



Photo by SGT Patrick Kirby

An Infantryman with the 1st Battalion, 187th Infantry Regiment, 3rd Brigade Combat Team, 101st Airborne Division (Air Assault), fires at notional opposing forces while clearing a tunnel system at Camp Atterbury, IN, on 7 December 2018.

The Subterranean Combined Arms Fight: A Primer

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The subterranean fight is one that has affected Soldiers since early warfare. Caves were used as hiding places. Tunnels were frequently dug under medieval castles to try and bring down walls (“sapping”), leading to counter-tunneling operations and underground fighting. Indeed, this is where the term “sappers” originated. Tunnels were frequent hiding places and hospitals during the Civil War, most notably during the siege of Vicksburg. Miners dug them during sieges, most notably during the Battle of the Crater during the Petersburg Campaign. World War I brought tunneling to the Western Front as opposing armies attempted to burrow under each other’s trenches. British attempts to blow up German defensive positions during the Somme campaign utilized these tunnels. As the Germans began countering these actions through their own tunnels, frantic, close-quarters fighting erupted when two opposing tunnels converged. During the World War II battles of Berlin and Stalingrad, there was heavy fighting below ground and in subway tunnels. German Soldiers took advantage of the subway system to appear in areas U.S. forces had cleared during the battle of Aachen. Soldiers and Marines

encountered intricate Japanese underground defenses all across the Pacific campaign. Veterans of Vietnam recall stories of underground complexes which Infantrymen had to go into and clear. Recent campaigns in Iraq and Afghanistan also had instances of underground warfare, both against the Taliban in multiple provinces and in insurgent attacks on coalition bases. Despite subterranean warfare appearing as a constant in war, the U.S. Army has only recently attempted to create the doctrine to address this type of fighting.

Organizing for the subterranean fight is much like organizing for an air assault. The smallest level organization that will lead the task force is the battalion. The smallest level that should execute is the company. Although at first glance it may seem that the underground battlefield is solely an infantry fight, as traditional combined arms do not appear to be able to support with lethal effects, subterranean operations require a combined arms task force as much as any other operation. Engineers are vital for the breaching equipment they bring and for the expertise they have in analyzing structures. Chemical Soldiers are needed for their use of sensors that can detect air quality and for anything else that might taint

the air, as well as for possible decontamination depending on the nature of the facility. Tankers and mechanized forces can help secure the surface, and artillery can help provide counterbattery radar to ensure enemy forces do not interdict the master portal with fires. Special operations forces (SOF) such as psychological operations (PSYOPS) can help win the battle before it begins by enticing the defenders to surrender.

Security is the most important principle of patrolling and is the first step in the underground fight. Once the underground facility (UGF) is identified, an outer security cordon must be established to prevent the enemy from interfering with the clearance operation. The forces conducting the clearing operation will have enough of a fight; they do not need to worry about enemy reinforcements coming from above the surface. Next, an inner security cordon must be established. This should encompass as much of the facility's entrances and exits (referred to as portals in doctrine) as possible. A good way to do this is to conduct an above-ground clearing mission to identify not only all portals in the area but also any ventilation shafts, generators, antennas, cameras, etc., (known as "umbilicals") that might connect to the UGF. The locations of any of the umbilicals found need to be shared on the unit's common operating picture. All portals found likewise need to be shared and secured. Umbilicals and portals give the unit the beginnings of a blueprint of how the UGF is designed.

Umbilicals can also allow the task force to shape the battlefield through cutting power, turning off ventilation, or isolating the UGF from its command and control elements. Depending on the operating environment and time available,

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the task force may begin to shape the fight before any forces enter the UGF. Turning off the power supply to the UGF can make conditions unbearable for the defender. Lack of air conditioning or heating can quickly make the defender uncomfortable, while powering off lighting can create feelings of claustrophobia and panic for the defender. The UGF may lose the ability to generate fresh water if electricity powers pumping or distilling equipment. Turning off ventilation may force the defender to make the decision of either surrendering or suffocating as breathable air is slowly replaced with carbon dioxide. At the very least, disabling surveillance equipment allows the task force to reduce the enemy's situational awareness.

