2025: Future Engineer Demands and Force Structure
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- **Panel Moderator:** Col. William Haight, P.E., USA (Ret.), Louis Berger
- **Army:** COL Jason Smallfield, US Army Engineer School
- **Marines:** Col (Ret) Ken Frantz, Marine Corps Engineer Association
- **Navy:** CAPT Rod Moore, Naval Expeditionary Combat Command
- **Air Force:** Col Mike Kozak, HQAF, A4C
- **Industry:** COL (Ret) Dan Grey, American International Contractors

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The Joint Operating Environment

- Document describes present and possible future trends, conditions, variables, circumstances and influences that will affect how a Commander will organize and employ his forces.

- Not intended to describe specific areas of operation, nor adversaries, but general conditions that shape the environment of conflict.
Key Challenges:

**Human Geography**
- Population and Age
- Ethnicity

**Governance and Legitimacy**
- Legitimacy
- Failed or Failing State
- Transnational Interests

**Urbanization**
- Density
- Rise of Mega Cities

**Resources and Economics**
- Climatic Disruption
- Resource Competition
- Distribution of Wealth
- Energy

**Globalization**
- Economic Dependencies
- Coalitions
- A2/AD
## Demand vs Supply – Joint Engineer Capacity

**General Engineering**  
**Combat Engineering**

<table>
<thead>
<tr>
<th>Shape</th>
<th>Deter</th>
<th>Seize Initiative</th>
<th>Dominate</th>
<th>Stabilize</th>
<th>Enable Civil Authority</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
</tr>
</tbody>
</table>

### Goals & Requirements:
- **Prepare & Shape the Theater**
- **Crisis Defined Force Tailoring**
- **Assure Freedom of Action**
- **Apply Dominant Force and Achieve Full Spectrum Superiority**
- **Establish Security and Restore Services**
- **Transfer Authority and Redeploy**

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Army Engineer Force Sufficiency

COL Jason Smallfield, US Army Engineer School
Total Army Analysis (TAA) Process

- Existing Force
- Defense Planning Scenarios
- Rules of Allocation
- War Plans & TPFDD’s

Draft 1-N List → Resourcing Panels → Army Structure Memo

- Emerging Growth
- Field Input

Risk Analysis
Army Structure and Capability Today

Command and Control

Embedded

Combat

General

Geospatial

Institutional

Embedded

Combat

General

Geospatial

Institutional

Civilians 35,000
Military 360
Global Presence
Deployable
Reachback
Current Geospatial Elements

- BDE
- \(\varnothing\) GEOSPATIAL
- GEOSPATIAL

Future Geospatial Elements

- BDE
- \(\varnothing\) GEOSPATIAL
- GEOSPATIAL

Increases Geospatial Team from 4 to 8 (led by WO) and gives BDE’s responsibility for geospatial data management in the JOA.

Increases number of GPC’s to cover all ASCC’s and USASOC, provides dedicated analysis and data base mgt to each Regional COCOM and SOCOM.
Current Construction Elements

- HORIZ
- VERT
- BN
- ESC
- ESP
- SURVEY/DESIGN
- FDU

Future Construction Elements

- ECC
- EVC
- ESC
- BN

Consist of two Horizontal Platoons, one Vertical Platoon and one FMT

RC only. Consist of two Vertical Platoons, one Horizontal Platoon and one FMT

Consist of two Horizontal Platoons, one Vertical Platoon and one FMT

BN Headquarters with Redesigned Survey and Design Team.
Potential Future Army Structure and Capability

Command and Control

Embedded

Combat

General

Geospatial

Institutional

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USMC Engineer Force Sufficiency

Ken Frantz (Colonel-USMC Retired)
Marine Engineer Uniqueness/Specialties

• Support expeditionary operations of a Marine Air-Ground Task Force (MAGTF) of any type/size

• Prepare or repair expedient Landing Zones (LZs), Forward Arming and Refueling Points (FARPs), landing strips, or other aviation support sites in forward combat areas

• Use of explosives for breaching, demolition, denial and other purposes

• Explosive Ordnance Disposal (EOD) embedded in Engineer Support Bns

• Includes bulk fuel and utilities
Marine Engineer Limitations

- **Construction**
  - Focus on mobility within an expeditionary mindset
  - General engineering functions provide increased operational tempo
  - General engineering capability supplemented by Naval Construction Force

