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Engineering Peace: The Critical Role of Engineers in UN Peacekeeping

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INTERNATIONAL PEACE INSTITUTE

Cover Image: Members of the Chinese engineering company of the UN mission in the Democratic Republic of the Congo (MONUC) work on a road rehabilitation project in April 2008 to allow greater access to the Ruzizi One Dam Power Plant, the only source of electricity for the east of the country. UN Photo/Marie Frechon.

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Abbreviations

C2	Command and Control
CIMIC	Civic-Military Coordination
CMS	Chief of Mission Support
COE	Contingent-Owned Equipment
CSB	County Support Base
CVR	Community Violence Reduction
DFS	Department of Field Support
DMS	Director of Mission Support
DPKO	Department of Peacekeeping Operations
DSRSG	Deputy Special Representative of the Secretary-General
GIS	Geographic Information Systems
HMEC	Horizontal Military Engineering Company
IC	Individual Contractor
ILO	International Labour Organization
IMC	Inter-Mission Cooperation
IOM	International Organization for Migration
JOTC	Joint Operations and Tasking Center
LFE	Light Field Engineering
MEC	Military Engineering Company
MINURCAT	United Nations Mission in the Central African Republic and Chad
MINUSMA	United Nations Multidimensional Integrated Stabilization Mission in Mali
MINUSTAH	United Nations Mission in Haiti
MOU	Memorandum of Understanding
MPC	Mission Project Cell
NGO	Nongovernmental Organizations
NSE	National Support Element
PITF	Programme Implementation Task Force

PRC	Prioritization Review Committee
QIP	Quick Impact Project
SAG	Special Advisory Group
SRSG	Special Representative of the Secretary-General
TCC	Troop-Contributing Country
UN	United Nations
UNDP	United Nations Development Programme
UNMIS	United Nations Mission in Sudan
UNMISS	United Nations Mission in South Sudan
UNOPS	United Nations Office for Project Services
UNSAS	United Nations Standby Arrangement System
UNV	United Nations Volunteer

Executive Summary

The UN Security Council mandates peacekeeping operations in some of the poorest, most conflict-prone areas of the world. These locations are often also extremely remote and nearly inaccessible. In this context, engineering is one of the most critical elements to the functioning of a UN peace operation; yet, it may be the least critically analyzed aspect of peacekeeping. During the start-up phase of a mission, engineers design, prepare, and build the camps that allow the mission to exist. Very little can be achieved in peacekeeping without sanitary and secure camps with electricity and passable roads or functional air strips. When there are engineering gaps coupled with major logistical challenges (as in the UN Mission in South Sudan), key elements of the mandate, such as the protection of civilians or support to the extension of state authority, become much more difficult, and sometimes impossible, to fulfill. During the mission consolidation phase, engineers can play a central role in the peacebuilding support tasks of a mission, working with the host country, UN agencies, and others to build capacity and deliver peace dividends.

Despite such central roles played by (and the high cost of) peacekeeping engineers, relatively little is known about their various capacities or tasks; nor is much known about the challenges the UN faces in effectively and efficiently utilizing both military and commercial engineering capacities. The following report details the various tasks undertaken and roles played by engineers (mission support, state assistance, and development and humanitarian roles). It then describes the types of engineering capacities available to a peacekeeping mission: civilian, military, commercial, and the UN Office for Project Services (UNOPS). Each type of engineering has differing capacities and its own benefits and drawbacks. While each mission has a civilian engineering section to design, manage, and administer engineering across the mission, UN peacekeeping relies heavily on military engineering capacities, typically in the form of military engineering companies, to carry out construction tasks.

Based on field visits to two UN missions, the UN Mission in South Sudan (UNMISS) and the UN Stabilization Mission in Haiti (MINUSTAH), the report then outlines a number of challenges to the effective use of engineering, divided into three parts: (a) during the mission start-up phase, (b) during the mission consolidation phase, and (c) cross-cutting engineering challenges.

MISSION START-UP PHASE

Often, the gravest challenge during the start-up phase of a mission is a lack of national infrastructure and national capacity. Typically, planning for a new UN mission does not adequately take into account the size and importance of engineering needs during the start-up phase. Delays in the recruitment and arrival of military engineering units (currently occurring in the UN's newest mission in Mali) have lasting effects for missions like UNMISS.[1] Operational caveats imposed by troop-contributing countries (TCCs), such as those that limit a unit's area of operation, also have an adverse effect on the mission's overall capabilities. During this critical start-up period, both the needs and expectations of the host government and people are at their highest, but often go unmet. Lastly, when presented with critical engineering gaps, missions have few available options for acquiring surge engineering capacities in a timely manner.

This report recommends that the UN pursue all avenues for developing the options available for rapid start-up and surge engineering capacities, including the following: furthering the UN Department of Field Support's concept of "modularization"; agreeing to a global systems contract with a commercial engineering provider; engaging in strategic outreach and providing incentives to member states for standby engineering capacity (as part of or alongside the mission); exploring modalities for more inter-mission cooperation; and signing a partnership agreement with the UN Office for Project Services to augment mission capacity.

MISSION CONSOLIDATION PHASE

In the mission consolidation phase, the key challenges relate to ensuring the ideal use of

1 For a detailed explanation of the various delays and challenges associated with the process of generating and deploying military capabilities, see Adam C. Smith and Arthur Boutellis, "Rethinking Force Generation: Filling the Capability Gaps in UN Peacekeeping," Providing for Peacekeeping No. 2, New York: International Peace Institute, May 2013, available at www.ipinst.org/publication/detail/397-rethinking-force-generation-filling-capability-gaps-in-un-peacekeeping.html .

engineering capacities to further the peacebuilding support goals of the mission. Given the high demand from partners and the host government for the mission's engineering capacities, clear prioritization and tasking arrangements must be developed that ensure adequate coherence and coordination within the mission and maximize the use of limited capacities. Mission leadership should also be made aware of the possibilities and limits of the use of military engineering capabilities. Funding projects that fall outside of the mission support role is also a challenge, as assessed contributions are not often available for this purpose. Ideally, predictable and efficient partnerships with UN agencies and the host government provide the materials for projects, while missions provide the heavy machinery and operators.

This report recommends that standardized memoranda of understanding between missions and UN agencies be developed to reduce transaction time and costs, and that a central point of contact is developed for efficient coordination with the host government. It also recommends adjusting UN procurement rules to allow missions to give higher priority to using local companies (rather than regional or international companies) for construction works in order to help build sustainable engineering capacity within the host country.

CROSS-CUTTING CHALLENGES

There are several cross-cutting engineering challenges that missions face throughout their lifecycle. First is the difficulty of analyzing and deciding on the ideal configuration of military versus civilian or commercial versus UNOPS capacities. Given variable costs and unpredictable outcomes, a generic cost-benefit analysis becomes difficult, but it is sorely necessary. Second, TCC capability can vary considerably from one military engineering company to another. The most prized aspect of a military engineering company's overall capability is its flexibility and willingness to take on any job with which it is tasked. In this respect, some TCCs have more capability than others, but mission leaders have little ability to affect this equation. Similarly, as needs change on the ground, and different types of engineering capacities are needed and others become unnecessary, missions have little ability to change the composition of TCC units or their equipment lists.

We suggest that military capability studies conducted for each mission should regularly include an assessment of the appropriateness of the mission's military engineering composition. TCCs' flexibility in adapting their contingent-owned equipment as a result of these assessments should be encouraged. Finally, the limited duration of peacekeeping mission mandates and budget cycles affects the ability of UN civilian and military planners to do strategic planning for engineering. An annual engineering master plan for each mission, including mission support tasks and non-mission support projects, would allow better budgeting (and procurement) planning.

RECOMMENDATIONS

In sum, this report offers five overarching recommendations for UN peace operations:

1. Develop rapid start-up or surge engineering capacities.
2. Better integrate engineering requirements into mission planning.
3. Adapt to changing needs in the mission consolidation phase.
4. Create win-win partnerships to address engineering needs beyond the mission.
5. Build local engineering and private-sector capacity for additional peace dividends.

A detailed list of recommendations is included at the end of the report.

Engineering Tasks and Roles

The most common types of engineering tasks performed in a peacekeeping operation are generally the same and can be put into three categories: major horizontal construction, major vertical construction, and minor engineering support.[2]

During the start-up phase of a peacekeeping operation, *horizontal construction* is the first, largest, and arguably the most vital set of tasks to be undertaken. Such tasks include the preparation of ground sites for the construction of base camps

2 Military engineering tasks are more commonly categorized by (1) construction (vertical and horizontal); (2) general (water, electricity, quarrying activities, and waste management); and (3) combat (field fortifications, mine clearing, and bomb disposal). Peacekeeping missions, however, include a civilian engineering component and rely less on combat engineering.

Military engineers from the UN mission in Haiti (MINUSTAH) work to clean debris blocking canals around Port-au-Prince in April 2012, in an attempt to minimize flooding during the upcoming rainy season. UN Photo/Logan Abassi.

(clearing, compacting, and leveling land, as well as laying building foundations) and the construction, maintenance, and repair of supply roads and bridges, airstrips, and helipads. Related to these activities are others, such as clearing rubble or trash, constructing or improving drainage systems, and canalizing rivers. Major horizontal construction tasks are typically carried out by horizontal military engineering companies (HMECs) that are deployed with the necessary heavy construction equipment (bulldozers, excavators, cranes, etc.).

Major *vertical construction* includes the construction of camps, rehabilitation of existing buildings, and erection of prefabricated structures (office space and staff housing). This category can also include well drilling. Vertical construction tasks are undertaken throughout the various phases of a mission and can be performed by military engineering companies or the mission's civilian engineers (often through contracting with local, regional, or international construction companies).

Minor engineering support entails maintenance and repair of UN facilities, including electrical or plumbing repairs, and carpentry and masonry work. Military engineering units are responsible for this work in their own camps and can sometimes be asked to undertake it for other UN camps or facilities. Infantry units should have some small engineering capacity to undertake minor works for their camps. Minor engineering work for large UN base camps is typically done by the civilian engineering component of the mission using local labor through the use of "individual contractor" arrangements.

The primary role of the engineering component (including both civilian and military engineering) of a UN peacekeeping mission is the *mission support role*: to establish and maintain mission infrastructure, as well as supply routes and landing sites used by the mission to sustain itself. Beyond this role, engineering components are sometimes also asked to support—within their capacity and depending on the mission's mandate—the host state and other international or regional organizations, as well as UN agencies and humanitarian NGOs operating in the same theater. This *non-mission support role* is sometimes described as part of the "early peacebuilding" function of peacekeepers.[3]

3 For more on the early peacebuilding role of peacekeepers, see UN Department of Peacekeeping Operations and Department of Field Support, "Peacekeeping and Peacebuilding: Clarifying the Nexus," September 2010, available at www.securitycouncilreport.org/atf/cf/%7B65BFCF9B-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/PKO%20Peacebuilding%20Peacekeeping%20Nexus.pdf .

As the extension of state authority has become a central function of peace operations (as is the case for both MINUSTAH and UNMISS), UN mission engineers are increasingly asked to provide targeted engineering support to the host country's infrastructure development and related institutions. For example, military engineers can be asked by the national government or local authorities to dredge a trash-clogged canal, repair a roadway, or clear the ground for a port when the host government is unable to undertake the projects on its own due to a lack of equipment or funding, or both. In the case of Haiti, requests for such activities are coordinated through the mission leadership for approval, and funding for any materials other than fuel (such as sand, gravel, or asphalt) typically must be contributed by the government. State assistance projects tend to be a higher priority and are more frequent during the consolidation or drawdown phases of a mission. During these periods the mission can more easily redirect its engineering assets from mission support to non-mission support functions. In addition, such projects may contribute to the achievement of key benchmarks under the mission's mandate to support the extension of state authority.

A second non-mission support role takes the form of assistance to other international or regional organizations, as well as UN agencies and humanitarian NGOs, by supporting them in their development and humanitarian mandates. Military engineering companies from a peacekeeping mission can provide niche engineering support and significant cost savings to these endeavors. For example, in Haiti, MINUSTAH's military engineering capacity has contributed to road construction for the "16/6 project," a major post-earthquake resettlement project for internally displaced persons supported by the UN Office for Project Services (UNOPS), the International Organization for Migration (IOM), the International Labour Organization (ILO), and the UN Development Programme (UNDP). UNOPS estimated that support from the mission's military engineers allowed it to save an average 40–45 percent of the project budget that would otherwise have been used to rent heavy equipment. The partners were then able to reinvest the money saved back into the project and hire additional local labor. This humanitarian or development role can also take the form of emergency response during a natural disaster, such as an earthquake or flood, or during a refugee crisis.

It can be argued that some engineering tasks fall under multiple categories at the same time. Some of the engineering works done to support the mission bring ancillary benefits to the local communities and the country as a whole. The socioeconomic "multiplier effect" of repairing a major supply road or building a new airstrip in an isolated community (and even flying national and local state officials in UN aircrafts) can be seen as both mission support and state assistance. Another example is when military engineers are asked to assist other components of the peacekeeping mission, such as the civil affairs section, to help implement a "quick impact project" (QIP). QIPs are small-scale, low-cost projects implemented to build confidence in the mission, the mandate, or the peace process. Depending on the project, they could fall under any of the three above-mentioned categories.[4] Finally, many military engineering units also take on a limited amount of activities in the community as part of their civil-military coordination ("CIMIC") duties, small acts required of all military units to improve relations and build confidence with local civilians. See figure 1 for a diagram of the various roles and sample tasks performed by engineering units.

