# Engineer Force Structure:

## *Past, Present, and Future*

*By Peter Malley*

Many articles have been published in recent months about changing the Army's strategy to account for a post cold-war threat and downsizing of the Army's force structure to meet that new threat. Most information written on this subject was taken from a "bottom-up review" study ordered by the Secretary of Defense, Les Aspin. The bottom-up study was a comprehensive examination of defense strategy, force structure, modernization programs, industrial base, and infrastructure in light of the new world situation.

This article is not an overview of the bottom-up review or of other articles on force structure. Instead, it explains what the Army engineer force was during the cold war, in the transition period from the old to the new strategy, and what the structure may look like as we enter the 21st century. It begins by defining the defense strategy and explaining how the force structure is developed through a process called "Total Army Analysis."

### Changing Defense Strategy

Prior to the collapse of the Soviet Union, the United States' defense strategy was defensive in nature; it was primarily designed to hold the Soviet Union and China in check. The new strategy, as outlined in the bottom-up review, identifies four "dangers" to our national interests:

- Nuclear weapons and other weapons of destruction, including dangers associated with the proliferation of nuclear, biological, and chemical weapons.
- Aggression by hostile regional powers.
- The potential failure of democratic reform in the former Soviet Union, Eastern Europe, and elsewhere.
- Economic dangers to national security, which could result if we fail to build a competitive and growing economy.[1]

### Building Force Structure

Senior Army leadership uses a process known as "Total Army Analysis" (TAA) to determine the force structure requirements to meet the threat. The process develops, for each program objective memorandum (POM) year, a projected program force that will meet mission requirements within anticipated resource levels.

### TAA—What It Is and How It Works

Total Army Analysis is a complex, multiphased force structuring process. It consists of both qualitative and quantitative analyses that generate the tactical-support forces and general-purpose forces needed to sustain and support division and nondivision combat forces designated in the "objective force."[2] The objective force is the desired force in terms of force structure, readiness, modernization, and sustainability; it is constrained by expected fiscal and manpower levels. The Secretary of the Army (SA) and Chief of Staff of the Army (CSA) use the objective force when they provide guidance to the Army staff and major Army commands (MACOMs) for program development.

The Army conducts an analysis of force alternatives to determine the best force mix. Decisions on the objectives reviewed by the SA/CSA are then reflected in the The Army Plan (TAP).

TAA is a biennial process that is conducted during even-numbered years. It is followed by a Force Integration Analysis (FIA) that is conducted during odd-numbered years. Senior leadership is considering whether to change from the biennial to an annual process and possibly deleting the FIA portion; their decision will be made during TAA 2003. The continuum and combination of the TAA and FIA are the basis for the Army's POM development and establishment of the program force, known as the "M-Force." The M-Force is based on the objective force and is neither fully structured, fully modernized, nor fully supported. It is responsive to operating strength deviation (OSD) sizing and structuring scenarios and is resource-constrained based on the OSD projections. The M-Force is

| Engineer Force Structure Personnel Losses | | | |
|---|---|---|---|
| | TAA 96 | TAA 99 | TAA 01 |
| Active | 40,025 | 24,004 | 22,043 |
| National Guard | 57,245 | 39,105 | 37,138 |
| US Army Reserve | 32,663 | 22,005 | 21,729 |
| Component 4 (Unresourced) | 10,704 | 5,724 | 1,339 |
| TOTAL | 140,637 | 90,838 | 82,249 |

Table 1

projected from two to six years and has a higher degree of risk than the objective force.[3]

The TAA is a four-phased process that consists of force guidance, quantitative and qualitative analyses, and leadership review. The process evolves as follows:

***Phase 1 (Force Guidance).*** Force guidance consists of input and guidance from various sources. The Defense Planning Guidance and The Army Plan provide the national strategy, threat data, resource assumptions and priorities. Force structure guidance is obtained from the TAP objective force. DOD-directed scenarios are specified in the form of illustrative planning scenarios. Additionally, the Army Force Planning Data and Assumptions (AFPDA) manual provides planning factors for theater-level studies and modeling by the U.S. Army Concepts Analysis Agency (CAA). For example, the number of engineer battalions (combat heavy) required in the force structure is based on information provided in the AFPDA manual.