With the surface secure, the task force can begin preparing to send forces into the UGF. One portal needs to be the designated master portal and is the main point of entrance and exit for the subsurface force. The subsurface force will need to establish a command post (CP) at this portal that allows the tracking of all Soldiers who are in the

UGF. A good technique is the use of a hook and pile taped board and name tapes. As the Soldiers go into the facility, they hand off their name tapes and are tracked by a radio-telephone operator (RTO) on the board. The company first sergeant and the executive officer (XO) are also at the CP. The first sergeant oversees the casualty collection point, decontamination point (if needed), recovery operations, and accountability from this point. The XO controls overall operations from the surface. He communicates with higher, works with an RTO to update the surface version of the UGF map, and positions in such a way to relay radio signals from inside the tunnel. The commander should go where the majority of the company's combat power resides. If the majority of the company is in the tunnel, the commander should go into the tunnel as well. This will allow the commander to more



Photo by SFC Brent C. Powell

A group of Army Reserve Soldiers from the 327th Chemical Company, 92nd Chemical Battalion, 415th Chemical Brigade, enters a tunnel to conduct reconnaissance of a suspected chemical weapons cache during a training exercise on 20 June 2019.

rapidly make decisions at the point of friction and will help alleviate the breakdown in radio communications that can occur with subterranean fights.

Platoons will need to task organize to best address the nature of the subterranean fight. Communications will quickly become degraded. Casualty evacuation (CASEVAC) becomes a difficult task, as teams will need to carry casualties long distances with little vehicle support and possibly up and down multiple stories. Automatic weapons fire deafens surrounding Soldiers and fouls the air. M240 gunners and antiarmor specialists can be task organized to fill other roles. Key positions to fill include aid and litter teams, runners, FM relay teams, and fire teams. Squads will quickly become jumbled up in the UGF so teams need to be

cross-trained to work with others in the platoon. In order to maintain tempo and initiative, every Soldier must be able to fill any position in the fire team. The more time platoons take to reorganize in the UGF, the more opportunities the enemy has to counterattack or to win back the initiative.

The company must also task organize for some of these same issues in order to address the aforementioned challenges. The task force must be prepared for contingency plans along all warfighting functions. For example, the commander must have a good number of runners available at all time. At least four is recommended, as these will allow the commander to rapidly send messages to underground elements and the surface elements in the case that radio communications fail. Additionally, the commander may want to create retransmission teams to leave at key locations in the UGF to facilitate radio communications with the surface. CASEVAC teams at the company level will need to consider moving Soldiers in gear through long passageways and potentially up and down ladders and stairs.

Platoons and higher also need to have designated mapping personnel. These Soldiers' sole job in the tunnels is to try and build a common operating picture to facilitate command and control in the UGF. This is a difficult task as UGFs do not have the typical reference points many Soldiers use to navigate by. Soldiers chosen to map the UGF will need a good ability to accurately measure distance and will need compasses and a good sense of direction. These Soldiers will draw out scale pictures of the UGF and name corridors, intersections, rooms, and portals in accordance with the unit's standing operating procedure (SOP). Engineers from



Photo by SGT Jessica DuVernay

Soldiers perform evacuation procedures at an underground training facility at Fort Hood, TX, on 18 October 2019 as part of a week-long training exercise.

the brigade's engineer support company have specialty equipment that will aid them in this task. If engineers are unavailable to map, units should have Soldiers identified and trained to assume this role. Platoon mappers will pass on their maps either via runners or face-to-face contact with the company's mappers and the surface CP.

The underground clearance team needs to incorporate Chemical Corps Soldiers as part of the combined arms team. These Soldiers have the training and equipment to test air quality of the UGF. Inhabited UGFs will quickly become breeding grounds for vermin, bacteria, and other vectors and pathogens. Additionally, many UGFs around the world are built to protect resources from U.S. air power. These facilities may include chemical, biological, radiological and nuclear (CBRN) development centers. Chemical Corps Soldiers will be able to test for the presence of CBRN in the UGF. They may also, with the proper equipment, be able to test for breathability of air and aid commanders in determining the protective equipment Soldiers will need before entering UGFs.

UGFs will use a lot of manpower quickly. Massive facilities can culminate with a battalion and still need additional forces. Likewise, it is easy to get lost inside the facility and clear areas that have already been cleared or to double back into friendly forces. Intersections will need to be guarded and can severely degrade combat strength through security requirements on uncleared rooms and corridors. SOPs and senior leaders can help alleviate this pressure. Unit SOPs need to determine how cleared rooms will be marked. This is standard infantry practice. However, care needs to be

taken to ensure there are enough marking devices on hand for large facilities and that they will work in both white light and no light conditions. Chemlights are perfect for this. For example, green can signify clear rooms and cleared portions of corridors; red can be for dangerous areas; and blue can mark casualty collection points. Whichever method is used, markings must be used at regular intervals in corridors, as they will aid in moving through the UGF.