- **General troop support**
  - Not generally employed to create a tent city and supporting functions for troop housing
  - Not typically deployed to support units other than Marines, unless those units are assigned to a MAGTF

- **Geospatial engineering capability** managed within the Marine intelligence community
Organization - General

- Command Element:
  - Ground Combat Element
  - Aviation Combat Element
  - Logistics Combat Element

- Expeditionary Force
  - ~20-90,000
  - Decisively Defeat

- Expeditionary Brigade
  - ~15,000
  - Swiftly Defeat

- Expeditionary Unit
  - ~2,200
  - Forward Presence
  - Crisis Response

- Special Purpose MAGTF (SP-MAGTF)
  - Non-standard Missions

- Partner and Prevent
  - Crisis Response
  - Contingencies
  - Major Combat

- Scalable and tailorable combined arms teams
Combat Engineer Bns (CEBs) Embedded in Ground Combat Element

3rd CEB eliminated Summer 2014, reduced to one engineer line company under Combat Assault Bn (Engr Co, LAR Co, AAV Co)
Engineer Support Bns (ESB)
Embedded in Logistic Combat Elements

6th ESB - Largest Bn with 3 Bulk Fuel Cos/3 Bridge Cos
11 Marine Wing Support Squadrons (MWSS) embedded in Air Combat Elements

Reduction of two MWSS’s from current 13 to 11 in FY16
Force Sufficiency Concerns

- Seabees (Naval Construction Force) Reduction impact on general engineering support to the MAGTF
- COCOM Use of Seabees for “In Lieu Of” missions, Theater Support Cooperation (TSC) missions, etc.
- Army RC/AC ratio and potential reduction Impacts on Joint Engineering Theater Support Command and Control and follow on support
Naval Construction Force Overview

Captain Rod Moore, NECC N3
Naval Construction Force (NCF) Mission Areas

Personnel: 4,715 Active and 4,384 Reserve*

- Provide a wide variety of military construction and humanitarian efforts in times of peace or war:
  - Expeditionary Construction: Forward operating bases, expeditionary camps, bridges, roads, forward arming and refueling points, munitions storage facilities, and detention facilities
  - Airfield Damage Repair
  - Port Damage Repair
  - Expeditionary Medical Facilities
  - USMC Maneuver Support
  - Underwater Construction & Repair
  - Renovating schools and municipal facilities, providing community outreach centers, medical clinics, community clean-up

AC 52%  
RC 48%
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- Expeditionary construction and engineering (combat service support) for Navy and Marine Corps forces, as well as for Joint and Combined operational forces
  - Engineer Reconnaissance
  - Horizontal & Vertical Construction
  - Utility & Specialty Construction / Water Wells
  - Tactical & Sustainment Bridging
  - Construction & Operation of Expeditionary Bases and Facilities
    - Airfields
    - Structures (Berthing, Operation Centers, Galleys, etc)
  - Amphibious & Underwater Construction
    - Piers / Docks / Moorings
    - Near Shore Hydrographic Surveys
- Defensive Combat Capability
  - Convoy Security Elements
  - Base Defensive Perimeter
  - Battle Damage Repair
- Foreign Military/Host Nation Capacity Building
  - Partnerships (Trust & Cooperation)
  - Community Relations events
- Humanitarian Assistance/Disaster Relief
  - Rapid deployers (ready in 48-hours)
  - Home and abroad

What Seabees do…

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What Seabees really do...

Things you may know:
- School houses
- Water wells
- Power and sanitation
- Power projection platforms
- Boat ramps, piers, moorings
- Underwater utilities
- Community relations projects and Fleet “ambassadors” ashore

Things you might not know:
- “Engineer targeting” of projects supporting operational objectives
- Foreign Military/Host Nation capacity building and partnerships
  - Civil-military operations
  - Humanitarian assistance/disaster response
- Technical skills exchange/SME exchanges
- Resource conservation and sustainability in vulnerable littoral areas/populations
- Engineer reconnaissance and near shore hydrographic surveys
- Cooperative Health Engagements

Seabees provide the Fleet with permissive and non-lethal access, entry, and presence
Cyclic Change in Force Structure

Seabee End Strength:

1942
World War II: 325,000 → 5,000 (98% reduction)

1950
Korean War: 14,000 → 9,400 by 1965

1969
Vietnam War: 26,000 → 12,000

2004
OIF/OEF: 17,000 → 9,000 (current, excluding ACBs)

9 AC NMCBs / 12 RC NMCBs → 6 AC NMCBs / 5 RC NMCBs
Current Naval Construction Force

NCR = Naval Construction Regiment
NMCB = Naval Mobile Construction Battalion
ACB = Amphibious Construction Battalion
CBMU = Construction Battalion Maintenance Unit
UCT = Underwater Construction Team

Navy Expeditionary Combat Command

Naval Construction Group 1
- 30 NCR
  - 1NCR
    - NMCB 18
    - NMCB 22
    - NMCB 25

Naval Construction Group 2
- 22 NCR
  - 7NCR
    - NMCB 14
    - NMCB 27

Navy Expeditionary Combat Command

The diagram represents the current organization of the naval construction force, detailing the command structure and the units under each group. The units are categorized as active or reserve, with specific codes indicating their designation and function within the naval construction forces.
AF Engineer Force Sufficiency - Engineer Force Laydown Analysis
May 15

Col Mike Kozak
HQ AF/A4CI
Sizing the AF Engineer Force

A9 Analysis
- Analytic Baseline
- Common Framework
- Starting point for analysis

A4C Analysis
- Engineer Force Laydown
  - Rotational
  - Field in Place
  - COCOM Support
  - Contingency ACS
  - Installation Support
  - Institutional

A1 Analysis
- Manpower Demand
  - Deployment Demand (DPART)
  - Sustainment
  - Non-Availability
  - Institutional

Risk Informed Analysis
- Total Force Continuum (TF-C) Personnel Readiness Revw (PRR) Models, Tools and Analysis
  - Balance TF, Civ/Mil capabilities
  - Fix shortage AFSCs
  - Most capable force given available resources

Inform Analytical Tools
- AC/RC Decision Space
- Potential Capacity

Programming Decisions
- Force Sizing Recommendations

AFCS Inputs
- National Security, Defense and Military Strategies
- Defense Planning Scenarios & Force Planning Constructs
  (Res CSE, CS, & APP)
- Programmed Force Structure
  (Res/Pres, President's Budget)

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**Deployment & Fight In-Place**

*NOT TO SCALE*

- Non-Surge/"Steady State" (Rotational)
- Surge
- Full Mobilization
- Post-Surge (Rotational)

**HLD/DSCA (Acft & rotational personnel)**

- Nuclear Deterrent Operations (Acft & rotational personnel)
- Counter-Terrorism and Irregular Warfare (Acft & rotational personnel)

**Nuclear Deterrent Operations (non-rotational personnel)**

**Counter-Terrorism and Irregular Warfare (non-rotational personnel)**

**Direct Support to Combatant Cdrs (non-rotational personnel)**

**Garrison**

**Institutional**

Overall CE Demand

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## Surge Demand Methodology

<table>
<thead>
<tr>
<th></th>
<th>Full Mobilization Deployment</th>
<th>Fight-in Place</th>
<th>Defined COCOM Support</th>
<th>Non-Defined COCOM Support</th>
<th>Contingency ACS**</th>
<th>Installation Support</th>
<th>Institutional</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traditional Craftsman</strong></td>
<td>ISC-B Locations</td>
<td>ISC-B Critical Locations</td>
<td>En Route, Foundational Activities*</td>
<td>N/A</td>
<td>Four RHS per MCO plus SF &amp; OBO</td>
<td>Reduced Level of Service by 25%</td>
<td>Supply equals demand</td>
</tr>
<tr>
<td><strong>Fire</strong></td>
<td>ISC-B Locations</td>
<td>ISC-B Critical Locations</td>
<td>CAP, En Route, Foundational Activities*</td>
<td>N/A</td>
<td>SF &amp; OBO Only</td>
<td>RLS4</td>
<td>Supply equals demand</td>
</tr>
<tr>
<td><strong>EOD</strong></td>
<td>ISC-B Locations</td>
<td>ISC-B Critical Locations</td>
<td>CAP, En Route, Foundational Activities*</td>
<td>HLD</td>
<td>SF &amp; OBO Only</td>
<td>Range Support Only</td>
<td>Supply equals demand</td>
</tr>
<tr>
<td><strong>EM</strong></td>
<td>ISC-B Locations</td>
<td>ISC-B Critical Locations</td>
<td>En Route, Foundational Activities*</td>
<td>HLD</td>
<td>Four RHS per MCO plus SF &amp; OBO</td>
<td>AFCOLS 3</td>
<td>Supply equals demand</td>
</tr>
</tbody>
</table>