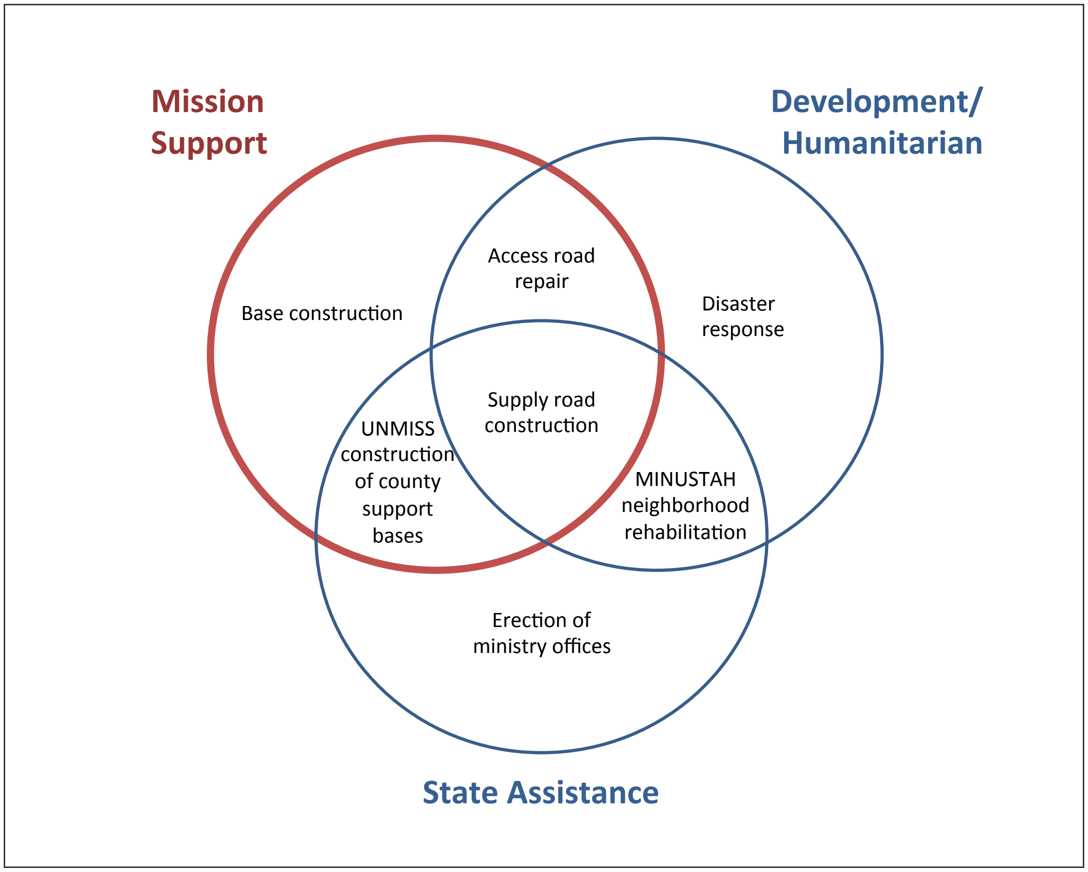
Types of Engineering Capacities Available to UN Peacekeeping

CIVILIAN ENGINEERING

Among the many civilian components of a UN peacekeeping mission is civilian engineering. The engineering section is responsible for the planning, design, construction, and maintenance of buildings and physical infrastructure, and the operation and maintenance of UN-owned engineering assets. Civilian engineering is headed by a chief engineer and falls under the mission support section, headed by the director of mission support (DMS) or chief of mission support (CMS). The chief engineer

4 For more on the implementation and objective of QIPs, see UN Department of Peacekeeping Operations and Department of Field Support, *Civil Affairs Handbook* (Durban: United Nations, 2012), ch. 12.

Figure 1. Engineering roles and sample activities



reports to the DMS/CMS through the chief of integrated support services. Each mission has a different assortment of civilian engineering capacities (human resources, budgets, and equipment). For example, MINUSTAH's engineering component had an approved staffing level of 20 international staff, 99 national staff and 31 UN volunteers (UNVs) in its 2012–13 budget. UNMISS's engineering component had an approved level of 45 international staff, 212 national staff, and 48 UNVs during the same budget cycle. The engineering staffing capacity was cut by 66 posts at the end of 2012. UNMISS currently uses around 1,200 individual contractors and has UN-owned equipment roughly equivalent to that of one horizontal military engineering company.

The MINUSTAH engineering section is composed of various functional teams: power generation, geographic information systems (GIS), water and water supply, management of assets and materials, budget and registration, and planning and design. In Haiti, the civilian engineering staff is divided among the seven regions of the country and the capital, Port-au-Prince. In South Sudan, in addition to the staff at mission headquarters in Juba, each of the ten states has its own civilian engineering component, including a chief engineer operating under a state coordinator with some delegated tasking authority and procurement authority up to $4,000. However, these decentralized civilian engineering components do not have access to heavy equipment and therefore largely rely on the military engineering companies deployed in their regions for tasks involving such equipment.

MILITARY ENGINEERING

For major engineering tasks, peacekeeping missions tend to rely primarily on the use of engineers and equipment from troop-contributing countries (TCCs). Military engineering units can range in size from a platoon (25–30 troops) that is embedded within an infantry battalion to a full military engineering company (MEC) of up to 275 troops. Military engineering companies can be made up of multiple platoons or teams, each with specialized functions: well-drilling, force protection, logistics, airfield or helipad construction, or road and bridge construction. Depending on the needs on the ground, the force requirements for a full MEC require some combination of these platoons. For instance, in South Sudan, the mission was designed to employ horizontal military engineering companies (HMECs), which had two road and bridge construction platoons but no well-drilling platoons. Both UNMISS and MINUSTAH currently have four MECs each, although of varying sizes and capabilities (see table 1 below).

Construction engineering companies are expected to bring with them all the equipment—heavy and light—necessary for their work. Such equipment is contingent-owned equipment (COE), and the depreciation of the equipment is reimbursed by the UN according to set rates in the UN's COE manual.[5] Much of the engineering equipment—bulldozers, cranes, etc.—is heavy, expensive, and difficult to transport to the mission and within the mission area. This is particularly true in difficult terrains such as those in South Sudan, where the rainy season considerably limits road movements for eight months of the year. Once in the mission area, heavy equipment is in high demand.

Engineering companies are headed by a company commander who receives tasking orders from the Chief Integrated Support Service, in coordination with the force commander (via a millitary engineering branch, when it exists within the force headquarters). The force commander retains operational command of all military units. Tasking arrangements can vary from mission to mission, however, and are discussed in more detail in the section below on challenges in the mission consolidation phase. Engineering companies are generally expected to be able to divide and operate simultaneously in three locations within their area of responsibility, but this can vary according to each TCC's agreement with the UN. Military engineering units are also expected to be fully self-sustaining when deployed. This means that they build their own camps and require no engineering or security support from the UN. In practice, however, most military engineering companies do

Table 1. Summary of mission engineering capacities

	MINUSTAH	**UNMISS**
Mission phase	Consolidation (fewer mission support needs)	Start-up (many critical mission support needs)
Engineering section projects budget (2012–2013)	\$4.3 million	\$27.9 million
Civilian engineering staff	150 (20 international)	305 (45 international)
Military engineering personnel	- 1 HMEC (~250 personnel) - 3 construction engineering companies (~130–170 personnel each) - 8 infantry engineering units (~25 personnel each)	- 2 HMECs (~268 personnel each) - 2 construction engineering companies (~275 personnel each) - 4 light field engineering (LFE) units (~50–120 personnel each)
Commercial capacity (national)	Some individual contractors, mostly low-skilled	Few individual contractors available
Commercial capacity (regional)	A number of large Dominican and American construction firms	Kenyan, Ethiopian, and Ugandan firms operate in the country.

5 However, this does not include construction materials (sand, gravel, concrete, asphalt, fuel, etc.), which are provided or purchased by the UN mission. Such materials can also be provided by partners working on projects with engineering companies, such as the host government or a UN agency. On some occasions, materials are purchased by the TCC itself (this cannot be reimbursed by the UN).

require support from the UN, often in the form of force protection provided by infantry units. Military engineering personnel are rotated back to their home country every six to twelve months depending on the TCC.[6] Force protection, rotation length, and self-sustainment issues are discussed in detail in the section on cross-cutting challenges.

COMMERCIAL ENGINEERING

UN missions have to rely on commercially contracted engineering capacities in many ways. For light engineering work, local individuals ("individual contractors," or ICs) can be hired on short (typically three month), renewable contracts. The number of these individual contractors can reach 1,000 in a mission like MINUSTAH, which has high recurring minor maintenance and repair needs. IC contracts are relatively cheap for the mission (compared to higher-skilled "national professional officers, or NPOs, for instance), and they provide a source of training, employment, and income to the local population. However, there are high transaction costs for the mission in processing contracts every three months and in overseeing the work of so many contractors. And while cheap in some respects, IC contracts can be approximately four to six times more expensive than prevailing wages in the local market.

Missions also contract national, regional, and international companies to take on larger engineering projects where needed and when cost-effective. The use of commercial assets for projects must go through the UN procurement process, using the "best value for money" formula. This process can be relatively quick for contracts under $50,000, but it can take between three and twelve months to complete if the value exceeds $50,000.[7] Given the state of the local economy in many missions, national capacities are typically insufficient or lacking experience, and the mission must therefore rely on larger regional or international companies to provide reliable services. However, in remote or particularly dangerous areas, it may be difficult to find any commercial contractors willing or able to take on a particular project for a reasonable price.[8] During the research visit to UNMISS in April 2013, five civilian contractors for a commercially contracted water-drilling company escorted by UNMISS troops were killed in an ambush while returning from a project site in the conflict-prone state of Jonglei.[9]

UN OFFICE FOR PROJECT SERVICES

One other option for engineering capacity within the UN system is for UN missions to work with the UN Office for Project Services. Mandated by the General Assembly "as a central resource for the United Nations system in procurement and contracts management as well as in civil works and physical infrastructure development, including the related capacity development activities,"[10] UNOPS mission is "to expand the capacity of the UN system and its partners to implement peacebuilding, humanitarian and development operations that matter for people in need."[11]

UNOPS was established in 1974 as part of the United Nations Development Programme (UNDP) and in 1995 became a separate entity, with a mandate and focus on civil works and physical infrastructure development, and the related capacity development activities. In 2008, the UN and UNOPS signed a memorandum of understanding (MOU) that set out the arrangements governing the provision of services by UNOPS to offices and departments of the UN, United Nations peacekeeping operations, and special political missions. The MOU has been operationalized primarily by the UN Mine Action Service to help manage and implement mine clearance projects. Other offices and departments—such as the DFS' Information and Communication Technology Division, the UN Department of Social and Economic Affairs, and the Executive Office of the Secretary-General—

6 New rules agreed to by the General Assembly in 2013 would make a twelve-month rotation standard for TCCs.

7 All contracts above a value of $50,000 have to be awarded from bids solicited based on a request for proposals (RFP). Those that exceed $150,000 have to be approved by a local committee on contracts. Contracts in excess of $500,000 have to be approved by UN Headquarters in New York.

8 Commercial contractors can be found for almost any job, anywhere; however, the security premiums charged by firms in the most risky areas can greatly exceed anything the UN mission is able to afford.

9 UN News Centre, "South Sudan: UN Officials, Security Council Condemn Deadly Attack on Peacekeepers," April 9, 2013, available at www.un.org/apps/news/story.asp?NewsID=44603 .

10 UN General Assembly Resolution 65/176 (December 2010), UN Doc. A/RES/65/176. See also, ECOSOC Resolution 2010/23 (July 2010) and the Executive Board Decisions 2008/35 (September 2008), 2009/25 (September 2009), 2010/7 (January 2010), and 2010/21 (June 2010).

11 UN Office for Project Services, "Mission and Values," available at www.unops.org/english/whoweare/Pages/Missionandvalues.aspx .

A team of Japanese engineers helps the government of South Sudan with road construction activities in Juba in February 2012. UN Photo/Isaac Billy.

have partnered with UNOPS through the MOU, though mainly for human resources services. In addition to human resources services, UNOPS offers expertise in infrastructure, project management, procurement, and financial management.

Until now, peacekeeping missions have found it difficult to use the framework agreement to facilitate collaboration with UNOPS on other projects. Despite the recognized needs and close coordination to define scopes of work at the field level, only a few times and for relatively small engagements were missions able to take advantage of UNOPS. Other instances of joint projects have typically been done through separate project-specific MOUs, which have been time-intensive and difficult bureaucratically to negotiate (particularly when these MOUs involve the UN mission, UNOPS, and also the host government's relevant ministries). In South Sudan, for instance, UNOPS constructed five referendum support bases for the earlier UN Mission in Sudan (UNMIS) in 2011. The original plan was for UNOPS to play a larger role, but this was scaled back as bureaucratic difficulties emerged. In South Sudan, UNOPS mostly works with other UN partners and humanitarian or development agencies to implement engineering projects, including the rehabilitation of airstrips in Bunj and Pibor, and various road constructions for humanitarian access. To support the current engineering teams in UNMISS to deliver on their tasks, UNOPS has proposed assembling and managing a civilian engineering enabling unit (roughly the equivalent of one horizontal military engineering company). This would include necessary heavy equipment along with onsite project management teams.

