Abrams, the Army Chief of Staff in the early 1970s, to eliminate everything in the active Army that did not contribute directly to the fighting force. The Corps of Engineers responded in two ways. First, it changed the designation of its construction battalions to "combat heavy battalions." Second, it shifted a number of corps and echelon-above-corps support functions to the Reserve Components.



Light Assault Raft

The fruits of the Division Restructuring Study were short-lived. In 1979, General Don Starry took command of TRADOC. He rejected the idea of "active defense" in favor of a reorientation on offensive operations. This ultimately led to the advent of "AirLand Battle." With a new doctrinal philosophy, TRADOC reexamined the heavy division in an effort known as Division 86. At the same time, TRADOC took on a directed task to standardize infantry, airborne, and airmobile divisions. The issue here was to field a force capable of rapid deployment, but with sufficient firepower and resources to sustain itself in combat. As was the case in the Division Restructuring Study, planners looked to technology to add new capabilities to the combat force.

Although the Army adopted a "final form" for the heavy division in 1982, the actual conversion of armored divisions was deferred until the mid-1990s. Reductions in personnel made it difficult, if not impossible, to fill the 18,000 to 20,000 personnel slots in the various forms of the division. In addition, the new division incorporated more than 40 new weapons or pieces of equipment, some of which were still in the developmental stage. The solution was to adopt interim organizations until such time as the materiel was available. The divisional engineer battalion reflected this approach. The structure called for an organization of four letter companies, a bridge company, and a headquarters company. The line companies were authorized the M9 armored combat earthmover (ACE). Unfortunately, the M9 had not been fielded. This, plus personnel constraints, meant that interim organizations with reduced manpower (to include the absence of the bridge company) and substitute (often obsolete) equipment would be the norm for the foreseeable future.

There was no final form for the "light" divisions. General Starry set a cap on the size of the unit at 14,000 personnel. In addition, the new division would not have organic tank or mechanized infantry units. More importantly, he specified that the unit had to be deployable in C-141 transports. In this latter case, Starry departed from one of the basic design principles that had guided Army planners for most of the 20th century. Force structure had always had as its guiding principle the ability of the organization to perform its function in combat. Starry added, or conceivably substituted, the ability of the unit to get to the area of operation. In this respect, Starry's action was remarkably similar to Army leaders of the post-World War I period who sought to trim the division based on the road space it occupied or the number of ships needed to get it overseas. In this sense, mobility was not the same as maneuverability; mobility was in fact deployability.

This idea carried over into the next phase of force design that came to be known as the Army of Excellence. The new Chief of Staff, General John A. Wickham, wanted light divisions to be deployable three times faster than existing infantry divisions. He also wanted the light division to be totally transportable in fewer than 550 C-141 sorties. Based on this criteria, planners designed a division of slightly more than 10,000 men. The divisional engineer battalion had 314 officers and men, organized into a headquarters company and three line companies. At full strength, each of the letter companies had 63 officers and men. The headquarters company had an assault and barrier platoon with small emplacement excavators and M9 ACEs. Indeed, all of the unit's earthmoving equipment was consolidated in the headquarters company.

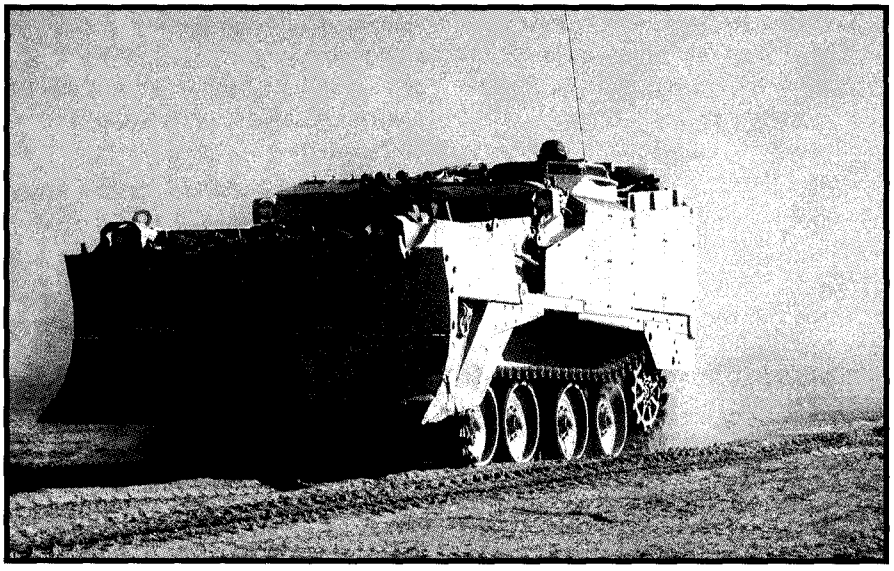
General Wickham's desire to reduce the size of the light division carried over to the airborne, airmobile, and motorized divisions. The engineer battalion was reduced to approximately 400 officers and men for the airborne and airmobile battalion. The motorized division engineers numbered 490. The engineer structure for the motorized division represented a significant departure from traditional designs. The battalion had three light and one heavy company. The light companies had three, two-squad platoons and a mine/countermine section. The heavy company had one standard platoon of two squads, a mobility platoon with ACEs and light assault bridges, and a countermobility platoon oriented to mines and antitank ditches.

