



ANNEX 3-34 ENGINEER OPERATIONS

ENGINEER FUNCTIONS

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In joint and Air Force operations, engineering functions are categories of related engineer capabilities and activities that are grouped together to help commanders integrate, synchronize, and direct engineer operations. These functions fall into three basic groups: [general engineering](#), [combat engineering](#), and [geospatial engineering](#). Following are descriptions of each of these functions:

[General Engineering](#) consists of those capabilities other than combat engineering used to modify, maintain, and protect the physical environment. Examples include construction, repair, maintenance, and operation of infrastructure, facilities, lines of communications, and bases; [airfield damage repair \(ADR\)](#); terrain modification and repair; and selected explosive hazard activities. General engineering provides the means to develop installations to project airpower. It can occur under combat conditions but differs from combat engineering in that it is not in support of the maneuver of forces, be it in the air or land domain. General engineering focuses on rapidly responding to establish, sustain, and recover airbases, conducting ADR as needed. These types of activities are usually required during initial stages of major operations when base infrastructure is unavailable or inadequate to support the [commander Air Force forces](#) (COMAFFOR) in achieving the [joint force commander's](#) objectives. Engineering tasks are time consuming, requiring centralized planning and control to effectively manage limited resources. Commanders may employ a combination of military engineers, civil service, contractors, multinational engineers, and host nation personnel to fulfill engineer requirements. Although the nature of some tasks or the threat of violence in an operational area may require military engineers, once the area begins to stabilize the tasks can be performed using multiple available resources. For more detailed information on general engineer capabilities, see Appendix B.

[Combat Engineering](#) is defined as those engineering capabilities and activities that support the maneuver of land combat forces and that require close support to those forces. It consists of mobility, countermobility, and [survivability](#) operations. The primary difference between combat engineering and general engineering is combat engineering's requirement for close support to land combat forces and its focus on mobility/maneuver versus supporting base and mission operations from fixed locations. This should not be confused with "engineering under combat conditions."

Although Air Force civil engineers are not specifically organized, trained, and equipped to conduct combat engineering, their inherent skills are used to conduct tasks to support the installation and are in close support of Air Force forces maneuvering within the operational environment. For example, engineers support mobility operations by

removal and demolition of obstructions on captured airfields. Engineers can also enhance mobility by establishing and recovering airfields and forward operating bases, providing the COMAFFOR with additional options of maneuver and flexibility. In support of countermobility, engineers emplace obstacles to achieve standoff, and work with Security Forces personnel to create obstacles to funnel enemy forces into firing zones that support integrated defense. To enhance base survivability, engineers build aircraft revetments; construct fighting positions and watch towers; reinforce overhead protection of key facilities; harden critical infrastructure; recover aircraft; and provide [fire emergency services](#) (FES), [explosive ordnance disposal](#) (EOD), and [emergency management](#) (EM) capabilities.

[Geospatial Engineering](#) contributes to a clear understanding of the physical environment by performing tasks that provide information and services to enhance effective use of the operational environment. Examples of geospatial data, information and services include: terrain analyses and visualization, digitized terrain products, nonstandard tailored maps, precision survey, data management, baseline survey data, and force beddown analysis. Installation geospatial data enable commanders to make informed decisions during installation planning throughout all phases of operations.