In MINUSTAH, which has far less critical mission support engineering needs than UNMISS at this stage of its lifecycle (consolidation phase), the partnership is the other way around. Rather than receiving services from UNOPS, MINUSTAH has been providing heavy equipment and operators to support UNOPS and other UN agencies in their reconstruction and development projects. A recent example of this is the "16/6 project," for which MINUSTAH military engineering companies completed ground preparation for road construction as part of a major refugee resettlement project of the Haitian government (implemented jointly by UNOPS, UNDP, IOM, and ILO). In both Haiti and South Sudan, UNOPS has a close working relationship with the host government ministries responsible for public works (see the section on challenges in the mission consolidation phase below).

Challenges in Mission Start-Up Phase

> *The immediate post-conflict period offers a window of opportunity to provide basic security, deliver peace dividends, shore up and build confidence in the political process, and strengthen core national capacity to lead peacebuilding efforts. If countries succeed in these core areas early on, it substantially increases the chances for sustainable peace — and reduces the risk of relapse into conflict …. In too many cases, we have missed this early window.*[12]

Engineering capacities are most critically needed during the start-up phase of a mission. For the mission to exist, camps must first be built. Heavy equipment must be transported to the mission area; ground must be cleared; perimeter protection constructed; and electricity, water, and sewage systems provided for. Access roads and airstrips must be repaired or constructed anew. Speed is of obvious importance during this period. Host-population needs and their expectations are at their highest during the initial deployment of a peace operation. As the quote above from the secretary-general's report on peacebuilding in the immediate aftermath of conflict makes clear, this early period is a window of opportunity to build confidence in the political process and create buy-in among the host population. The UN's actions during this period can be highly determinative of its future success.

South Sudan provides a dramatic example of just how great the need for engineering capability can be during a mission start-up. The newest country in Africa is 644,000 square kilometers in area, larger than any country in Western Europe. Inside this vast and impoverished country, where 83 percent of the population lives in rural areas, only 2 percent of the very few roads that exist are paved.[13] The few towns across the country are linked instead by dirt roads that become impassable during the annual eight-to-nine month rainy season in which the native black cotton soil turns into a thick mud. The country is land-locked, and only three airports in South Sudan have paved runways. In addition to a lack of national infrastructure, a legacy of five decades of conflict also left a dearth of national capacity, including experienced and qualified personnel.

Within this environment, the UN Mission in South Sudan was mandated in July 2011 to implement an array of ambitious tasks on behalf of the international community. To enable the implementation of the mission's mandates (to protect civilians, support the extension of state authority, and monitor human rights, among many others), the 2011 concept of operations planned for the establishment of a mission headquarters in the capital, Juba, as well as ten state offices, and, later, thirty-five geographically dispersed county support bases.

Two years in, the operating environment has become even more challenging. For 2012 and 2013, the government of South Sudan allocated only 2 percent of its budget for infrastructure (160 million South Sudanese pounds, or $40 million), which suffered further when oil production—representing more than 90 percent of revenue—was halted in January 2012. In May 2012, following public disclosure that approximately $4 billion (or about one third of the then government of Southern Sudan's income during the 2005—2011 transitional period) was unaccounted for, relations with bilateral donors were further strained, placing increased pressure on UNMISS. In December 2012, South Sudan's army (the Sudan People's Liberation Army/SPLA) shot down an UNMISS helicopter, resulting in additional air mobility restrictions for UNMISS. Since 2011, unresolved bilateral political tensions with Sudan also led to delays or stoppage of transportation of goods from Port Sudan via the Nile, further restricting available national and international engineering supplies and equipment in South Sudan.

Given the significant and unpredictable obstacles—environmental, security, political, and others—and the ambitious goals of a mission and expectations of the international community during a start-up phase, a UN peacekeeping mission must be able to count on having adequate

12 United Nations Secretary-General, *Report of the Secretary-General on Peacebuilding in the Immediate Aftermath of Conflict*, June 11, 2009, UN Doc. A/63/881, paras. 3 and 4.

13 African Development Bank, "South Sudan Interim Country Strategy Paper: 2012-2014," October 2012.

engineering capabilities, as well as appropriate and flexible planning, financing, management, and oversight systems to implement engineering projects.

Adequate engineering capability means that the equipment, manpower, and will are commensurate with the tasks to be performed, but also that the mission is provided with an adequate engineering budget—not least to procure materials and fuel. In this context, the equipment must arrive on the ground in a timely fashion, be in good working condition, and be the appropriate equipment for the tasks. The manpower must be correctly trained, and the units must have the will to go where the needs are at a given moment. On the civilian side, the planning must take proper account of the operating environment, the mission priorities, and any and all unplanned contingencies that can affect implementation (for example, a delayed process of acquiring land for UN camps). In a rapidly changing environment and in a time of urgency, financing must be adequate, timely, and flexible. Finally, effective tasking, management, and oversight systems must be in place to ensure on-schedule project implementation and quality control.

For the UN, a number of challenges with regard to the above set of conditions are consistent features of mission start-ups globally. For the UN Mission in South Sudan, still in start-up mode two years after its establishment in July 2011, these challenges have had a significant impact on the implementation of its mandated tasks, most specifically on the field-based component of its protection of civilians role. The head of UNMISS has made no secret of this fact, candidly telling a reporter, "We cannot sustain a presence with the logistical capacity that we have, with the problems we have with air transport and by road. So we cannot protect civilians in big, big, big numbers."[14] This sentiment has also been echoed by the host government. Following a December 2011 inter-ethnic attack that killed hundreds, the governor of Jonglei State blamed the slow response from the government and the UN on the lack of roads in the area.[15]

Beyond its civilian protection mandate, the mission has also been limited in its ability to support the extension of state authority and the development of national capacity, given the slow

Members of the UN Mission in Sudan (UNMIS) encounter challenging road conditions during the 2007 rainy season in Chukudum, now part of South Sudan. UN Photo/Tim McKulka.

14 Hereward Holland, "Peacekeepers Cannot Protect Civilians in South Sudan's East: UN," *Reuters*, May 27, 2013.

15 Jeffrey Gettleman, "U.N. Fact-Finding Team to Visit Site of South Sudan Killings," *New York Times*, February 11, 2013.

pace in building the envisioned county support bases (CSBs). The aims of these bases are to support the government's efforts to consolidate peace and security and strengthen decentralized service delivery in areas where risks to peace and stability are considered high. This attempt to extend its presence beyond state capitals to the county level, however, has been a source of frustration for the mission. Original plans called for the completion of thirty-five CSBs in three years, with nineteen operational by the end of 2012. In reality, only eight CSBs were suitable for full deployment as of March 2013. A revised timeline plans for completion of all thirty-five by 2016. Some in the mission and back in New York believe that this is also an unrealistic goal and the total number to be completed by 2016 should be reduced to twenty.[16]

OVERSTRETCH AND MISSION PLANNING

One of the more obvious considerations related to engineering during mission start-up is that there is an enormous amount of work to be done, and the sooner it is completed, the sooner the mission can start operating properly and implement its mandate. As evidenced by the UNMISS example above, almost two years into its existence (and seven years after the UN first deployed in the area as part of the earlier UNMIS), extremely high-priority engineering projects have not been completed. For a number of reasons described below, roads, airstrips, and helipads have not yet been rehabilitated, which severely impacts mission performance. The short-run lack of roads and adequate airstrips also costs the UN a great deal in the long run. Throughout its existence, UNMISS has been forced to use helicopters for nearly all transport during the long rainy seasons rather than the more cost-effective trucks or fixed-wing aircrafts. Some estimated that the mission has overspent by millions of dollars because of delays in finishing major supply roads and runways that would have allowed it to use cheaper forms of transport than helicopters.

In addition to mandate implementation and financial costs, engineering delays can affect mission morale, including the performance and retention of personnel. Because of other, higher priority engineering projects, the construction of adequate accommodation for both military and civilian staff has not yet been fully addressed. In mission headquarters, the construction of hard-wall accommodations is currently on hold given cuts to the mission engineering budget. In the field, the military units have had to make do longer than the six-month self-sufficiency period in tents.[17] During the rainy season, this makes life in the field particularly difficult.

Planning for a new UN mission does not adequately take into account the size and importance of engineering needs during the start-up phase. UN peace operations must be planned within a set of inflexible parameters established by the UN Security Council. One of those parameters is the troop ceiling, which places a fixed limit on the total number of uniformed personnel available to the mission. In South Sudan, the troop ceiling is 7,000. Approximately 4,500 of these troops are infantry, and the rest compose different enabling units (air, medical, engineering, etc.).

Ideally, a troop ceiling would be much higher during a mission start-up phase to address the increased engineering needs during that period. An early "engineering surge" would save money in the long run, and, more importantly, allow the mission to fully implement its peacekeeping and peacebuilding support mandate during the critical early postconflict window of opportunity. In lieu of higher troop ceilings, force requirements for the mission should, in cases like South Sudan, where the environmental and terrain challenges are so formidable, give higher priority to engineering capabilities. Simply put, the first twelve months of a mission should include surge engineering capacity (both military and civilian) to set the mission on its feet before the window of greatest opportunity has closed. For UNMISS, this extra capacity would have improved the mission's ability to implement its mandate while at the same time accruing significant cost savings.

16 See Diana Felix da Costa and Cedric de Coning, "UNMISS County Support Bases: Peacekeeping-Peacebuilding Nexus at Work?," NUPI Policy Brief, April 2013.

17 After the initial six-month period, the UN is required to have made hard-wall accommodations available for the troops. TCCs are reimbursed extra if the UN is unable to meet the six month timeline. This rule, however, is a holdover from an earlier time in peacekeeping, when deployments were more static than today.

TCC CAVEATS AND DELAYED DEPLOYMENTS

Despite the best planning, however, UN missions are still subject to severe capability gaps resulting from largely exogenous factors, such as TCC caveats and delayed deployments. The Force Requirement document, drafted for each unit in a peacekeeping operation by the DPKO Military Planning Service, explains the individual unit's "employment concept," mission, area of operation, and tasks, and it lists the exact assets the unit is required to bring with it to the mission. Force requirements are based on the strategic concept of operations for the mission. TCCs that contribute a unit to a mission agree to contribute personnel and assets as detailed in the force requirements. They also agree to the employment concept. DPKO operational planning relies on the assumption that TCCs will abide by the force requirements and, as such, those exact capabilities will be available to the mission without caveat. However, for a number of reasons this is not always the case. TCCs may not arrive with the right equipment. This may be a result of the pre-deployment MOU negotiations, when the TCC successfully negotiates to change the required capabilities (e.g., to 10 cubic meter capacity dump trucks rather than the more appropriate 20 cubic meter trucks), or, in a small number of cases, it might result from a TCC simply showing up without certain required equipment. A TCC will not be reimbursed for missing or nonfunctional equipment, uncovered during regular COE inspections, but is not otherwise penalized for this capacity gap.[18]

A related issue is the use of caveats by TCCs, which can significantly affect the capability of a unit, particularly during mission start-up, when the mission design has not yet been adjusted to account for the resulting capability gaps. Caveats typically restrict the rules of engagement or the area of operation. In UNMISS, the decision by the Japanese government to restrict the area of operation of its horizontal military engineering company to a 20 kilometer radius around the capital, Juba, has limited the operational capacity of the mission. Because the pressing engineering needs in South Sudan are located away from the capital, a sizeable part of the mission's military engineering capability has been underused during the most critical period of time. Meanwhile the mission has been unable to seek alternate means of filling this gap because of financial limitations and the Security Council–imposed troop ceiling. In October 2013, the Japanese government agreed to expand the work of its engineering unit to the three states of South Sudan's Equatoria region—the originally planned area of operations for this HMEC.[19]

Another significant blow to the capabilities (engineering and otherwise) of UN missions during start-up is the late arrival of TCC personnel or equipment. While force generation is a complex and time-intensive process,[20] the delayed arrival of engineering assets can have a proportionally greater negative impact on the mission's operations. In South Sudan, two of the mission's four planned horizontal military engineering companies were not yet deployed twenty months after the establishment of the mission. A South Korean engineering company, intended to deploy to the most restive—and therefore critical—state, Jonglei, was delayed over a year and a half by the parliamentary approval process in Seoul. A second engineering company, from India, was delayed over financial requests from the Indian government related to the rotation of their equipment, which slowed MOU negotiations with UN Headquarters. Although an engineering company from Bangladesh (held over from UNMIS) has been operating in place of the Indian company during this period, its capacities have not been of the ideal composition (it is a construction engineering company as opposed to an HMEC), and its equipment has suffered from extreme wear and tear over the years without being replaced.[21]

18 The "Report of the Senior Advisory Group on Rates of Reimbursement to Troop-Contributing Countries and Other Related Issues" (A/67/713) recommended further financial penalties for non-functional or absent contingent-owned equipment. With some conditions, this was agreed to by the General Assembly's Fifth Committee in May 2013, but it has not yet been implemented.

