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# Will a Lack of Combat Support Engineer Capabilities Limit the Canadian Army's Ability to Organically Employ Land Power?

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# **WILL A LACK OF COMBAT SUPPORT ENGINEER CAPABILITIES LIMIT THE CANADIAN ARMY'S ABILITY TO ORGANICALLY EMPLOY LAND POWER?**

## **AIM**

1. The aim of this paper is to identify the challenges with the deficiencies in close support capabilities and equipment within the engineer (Engr) Corps, and the impact this creates for the Canadian Army's (CA) ability to organically project and employ Land Power across Full Spectrum Operations (FSO). The CA and Engr Corps possess a strong and robust set of capabilities that enable it to operate in a multitude of mission sets, but the lack of close support<sup>1</sup> capabilities limit the CA's ability to operate effectively in major combat, such as a peer-to-peer environment. To enable this from an Engr perspective, it is recommended the Engr Corps and CA prioritize the procurement of capabilities to support its close support roles, as well as focus on Combined Arms training by employing similar capabilities to prevent skill fade.

## **INTRODUCTION**

2. How militaries and states engage in war continues to evolve. Over the last 30 years, the reliance on aircraft, communications, and naval transportation methods have led to Joint Operations being the modern way to conduct warfare.<sup>2</sup> The CAF continues to refine its integration into Joint Operations while it aims to ready itself for the next threat. For the CA, the analysis of the Future Land Operating Environment points to a complex, dynamic and volatile environment marked by diverse conflicts with adversaries using conventional, unconventional, and/or hybrid actions.<sup>3</sup> Russia's invasion of Ukraine with conventional forces provided a stark reminder that peer-to-peer combat is not an unfathomable method in the current world order. China's effort to improve its military strength to combat western influence and deter military action against it, further amplifies the threat of peer-to-peer combat.

3. A key tenet to remaining militarily relevant and capable of deterring, or engaging in, armed conflict with these potential adversaries is the ability to project and employ Land Power in Full Spectrum Operations (FSO). From the author's perspective, the CAF does not possess organic Land Power, and is therefore incapable of projecting or employing it due to the CA's limited close support Engr capabilities.

4. To demonstrate the CA's inability to project Land Power in FSO, this paper will examine the following: the Canadian Armed Forces' (CAF) perspective on its projection of Land Power; the current and future Engr capabilities; and the effects on the CA. Finally, this paper will

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<sup>1</sup> Close Support is defined as forces organized and equipped to support manoeuvre forces through mobility, counter-mobility, and survivability tasks. General support is defined as forces organized and equipped to support the force as a whole. General Support forces can operate independently or can reinforce close support forces as required. CADTC, B-GL-321-005/FP-001 Battle Group In Operations (Kingston, ON: CA, 2012), 3B3-1.

<sup>2</sup> William T. Johnsen, 'Land Power in the Age of Joint Interdependence: Toward a Theory of Land Power for the Twenty-First Century', *Defense & Security Analysis* 35, no. 3 (3 July 2019): 224.

<sup>3</sup> Canadian Army Land Warfare Center, *Close Engagement - Land Power in an Age of Uncertainty - Evolving Adaptive Dispersed Operations* (Kingston, ON: DND, 2019), 11-12.

highlight some of the current challenges affecting the CA's ability to mitigate the deficiency, followed by some initial recommendations.

## **DISCUSSION**

### **Land Power**

5. Canadian Land Power. From a Canadian perspective, Land Power will remain essential to the maintenance of state sovereignty, state defence, and a cohesive international system that supports Government of Canada (GoC) objectives.<sup>4</sup> Land power can be defined as the capability to generate, employ, and sustain combat power across FSO, on or from land.<sup>5,6</sup> The CA's Land Power, from the author's perspective, is centered around Brigade Groups (Bde Gp), Battle Groups (BG), and Combat Teams (Cbt Tm). They are the action arms of the army, and are the largest elements that the CA is able to effectively generate, employ, and sustain. This can be seen in the CAF's effective deployment of BGs into Afghanistan in the mid 2000's, and more recently to Latvia in support of Op REASSURANCE.

