ANNEX 3-34 ENGINEER OPERATIONS

PLANNING

Last Updated: 30 December 2014

Air Force planning begins when the joint forces commander assigns the commander, Air Force forces (COMAFFOR) an operational mission. As a general rule, civil engineers participate in all stages of operational planning, providing estimates of capability, availability, resource requirements, and cost limitations. Initial plans focus on providing bases along with supporting infrastructure, environmental, and emergency services for each course of action (COA) being considered. Estimates are tracked during execution to determine if operations are proceeding according to the COMAFFOR's intent and if future operations are supportable.

Planning efforts should be aimed at *readying the force* and *preparing the operational* environment to support operational missions or other unforeseen contingencies. Readying the force includes educating, training, and equipping civil engineers to accomplish the mission. Preparing the operational environment involves building comprehensive contingency plans geared towards force beddown, protection, sustainment, and all other tasks engineers may be required to perform to meet the COMAFFOR's objectives. Engineers can also assist targeting efforts by assessing long-term effects of destroying infrastructure and determining the level of destruction targets can withstand yet be repairable with organic engineer capabilities for use by friendly forces.

Deliberate Planning

Civil engineer deliberate planning assists Air Force forces in preparing the operational environment. Plans identify all actions and requirements necessary to provide effective engineer support to all types and throughout all phases of military operations. While planning, civil engineers provide coordinated sourcing solutions to the global force management process. In general, deployment requirements are sourced before CONUS wartime in-place requirements are met. However, some forces are postured for strategic mission support, homeland operations, and CONUS force projection operations. Deliberate planning considerations may include evaluating, reconfiguring, modifying, and constructing facilities and infrastructure for immediate and sustained support of personnel, equipment, and weapon systems. Due to limited resources (e.g., manpower, funding, materiel, equipment, time) during prolonged contingencies, deliberate plans should incorporate several aspects of operational risks for effective use of available resources. However, risks should be mitigated by definitive, existing support plans, to include plans to obtain resources needed to backfill capabilities (e.g., contracting support, civilian overhires, etc.). Detailed engineer planning guidance is outlined in expeditionary engineering publications. Key aspects of engineer deliberate planning are:

Site Assessment. In concert with operational planning, engineers conduct site

assessments using all available tools, including geospatial data and other technological means to assess and map proposed beddown locations, and assist in developing plans for deployment, reception, beddown, employment, and sustainment. Site assessments identify requirements and describe capabilities of proposed beddown locations to accommodate and sustain missions. The objective is to compare mission requirements with a site's existing capabilities and identify shortfalls in existing assets and resource limitations. Once accomplished, the means to eliminate or mitigate the effects of these shortfalls and limitations can be addressed. The worst case would be the need to establish operations at a bare base, requiring mobile facilities, utilities, and support equipment that can be rapidly deployed and installed to convert undeveloped real estate into an operational airbase virtually overnight. **To ensure beddown requirements are accurately identified, civil engineers should always accompany Air Force, joint, or coalition survey and assessment teams to survey potential Air Force forces beddown locations.**

While performing site assessments, engineers gather the best available data on existing airfields and support infrastructure, water sources, the local threat, explosive remnants of war, climate, topography, soil conditions, host nation construction standards, and available logistics support. All available resources are considered, including support from other Services, multinational support, host nation support, local skilled labor, indigenous materials and equipment, and contract support. Where possible, asset prepositioning can be used to address anticipated shortfalls and limitations. A baseline environmental survey is also conducted to document existing environmental conditions.

Site Planning. Engineers prepare site plans prior to build up or beddown. Plans should include site layout, facility designs, and standards of construction, which is based on operational needs, the threat, and law of war requirements such as location of medical facilities. Site plans should maximize use of existing facilities and infrastructure.

To achieve successful mission generation, civil engineer site planning activities should be integrated with logistical and operational planning throughout all stages. Site plans should consider all standards relating to aircraft operations, other installation missions, force protection, energy and resource conservation, environmental protection, explosives safety, fire prevention, etc. Engineers should take advantage of site planning tools available to assist with developing base layout and designing facility and utility systems. These tools incorporate knowledge and lessons from previous deployments. Facility and infrastructure designs should include the abundance of resources available as well as resource limitations.

Although site assessment usually occurs before site plans are prepared, the assessment and plan development could occur simultaneously or possibly in reverse order based on the urgency of the situation. Several factors impact site planning and design and should be considered. These include local threats, access to resources, types and amount of indigenous materials and equipment, availability of skilled local labor and contract support, political variables, funding, manpower, time, commander's intent, and doctrine.

While planning, Air Force civil engineers should consider providing support and receiving engineering and construction support from other Services, agencies, and coalition partners. Engineers should be prepared to plan joint force beddown locations; consider long-term plans for airfields, support the senior airfield authority,

consider possible surge in operations including other Services' requirements as well as consider different layers of authority Services may have while providing base operating support. Since personnel and equipment will likely flow incrementally into the site, the site plan should be developed to reflect a phased buildup of facilities and support infrastructure to the anticipated requirement. If necessary, procurement of funds and programming actions take place immediately after site plans are complete.

Logistical Support. Engineers are ultimately responsible to identify and acquire resources needed to accomplish the mission; therefore, efforts should be made to achieve equipment common to other Services. Engineers should also remain abreast of advances in technology and aggressively work towards equipment modernization.

Due to heavy lift requirements, civil engineer deliberate plans largely depend upon leased or contracted, pre-stocked and prepositioned (war readiness materiel [WRM]) expeditionary assets, consumables, spares, and repair kits. Engineers work with logisticians to ensure assets reflected in deliberate plans will be available or delivered to the right location, in the proper sequence, when needed. Of particular importance are heavy equipment, tools, and supplies needed to establish airfields and conduct runway repairs. To ensure WRM equipment is reliable, engineers are integrated into logistics organizations, providing technical advice and quality assurance to confirm these items are mission capable.