19 See "Japan to Expand Peacekeeping Work in S. Sudan Despite Safety Concerns," *Global Post*, May 28, 2013, available at www.globalpost.com/dispatch/news/kyodo-news-international/130528/japan-expand-peacekeeping-work-s-sudan-despite-safety- .

20 See Smith and Boutellis, "Rethinking Force Generation."

21 UN rules do not allow payment to a TCC to procure new equipment ahead of deployment or replace equipment that has been worn down on the job, only reimbursement for the estimated depreciation of already purchased equipment. In some ways this could be seen as providing an incentive for TCCs not to use their equipment, lest it soon need to be replaced at the TCC's expense. Bangladesh has employed its engineering equipment throughout its deployment, yet could ostensibly receive less reimbursement because some equipment may become non-functional in the process.

Japanese engineering peacekeepers serving with UNMISS upgrade Yei Road in Juba in August 2012. UN Photo/Staton Winter.

Quick deployment of enabling capabilities is possible when there is both political will and strategic airlift available. A recent example occurred following the January 2010 earthquake in Haiti. The Japanese engineering company, along with its equipment, was able to deploy to Port-au-Prince within weeks, largely due to the fact that Japan self-deployed by air (i.e., it did not rely in the UN to ship its equipment by sea) and that MOU negotiations were worked out ex-post facto. A military engineering company from South Korea was also able to deploy rapidly to MINUSTAH, arriving shortly after the Japanese unit. The contrasting experience of South Korea's engineering company (in Haiti versus South Sudan) underlines the unpredictability of force generation, something that UN leadership and the Security Council members must take into account when planning missions.

A related challenge regards long delays importing engineering equipment. This is particularly challenging in the South Sudanese context. Equipment, prefabricated housing containers, and other materials have all suffered long delays either due to impassable terrain or customs problems. As noted above, many such goods have also been stuck for months at the Port of Sudan or the Sudanese city of Kosti (just north of the border with South Sudan) due to actions taken by the government of Sudan that prevented their timely release.

LACK OF OPTIONS FOR SURGE ENGINEERING CAPACITY

In South Sudan, the mission was unable to fill the significant capability gap created by the absence of one MEC and the caveat of another. As explained above, this lingering gap has had enormous effects on mandate implementation, while also costing the UN financially given the resulting over-reliance on helicopter transit. The engineering gap went unaddressed for several reasons. An obvious one is that the mission never actually knew when the Koreans would deploy or when the Japanese would lift their caveat, so mission leadership optimistically continued to wait. More importantly, however, the mission was constrained by a lack of feasible contingency options to fill the gap. A 2010 meeting between UN Procurement Division and DFS focused on the lack of engineering surge capacity for peacekeeping missions. An outcome of this meeting was the intention of the parties to develop a workable contract for engineering surge capacity, something that has yet to occur.

A related need for engineering surge capacity is to allow the UN to rapidly start up (or expand) missions within ninety days of a Security Council resolution, something it has always had a hard time accomplishing. The most visible effort at present is through the "modularization" concept envisioned as part of the Department of Field Support's Global Field Support Strategy. As DFS puts it, "missions will be deployed more rapidly to the field owing to the use of predefined service packages, standard funding models and streamlined recruiting practices."[22] The strategy envisions the development of "a menu of modular solutions that will combine equipment with enablers to arrive at service packages to meet mission needs."[23] In practice, this would mean having the designs and materials to set up 1,000-, 200-, or 50-person camps at the ready, presumably in stock at the Regional Service Center in Entebbe or the Global Service Center in Brindisi, and a global service contract to ship the materials to a new mission within thirty days.

According to DFS, three modular camps were constructed in Mogadishu for the UN support office for the African Union Mission in Somalia, but "pilots of modules as part of the UNMISS start-up in South Sudan were not carried out as a result of regional redistribution of assets from liquidated UNMIS and MINURCAT missions."[24] Assuming there are stocks of materials ready to be shipped from Brindisi or Entebbe, the remaining obstacles to rapidly-assembled modular camps are, first, the often slow and complex land acquisition process; second, ground preparation; and third, having a reliable, trained labor capacity to assemble the camps. For the last two tasks the UN would need either an MEC already deployed (or on standby) with heavy equipment and trained to put together prefabricated camps; or a commercially contracted vendor, or UNOPS, on a standby contract. (An alternative could be for the UN to purchase its own heavy equipment and spare parts, stored in Brindisi or Entebbe, to be used by either commercially contracted operators or a TCC unit of engineering operators).

There are a few potential options (civilian and military) for engineering surge capacity. Many of these options are unavailable at present to a peacekeeping mission, and still others might only be available in the right political context. A selection of these options and related challenges to their effective use is described below.

Military Engineering Standby Surge Capacity

On the military side, strict troop ceilings prevent a temporary influx of military engineers during mission start-up or when other circumstances make it necessary. To keep below the troop limit, a mission would have to adjust its ratio of military personnel (infantry versus enablers), which proves difficult given that infantry are also sorely needed during mission start-up. Military capability studies are periodically conducted by UN Headquarters to assess such needs, but rarely lead to dramatic changes in the composition of its military component. Even if they did, the process of generating new, different military capabilities is a long one, and the costs (political and financial) associated with rotating out certain units and equipment and rotating in different ones is significant.

To shorten the force generation and deployment timeline, the UN Standby Arrangement System (UNSAS) was created as a repository of potentially available member-state capacities on standby for use in peacekeeping. The system has never worked as a rapid-response mechanism but rather exists as a way to induct new troop-contributing countries (via the UNSAS MOU). In its present state UNSAS would need to be wholly repurposed to be useful for the identification of rapid-response peacekeeping capabilities.

Even when willing TCCs with engineering capacity are identified, however, it still takes some time to negotiate an MOU and arrange for the movement of personnel and heavy equipment across oceans. The ideal scenario is therefore to find military engineering TCCs that can (and are willing to) self-deploy. This is a very small subset of member states, however, given the scarcity of large transport aircrafts available and the prohibitive cost of airlifting major equipment. If, then, military engineering capability were put on standby for the UN by a member state or group of member states

22 United Nations Secretary-General, *Third Annual Progress Report on the Implementation of the Global Field Support Strategy*, December 2012, UN Doc. A/67/633.

23 United Nations Secretary-General, *Global Field Support Strategy*, January 2010, UN Doc. A/64/633.

24 United Nations Secretary-General, *Third Annual Progress Report*.

with self-deploying capability (or stationed in Brindisi or Entebbe in a reserve capacity), it would become an ideal start-up or surge option.

TCCs that do not want to remain in a UN mission for an indefinite period of time and prefer to deploy for one year only may find a time-defined role (a "bridging" role) attractive. There is some precedent for this, but it involved a partnership with a regional organization for rapid mission start-up. Specifically, in 2008 the European Union deployed a one-year-long bridging force that initially included a heavy engineering capability. It thus successfully prepared a number of camp sites, which were later turned over to the UN's second mission in the Central African Republic and Chad (MINURCAT II). The EU force was not, of course, on standby for the UN, but it was able to rapidly deploy. These engineering units also enjoyed other advantages to UN military engineers: they were able to self-protect, and the force had no funding limitations for high-quality construction materials.

One complication regarding standby capabilities is that the composition of the capability and the financial arrangements would need to be negotiated in a generic context, and therefore the mix of equipment that the unit has ready and deploys may not be exactly what is required for a particular mission. (In one way or another, the four MECs that provided the surge capacity to MINUSTAH after the earthquake all had issues in this regard). Furthermore, some TCCs would want to retain control over which theaters or countries they deploy to, based on security considerations and national interest—as is the case for most contributions of military units to peacekeeping. However, should such an arrangement be agreed to with certain engineering TCCs ahead of time (and with the possibility of adjusting the list of equipment somewhat, based on the specific circumstances and terrain), it would likely be the ideal surge engineering option.

Inter-Mission Cooperation

Inter-mission cooperation (IMC) has steadily been gaining acceptance among member states as a way to share peacekeeping assets among missions in the same subregion when urgent needs arise. Having one engineering battalion within a subregion supporting multiple missions might produce cost savings and serve as a mechanism for rapid-response engineering capacity. However, IMC has until now only been used in situations of potential security crises rather than for support enablers, such as engineering (the transfer of attack helicopters and infantry from Liberia to Côte d'Ivoire during the 2010–2011 post-election crisis, for example). In addition, many TCCs are still hesitant to commit their assets beyond one area of operation within one country, let alone across several countries. A debate on IMC was held in the Security Council in December 2012. One area of cooperation cited in the meeting's concept paper was to achieve "efficiency gains or savings through the sharing or pooling of logistical, military or other assets."[25]

In practice, there would need to be adequate financial incentives developed in exchange for contributing a flexible asset designed for IMC or put on standby and rapidly deployed. In this regard, in 2013 the secretary-general's report on the implementation of the recommendations of the Senior Advisory Group on troop reimbursement rates outlined the circumstances for a premium (up to 15 percent) to be paid for the provision of key enabling capabilities that have been persistently missing in a particular mission.[26] Such a premium is a step in the right direction and might help influence some countries to prepare engineering capabilities for UN deployment, but it is not clear at this point if the payment could be used to reward IMC or standby contributions.

Commercial

An alternative to using military engineering for surge capacity would be to contract with a regional or international commercial contractor—providing equipment and operators to different UN missions. Unlike with the military capabilities, this option would not depend on finding TCCs with the political will to contribute high-quality engineering capabilities without caveats or delay, or with the ability to self-deploy. It is also possible

25 This concept paper was drafted by the Permanent Mission of Morocco to the United Nations in its capacity as chair of the Security Council Working Group on Peacekeeping Operations and dated December 2012. It is not publically available.

26 United Nations Secretary-General, *Implementation of the Report of the Senior Advisory Group on Rates of Reimbursement to Troop-Contributing Countries and Other Related Issues*, January 29, 2013, UN Doc. A/67/713.

to hold commercial contractors responsible financially for the quality and timeliness of their work (unlike TCC units).

At the same time, given UN procurement rules and timelines with processes sometimes lasting more than twelve months for large contracts, the commercial route for major engineering has not been an ideal one for missions in search of quick engineering capabilities. Rather than missions contracting on an ad hoc basis, then, DPKO/DFS would need to establish a global systems contract. Developing such a broad, expensive contract with one firm has also proven to be difficult given the strictures of the UN procurement system. However, even if the Secretariat were able to establish a global systems contract with an international construction firm, it is unlikely that the firm would agree to operate in every environment in every peacekeeping mission given safety concerns.[27] It is also unlikely that the firm would be able to guarantee deployment of its equipment to any area of the world within an acceptable time period.

UNOPS

A related option is to engage the services of UNOPS for surge engineering capacity. In 2010 the General Assembly "reaffirmed the role of UNOPS as a central resource for the United Nations system in procurement and contracts management as well as in civil works and physical infrastructure development, including the related capacity development activities."[28] Although the UN Secretariat and UNOPS have had a framework agreement in operation since 2008, it has primarily been utilized in peacekeeping contexts in a limited manner, typically only for mine action projects. There have been ongoing discussions within the UN over the last few years regarding the possibility of using UNOPS to fill the gaps in start-up or surge engineering project needs to augment existing capacity for UN peacekeeping missions. UNOPS could pre-arrange support with one or several commercial contractors for ground preparation work in any new or current mission and, if possible, take advantage of local contractor

Members of the Brazilian engineering battalion of MINUSTAH assemble a bridge to improve access to Boucan Carré, a small village 60 kilometers north of Port-au-Prince, in October 2009. UN Photo/Marco Dormino.

27 The United Nations Support Office for AMISOM at one point tried to use a firm under a systems contract with the UN, but because of security concerns the contractor would not work in Mogadishu unless a prohibitively high premium was paid for private security.

28 At its annual 2013 session, in decision 2013/23, the executive board of UNDP/UNFPA/UNOPS called on United Nations system organizations to actively seek efficiency gains through greater collaboration, taking into account the competitive advantages of UNOPS in its mandated areas of expertise: procurement, infrastructure, and project management, including provision of implementation, transactional, and management advisory services.

capacity. UNOPS could manage the ground preparation project and provide the labor and management for the construction of modular base camps. DPKO and DFS would be able to call on UNOPS to augment mission capacity in the start-up phase and when other projects arise that fall outside of the scope of responsibilities or available capacity of MECs.

Despite some heads of mission urging field support to further develop this type of operational partnership with UNOPS, progress at UN Headquarters on this front has been stalled, due in part to concerns by the UN Procurement Division. The first set of concerns centers on the differences between UN Secretariat procurement rules and UNOPS procurement rules. The procedures are similar (both rules are based on the principles of fairness and best value for money), UNOPS procurement rules are acceptable to the UN Board of Audit, and the results are acceptable for use by the UN for joint procurement, according to the UN financial rules. However, the UN Procurement Division is concerned that UNOPS' procurement rules do not include the requirement to advertise requests for proposals internationally and tend to have shorter bid periods. While this has the benefit (attractive to mission leaders) of facilitating quick responses to engineering and infrastructure requirements of the mission, this same feature concerns some in the UN Secretariat headquarters, who think that the use of UNOPS is not thorough enough and amounts to a bypass of well-established UN DPKO procurement rules. Both organizations can cite a handful of prior experiences working together in which the communication was poor or changes to the project design or circumstances led to sub-par results. However, there is considerable goodwill on the part of DPKO, DFS, the engineering section, and other offices to use UNOPS more as a consistent implementing partner, to augment existing capacity, if a more streamlined and consistent mechanism for partnering can be found.

