

Field Artillery in the Arctic



Thoughts, experiences, and TTPs from 2-8 Field Artillery Regiment

Located less than 200 miles south of the Arctic Circle, Fort Wainwright presents challenges to those living and working here. With extreme winter temperatures, snowfall accumulation, and months of constant darkness or daylight, the conditions existing at Fort Wainwright are not commonly experienced at other duty stations in CONUS. It is essential to the success of the Field Artillery that we shed light on these identified challenges and some potential solutions.

This article highlights the challenges 2-8 FAR (Fort Wainwright, Alaska) has experienced in Field Artillery operations. For too long, the Field Artillery has neglected cold weather and high-altitude operations. With the focus on developing an Arctic Strategy, we implore the larger Field Artillery community to respect the challenges discussed within this document to pave the way for future initiatives in manning, equipping, and training in cold weather and high-altitude regions. Our goal is that this article serves as an entry point for a professional discussion on what is required to fight and win in the Arctic - including further refinement of our TTPs for future generations of Arctic Warriors.

Winter Impacts on Operational Timelines

With winter temperatures remaining below freezing and months of constant darkness, the Arctic climate is one of the most dominant issues that wreak havoc on training, maintenance, and equipment in the Arctic. Last year in late September, we received our first significant

snowfall in Interior Alaska. That accumulation remained until April. To this point, the artillery battalion lacks the organic snow removal equipment required to maintain operations in both garrison and tactical operations. Based on snow removal contracts, the garrison can only commit to clearing our motor pool and parking lots approximately once a month (beginning in December). Further, the battalion is not equipped for clearing snow from main avenues of approach, firing points, observation points, or radar positions. Because of this, we rely heavily on support elements from the Brigade Engineer Battalion (BEB) and assets from Fort Wainwright Garrison - Department of Public Works and Range Control. Lack of an organic snow removal capability significantly encumbers our formation in garrison and

limits the cross-terrain mobility of the battalion in training and operations.

Cold Weather Impacts on Communications, Sustainment Equipment, and Howitzers

The majority of the equipment employed by the battalion has not been extensively tested in Arctic conditions before issue. Due to the brigade's historical deployments to CENTCOM regions, MTOE equipment was purpose-built to function in temperate or arid conditions. However, our current equipment is frequently effected by the winter climate of the Alaskan Interior. These effects have the potential to impede our ability to support the SBCT with all-climate, year-round, accurate fires.

Winter temperatures tend to fall outside our firing communication



2-8 FAR conducts Artillery Certifications and Qualifications in the Yukon Training Area, Alaska. During this Live-Fire Exercise, the battalion experienced a spectrum of temperatures - from -30F to 45F. (April 2021)

platforms' prime operational temperature ranges, firing batteries, and radar equipment. These impacts require extra determination to keep our equipment functional. For example, we must ensure key Mission Command nodes and vehicles are fortified against the climate to avoid wild temperature fluctuations, which cripple the sensitive components inside.

In our experience, communications radios require a defrosting process that may take up to an hour - restricting use and capability until the components warm. After turning the radio on, additional time must be allotted for initialization before transmitting or changing frequencies. Internal damage can be inadvertently caused to our electrical equipment due to condensation and rapid cooling caused by the cold external temperatures conflicting with the warmer internal temperatures of the equipment. External components, such as wires and antennas, are not designed to be exposed to severe conditions and will become brittle and break easily in subzero temperatures. We have experienced some success by periodically running vehicles and insulating our radio systems when not in use - often by placing unused garments and insulating materials around these sensitive components.

Sustainment equipment such as water buffalos and portable burner units (Jet Boils) do not escape the effects of subzero temperatures. Water Buffalos are often prone to internal icing (even with the heaters attached and running). The water distribution nozzles are susceptible to freezing in cold weather as they are exposed to the elements. Meanwhile, the portable burner units used by our Field Feeding Teams are not designed to operate in temperatures below -15F due to the risk of equipment failure. This requirement often requires extra heat generation systems to be applied and the Assault Kitchen tents to be warmed to above -15F before starting the burners to ensure our equipment operates effectively.