A critical step in Phase 1 is the review and update of allocation rules used by CAA in Phase II. An allocation rule is the statement of a unit's capability, mission, and/or doctrinal employment. Put another way, doctrine justifies force structure and allocation rules translate that doctrine. Engineers have 281 allocation rules, which are updated during the Force Structure Conference I. This conference culminates when the General Officer Steering Committee (GOSC I) approves the rules and forwards them to the Concepts Analysis Agency (CAA) for implementation in Phase II.

***Phase II (Quantitative Analysis).*** The quantitative analysis process takes the major combat forces (divisions, separate brigades, armored cavalry regiments, and special operations units) identified in the Army's objective force and determines the necessary tactical support requirements. The CAA accomplishes this analysis through a series of computer models and simulations. Through a series of reports, CAA then compares the new doctrinal support requirements with a current list of on-hand and programmed units to provide the "delta" for future programming. The TAA decision force is then disseminated to the MACOMs for review. As the last step in Phase II, the MACOMS and the Engineer School formulate issues to be analyzed during Phase III.

***Phase III (Qualitative Analysis).*** During the qualitative phase, the initial program force is developed within end-strength guidance and then is used to develop the POM.

The second major conference, Force Structure Conference II (FSC II), is held during this phase. At this conference, senior leaders develop a force requirement structure through a series of analyses and panel reviews. They consider and validate the computer-generated requirements and review MACOM and HQDA inputs, proposed changes, and issues that center on claimants versus billpayers and prioritization. While the doctrinal basis of allocation rules were reviewed in FSC I, FSC II centers on the review of each discrete level and type of TOE unit in the decision force and the integration of TDA issues. Issues raised during the FSC II are resolved during GOSC II. The proposed force requirements are then forwarded to the Army's senior leadership for review and approval.

***Phase IV (Leadership Review).*** The leadership review is initiated after the GOSC II meets to resolve any outstanding issues from FSC II. The Vice Chief of Staff of the Army chairs a force program review to resolve any issues from GOSC II; results are then briefed to the Army Chief of Staff for decision. The resulting force, the TAA base force, represents the force structure for POM development. It captures all components (active and reserve) and TDA requirements through the end of the POM years.[4]

## Determining the Engineer Structure

Since 1988, the Army has conducted three TAAs; they developed the program forces for 1996, 1999, and 2001. As mentioned earlier, the program force is projected two to six years; thus, the program force 2001 in reality will be the force structure for fiscal year (FY) 1995. The programmed engineer force structure has dropped from 140,637 spaces in TAA 96 to 90,838 spaces in TAA 99, and to 82,249 spaces in TAA 01. Table 1 identifies, by component, the number of engineer spaces lost in each TAA. As of 1995, 72 percent of the engineer force structure will be in the Reserve Components.

**Total Army Analysis Planning Scenarios**

**Total Army Analysis 1996 - 28 Division Force**
Europe + Southwest Asia + Northeast Asia = Total Force

**Total Army Analysis 1999 - 20 Division Force**
Major Regional Contingency-East + Major Regional Contingency-West or Europe = Total Force

**Total Army Analysis 2001 - 20 Division Force**
Major Regional Contingency-East + Major Regional Contingency-West + Forward Deployed Europe + Unique = Total Force

Figure 1

## Engineer Structure Losses

The following discussion, with Figure 1 and Table 2, page 46, outline the type of scenarios, number of divisions, and engineer structure (from command and control elements to echelons above corps units) in the three TAAs. The engineer combat battalion (mechanized) used in this discussion is an example and does not represent actual battalion losses.

Figure 1 shows the type of scenarios and number of divisions used in each TAA. In TAA-96, each theater was allocated engineer forces. For example, the number of engineer combat battalions, (corps mechanized) required for Europe was 15; Southwest Asia required 5; and Northeast Asia required 5; making a total of 25 battalions.

During TAA-99, the types of scenarios changed from major theaters to regional contingencies. What was previously called Southwest Asia was changed to Major Regional Contingency-East (MRC-E); Northeast Asia was changed to Major Regional Contingency-West (MRC-W); and Europe remained the same. The number of engineer units required in TAA-99 was based on whichever two scenarios (MRC-E + MRC-W or Europe) required the majority of forces. For example, engineer combat battalion (corps mechanized) requirements for MRC-E was 5; requirements for MRC-W also was 5, making a total of 10; Europe required 15 battalions. The total battalions required for TAA-99 was 15 because Europe was the largest theater.