Marking cleared rooms and intersections also provides an additional means of navigating tunnels and allows units to rapidly exfiltrate the facility if needed. There are a variety of reasons a unit may need to withdraw from the UGF. Air quality may become so poor as to be dangerous to Soldiers. The UGF might become so weakened by explosions that the structural integrity becomes compromised and it begins to break down. Whatever the reason, there must be a battle drill in place

to ensure all Soldiers leave the UGF and are accounted for. This drill needs to be initiated with a single proword that is passed through radio communications, runners, and through verbal relay. Upon receipt of the proword, Soldiers repeat the proword and begin a controlled, rapid withdrawal out of the UGF. Security is still paramount. The furthest Soldiers into the UGF begin moving back towards the master portal, collecting the security elements as they fall back. The biggest friction point for an evacuation drill is accountability. As units rapidly withdraw from the UGF, there is the possibility that someone will be left behind. Once the Soldiers on the clearance force exit the master portal, they need to enter a designated holding area until they can file through the control point run by the company RTO. In the event that someone is left behind in the UGF, a properly equipped rescue team needs to be prepared to enter the UGF to attempt rescue.



Soldiers assigned to the 5th Battalion, 20th Infantry Regiment, 1st Stryker Brigade Combat Team, 2nd Infantry Division, prepare to enter an enemy tunnel complex during Decisive Action Rotation 18-06 at the National Training Center on Fort Irwin, CA, on 15 April 2018.

Photo by SPC Daniel Parrott

Another challenge is preventing a unit's Soldiers from doubling back into themselves and creating an increased risk of fratricide. This is done in multiple ways. First, SOPs stating the clearance procedures ensure everyone is going in the same direction. For example, when coming across a T intersection, how does the unit ensure that it knows exactly how to go?

The next way to prevent fratricide is through the use of a continuously updated common operating picture. It needs to be a regular occurrence where platoons and above send their runners with updated maps to their next higher element. In this way, the units are able to show where they have Soldiers and are able to pass on more of an idea of what is inside the UGF. This way follow-on forces know where friendly forces are ahead of them before they go into the tunnel. It also helps prevent units from doubling back into themselves if they encounter a UGF that has corridors that turn back towards itself such as circular corridors or facilities.

Finally, fratricide prevention must take portals into account. The master portal should be the only entrance and exit point for friendly forces. All other portals will have security on them from the surface. This is to ensure that no forces leave the UGF without their higher headquarters having accountability of them and will help prevent the subterranean clearing force from taking the inner cordon by surprise, appearing suddenly out of a portal. There will be times when additional portals need to be opened, such as for CASEVAC purposes

or to bring in equipment or personnel, but this needs to be tightly controlled and heavily coordinated. Communications between the subterranean clearing force and the inner cordon will likely be nonexistent except through the surface CP. Ideally, all friendly forces moving in and out of the UGF will use the master portal. If this is not possible, the task force commander needs to tightly control the use of additional portals.

Breaching will be a common task, especially in specially designed UGFs. Avoid breaching until as much of the facility as possible is cleared since the explosions can weaken the UGF. This may cause portions to break apart, endangering friendly forces. Explosives also foul the air, deteriorating the air quality and potentially creating inaccessible areas. Mitigate air fouling by first checking to see if doors are unlocked before attempting mechanical breaching, thermal breaching, and finally, explosive breaching. Explosives need to be handled with caution; the shock wave through the UGF can concuss friendly forces, damage the overall structure, and potentially cause a variety of other effects. Sappers are a vital part of the underground clearing team. Not only are they equipped with a wide variety of breaching assets, but they can also detect and neutralize booby traps and mines. Sappers will help mitigate the risks of explosives by analyzing the UGF and using the minimum amount required to breach doors.

Extra equipment is desirable in the subterranean fight but not necessary. Ballistic shields and specialty radios will help the clearing force but are not go/no-go criteria. A well-rehearsed force that practices the fundamentals of room clearing and understands the limitations of its organic equipment inside an UGF will be able to win any subterranean fight it encounters.

With the increasing urbanization of the world, subterranean fights will become more and more common. Most recently, the Battle of Mosul demonstrated that a determined foe will use this domain to their advantage. Few units were prepared for that type of fighting. The U.S. Army needs to prepare to fight and win underground. Rehearsing for an urban environment and understanding the specialized environment will allow units to do this.



Photo by SPC Daniel Parrott

Soldiers assigned to the 5th Battalion, 20th Infantry Regiment clear an enemy tunnel complex during NTC Rotation 18-06 on 15 April 2018.

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