Plans must also identify procedures to obtain Class V supplies (e.g., ammunition) and large amounts of Class IV supplies (e.g., construction and barrier materials). Effective reachback capabilities minimize the engineer footprint. To reduce dependence on airlift and sealift, use of indigenous equipment and materials is expected where feasible. Labor can be obtained through owner/user or be contracted to increase engineer capacity. Planners should keep in mind that the level of host nation support and access to resources will depend largely on whether forces enter the country under permissive, semi-permissive, or forced entry conditions.

Staging. Theater or regional engineer capabilities should be positioned at tactical mobility hubs to leverage the inherent ability to move and support missions as operations dictate.

Equipping. Prime BEEF and RED HORSE engineers must be properly equipped. Commanders focus on equipping at home station based on mission requirements and collaborative efforts within the civil engineer community. This includes individual protective clothing, hand tools, and team equipment required to conduct surveys, construct temporary facilities, and establish emergency services immediately upon arrival at deployed locations. Planners should assume equipment items and supplies needed to establish or repair base facilities and utilities and to perform runway repairs will not be available initially. Team kits should include items most critically needed. Since it is inevitable some equipment will be damaged during deployments, it is important to have a means of repairing items and have spares whenever possible. Commanders should ensure equipment and supply items maintained at home station are adequate and mission-capable at all times.

Force Protection. Civil engineer plans place emphasis on protecting the force, a unique challenge in the expeditionary environment. The severity of the threat, along

with desired levels of protection, are primary planning considerations. Some important planning factors include available real estate, existing facilities, existing natural or man-made features, and type and quantity of indigenous construction materials. These factors will affect decisions such as standoff, vulnerability reduction measures, and layout of facilities and supporting infrastructure. Plans should also minimize environmental, fire, safety, and health hazards. **As a general rule, civil engineers should design airbases to enhance operability and balance mission requirements with force protection standards**. Base design and layout should comply with force protection unified forces criteria, be defendable and effectively protect personnel, critical facilities, and weapon systems. Engineers should always be aware of anticipated threats and devise effective means to counter them.

Threats, hazard, vulnerability, capability, and criticality risk assessments are conducted in concert with Security Forces and Intelligence. These assessments are used to determine levels of protection for personnel and assets. Intelligence personnel working with local Air Force Office of Special Investigation counterintelligence provide products such as local threat assessments, current/emerging threats to critical infrastructure, or collateral effects of WMD, that generate recommendations to mitigate or eliminate a threat to facilities, airfields, entry control points, etc. When developing engineer plans in support of the assessments for airbase operations in the expeditionary environment, planners must understand the natural environment as well as adversary weapon systems and capabilities in order to conduct risk management. Civil Engineers should be members of installation force protection or antiterrorism working groups. Engineer planners can obtain critical data through threat information sharing during force protection or antiterrorism working groups. Force protection intelligence (FPI) is a key source of information for engineer planning. For additional information and guidance on force protection and FPI, see Annex 3-10, *Force Protection*.

Environmental Considerations. Civil engineers should advise commanders on the environmental aspects of contingency operations to allow them to consider alternative COAs prior to implementing any specific COA. Commanders should mitigate the effects of operations on personnel and the environment to the extent practicable. Consideration of the human environment and supporting documentation are a critical part of initial planning and decision making. Civil engineers strive to ensure plans include the capability to create secure and sustainable environments through responsible leadership, comprehensive training, awareness, and consistent monitoring. Plans should be developed to protect health of the population, preserve the environment, and reduce waste. Because contingency operations can be rapid and time-constrained, time may not permit conducting comprehensive environmental planning initially. However, this should be done as soon as possible in collaboration with other Air Force, joint, or coalition survey and assessment teams. Failure to maintain basic environmental standards could result in illness, disease, or death. Neglecting environmental concerns in foreign countries can also negatively impact local community relations and diplomatic efforts, and possibly increase insurgent activities, making it difficult to achieve US strategic objectives.

Energy Security. Civil engineers strive to reduce the demand for energy; increase energy supply through alternative and renewable energy sources and fuel efficient equipment; and factor energy security into every aspect of contingency

operations. Engineers use renewable energy and sustainable designs to plan, program, construct, maintain, and operate facilities and supporting infrastructure. Engineers provide technical expertise on energy security in all areas where the Air Force requires energy resources. As new technologies emerge (e.g., improvements in equipment, processes, etc.), engineers should leverage them to achieve optimum solutions to energy security.

Installation Management. Civil engineers strive to better quantify, articulate, and manage risk while supporting the mission with assets at the right size, condition, and cost to maximize value and utility of built and natural infrastructure. Engineers use Installation Management principles to integrate existing processes and provide visibility, supporting advocacy and resource allocation as well as enabling analysis to balance cost, risk, and benefits to permit better planning and operation of facilities supporting infrastructure and the natural environment. Engineers provide technical expertise on built and natural infrastructure in all areas where the Air Force requires efficiency.

Crisis Action Planning

Engineering considerations are similar for both deliberate and crisis action planning. Deliberate planning facilitates the transition to crisis action planning. Crisis action planning leads into positioning the force and is usually accomplished in a time-constrained environment, addressing situations and emergencies using assigned, attached, and allocated forces and resources. During dynamic crisis situations, changes to deployment plans may be necessary regardless of technical requirements and adverse impact. Commanders should ensure changes to requirements are accomplished accurately to minimize the impact on schedule development. Thus, plans should be flexible to respond to the demands of a dynamic situation.