In TAA-2001 the scenarios changed again, as shown in Figure 1, but the divisional force remained at 20 divisions. The European theater is no longer considered a major theater. The scenario used by CAA was: MRC-East + MRC-West + Forwarded Deployed Europe + Unique = the total force. Korea is included in MRC-West. A "unique" requirement is a one-of-a-kind unit, such as a prime power battalion.

For example, the number of engineer combat battalions (corps mechanized) required for MRC-E was 5 + MRC-W was 5 + Forwarded Deployed Europe was 1 + Unique was 0, making a total requirement of 11 battalions.

The number of units shown in column TAA-01 in Table 2 is the programmed engineer structure as of FY 95.

In the past, the majority of engineer units lost were component (compo) 4, which means they were required by doctrine but were unmanned and unresourced. However, during the TAA-99 and TAA-01 processes, actual active and reserve organizations were selected for inactivation.

In the TAA process, only the type of organization (i.e. engineer combat battalion (corps mechanized) is selected. The actual unit to be eliminated is selected by the MACOM, i.e. 00th Engineer Combat Battalion, Corps Mechanized.

## Future Force Structure

What will the engineer force structure look like as we enter the 21st century?

The bottom-up review identified two future planning scenarios: Iraq against Kuwait and Saudi Arabia, and North Korea against the Republic of Korea.[5] The force structure required to fight and win those two "nearly simultaneous major regional conflicts" will be 18 divisions (10 Active Component divisions, 15 enhanced National Guard brigades, and 8 National Guard divisions). Previous publications have described the future force structure as having 10 active divisions and 15 enhanced reserve brigades, with five divisional headquarters[6]. That structure, however, was changed in the past few months. The current and future divisional force structures, as of March 1994, are compared in Figure 2, page 47.

In response to regional contingencies and to advance our national interests, forward-deployed forces will continue to play an important role. Army forces should remain at the current strength in Europe and Northeast Asia. Army forces in Europe will participate in two multinational corps with German units. They will train for rapid deployment outside Europe and for peacekeeping missions, as well as for the traditional mission of stabilization in central Europe.[7]

| Engineer Force Structure | | | | |
|---|---|---|---|---|
| | Organization | TAA 96 AC/RC | TAA 99 AC/RC | TAA 01 AC/RC |
| Division | EN BN, ABN | 1/0 | 1/0 | 1/0 |
| | EN BN, AA | 1/0 | 1/0 | 1/0 |
| | EN BN, LID | 2/1 | 2/1 | 2/1 |
| | EN BN, HVY | 0/7 | 0/0 | 0/0 |
| | EN BN, HVY ERI | 20/3 | 20/27 | 19/27 |
| | EN CO, ACR | 3/2 | 2/1 | 1/1 |
| | EN CO, LTACR | 0/0 | 0/0 | 1/0 |
| | EN CO, HSB | 1/5 | 1/4 | 1/4 |
| | EN CO, SIB | 2/4 | 2/1 | 1/1 |
| Corps | EN BN, WHEEL | 0/30 | 1/10 | 1/10 |
| | EN BN, MECH | 4/4 | 3/15 | 3/14 |
| | EN BN, ABN | 1/0 | 1/0 | 1/0 |
| | EN BN, LT | 1/0 | 1/2 | 1/2 |
| | EN CO, CSE | 6/15 | 7/30 | 6/21 |
| | EN CO, LT EQUIP ABN | 1/0 | 1/0 | 1/0 |
| | EN, CO, LT EQUIP | 1/0 | 1/2 | 1/2 |
| | EN CO, MGB | 5/17 | 4/11 | 2/9 |
| | EN CO, AFB | 4/11 | 6/14 | 5/6 |
| | EN CO, TOPO | 0/0 | 0/0 | 3/1 |
| Echelons Above Corps | EN BN, CBT HVY | 11/29 | 7/27 | 7/29 |
| | PRIME POWER BN | 0/0 | 0/0 | 1/0 |
| | HHC, TOPO BN | 3/1 | 3/1 | 3/0 |
| | EN CO, TOPO | 6/3 | 5/2 | 2/0 |
| | EN CO, CSC | 1/8 | 0/8 | 0/8 |
| | EN CO, PORT CONSTR | 1/2 | 1/2 | 0/3 |
| | EN CO, PIPELINE | 1/3 | 1/3 | 0/4 |
| | EN CO, DUMP TRUCK | 0/4 | 0/8 | 0/8 |
| Command and Control | ENCOM | 0/2 | 0/2 | 0/2 |
| | BDE, TA | 1/4 | 0/3 | 0/3 |
| | GROUP, EAC | 2/9 | 1/6 | 1/5 |
| | BDE, CORPS | 2/2 | 2/2 | 2/2 |
| | GROUP, CBT | 1/10 | 2/8 | 2/7 |
| | BDE, DIV | 8/0 | 8/7 | 8/7 |