* Foundational activities include DSCA, DSU, SART, VIPPSA, and DCRF as applicable

** Compromised of RH, SF, and “Owned-by-others”
# Post-Surge Demand Methodology

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Rotational Deployment</th>
<th>Fight-in Place</th>
<th>Defined COCOM Support</th>
<th>Non-Defined COCOM Support</th>
<th>Contingency ACS**</th>
<th>Installation Support</th>
<th>Institutional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Craftsmen</td>
<td>ISC-B Locations</td>
<td>ISC-B Critical Locations</td>
<td>Foundational Activities*</td>
<td>N/A</td>
<td>One RHS per MCO plus SF &amp; OBO</td>
<td>FY08-13 Levels of Service</td>
<td>Supply equals demand</td>
</tr>
<tr>
<td>Fire</td>
<td>ISC-B Locations</td>
<td>ISC-B Critical Locations</td>
<td>Foundational Activities*</td>
<td>N/A</td>
<td>SF &amp; OBO Only</td>
<td>FY13 AFCOLS</td>
<td>Supply equals demand</td>
</tr>
<tr>
<td>EOD</td>
<td>ISC-B Locations</td>
<td>ISC-B Critical Locations</td>
<td>Foundational Activities*</td>
<td>N/A</td>
<td>SF &amp; OBO Only</td>
<td>Mission &amp; Range Support</td>
<td>Supply equals demand</td>
</tr>
<tr>
<td>EM</td>
<td>ISC-B Locations</td>
<td>ISC-B Critical Locations</td>
<td>Foundational Activities*</td>
<td>N/A</td>
<td>One RHS per MCO plus SF &amp; OBO</td>
<td>FY13 AFCOLS</td>
<td>Supply equals demand</td>
</tr>
</tbody>
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* Foundational activities include DSCA, DSU, SART, VIPPSA, and DCRF as applicable

** Compromised of RH, SF, and “Owned-by-others”
Industry Perspective
COL (Ret) Dan Grey, AICI
Contents

• Background

• Total Force Structure Components

• Considerations in Building the Force

• When Contractors are Less Valuable

• When Contractors are More Valuable

• Contractor Casualties

• Conclusions
Background
The US Military has always used contractors on the battlefield as far back as the Revolutionary War

- The Revolution
- WWI & WWII
- Korea
- Vietnam
- Desert Storm
- Balkans
- Operation Enduring Freedom
- Operation Iraqi Freedom

The reliance on contractor support has evolved past the basic logistical supply activities to include some of our most technical and mission critical wartime tasks.
Total Force Structure

- U.S. Service Components
  - Active
  - Reserve
  - National Guard
- Coalition Forces
- Interagency
- Contractors
Considerations in Building the Force

- Affordable Near and Long Term
- Deter Adversaries
- Win Wars
- Leverage Component Strengths and Minimize Weaknesses
  - Speed / Timeliness
  - Phase of Operations (0 – V) / Type of Operations
  - Versatility
- Include Contractors Early in the Planning
- Train with Contractors
When Contractors are Less Valuable/Viable

- Speed to the Battlefield is Critical
  - Examples: Haiti, Sava River
- Combat Intensity is Highest
  - Examples: Forcible Entry, Desert Storm
- Complex Joint/Coalition Operations
  - Example: Airborne Operations
When contractors are More Valuable/Viable

• Peacetime and Wartime Operations are Similar like Construction (Roads, Airfields, Buildings, etc.), LOGCAP
• Inside the Wire Operations and Lower Intensity Operations
• Time Available / Longer Term Operations
• When Involved Early in the Planning
• Coordinating Interagency and Host Nation Operations
• Specialty Requirements
  • Examples: Complicated/Specialty Infrastructure like Bridges, Dams, etc.
Contractor Casualty Example - Afghanistan