Challenges in Mission Consolidation Phase

Engineering activities for a UN field mission in a steady-state or consolidation phase are different from those during mission start-up, and generally involve more maintenance-type tasks (including maintenance of camps and supply roads) rather than major horizontal and vertical works related to the preparation of sites and erection of facilities.

This can allow the use of mission's military engineering capacities for other types of projects, including some humanitarian and development projects in support of the host state and its population. Such projects are undertaken provided that the mission has "sufficient" or "excess" engineering capacity (meaning all basic mission support engineering tasks are fulfilled), sufficient budget and/or materials available, and that the projects fit within the overall mandate of the mission.

However, such expanded scope of work beyond traditional mission support roles creates a new set of challenges for the UN mission and its leadership, in terms of prioritization and tasking, the acquisition of materials, the coordination of the work of military engineers with others within and outside the mission, and the design and execution of the projects—including in partnership with other organizations.

These challenges are analyzed in detail in this section of the report using lessons from Haiti, where, following the January 2010 earthquake, the five-year-old UN mission received an additional four military engineering units (in addition to the two it already had) and an increase in its overall budget. But it was also given additional tasks for its engineers (under Security Council Resolutions 1927 and 2012[29]) to assist the government of Haiti in rebuilding its infrastructure—and later in mitigating the spread of cholera. MINUSTAH therefore became a laboratory for this "new role" of military engineering units in peacekeeping.

29 UN Security Council Resolution 1927 (June 4, 2010), UN Doc. S/RES/1927, and UN Security Council Resolution 2012 (October 14, 2011), UN Doc. S/RES/2012. Security Council Resolution 1927 recognized "the need for expanded assistance by the international community to the Government of Haiti in order to allow State institutions to continue operations, provide basic services and build State capacity, and acknowledging the valuable supporting role MINUSTAH can play in this regard" and "encourage[d] MINUSTAH to provide logistical support and technical expertise, within available means, to assist the Government of Haiti, as requested."

PRIORITIZING, TASKING, AND INTERNAL COORDINATION

One of the challenges MINUSTAH has wrestled with since acquiring additional military engineering capacity has been how to make the best and most use of it, and avoid valuable engineering equipment sitting idle in camps when the needs are so great outside.

Prioritizing

Faced with many requests for engineering and other kinds of support from UN humanitarian agencies and NGOs, as well as the government of Haiti, MINUSTAH initially managed these through its Joint Operations and Tasking Center (JOTC), which was created immediately after the earthquake (and ended in June 2012). The JOTC functioned as a hub for all outside requests for military or police assistance to the mission; it assessed and prioritized these, and then allocated resources based on site surveys and humanitarian cluster leader priorities. This mechanism enabled NGOs to remain independent from direct military engagement and enabled the military to manage the requests for assistance.

As MINUSTAH reorganized itself and the additional military engineering companies started arriving, the mission created a more formal mechanism in mid-2010 to review outside requests submitted through the JOTC or MINUSTAH's regional offices: the Prioritization Review Committee (PRC). The PRC was chaired by the mission's chief of staff and tasked to review these requests and advise the special representative of the secretary-general (SRSG) on whether or not the mission's military engineering assets should provide support. While both military ("U8" branch[30]) and civilian engineers were present on the PRC, the lack of criteria for prioritizing one project over another, the limited knowledge of the actual military engineering capacity of the mission (what it could or could not do), and the fact that these did not feed into a six to twelve month work plan led to a largely ad hoc and inefficient approach, which sometimes raised expectations of requesters without the mission being able to deliver afterward.

While support to the government of Haiti had been a mandated activity since the earthquake, mission priorities requiring engineering support had not been clearly laid out. The new SRSG and director of mission support (DMS) therefore decided to articulate the four priority areas for the mission in terms of its engineering support to the government of Haiti.[31]

Tasking and Command & Control Arrangements

As an attempt to improve both prioritization and tasking, MINUSTAH established the Mission Project Cell (MPC) in September 2011. The MPC was conceived of as a tool for the efficient management, planning, coordination, and tasking of the mission's military and civilian engineering "pooled" resources, according to the standard operating procedure for the MPC issued by MINUSTAH's Division of Mission Support in October 2011. The idea was to bring together the military and civilian engineering capacities of MINUSTAH under one structure—pulling staff from the engineering section and MEC liaison officers—under the overall tasking authority of the director of mission support (DMS). The MPC was initially headed by a civilian consultant, with the U-8 (military engineering) chief as his deputy.

According to both MPC staff and the MECs, the MPC has contributed to better coordination between military engineering companies (with heavy equipment and manpower the rest of the mission lacks) and the civilian engineering section of the mission (which purchases and allocates materials for engineering projects). One of the main achievements of the MPC has been a much more efficient tasking and monitoring of the mission's military engineering companies, which led to an increase in the average utilization rate of MECs by approximately 30 percent.[32]

30 The U-8 Engineering Branch was created in Force Headquarters in August 2011 to better align the mission to contribute to long-term reconstruction and development efforts within Haiti.

31 These four priorities were articulated in an internal mission memorandum dated September 30, 2011, as follows: "(1) Mitigating the effects and limiting the spread of cholera in Haiti through water treatment, well-digging and effective waste management projects; support of health services projects; (2) Ensuring safety and security… through the implementation of street lighting projects… ; (3) Improving traffic flow through the rehabilitation of infrastructure including roads, bridges and drainage, bearing in mind that the Mission's mandate does not allow for large scale road works… ; (4) Providing support to the GoH in efforts to strengthen the rule of law, eg through projects to construct Tribunaux de Paix in the regions as well as infrastructural/equipment support to different GoH institutions in Port-au-Prince."

32 This figure is an estimate given by MINUSTAH staff during interviews.

Members of the Chilean and Brazilian contingents of the United Nations Stabilization Mission in Haiti (MINUSTAH) construct a new road to the general dump in Port-au-Prince on September 8, 2009. UN Photo/Logan Abassi.

In MINUSTAH, the director of mission support—through the MPC—has tasking authority over MECs, but the force commander (or his deputy) co-signs tasking orders for the units. UN command and control ("C2") arrangements formally place MECs, as military units, under the operational command of the force commander. But in a peacekeeping context and particularly during a consolidation phase, MECs have become an integral part of the overall support capacities of the mission rather than only a military enabling capacity; they are therefore tasked by the support component of the mission.[33] The peacekeeping mission in South Sudan (UNMISS) also gives mission support the authority for overall tasking of MECs (through the DMS, delegated to the chief engineering officer), as part of the mission's overall engineering work plan.

The willingness of MECs and their commanders (and the TCC more generally) to be flexible and to do what the mission requests is always an essential part of the capability a unit brings to the mission. A key tasking/C2 challenge, however, comes from the fact that some MECs occasionally undertake their own projects, potentially outside the scope of the mission mandate and tasking orders, therefore diverting mission engineering capabilities and creating coherence and liability issues for the mission (see the next section). Whether this issue would be better addressed with differing command and control arrangements is doubtful, as the problem originates in TCC capitals and would need to be addressed at the political level.

Coordination Within the Mission

While the creation of the MPC improved the efficiency and focused the agenda of the MECs, some substantive sections of the mission (political affairs and civil affairs) raised the need for greater coordination between MINUSTAH engineering works and other activities of the mission. This was of particular concern when the MPC first took over the prioritization function previously held by the PRC. At that time, the MPC may have agreed to certain projects without sufficient coordination with the rest of the mission. Substantive sections were not represented in the MPC at its inception (although the civil affairs section had been invited to participate), which made the MPC look like a purely technical entity. In practice, the MPC's decisions can have significant political implications.

33 Under any exceptional circumstances, the force commander retains the ability to directly task all military enablers, including MECs.

Internal mission coordination was strengthened six months after the creation of the MPC by creating a new oversight and decision-making body called the Programme Implementation Task Force (PITF) and composed of mission leadership—including the two deputy special representatives of the secretary-general (DSRSGs), the DMS, and the force commander. The PITF effectively replaced the PRC and met every second month, on average, to discuss the projects that would cost more than $50,000. Some of the same issues that existed in the PRC remain, however, as this is still a demand-driven system in which the mission leadership does not always have a clear picture of what the mission's overall engineering capabilities are (i.e., if we undertake this road project, what other projects are we not able to do?). This situation arises in part due to the absence of an overall plan for mission projects with clear resource allocation (of MECs and budget or materials) that is based on mission priorities.

An additional concern was that the MPC initially intended to oversee all mission projects, including the civil affairs section's quick impact projects (QIPs) and community violence reduction (CVR) projects, rather than only those involving the use of MECs.[34] Both the civil affairs and CVR sections objected to this proposal, however, arguing that their projects were smaller in scale with already well-defined but different objectives (focused on hiring local labor rather than using heavy equipment), and therefore should not be under the MPC's purview. In the end, it was decided that the MPC would almost exclusively oversee and task MEC projects, not QIP or CVR projects. In 2012, an estimated 90 percent of the tasking done by the MPC concerned MECs, as they represent the bulk of the mission's engineering capabilities, and the MPC estimated that 70 to 80 percent of MECs were used for projects in support of the government of Haiti.

FUNDING PROJECTS

One of the main limitations of using MECs for non-mission support projects is that the mission does not necessarily have money in its budget to purchase the construction materials required to undertake such projects. Sometimes the UN mission can purchase (through its assessed budget or some kind of ad hoc trust fund) and provide these materials, such as gravel or laterite, to the MECs. When it is not the mission, an external partner (UN agency, nongovernmental organization, or the host government) may be able to provide materials. In a few instances a TCC has provided its MEC with a small budget of its own (usually under its "CIMIC" budget for civil-military coordination).[35] All of these funding options present opportunities and challenges.

Funding Projects Through the Mission Budget (Assessed Contributions)

As highlighted above, after the January 2010 earthquake in Haiti MINUSTAH found itself in the unique situation of having not only extra military engineering capacity but also additional funds that its new mandate allowed it to use toward non-mission support engineering projects. However, UN missions are not currently configured to do this. The long budget cycle and slow procurement process for missions (projects need to be included in the "mission acquisition plan" from the outset) require advance planning that is often not possible for small-scale, demand-driven engineering projects.[36] Mission budgets are also not configured for the kinds of adjustments often required during the implementation of complicated engineering projects.

This procurement of materials is done by the civilian components of the mission, through the civilian engineering section (made up of about 150 international and national staff in MINUSTAH), which is responsible to UN auditors for the use of all funds and materials. In addition, the procurement of materials for the MECs represents additional work for the civilian engineering and procurement sections, which were not compensated with additional capacity when the surge of MECs arrived following the earthquake. The civilian engineering section therefore finds itself struggling to meet both mission support require-

34 This was reflected in the internal mission memorandum of September 30, 2011, which indicated that for one year, "approximately USD 22 million has been identified from the Mission budget, which could be broadly used in support of the GoH. This includes USD 7.5 million and a portion of USD 9 million in QIPs and CVR funding respectively, as well as USD 6 million in financial support for the six military engineering companies deployed to MINUSTAH."

35 Every TCC/military unit deployed in a UN peacekeeping mission is required to carry out civil-military coordination, or "CIMIC," activities under the MOU, but their respective CIMIC budgets vary greatly.

36 For instance, it was said that it took MINUSTAH eight months to procure a water treatment plant as part of the response to the cholera outbreak.

ments and additional MPC requests to support outside projects.

Some mission staff continued to caution the use of the mission budget (assessed contributions) on projects outside of traditional mission support, despite MINUSTAH's Security Council mandate to support the reconstruction effort. As one staffer put it, "If we have spent funds on materials for external projects, then we will suffer internally," and "when IPSAS will kick in, it will be more difficult to do this."[37] Leaving aside the question of whether assessed contributions should be used for non-mission support projects,[38] the fact that mission support and outside projects are drawn from the same budget can lead to a lack of clarity on the total amount dedicated to each.

As MINUSTAH entered a consolidation phase in late 2012, its engineering capacity was reduced by two MECs (Japan and Korea) and the mission was asked to cut its overall budget by $250 million (likely meaning cuts to both the civilian engineering staffing and the money available for projects). Because of such cuts, it is unlikely that the MPC could continue implementing non-mission support projects at the previous level. Some have argued that the opposite approach should be taken—that as the UN peacekeeping mission prepares to leave, instead of going back to pre-earthquake levels of engineering capacities and budget, the consolidation and drawdown phase requires more engineering capacities (although not necessarily military) to support national counterparts and the UN country team in their peacebuilding projects.

Short of a dedicated budget for non-mission support engineering projects within the mission, MECs can support existing mission projects that have their own budget as outlined in the example involving MINUSTAH's community violence reduction section in box 1.