**Table 2**

## Engineer Divisional Force

The Active Component engineer force will consist of 10 divisions: six heavy, one airborne, one air assault, and two light. Each of these divisions will have three active brigades; they will not have the round-up or round-out reserve brigades they have today. The engineer support programmed for each division will be:

- Six heavy divisions - one engineer headquarters and headquarters detachment (HHD) and three engineer battalions
- One airborne division - one engineer battalion
- One air assault division - one engineer battalion
- Two light divisions - one engineer battalion per division

In addition to the divisional units, there will be one armored cavalry regiment, one light armored cavalry regiment, and one heavy separate brigade, each with an engineer company for support, as they are configured today.

The National Guard force structure will consist of 15 enhanced brigades and eight divisions. The 15 enhanced brigades will consist of:

- Seven heavy brigades - one engineer battalion (heavy division) per brigade
- Seven light brigades - one engineer company (separate infantry brigade) per brigade
- One armored cavalry regiment - one engineer company (armored cavalry regiment).

The enhanced brigades will be authorized 5 percent above their personnel strength. Ten of the 15 brigades will have training affiliations with active brigades and should be equipped in the same priority as their active counterparts. The goal of the enhanced brigades is to be mobilized, trained and prepared for deployment within 90 days. If these brigades are realigned to a divisional structure, the command and control will come from the eight National Guard Division headquarters.

In addition to the 15 enhanced brigades, the National Guard will retain the eight divisions they have today. However, the type of the divisions will change to:

- Four heavy divisions - one HHD and three engineer battalions
- Three medium divisions - one engineer battalion per division
- One light division - one engineer battalion

## Engineer CS AND CSS Requirements

At this time, the combat support (CS) and combat service support (CSS) structures required for the 18 divisions are unknown. However, the eight National Guard divisions will not be programmed CS or CSS organizations because that structure will already be in place. These requirements will not be determined until Phase III of TAA 2003 is completed.

**Current and Future Engineer Force Structures**

*Current (TAA 01) -*

| Active | National Guard |
|---|---|
| 8 - Heavy Divisions | 7 - Heavy Divisions |
| 1 - Airborne Division | 1 - Light Division |
| 1 - Air Assault Division | |
| 2 - Light Divisions | |

*Future (TAA 03) -*

| Active | National Guard |
|---|---|
| 6 - Heavy Divisions | 15 - Enhanced Brigades |
| 1 - Airborne Division | 7 Heavy |
| 1 - Air Assault Division | 7 Light |
| 2 - Light Divisions | 1 ACR |
| | 4 - Heavy Divisions |
| | 3 - Medium Divisions |
| | 1 - Light Division |

Figure 2

## Future Planning

The Engineer School is now preparing for TAA-2003, which begins this fall. Numerous conferences are scheduled with "key engineer players" who represent the Combined Arms Center, CINCs, Chief of Engineers, and ODSCOPS. The school's mission is to ensure that the allocation rules applied adequately reflect engineer doctrine and that the "right mix" of engineer forces will be available to support future Army requirements. Decisions concerning that structure will be made throughout 1995 as the programmed force evolves and is modelled. Since the TAA process never ends, our senior leaders will continue to modify the engineer force structure to support the Army's response to the changing threats to our nation's security.

*Mr Malley is a military equipment and personnel analyst in the Directorate of Combat Developments, U.S. Army Engineer School. Before retiring from the Army, he held positions in engineer, armor, and infantry units. Mr Malley holds a master's degree from Webster University.*

### *End Notes*

1 The Bottom-Up Review, 1 September 1993, page 1-2.
2 Army Command, Leadership, and Management, 1992-1993, pages 11-12.
3 Ibid, pages 10-11 and 10-12.
4 Ibid, pages 11-12, 11-13, and 11-14.
5 The Bottom-Up Review, 1 Sep 93, page 5.
6 Ibid, 17.
7 Ibid, page 14.