Forward Observer Teams watching illum. Yukon Training Area, Alaska. (October-November 2020)



Forward Observer Teams support infantry battalion Mortar Qualifications (MORTEPS). Yukon Training Area, Alaska. (October-November 2020)



Forward Observer Teams negotiate extreme climate variances to direct artillery fires to a precise location. Yukon Training Area, Alaska. (April 2021)

Cold Weather Impacts on Maintenance Operations for the Howitzers

Maintenance operations in the winter months of Interior Alaska require an extreme amount of time as our M777A2 battalion is vulnerable to cold weather conditions. Colder temperatures result in the fluctuation of nitrogen levels which decrease, and potentially increase with the temperature. Thus, the nitrogen must be adjusted to account for external temperatures to avoid difficulties with the employment of howitzers in subzero temperatures. Intrinsically, if temperatures drop below -10 degrees F, fluids and gases in the system retract and shrink, creating leaks in seals.

Furthermore, the trunnion pumps frequently experience malfunctions in colder weather, preventing the howitzer from the transition from employed to towable status. Additionally, these temperatures cause vehicle and howitzer batteries to discharge at an increased rate. Commonly, an M777A2 with standard batteries will completely discharge in less than two hours when subjected to temperatures below

-20F if not prepared adequately. Our experience has determined that the howitzers must remain attached to a power generation system to maintain firing capability.

The M777A2 howitzer is extremely sensitive to fluctuating temperatures. If transitioned between warm storage and a frigid environment, condensation will form in the brake fluid reservoirs which freeze essential fluids and prevent the use of the brakes. Currently, the recommended winterization of howitzers at the battery level requires the following equipment across the battalion: 12 x Nitrogen tanks, 7 x Quarts of petroleum-based hydraulic fluid (OHT), 6 x Gallons of brake fluid, and two U6 certified personnel to oversee and complete these intensive and vital tasks. Failing to winterize the howitzers properly places excess strain on the elevation belts, resulting in damage to or snapping of these components. Daily pressure monitoring is required throughout the winter months to prevent damage from the environmental conditions.

Cold Weather Impacts on the Five Requirements for Accurate and Predicted Fire

The Artillery's goal is always to achieve first-round fire for effect. Even fully winterized howitzers will see effects caused by the deep cold at Fort Wainwright. To account for these conditions, we must understand the impact of Arctic conditions on the five requirements for accurate fire.

Regarding firing unit location, employing howitzers from the months of October through April, temperatures can historically drop as low as -70 degrees Fahrenheit. At these subzero temperatures, the ground freezes - complicating emplacement. When combined with the frigid environment, snow and ice accumulations make it nearly impossible to dig in howitzer spades. Without properly dug-in spades, the howitzer is likely to dislocate when fired (a term used to describe the howitzer coming out of position due to not having the stable firing conditions necessary to remain in a consistent location). Any movement of the howitzer has a significant impact on the accuracy of the round. To account for a potential dislodgment of the howitzer requires the Section Chief to maintain and update the howitzer's position through each fire mission.

For target location, when snow and ice accumulations in the target area are unknown, extracting an accurate altitude can be difficult. Without a precise target altitude, we risk missing the intended target.

The cold temperatures also result in cold-tube and cold-propellant situations, further reducing muzzle velocity and affecting the firing range. The cannon tube will warm up as it is exercised, but variations in muzzle velocity must be accounted for. If the howitzers stop firing for a short time, the muzzle velocity will once again replicate the conditions of a cold tube. Additionally, improper storage of propellants will cause ice crystals to form within the powder, further degrading the propellant efficiency and affecting the range. In the Arctic, plan for higher charges to account for the effect of cold tubes and cold propellants.

Finally, the drastic transition periods between day and night conditions require MET to be analyzed more frequently to achieve precise fires.

Conclusion

With the identification of prevalent challenges faced in Arctic Field Artillery operations and sustainment, we aim to find resolutions throughout our FY22 training. Currently, one of the greatest assets at our immediate disposal is the knowledge possessed by current and previous Soldiers in the Arctic Field Artillery community – and our international community of Arctic Artillery experts. Through the collection of AARs and collaborative efforts such as this article, we will use that knowledge to our benefit established TTPs, and create new ones. We hope that this article sparks discussion amongst the Field Artillery community and paves

the way for further collaboration to support the Arctic Strategy's future.

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Howitzer crews conduct Cold Weather maintenance and weatherizing. Fort Wainwright, Alaska. (February 2021)

