Power Generation – Reducing Excess in the LSB

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Light, mobile, and agile — these are all terms used to describe the new light support battalion (LSB) concept. As transformation in contact (TiC) progresses, we continually look for ways to live up to them; to do so, we must rightsize our organization and the equipment it carries. Legacy power generation continues to weigh us down as we prepare for the next war. While generators are required for maintaining command and control (C2) nodes as well as conducting general operations within an LSB, they are often underutilized, with our Soldiers possessing no true understanding about how much power a single generator produces. Reducing the size and number of generators within the LSB ultimately improves the battalion's capabilities and balances the formation against our future mission.

Waste of Energy

Throughout Operation Lethal Eagle (OLE) 24.1, the 526th Light Support Battalion operated three 5-kilowatt (kW) generators, three 15-kW generators, and two 30-kW generators in a moderately dispersed base cluster. These generators, while capable of producing 185 kW of power, on average produced 31 kW of power daily. The average power usage per company was 28.56 percent of its total capability. The most notable energy waste was from the Headquarters and Headquarters Company (HHC) node: It was capable of producing 65 kW of power but only required 3 kW daily, a mere 5 percent of its capability. J Forward Support Company had the least utilized amount of energy based off its capabilities; it was able to produce 25 kW but only utilized .5 kW of power daily — just 2 percent of its maximum capability. The only company that frequently met the max capability was C Company (medics), which used 3-10 kW daily (the 10 kW being utilized during X-rays). This met the 10 kW capacity. The effects of wasting a generator's power are more serious than simply transporting unnecessary equipment. During large-scale combat operations (LSCO), near-peer threats possess the capability to detect emitted energy in a given area and target the source with deadly unmanned aerial systems (UAS) and indirect fires. It is critical to reduce energy emissions as much as possible.

Capabilities by Variations

3- or 5-kW Generators:

Mobility: These generators are highly portable and can be easily transported by hand or mounted on a small trailer. They are ideal for rapid deployment and use in remote areas.

Placement: Due to their compact size, they can be placed in tight spaces or concealed to avoid detection or reduce noise.

Utilization: While they may not provide sufficient power for larger command posts at echelon, they can be effectively used to power smaller mobile command posts, distributed operations centers, or medical stations.

15- or 30-kW Generators:

Mobility: Larger generators are bulkier and may require specialized vehicles or equipment for transportation. They are less maneuverable and best suited for semi-permanent or fixed installations.

Placement: These generators require more space for setup and operation, limiting their use in confined or congested areas.

Utilization: While they offer higher power output, these generators are most suitable when equipment or circumstances require fully utilizing the maximum available power output. Running a larger generator at partial capacity is inefficient, requires larger vehicles to move, and reduces flexibility to disperse when multiple capabilities tie into a single power source.

How Small Can We Get?

A 15-kW generator is likely more than enough to run a battalion-level main command post (MCP). The 30-kW generator still has its place; however, that should be within a setting such as the Role II with Charlie Company to utilize the X-ray machines sporadically throughout the day. The benefits of having a 15-kW generator include but are not limited to: reducing the amount of fuel consumed per day, reducing electricity emissions, and increasing a unit's mobility. For supply service activities, unit maintenance collection points and various other sites that require less power, a simple 5-kW generator will meet the necessary requirements. Tactically positioning multiple smaller generators through the brigade support area (BSA) will allow the maximum reach of energy, provide redundancy for maintenance contingencies, and allow dispersion of the BSA.

Share the Power

The best way to effectively minimize the waste of power is by utilizing the power distribution box. This box serves as a centralized hub for distributing power from a single generator

to multiple tents. By connecting the generator to the distribution box, power can be divided and distributed through various outlets to different users as needed. This allows for better organization, management, and allocation of power within the BSA.

Best Setup for Powering Tactical Operations Center (TOC) and Other Tents

Considering the analysis and Army publications, the best setup for powering a TOC and other tents in a BSA would involve a combination of smaller generators and a power distribution system. Here are three different courses of action (COAs):

COA 1 - Multi-Generator Setup

Generator Selection: Deploy multiple 3- or 5-kW generators strategically throughout the BSA to power smaller nodes.

Power Distribution: Utilize power distribution boxes to divide and distribute power from each generator to multiple users.

TOC Power: Use a larger 15- or 30-kW generator specifically dedicated to powering the TOC and other high-demand areas.

Strength: Maximum dispersion when paired against a UAS or indirect threat.

Weakness: Less utilization of generator capability, which will lead to a waste of power.

COA 2 - Single Generator with Distribution

Generator Selection: Utilize a single 15- or 30-kW generator as the primary power source for the entire BSA.

Power Distribution: Use power distribution boxes to distribute power from the main generator to different tents.

Utilization: Ensure that equipment is efficiently utilized to make the most of the available power capacity.

Strength: Lack of excess equipment, making the LSB more maneuverable.

Weakness: If the generator breaks down, the entire BSA will be under blackout until repaired.

COA 3 - Hybrid Approach

Generator Selection: Combine smaller and larger generators based on specific power requirements of different areas within the BSA.

Power Distribution: Implement a flexible power distribution system that can adapt to changing power demands.

Utilization: Include backup generators or power sources to ensure continuity of operations in case of generator failure.

Strength: Allows for scalability, adaptability, and redundancy to meet power requirements within the BSA to ensure optimal utilization of resources.

Weakness: Increases the number of generators being utilized, causing a reduction in maneuverability.

Conclusion

Each COA has its place depending on a unit's power generation needs and threat capabilities. There is no one correct COA; they each need to be analyzed based off of the mission. If there is a high UAS or indirect fire threat, COA 1 will be favorable. If there is little to no threat to the BSA and it is co-located with another battalion that has its own power generation capabilities, COA 2 would likely be the best fit. COA 3 allows for the most compatibility with the various missions and therefore could be utilized as the standard operation procedure.

References

Technical Manual (TM) 5-6115-584-12, *Operator and Organizational Maintenance Manual, Generator Set, Diesel Engine Driven, Tactical Skid Mtd, 15 kW, 3 Phase, 4 Wire, 120/208 and 240/416 Volts*, 2017.

Field Manual (FM) 4-30.31, *Distribution Operations*, 2019.

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