6. At the tactical level, Bde Gps, BGs and Cbt Tms are the essential elements for Canada's projection of Land Power. From the author's perspective, these forces are unable to organically project Land Power as they are limited in their employment in FSO in a peer-to-peer environment. This is due to the lack of Engr capabilities in providing mobility support to these elements. With the lack of critical Engr capabilities organic to the force, it raises the question of whether the CA can independently project and employ Land Power, or must it operate in a multinational or coalition construct?

### **Capabilities - Current and Future**

7. Outside the Engr realm, it is noted the CA is lacking additional organic capabilities such as ISR, Anti-Armour and Air Defence to generate and employ Land Power through BGs and Cmbt Tms. These capabilities are beyond the scope of this paper and the author's knowledge; therefore, the focus will be on Engr specific capabilities and their influence.

8. An Engr's role is to provide mobility, counter mobility, and survivability support to forces.<sup>7</sup> To achieve this, Combat Engineers (Cbt Engr) possess a significant number of capabilities, such as gap crossing, obstacle construction, breaching, mine warfare, fortification, force protection, horizontal and vertical construction, and water supply.

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<sup>4</sup> Canadian Army Land Warfare Center, Close Engagement - Land Power in an Age of Uncertainty - Evolving Adaptive Dispersed Operations (Kingston, ON: DND, 2019), 9.

<sup>5</sup> Ibid., 9.

<sup>6</sup> William T. Johnsen, 'Land Power in the Age of Joint Interdependence: Toward a Theory of Land Power for the Twenty-First Century', Defense & Security Analysis 35, no. 3 (3 July 2019): 227.

<sup>7</sup> CADTC, B-GL-321-005/FP-001 Battle Group In Operations (Kingston, ON: CA, 2012), 3B3-1.

9. Current Engr Capabilities. According to the 2022 Engr Capability Map, the Corps' overall capability health in counter-mobility, survivability, and general engr support are adequate.<sup>8</sup> Similar to the aging CA, there are areas, such as mine warfare, force protection, and horizontal construction where new equipment is required to mitigate emerging deficiencies.

10. When examining mobility, the overall health of Engr capabilities differs dramatically. Currently gap crossing and hasty breaching capabilities are critical due to a lack of equipment and resulting lack of training.<sup>9</sup> For gap crossing, the Engr Corps possess only three types of in-service bridging assets.<sup>10</sup> The CA no longer possesses Assault bridging capability since it was fully divested in 2012,<sup>11</sup> and the current capabilities are insufficient to support CAF in combat operations. For hasty Breaching, the CA has it's the Leopard tanks, and the Engr Corps has recently acquired the Armoured Engr Vehicle (AEV) Badger platform designed to support hasty mechanical breaching. Unfortunately, the CA and Engr's lack of explosive capability for rapid combat breaching requirements significantly reduces its combat mobility.

11. Future Capabilities. Many of the current capabilities, such as Engr bridging, are beyond their original life expectancy.<sup>12</sup> As such, the Engrs and CA are undergoing a modernization period to upgrade platform and equipment, as well as source new capabilities. Upgrades to the Expedient Route opening capability, heavy equipment, and most significantly to bridging<sup>13</sup> are expected over the next 10 years. The Bridge and Gap Crossing Modernization (BGCM) project was approved for definition phase in May 2022.<sup>14</sup> This will see the replacement of the existing CA bridging capabilities with an inventory of equipment that can support CAF missions, both domestic and expeditionary.<sup>15</sup> The project sees the acquisition of five bridging systems classified as Short, Medium and Long Support Bridging, Lines of Communication Bridging, and Floating and Rafting Bridging.<sup>16</sup>

12. Capability Concerns. Strong, Secure, and Engage (SSE) requires that the CAF be an agile, combat-ready force, operated by highly trained, well equipped personnel that are ready to

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<sup>8</sup> Canadian Army DLR 7-2-3, '2022 Royal Canadian Engineer Capability Map (Reg Force)' (Royal Canadian Engineer Corp, 2022).

<sup>9</sup> Ibid.

<sup>10</sup> The three types of in-service bridging assets the Engr Corps possesses are long support bridge, line of communication bridge, and floating raft/bridge. These Bridges are predominantly used in General support engineering, although the long support bridge was employed in a close support function due to the lack of assault bridging. Canadian Army DLR 7-2, 'Preliminary Statement of Operational Requirements C.000827 - Bridge and Gap Crossing Modernization' (DND, November 2019), 7.

<sup>11</sup> Ibid., 9.

<sup>12</sup> Ibid., 9.