<table>
<thead>
<tr>
<th>Casualty Type</th>
<th>REFS (30 Sep 02- 30 Jun 07)</th>
<th>IRP (1 Sep 06-1 Sep 12)</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expats</td>
<td>CCN</td>
<td>Expat</td>
</tr>
<tr>
<td>Wounded</td>
<td>10</td>
<td>148</td>
<td>14</td>
</tr>
<tr>
<td>Killed</td>
<td>16</td>
<td>120</td>
<td>5</td>
</tr>
<tr>
<td>Kidnapped or Missing</td>
<td>6</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Totals</td>
<td>32</td>
<td>270</td>
<td>19</td>
</tr>
</tbody>
</table>

Illustrative for Gardez – Khost Road

- Reportable security related incidents: 364
- IEDs: 108
- UXOs/Landmines: 50
- Direct Attacks: 147
- Casualties: 21 KIA, 51 WIA & 4 MIA = 76 total
- Security costs are approx. 1/3 of TO total budget
Conclusions

• Contractors are able to absorb casualties, but there are limitations

• Contractors work better in lower intensity combat or inside the wire

• Contractors generally can’t get to the battlefield as fast as the military

• Contractors must be synchronized; early planning & training are essential

• Contractors can be a conduit for interagency operations

• Contractors are good at peacetime tasks in war zones

• The total force will include contractors on the battlefield
Questions and Discussion
Navy Expeditionary Combat Forces

**Coastal Riverines:**
- Maritime Security, Security Force Assistance, ISR, High Value Unit Escort

**Explosive Ordnance Disposal and Mobile Dive and Salvage:**
- Underwater MCM, Flight Deck UXO, Counter WMD, Counter IED
- Salvage and Recovery, Harbor Clearance, Battle Damage Repair

**Naval Construction (Seabees):**
- Expeditionary Construction (camps, bridges, roads), Port and Airfield Damage Repair

**Expeditionary Intelligence:**
- Intelligence Preparation of the Environment (IPOE), Maritime Tactical HUMINT, VBSS

**Expeditionary Logistics:**
- Break-Bulk Cargo, Air Cargo, Port and Air Terminal Operations, MPF Operations

**Expeditionary Combat Readiness Center:**
- Individual Augmentee Processing, Reserve Mobilizations
We are Warfighters First.
We Operate Forward. We are always Ready!
NCF…Prior to Force Reductions

1NCD

1NCD

PAC

31SRG

1NCR

9NCR

30NCR

22NCR

25NCR

3NCR

7NCR

20SRG

NMCB 17

NMCB 18

NMCB 22

NMCB 22

NMCB 25

NMCB 25

NMCB 28

NMCB 28

NMCB 23

NMCB 24

NMCB 24

NMCB 26

NMCB 26

NMCB 27

NMCB 27

NMCB 4

NMCB 1

NMCB 11

NMCB 74

NMCB 133

CBU 202

UCT 1

AC Command

RC Command
NCF Force Structure Changes

• Phased changes:
  – FY12
    • Decom NMCB 7, 40
  – FY13
    • Decom NMCB 15, 21, 23, 24
    • Decom NMCB 3, 25 NCR
    • Change 20SRG to NCG2, 31SRG to NCG1
    • Disestablish 1NCD
  – FY14
    • Decom NMCB 17, 26, 28, 74, 9 NCR

• Remaining Force Structure
  – 2 AC NCG’s
  – 2 AC / 2 RC NCR’s
  – 6 AC / 5 RC NMCB’s
  – 2 AC UCTs / 2 AC CBMUs
  – EXCOMCAM
Service Engineer Capabilities by Operating Environment

Operating Environment:
- Hostile
- Unknown
- Permissive

JCA Element:
- Gap Crossing
- Develop & Maintain Facilities
- Establish LOCs
- Global Access Engineering
- Repair and Restore Infrastructure
- Harden Key Infrastructure & Facilities
- Master Design
- Defeat Explosive Hazards
- Enhance Mobility
- Deny Movement and Maneuver
- Enhance Survivability
- Utilize Geospatial Data
- Provide Mobility Assessments

USA
USN
USMC
USAF
Service Engineer Capabilities by Level of War

Level of War:
- Strategic
- Operational
- Tactical

JCA Element:
- Gap Crossing
- Develop & Maintain Facilities
- Establish LOCs
- Global Access Engineering
- Repair and Restore Infrastructure
- Harden Key Infrastructure & Facilities
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