Ironically, all of the effort at designing a motorized division that reflected the latest technological innovations came to naught. The division's structure, and to a degree its method of operation, depended on the acquisition of the new equipment, such as assault guns and fast attack vehicles. However, the money for the acquisition of those systems never materialized. Consequently, the Army had developed a specific type of division that it ultimately could not field because it could not purchase the equipment unique to that organization.

Desert Storm and the ERI

In late 1990 and early 1991, the Army deployed a significant part of its force structure to the Persian Gulf in response to the invasion of Kuwait by Iraq. The forces included armor, mechanized infantry, airborne, and airmobile organizations. These units brought with them a variety of organizational structures implemented under the Division Restructure Study, Division 86, and Army of Excellence programs. Most of these had been established to deal with a principal threat of conflict in Europe against the Soviet Union. However, the demise of the Soviet Union cast large questions about the proper structure and composition of Army units.

The engineer force that operated in Southwest Asia was not one approved in the conventional force structure process. Since the mid-1980s, the engineers had advocated a fundamental change to the 50-year rule of limiting divisional engineer assets to a battalion. The Engineer School commandant recognized the need for an engineer brigade in the armored and mechanized infantry divisions. This was initially called E-Force and would ultimately become ERI. This concept called for three divisional battalions under the command and control of a divisional engineer brigade commander. Although the concept had



M9 Armored Combat Earthmover

been approved at several levels and had been tested in various exercises, it had not been formally adopted by the Army. The Central Command commander approved the formation of ERI "brigades" in four of the five divisions deployed to the Persian Gulf. Engineer brigade commanders and staffs were formed as ad hoc organizations with personnel drawn from a number of sources. In one case, the supporting engineer group commander assumed command authority over the three battalions in the division (the original divisional engineer battalion and two corps assets). For the most part, the new divisional battalions were corps units. While the ERI concept was successful, some engineers suggested that an operational environment was not the place to test new organizational concepts and that the hastily assembled divisional brigade command and control elements could have encountered significant problems. The shortness of Operation Desert Storm meant that many of the potential problems of the ERI did not have time to surface.

In March 1991, the Army Chief of Staff approved the ERI for implementation across the Army. This constituted a rather unique situation where the Corps had developed an organizational structure and "sold" it to the Army. Historically, engineer planners have been part of a larger group of individuals examining organizational structures and arriving at integrated recommendations.

However, the ERI would suffer from the same circumstances that negated adoption of the two-battalion regiment in the days following World War II. A continuing move to reduce the manpower strength of the Army and the application of scarce resources to other programs, such as modernization, prompted a continuing number of inactivations. In addition, the reorientation of the Army from a forward-deployed force to a CONUS-based force placed an unusually high premium on the ability to deploy to a distant region in a reasonable amount of time. As had happened in the past, the ability to meet certain deployment criteria became, in some instances, a factor more important than the ability to perform required missions or tasks once in the area of operations.

Conclusion

For most of the 20th century, engineers have tried to develop force structures that enable them to meet their mission responsibilities. Those responsibilities have remained relatively constant through time. While planners and developers from the 1920s, 1950s, 1970s, and 1990s have used different terms or phrases to define mission requirements, the challenge of the engineers has consistently been to facilitate the movement of the combined arms, impede the movement of the enemy force, and construct those works which allow for the physical and logistical support of the field force. Technology has changed the physical characteristics and capabilities of the equipment the engineers use, but it has not altered the purpose of engineer work.

The evolution of engineer forces in the last 80 years has shown certain recurring trends. First, the division has been the central focus for Army planners throughout the 20th century. For engineers, the capabilities and limitations of divisional engineers have significantly affected the composition and structure of corps engineer units. Lack of sufficient organic engineers in the division has forced planners to push corps engineer units into the divisional area to accomplish needed work. This has, in turn, forced the forward displacement of engineer units in echelons above corps to the corps area to cover requirements. This constituted a "work-around" approach that actually became codified in engineer doctrinal publications. The second fact is that while maneuver commanders have generally clamored for more engineers during combat operations, this need has often been forgotten when postconflict demobilizations and reduced budgets required manpower caps on divisional and nondivisional units. Finally, engineer planners have generally based their organization structures on the nature and quantity of work to be done in a given area. However, Army planners have often been influenced by the dictates of deployability and unique operational requirements. The pentomic division, and its focus on an atomic battlefield, was an illustration of the latter.

The challenge for engineer force planners in the future will be to educate the senior Army leadership on the nature and scope of engineer work across the operational spectrum. These same planners must then craft an engineer force with whatever manpower and equipment resources the Army is willing to provide.

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