Funding Projects Through Trust Funds

From a transparency and accountability standpoint, using a trust fund would help separate the assessed budget dedicated to mission support from

Box 1. Military engineering support to MINUSTAH's community violence reduction section

One positive example of synergies between a substantive section of a peacekeeping mission and its military engineers is MINUSTAH's "Wharf Jérémie" project. The community violence reduction (CVR) section of MINUSTAH is the only substantive section to run its own trust fund, which received an increase in its budget from $3 million to $14 million after the earthquake. While all CVR projects are aimed at involving local communities and hiring and training local labor, in this case the section needed MINUSTAH's MECs and their heavy equipment to help with the clearing of ravines and sewage, and for installing solar panel for street lights (which CVR had purchased). The use of machines was only a small part of the project, however, as CVR also hired many members of the community and ensured follow-up afterward in terms of the social impact and sustainability of the project.

This was a win-win situation as it helped improve the image of MINUSTAH military staff in these communities (where MINUSTAH also carries out robust operations against criminal gangs, in support of the Haitian police), at small expense to the mission budget. As one CVR staff member put it, "not using military engineering capability would be mismanagement, because the mission already has it available."

Unlike the mission's engineering projects, CVR plans all of its projects well in advance, obligating funds the first year and completing the projects the following year. Each CVR project proposal is reviewed by the Project Appraisal Committee composed of the heads of most of MINUSTAH's substantive sections (and subsequently approved by the SRSG, after modifications if necessary) to increase coherence and impact.

37 The UN's adoption of the International Public Sector Accounting Standards (IPSAS) is meant to strengthen transparency and accountability in the management of its assets and to help make more informed financial decisions.

38 The original CIVCAP report called for "flexibility for missions to undertake programmatic tasks" using its assessed budget.

the (more voluntary) funding dedicated to projects in support of the government and UN agencies. Peacekeeping mission trust funds are rare in practice, however. UN missions are not necessarily well configured to manage such trust funds, in part due to the overhead charged for voluntary contributions to mission trust funds (which is being harmonized with UN agencies, from 13 percent down to 7 percent), as well as the fact that the trust funds do not come with the procurement and other support staff to manage such additional budgets. Trust funds for peacekeeping missions are rare also because member-state donors tend to prefer to give directly to UN agencies or NGOs, rather than a UN peacekeeping mission, which they've already given money to as part of their assessed contributions to the peacekeeping budget. Some member states also believe that these kinds of projects should be completely managed and implemented by development professionals, rather than a UN peacekeeping mission, which should be focused more on politics and security.

Funding Projects with TCC Money

While all contingents serving in peacekeeping are asked to undertake modest CIMIC activities at their own expense, a few contingents and MECs come to the mission with considerable additional resources. They may decide to use their own resources to purchase materials to undertake larger-scale projects, such as the building of a school or a clinic. This was the case for MECs from Japan and the Republic of Korea in both MINUSTAH and UNMISS. The South Korean MEC had recently arrived in UNMISS with an annual CIMIC budget of $1 million, while the Japanese MEC brought an accompanying support element with a separate office in Juba tasked with liaising with the South Sudanese government on projects. While these budgets can be used to purchase materials toward engineering projects, such projects can be undertaken outside of the framework of the UN mission. In so doing, they could represent a diversion of mission resources, as the MECs are not necessarily supporting the work of the mission while committed to other bilateral works.

Partnering with UN Agencies for Projects

Given the challenges highlighted above, partnerships with UN agencies, the host government, or NGOs—in which the partners fund the projects—is often the ideal scenario for leveraging MECs for non-mission support projects.[39] Such partnerships are in many ways a win-win situation for all parties.

MECs have a niche capacity, and they can have a multiplier effect by contributing heavy equipment (with equipment operators) for short, targeted periods of time. The partners would otherwise have to contract or rent the equipment at very high costs and with delays, provided such capacities are even available locally. In this situation, the UN agency or NGO brings not only the materials needed but also the project management expertise; procurement; flexible modalities and tested systems to hire (and pay) local labor;[40] and the ability to monitor and evaluate projects during and after—to ensure some level of sustainability. In addition, some of these UN agencies and NGOs bring a longstanding relationship with government counterparts and local communities, which the UN mission does not necessarily have due to its shorter lifetime.

The benefits of such a partnership are well illustrated by the collaboration between MINUSTAH MECs and UNOPS on infrastructure projects in Haiti. According to UNOPS, on one project (detailed in box 2), the support of the MECs allowed it to save about 40–45 percent of the project budget and to reinvest that money into hiring more local labor. Overall, the estimated monetary value of MINUSTAH's in-kind contribution to UNOPS projects since 2008 is nearly $1.5 million, not including the land preparation for the construction of the Gonaives Departmental Hospital (at negligible additional cost to the mission, since it was paying for the personnel and equipment regardless and did not have critical mission support needs to attend to in the last two years). MINUSTAH has also supported UNOPS at times with security—military escorts, site surveillance, etc.—that has enabled it to operate in higher risk areas of Port-au-Prince, such as Cité Soleil and Martissant. Similarly, UNDP indicated that it saved

39 The MPC eventually decided only to accept requests from UN agencies (including UNOPS and UNDP), IOM, and OCHA, but not direct requests from NGOs.

40 UN agencies have more flexible payment terms and can pay local labor on a daily basis. In contrast, UN missions can only employ local labor under "individual contractor" (IC) contracts, which require a more complex hiring process and for which costs are much higher for the mission.

time and about $50,000 thanks to MINUSTAH MEC land preparation for a project building a maritime base for the Haitian Coast Guard, which MINUSTAH is also supporting with training.

Box 2. UNOPS contribution to "16/6 Project" gets multiplied thanks to MINUSTAH MECs

The 16/6 Project aims to rehabilitate and rebuild sixteen neighborhoods that were seriously affected by the earthquake in Haiti, thereby facilitating the return of 5,000 families living in six camps for internally displaced persons. It is a government of Haiti project, supported by the United Nations (UNDP, UNOPS, OIM, and ILO). As part of this project, UNOPS designed and built earthquake-proof houses and roads using labor from local communities. However, the building of roads required land preparation that only heavy equipment could do, which would have needed to be leased at high cost, using limited project funds.

UNOPS therefore called on MINUSTAH MECs for assistance with their machine to crush gravel and heavy equipment to prepare the land where concrete roads would then be built using local labor, supervised by UNOPS. On one project, this brought the cost down from $900,000 to $500,000, allowing UNOPS to reinvest the $400,000 to hire more labor on building more roads. UNOPS said that on average, MINUSTAH MECs support allowed it to save 40–45 percent on such projects. In return, the participation of MECs in such community projects could also contribute to improving MINUSTAH's image among Haitians.

MINUSTAH partnerships with UN agencies or NGOs are implemented under the framework of an MOU, which is developed on an ad hoc basis for each individual project. This has created unnecessary delays due to the need for each organization to consult with their respective legal services before signing such an MOU.[41] In the case of the above mentioned 16/6 Project, for instance, MINUSTAH and UNOPS had to enter a new MOU for each new sub-project (each individual road). While such formal agreement may be needed to provide clearance on a case-by-case basis for partnerships on projects with non-UN entities, such as NGOs, an umbrella agreement between missions and UN agencies to facilitate partnership would save time and money.

There are many examples of successful win-win partnerships between the mission and the UN agencies; yet, not all projects supported by MINUSTAH MECs present obvious added value for the mission. With high demand for such MEC support, missions must establish—and stick to—clear priorities and decision-making processes for the use of these important enablers.

RISK OF UNDERMINING THE LOCAL COMMERCIAL MARKET

The risk of MECs doing work that could be done by the local commercial market is often brought up as an issue of concern, including by member states that have raised the issue of the possible crowding out of local contractors by MINUSTAH. However, this concern is misplaced in Haiti, particularly in light of the immense needs and the lack of appropriate Haitian contractors. Commercial contractors—whether Haitian or international—bid to implement Haiti's larger infrastructure projects (main roads and larger buildings), which are outside the scope of the capabilities and the mandate of MINUSTAH's MECs. The January 2010 earthquake damaged the capacity of Haitian commercial contractors. At the time, it was estimated that with the existing heavy equipment already in country, it would take ten years to clear the rubble. But 80 percent of the debris had already been removed by the end of 2012, due in part to the influx of heavy equipment that came with commercial contractors—mostly from the Dominican Republic and the United States. These international contractors represent a much bigger threat to local Haitian markets than the MINUSTAH MECs, which provide short-term and small-scale support to UN agencies, NGOs, and the government of Haiti, and, in essence, are deployed to support the military activities as their primary task.

41 For instance, one UNDP staff member indicated they may have to pull out of a joint project with MINUSTAH (helping with land preparation and installing prefabricated buildings purchased by UNDP) in support of the Ministry of Justice due to delays in finalizing an MOU between MINUSTAH, the Ministry of Justice, and UNDP.

Following the destruction of the Haitian Parliament in the January 2010 earthquake, construction workers build a temporary Haitian Parliament facility with funds from MINUSTAH in March 2011. UN Photo/Logan Abassi.

With that said, UN missions could be more conscious of the need to work with and build the capacities of the local commercial market. This is, however, more of an issue with UN procurement rules and procedures than with military engineering companies per se. These concerns have been raised repeatedly, including in the 2011 civilian capacity (CIVCAP) report, which recommended that "United Nations procurement rules should be revised so that they prioritize national capacities and leverage local expertise and comparative advantage where possible."[42] This has not yet happened. Based on UN procurement rules, procurement staff in the missions are not able to prioritize local procurement. However, in many missions, chief procurement officers have led outreach in the local market to help explain the bidding process to local contractors and increase their capacity to bid on and win UN contracts through the normal procurement procedure.

COORDINATING WITH AND BUILDING THE CAPACITY OF THE GOVERNMENT

The consent of the host country is one of the key principles of UN peacekeeping, and adequate collaboration and coordination with national authorities is always a factor of success. In the context of military engineering, this means both ensuring that projects undertaken are in line with government priorities and that consideration is given to the government's capacities to sustain such projects once the UN mission departs.

Coordination with the Government of Haiti

A first issue in terms of coordinating infrastructure projects with a host government is that coordination between a UN mission and the government happens at many different levels (mission leadership, support, and substantive sections—civil affairs, justice, etc.), including for some projects involving engineering-related works. It can happen that an SRSG or another member of mission leadership may agree with a government official on some kind of UN engineering support for a project, without having consulted the engineering section. In MINUSTAH, the vision for the MPC is that it would become a central point of contact for the Haitian government's Ministry of Public Works for engineering-related matters. Others in the mission,

42 Senior Advisory Group, "Civilian Capacity in the Aftermath of Conflict: Independent Report of the Senior Advisory Group," February 22, 2011, UN Doc. A/65/747–S/2011/85, p. 39.

however, pointed to the risk that engineering would then become a "third leg" of the mission—instead of remaining a support function—and believed that the civil affairs section should remain the focal point with local authorities.

Finalizing MOUs with the government for specific projects has led to considerable delays. MINUSTAH is therefore trying to formalize its relationship with the government for engineering projects through umbrella MOUs. For instance, as part of the mission's support to the government in mitigating the effects of cholera, it is finalizing an MOU with the Haitian National Directorate for Water Supply and Sanitation (DINEPA) in the Ministry of Public Works, so that DINEPA will be able to use four MINUSTAH water drilling units.

The Haitian Minister of Public Works privately expressed his frustration with the mission, lamenting the absence of "one person" in MINUSTAH who would be the counterpart for all infrastructure projects. This appeared to be a recent issue resulting from several factors: frequent changes in government personnel,[43] the halting of regular coordination meetings at the ministry (with all international partners, the UN, and NGOs), the lack of a replacement for the head of the MPC, and the fact that MINUSTAH may have at times undertaken projects with local authorities directly without going through the central ministry. UNOPS, on the other hand, had a much more established relationship, in part because a branch of the UNOPS office is co-located within the Ministry of Public Works.

One key issue with making MECs available to the host government is that it can easily lead to unreasonable expectations, given the specific capacities and tasking orders of MECs. For instance, although MINUSTAH had an asphalt plant, horizontal MECs only have the capacity to build limited portions of two-lane roads, whereas commercial contractors are needed for the four-lane roads requested by the government. Another potential risk is that the more the UN does in terms of infrastructure development, the less the government takes on (regardless of the capacity and funds it has). This could limit its experience in developing the systems and management to implement such projects after the UN's departure.

Capacity Building

One of the key issues raised by the Haitian government has been its desire for the UN to do capacity building as part of its engineering support, both for the government itself but also for Haitian commercial companies. The government was particularly grateful for the Japanese MEC that worked with the Haitian Ministry of Public Works toward the end of its deployment. The Japanese engineers trained fifty Haitians selected by the ministry to operate their heavy machinery, and it subsequently donated fourteen pieces of engineering equipment to the ministry for its own use. Japan also left behind a number of spare parts for the machines.

On a smaller scale, upon withdrawal, the Korean MEC donated their base in Leogane, including generators, to the Haitian government (specifically, to the Haitian police, stipulating that the base not be used for military purposes). Ecuador (which also contributes an MEC to MINUSTAH, jointly with Chile and Peru) also runs a capacity-building program in support of the government, but this is outside the framework of MINUSTAH, with the objective of creating a Haitian MEC should there be a Haitian army in the future.[44] A few Haitian engineers are currently undergoing training in Ecuador for one year while the operators are being trained in Haiti.

There is no question that such heavy equipment and training are much needed in a country like Haiti. The minister, for instance, indicated that when he took office he found that 85 percent of the heavy equipment of the state-owned National Equipment Center (CNE)[45] was no longer functional. The above capacity-building examples were, however, the initiative of individual TCCs rather than a specific, coordinated effort by MINUSTAH together with the MECs to build the engineering capacity of the government. Also, there are some questions as to how the donated equipment will be used by the government and whether it will find enough funds for fuel and proper maintenance.

43 For instance, the recent change of minister of environment affected the finalizing of the above-mentioned MOU with DINEPA.

44 See Arthur Boutellis, "What Army for Haiti?," New York: International Peace Institute, November 2011, available at www.ipinst.org/publication/policy-papers/detail/340-what-army-for-haiti.html .

45 The former Préval government had created the CNE (National Equipment Center) to build and maintain local roads, as a way to bypass the Ministry of Public Works, by making it respond directly to the presidency.

With better coordination between the UN and TCCs, the impact of such training and donation of equipment could be amplified in the future. Such generous donations from TCCs would also save the UN the costs associated with repatriating heavy engineering equipment back to the TCC's capital. (The UN shipped the Korean engineering equipment from Haiti to Korea, onl y then to deploy much of the same equipment to South Sudan a few months later when Korea deployed its MEC to UNMISS).

Cross-Cutting Engineering Challenges

COSTS AND BENEFITS: MILITARY VERSUS CIVILIAN ENGINEERING CAPACITIES

Although the overall costs of engineering in UN peacekeeping is an important issue, it is a complex one, and no comprehensive cost-benefit analysis has yet been done to compare differing engineering capacities. The cost of a military engineering company varies significantly, depending on the size of the unit and the type and quantity of major equipment it brings. Roughly, it can go from \$6 million per year for a 175-person company to \$10 million for a full 275-person HMEC.[46] (See the annex for a full breakdown of these costs.) However, for many reasons it would be misleading to try to do a generic comparison of the costs of an MEC to a civilian contractor with similar capacities. Although MEC costs are relatively straightforward, there are no generic contractor rates to use for comparison. Costs vary widely from place to place and from time to time. Relative benefits are also hard to quantify given the differences among TCCs in terms of their capabilities. Contractors can also vary greatly in their quality and reliability. In addition, the benefits to the mission's image of using its military in a visible and constructive way are also difficult to measure. In the end, the decision between using military or civilian capacities for engineering must be made contextually, depending on available commercial and military capacities and prevailing commercial rates.

Military engineering companies form the backbone of any UN mission's overall engineering capabilities. However, given the military engi-

Brazilian military engineers with MINUSTAH use dump trucks to dispose of the debris from their former base in Bel Air, Port-au-Prince, in February 2010. The base collapsed in the January 2010 earthquake, killing seventeen Brazilian peacekeepers. UN Photo/Sophia Paris.

46 This is an estimated cost that includes reimbursements for troops, gear and equipment, personal weaponry and ammunition, the "specialist allowance," allowances paid to troops in the field, major equipment, self-sustainment, rations, water, rotation costs, use of medical facilities, field defense, and fuel. However, the final cost will likely be higher given the recent agreement in the General Assembly to adjust troop reimbursement rates.

neering capability gaps that can arise early in a mission, options for using commercial engineering capacities are always explored at the onset of the mission to fill the short-term gaps and take on projects too small or otherwise ill-suited for military engineering. Such capacities also come with their own set of constraints and could never be seen as a panacea for early mission capability gaps. Strict UN procurement rules and long procurement timelines, as well as the challenge of finding contractors that are cost-effective, reliable, and willing to work in insecure environments, are all issues that limit UN missions' ability to use commercial engineering. Such capacities also come with their own set of constraints and could never be seen as a panacea for early mission capability gaps. Strict UN procurement rules centralize decision making on large contracts and use processes that, while effective in limiting corruption, do not facilitate quick action in the field. As mentioned above, contracts that exceed $50,000 in value can take up to twelve months to finalize. (It must be said that some of the prolonged procurement timelines have to do with expertise and coordination problems in the field, not just with headquarters delays). With some exceptions, this makes the use of commercial capacities to fill urgent engineering needs problematic. The other side of the coin is the limitations of the commercial heavy engineering marketplace. In South Sudan, there was no available capacity in the local market, and regional contractors have proven unreliable at times or unwilling to work (at a reasonable price) in the least safe areas of the country.

In part because of the difficulty of accurately comparing military and civilian costs and benefits, during the initial stages of mission planning the ideal composition of engineering capacities of a mission is not typically analyzed in depth (i.e., what are the total engineering needs, and how much military versus civilian capacities are required?). Yet, understanding the costs and benefits is all the more important in a time of financial austerity. Most mission support staff agree that it is better to have MECs than not to have them, of course. If the mission were to get fewer MECs, they believe it would probably not get increased budget and

Table 2. Pros and cons of MECs (relative to commercial contractors)

Pros	Cons
• MEC capacities are accurately known (or quickly become known). • MECs have their own heavy equipment that has already been transported to the mission area. • The mission can support MECs with additional UN-owned or rented equipment. • Procuring materials, although it may take time under UN rules and regulations, tends to be faster for the UN mission than doing large commercial contracts (because of UN rules and regulations). • MECs supervise their own work (whereas commercial contracts require supervision by UN civilian engineers). • MECs can carry out work in places where commercial companies would refuse to go because of security issues and/or the fact that the project would not be profitable. • MECs working on infrastructure projects can benefit the image of the mission (and the military) in the host country.	• Short rotations (if six months long, only four of those months operational) can limit MECs overall capacity by 25–33 percent. • TCC caveats can significantly limit overall MEC capabilities. • It is difficult to adjust the composition of the unit and equipment list if needs on the ground change (requires MOU revision and difficult/costly transport process). • MECs only do smaller infrastructure projects, and the MECs can take longer than an experienced commercial contractor to complete a project. • MECs can lack flexibility and require new tasking orders when different, additional work is required. • MECs are not responsible for any defects on the project afterward, whereas commercial contractors provide a warranty on the project after completion and can be financially penalized. • MECs are fully paid even when underutilized.

civilian engineering capacities to compensate. At least with a mission support structure designed around MECs, there is a reasonable assurance that the mission will—even during budget cuts—have heavy equipment and operators available. See table 2 for a list of considerations when comparing commercial and military engineering capacities.

COST, THE LENGTH OF DEPLOYMENTS, AND SHORT ROTATIONS

A key issue that reduces the capacity of MECs and increases their costs are the short rotations (six months for many MECs) and in some cases short overall deployment periods (two years, for instance). As detailed in table 3, the cost of the initial deployment and later of repatriation of an MEC are very high (about $2 million). Shorter mission deployment periods make such fixed costs a large part of the annual cost of the unit. These costs can be mitigated if a TCC donates some equipment to the host country (as described above with Japan in Haiti) or redeploys its equipment directly from one UN mission to another if it is still in good working condition.

National Support Elements (NSEs) are equipment and personnel that the TCC decides to bring with a unit in addition to what is agreed to in its MOU with the UN—to strengthen it with additional administration and management capacities or for managing CIMIC activities.[47] NSEs are not included in the MOU with a TCC and therefore are not reimbursed by the UN. While these NSEs should not, in theory, be an additional burden to the mission, there can be some additional, hidden costs to the mission associated with their use of common UN facilities, and they increase the general footprint of the UN in the host country.

Table 3. Cost of a one-time deployment of a 175-person engineering company

Activity	Cost
Painting/repainting	$284,373
Self-provisioning	$127,238
Deployment of equipment	$500,000
Repatriation of equipment	$500,000
Deployment of personnel	$309,111
Repatriation of personnel	$278,244
Total	**$1,998,966**

The relatively short rotation time for most MECs (usually six months, although all units should soon move to twelve-month rotation periods) increases costs, but most importantly reduces the efficiency of that unit. According to MEC staff, it takes them one month after arrival to become fully operational and one month at the end of a rotation to prepare for departure. An MEC with six-month rotations would therefore only be fully operational for eight of the twelve months of the year. This discontinuity can also affect the ability of an MEC to carry out longer projects.

Extending the length of rotations for MECs and for other military units was recommended by the Senior Advisory Group (SAG) on rates of reimbursement to troop-contributing countries and other related issues, and endorsed by the Fifth Committee in May 2013 (although with certain exemptions). The SAG report recommended that "in the interest of effective peacekeeping… the typical rotation period be set at 12 months, except in cases where the Secretary-General determines that operational circumstances and requirements demand otherwise." The subsequent report of the Fifth Committee delayed enforcement of this provision until June 2015 for "individual units currently deployed with rotation periods shorter than 12 months" and for naval forces.[48]

MOBILITY AND FORCE PROTECTION

The manual for contingent-owned equipment, as well as standard MOUs between the UN and TCCs, states that all peacekeeping contingents—including MECs—need to be self-sustained for six months upon arrival in the mission during their initial deployment, "with integral support and maintenance elements, to sustain its operations at the permanent and temporary deployed locations." But it also states that after those six months, the UN mission is obligated to provide the contingents with hard-wall accommodation. Constructing

47 For instance, the Korean MEC in MINUSTAH was running its own clinic, which also provided basic health services to Haitians from the community.

48 "Report of the Senior Advisory Group on Rates of Reimbursement to Troop-Contributing Countries and Other Related Issues," November 15, 2012, UN Doc. A/C.5/67/10, paras. 53 and 108(b), and "Administrative and Budgetary Aspects of the Financing of the United Nations Peacekeeping Operations: Report of the Fifth Committee," May 6, 2013, UN Doc. A/67/858, paras. 4–7.

hard-wall accommodation in every location where a unit is deployed is resource-intensive for the UN mission, and the rule is largely a relic of traditional peacekeeping missions with static deployments, rather than contemporary missions that require mobile and dynamic deployments.

The hard-wall rule, but also the strict interpretation by TCCs of the "area of operation" provision of each MOU, considerably limits the ability of the mission to move contingents around, based on evolving needs in the mission area. This is particularly problematic when a new base needs to be set up and MECs are needed for site preparation. In UNMISS, the mission could not get an MEC in one region to deploy for a short period to work in Jonglei, for instance (where the mission was waiting for the arrival of the Korean MEC).

Force Protection

The fact that MECs can ensure their own protection is often put forward as one of their main advantages over civilian engineers or commercial contractors, which both require additional force protection. The force requirements agreed to by each contributing country state that all personnel in the MEC must have their own defense weapons, such as pistols, sub-machineguns, and/or automatic assault rifles, and be able to protect themselves (usually in up to three locations). In practice, however, most MECs still request force protection by another unit (infantry unit or formed police unit) when operating outside of the immediate vicinity of the UN camps. MECs also require additional force protection when moving equipment from one location to another.

With that said, even if not fully able to protect themselves, MECs will usually be able to operate in riskier locations than UN civilians and commercial contractors (see box 3). Of course, for a high enough price, a contractor can always be found. But the UN mission, host governments, and UN agencies cannot usually afford such a premium.

Box 3. MINUSTAH military engineers help build midwifery school in Cité Soleil

The United Nations Population Fund (UNFPA) in Haiti requested the support of MINUSTAH MECs for a joint project with the Haitian Ministry of Health located at the maternity hospital in Cité Soleil, a dangerous area in Port-au-Prince. The project consisted of rebuilding Haiti's only midwifery school (destroyed during the earthquake) in a neighborhood where no commercial contractor would work due to the security situation in the area. During the time it was doing site preparation and erecting prefabricated classrooms, the presence of MINUSTAH's Brazilian MEC allowed UNFPA to do its work in the adjacent maternity ward and, importantly, put a stop to ongoing nightly attacks perpetrated against the women inside the maternity ward.

THE RIGHT MIX OF CAPABILITIES AND THE IMPORTANCE OF FLEXIBILITY

In the absence of codified standards for MECs, different TCCs bring very different capabilities to UN missions, as well as different ways of working.

The issue of the optimal mix of equipment is a challenging one, because the needs of a mission will vary depending on the tasks required and the terrain in the area of operation. In addition, the needs change during the lifecycle of a mission. In MINUSTAH, the Brazilian MEC indicated that even though all its personnel were working at almost full capacity, it was only using about 45–50 percent of its machines on a daily basis—mostly dump trucks, bulldozers, excavators, loaders, and cranes. Its asphalt plant, compacter, and mixer are less frequently used. Similarly, in UNMISS, support staff complained that the size of the dump trucks provided by the MECs was too small, leading to additional costs and delays. However, changing the composition of an MEC requires lengthy renegotiation with little incentive for the TCC to respond. And because it is typically costly to move heavy equipment, equipment lists and MEC composition are rarely adjusted in the course of a mission, despite capability gaps or changing needs.

Tasking Flexibility

Another issue, which is not unique to MECs and applies to most military units in peacekeeping missions, is the need for a TCC to display flexibility and willingness to take on any job its unit is tasked with—even tasks that are not typically performed by its military back at home. In MINUSTAH, for instance, one MEC reportedly refused to carry out certain tasks, which it considered too basic, such as using its trucks for garbage removal. In contrast, another MEC was highly praised by mission leaders and government officials for being adaptive and flexible in its activities.

STRATEGIC MISSION PLANNING

The limited duration of peacekeeping mission mandates and budget cycles affects the ability of UN civilian and military planners to do strategic planning for engineering. In Haiti, for instance, some agencies plan projects for the next three years, which makes it possible to fundraise, allocate resources, hire staff, and develop coordination mechanisms with the government. In contrast, MINUSTAH only has a one-year mandate and budget, and both could change from one year to the next.

Even with such limitations, it is clear that UN peacekeeping missions should be able to do a better job of developing a strategic plan for the use of their engineering assets. There is a need to shift from a demand-driven approach (based on ad hoc requests coming from government and outside actors) to a forward-looking planning culture. In MINUSTAH, an annual mission engineering master plan, including mission support tasks and non-mission support projects, would allow better budgeting (and procurement) planning. This would in turn facilitate more efficient tasking of MECs over their deployment time and in accordance with their capacities (e.g., heavy equipment). It would help prevent MECs being tasked with activities that others (civilian engineers, local companies, etc.) could easily do (such as erecting prefabricated buildings) or getting distracted with other non-mission activities, such as CIMIC activities.

In the case of UNMISS, better planning would have accounted for the enormous (and often foreseeable) challenges of the start-up phase and the gaps in the mission's military engineering capabilities. Interviews with mission staff made clear the large and continuing gulf between what the substantive side of the mission would like to accomplish and what the support side believes is possible given present limitations (e.g., funding, MEC capabilities, environment/terrain). Previous mission plans proved to be too ambitious in this regard and led to unrealistic expectations on the part of the host government and the international community.

Table 4. Priority engineering needs in different mission phases

	Start-up	**Consolidation phase**
Mission support needs	• Preparation of camp sites and rehabilitation of supply roads are high mission priorities. • Great need for horizontal MECs (supported by LFEs in infantry units). • Civilian engineering units needed to support erection of camps and self-sustainment.	• Most self-sustainment can be done by civilian engineering units (and engineering elements within infantry units).
Non-mission support projects	• MECs provide contingency capacity for use during natural disasters and refugee crises. • MEC mission support projects can serve dual functions in assisting host government in the extension of state authority (e.g., UNMISS CSBs).	• Depending on mission mandate, host-government priorities require support. • Partnerships with UN Agencies needed to ramp up peacebuilding effort. • Need for horizontal MECs (and well-drilling in some contexts).

Box 4. A Brazilian asphalt plant for MINUSTAH

A Brazilian MEC first deployed to MINUSTAH in 2005 with 150 troops, and it increased to 250 troops in 2008. During the MOU negotiation, Brazil offered to provide an asphalt plant as part of its MEC, which is not standard equipment for an MEC in a UN peacekeeping mission. The plant made it possible for MINUSTAH MECs to participate in the *bouche-trous* campaign—a government-sponsored project filling potholes in the streets of Port-au-Prince—and may have contributed to improving the image of the mission. However, the asphalt plant has functioned at very low capacity because it requires the mission to buy expensive asphalt (approximately $50,000 per one kilometer of road) and because it cannot transport asphalt outside of Port-au-Prince. (For one project, the Inter-American Development Bank purchased the asphalt for the MEC.)

In addition, the government of Haiti tends to favor roads made of concrete or *adoquin* (paving) because they last longer in Haiti's heavy rains. MINUSTAH road projects consist mostly in the rehabilitation of "dirt roads" because it does not have the capacity to carry out large multilane projects. Some interviewees therefore believed that such an asphalt plant is not needed in MINUSTAH, unlike a crusher plant (to produce sand and gravel), which has been more useful to the work of this MEC as well as other MECs in the mission.

Recommendations

The following recommendations are intended as ways to enhance the efficiency and effectiveness of UN peace operations in their use of engineering capacities.

1. **Develop rapid start-up or surge engineering capacities.**

Despite the continued existence of debilitating engineering gaps in UN missions, there is presently no rapid start-up or surge engineering capacity available, although several potential options exist. DPKO and DFS should look to develop all of these options for the future:

- DFS should fully implement its vision for rapidly-assembled modular camps, including site preparation and required construction management elements (with or without military engineering capacities) as part of the Global Field Support Strategy, and assess it based on the few trial experiences so far.
- Procurement Division and DFS should renew efforts to develop a workable global systems contract for commercial engineering start-up capacities.
- DPKO and DFS should engage in targeted, strategic outreach to member states or groups of member states to find TCCs with self-deploying capacity that would be willing and able to deploy military engineering capacities either as part of or in parallel to a UN mission start up or surge. As specialized capacities in high demand and low supply, standby engineering capabilities should be paid a premium during their first twelve months of deployment.
- DPKO and DFS should also further explore with member states the possibility of including MECs as part of inter-mission cooperation (IMC) arrangements, as an alternative to standby engineering capabilities.
- DPKO and DFS should develop a generic partnership agreement with UNOPS to augment capacity in start-up or surge engineering project needs for UN peacekeeping missions, where relevant.

Over the last decade, overall accountability throughout the UN peacekeeping procurement chain has been enhanced. However, concerns about delays in the DPKO/DFS procurement processes are increasingly frequent among mission staff and within the UN Procurement Division in New York. Procurement delays can have a significant effect on overall mission capability, impacting its ability to fulfill its mandate in a timely manner or respond efficiently to emerging needs.

- A thorough review of the procurement system for UN peacekeeping should be conducted with an eye toward reducing roadblocks and, perhaps, increasing the procurement authority of the field.

2. Better integrate engineering requirements into mission planning.

Planning for a new mission does not adequately take into account the size and importance of engineering needs during the start-up phase.

- Troop ceilings should be higher during a mission start-up phase to address the increased engineering needs during that period. An early "engineering surge" would have brought significant cost savings in UNMISS and, more importantly, allowed the mission to fully implement its peacekeeping and peacebuilding support mandate during the critical early postconflict window of opportunity.
- In cases where the environmental and terrain challenges are formidable, force requirements for a mission should give higher priority to engineering capabilities for the first twelve months in lieu of higher troop ceilings. (This should include both full engineering companies and light field engineering capacities embedded within infantry battalions that can be rotated out and replaced with infantry at a later stage).

During the initial stages of mission planning, the ideal composition of overall engineering capacities of a mission is not typically analyzed in-depth (i.e., what the total engineering needs are and how much military versus civilian capacities are required based on terrain, availability of local contractors, etc.).

- DPKO and DFS should carry out a study to compare the costs and benefits of military capacities relative to available commercial capacities in different missions.
- Greater efforts should be made by DPKO and DFS together to come to a better understanding of the available engineering options early on during the planning phase for a new mission.

Delayed deployments and TCC caveats severely affect all aspects of a mission's ability to implement its mandate. Too often, politics intervenes during TCC selection and capability requirements become a lesser priority.

- DPKO should not get "locked-in" by an engineering pledge if a TCC has uncertain deployment timelines. Mission planning should always include contingencies for the late arrival of TCC engineering units (and/or their contingent-owned equipment).
- DPKO should reject TCC engineering pledges that include significant operational caveats. The most prized aspect of an MEC's overall capability is its flexibility and willingness to take on any job its unit is tasked with. MECs should have more flexible tasking orders from their capitals, allowing mission leaders to utilize them more efficiently and effectively.
- Whenever possible, and assuming the equipment is still functional, DPKO and DFS should work together with TCCs upon their withdrawal to redeploy their equipment directly from one UN mission to another if possible, rather than sending it back to the TCC capital and then to another mission.

3. Adapt to changing needs in the mission consolidation phase.

Despite the emergence of a specific capability gap or changing needs on the ground, equipment lists and MEC composition are rarely adjusted in the course of a mission. Changing the composition of an MEC requires a lengthy MOU renegotiation with little incentive for the TCC to respond positively. And it is, of course, costly for the UN to move heavy equipment from a mission to a TCC capital and back. However, it is often worth the price in order to adapt to the changing needs of the mission.

- Military capability studies undertaken in a mission should regularly include an assessment of the appropriateness of the mission's military engineering capacities. TCC flexibility in adapting their contingent-owned equipment as a result of these assessments should be encouraged and positively acknowledged by the UN.

In the mission consolidation phase, UN peacekeeping missions should be able to do a better job of developing a strategic plan for the use of its engineering assets, in part to avoid valuable engineering equipment sitting idle in camps when the needs are so great outside. There is a need to shift from a reactive, demand-driven approach (based on ad hoc requests coming from government and outside actors) to a forward-looking planning culture.

- The development of annual mission engineering plans would facilitate this more strategic approach, including in terms of budgetary provisions for construction materials in support of engineering projects.

- This also implies that authority for overall tasking of MECs should reside with the director of mission support (DMS), as part of the mission's overall engineering work plan, even as command and control ("C2") arrangements formally place MECs under the force commander. This would allow for better coordination with the civilian engineering component of the mission, which purchases and allocates materials for projects.
- It is essential that substantive sections (such as the civil affairs and political affairs sections) be consulted throughout the development and implementation of an engineering work plan, particularly when they involve non-mission support projects that can have significant political implications.
- If and when a mission is mandated to undertake non-mission support engineering projects, a dedicated budget (separate from the assessed budget) can provide greater transparency and flexibility. However, such trust funds require that the mission be provided with additional procurement and other support staff to manage these supplementary budgets.

4. Create win-win partnerships to address engineering needs beyond the mission.

UN missions receive many demands from UN agencies, host governments, and others for MEC support. Partnerships with UN agencies, the host government, or NGOs—where the partners fund the projects—is often the ideal scenario for leveraging MECs for non-mission support projects. Such partnerships present many advantages and are in many ways a win-win situation for all parties.

- Missions must develop—and stick to—clear priorities and decision-making processes for the use of these important enablers based on their mandate, mission support priorities, and overall engineering capabilities. Mission leadership (SRSG, DSRSGs, force commander, and police commissioner) also needs to be better educated on the possibilities and limits in the use of military engineering capabilities and the differences between military and civilian engineering.
- Peacekeeping missions and UN agencies should develop an umbrella agreement or standardized MOU for the use of the mission's engineering capacities. This would facilitate more productive partnerships, save a significant amount of time, and lead to cost savings.

5. Build local engineering and private-sector capacity for additional peace dividends.

Based on UN procurement rules, procurement staff in the missions are not able to prioritize local procurement, which has led to a lost opportunity for producing valuable peace dividends.

- As the 2011 civilian capacity report recommended, "United Nations procurement rules should be revised so that they prioritize national capacities and leverage local expertise and comparative advantage where possible."[49]
- Mission procurement officers should be encouraged to continue their outreach in the local market to help explain the bidding process to local contractors and enhance their capacity to bid on and win UN contracts through the normal procurement procedure.
- Host countries would benefit if military engineering companies would engage in more training of local engineers as part of their CIMIC activities. Costs to the UN would also be reduced if a TCC donated (still functioning) equipment and spare parts to the host country upon its withdrawal (as described above with Japan in Haiti). Such contributions to the host country should receive public acknowledgment from the UN.

49 Senior Advisory Group, "Civilian Capacity in the Aftermath of Conflict," p. 39.

Annex

The Cost of Military Engineering Companies

Troop reimbursement (including specialist allowance) represents 25–35 percent of the monthly cost of an MEC, whereas reimbursement for major equipment (or contingent-owned equipment) represents 20–25 percent of the total.

Table 5. Monthly cost of MEC reimbursements

Cost	Number of personnel per unit	Troop cost ($1,028/month)	Specialist allowance ($303 for 25% of troop strength)	Major equipment (COE) reimbursement
Average	212	$218,000	$16,064	$133,762
Lowest	70	$71,960	$4,526	$56,747
Highest	335	$344,380	$25,376	$221,226

Major additional costs include self-sustainment (i.e., food, including fresh food and rations; bottled water; and accoutrements), fuel, and the cost of rotating staff in and out, which is usually spread over a period of a few months to ensure that the whole unit does not rotate at the same time and that there is a handover with the incoming unit.

Table 6. Monthly cost of MEC self-sustainment, fuel, and rotations

Cost	Number of personnel per unit	Self-sustainment (food, rations, water, etc.)	Fuel	Rotations
Average	212	$86,386	$24,458	$63,619
Lowest	70	$27,412	$1,354	$21,000
Highest	335	$135,545	$40,159	$100,500

Fuel costs vary a lot, of course, depending on the size of the unit and quantity of equipment and machines, but also depending on the utilization rate of these units. For instance, in MINUSTAH after the January 2010 earthquake, the six MECs cost approximately $40–60 million a year in troop and COE reimbursement, which is within the average cost of an MEC. However, the mission spent a lot more than average on fuel because the MPC was tasking the MECs heavily (and the mission had the budget to pay for it, at least initially), sometimes spending over $50,000 per month—double the average—on fuel for one MEC.

Table 7. Overall monthly and annual cost of an MEC (excluding materials)

Cost	Number of personnel per unit	Monthly cost	Annual cost
Average	212	$661,345	$7.9 million
Lowest	70	$304,106	$3.65 million
Highest	335	$1,055,261	$12.66 million

These costs do not account for the purchase of materials needed for most engineering projects supported by MECs. While in some cases such materials are provided for free or at low cost from the host government (e.g., gravel and sand in Haiti) or through a partnership with a UN agency, in other cases the host government charges for it (e.g., South Sudan). Other materials simply have to be purchased by the mission because they are not readily available. These additional costs are currently very difficult to estimate—for example, in the case of MINUSTAH such materials were purchased in bulk by the mission for both mission support and project purposes, using the assessed budget.

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