<sup>13</sup> Canadian Army DLR 7-2-3, '2022 Royal Canadian Engineer Capability Map (Reg Force)' (Royal Canadian Engineer Corp, 2022).

<sup>14</sup> Ibid.

<sup>15</sup> Canadian Army DLR 7-2, 'Preliminary Statement of Operational Requirements C.000827 - Bridge and Gap Crossing Modernization' (DND, November 2019), 1.

<sup>16</sup> Canadian Army DLR 7-2, 'Preliminary Statement of Operational Requirements C.000827 - Bridge and Gap Crossing Modernization' (DND, November 2019), 1.

support Canadian Objectives both domestically and abroad.<sup>17</sup> The BGCM and other Engr projects will provide the CA with robust capabilities permitting it to support the mobility, counter-mobility, and survivability of land forces in domestic operations, military operations other than war, and limited combat operations. From the author's perspective, two critical capabilities have been delayed, or are not being developed. The lack of Assault Bridging and Explosive Breaching inhibits the CAF ability to maximize the employment of Land Power across FSO. According to the 2022 Royal Canadian Engineer Capability Map, Assault Bridging has been folded into a separate project that has yet to be approved, and there is no solution or capability development ongoing or planned for explosive breaching.<sup>18</sup>

13. The CA and Engr currently have, or are in the process of acquiring, capabilities that support employment across a large spectrum of operations. The lack of assault bridging and explosive breaching capabilities limits the CA's ability to independently operate in major combat, and more importantly, in a peer-to-peer environment. Therefore, the CA is limited in its ability to project and employ Land Power across FSO.

### **Impacts to the CA**

14. The invasion of Ukraine and the ongoing year long battle has highlighted the importance of Land Power and the significance of maintaining capabilities for one to operate in a peer-to-peer contested environment. The lack of critical assault bridging and explosive breaching engineer capabilities impacts the CA in two fundamental ways:

- a. It inhibits the CA from fully employing its Land Power by limiting the manoeuvre of its own forces.
- b. It prevents the CA from effectively employing its Land Power due to skill fade from lack of proper combined arms training.

15. Manoeuvre. Is defined as the employment of forces on the battlefield through movement in combination with fire, or fire potential, to achieve a position of advantage, in time or space, in respect to the enemy to accomplish the mission.<sup>19, 20</sup> Manoeuvre for a Land force is pivotal for success as it enables freedom of movement (FoM) in the battlespace.

16. Movement and manoeuvre are easily limited by obstacles ranging from natural to man-made obstacles. One of the most common obstacles that a force might encounter is a gap, which can vary in size and complexity from a small ditch to major river or water way. When examining two of the future potential conflict areas, Europe and Asia, the estimated gap sizes for

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<sup>17</sup> Department of National Defence, Strong, Secure, Engaged. Canada's Defence Policy. (Ottawa, ON: DND, 2017), 14.

<sup>18</sup> Canadian Army DLR 7-2-3, '2022 Royal Canadian Engineer Capability Map (Reg Force)' (Royal Canadian Engineer Corp, 2022).

<sup>19</sup> CADTC, B-GL-321-005/FP-001 Battle Group In Operations (Kingston, ON: CA, 2012), 2-1.

<sup>20</sup> The Development, Concepts and Doctrine Centre, Joint Doctrine Publication 0-20 UK Land Power (Ministry of Defence, 2017), 56.

existing obstacles in the regions show the importance possessing the capability to rapidly cross or breach said obstacles. In Europe, 60% of the gaps are less than 10m, and 20% are 10-20m.<sup>21</sup> In Southwest Asia, it is estimated that 80% are less than 10m, and 12% are 10-20m.<sup>22</sup> For a Bde Gp, BG or Cmbt Tm, this highlights the requirement to rapidly cross these obstacles in a contested environment using integral resources. Assault bridging provides forces with “immediate and rapid crossing support in the face of the enemy”<sup>23</sup> for those gap lengths.

17. Unfortunately, the bridging being sourced as part of the BGCM project is focused on support, LOC, and floating bridging. These bridges are not rapidly deployable, nor would one want to construct them in a contested, peer-to-peer environment. An Assault bridging specific capability is necessary. Additionally, although support, LOC and floating bridges might not be suitable for close support in combat operations, Assault bridging may be employed in tasks outside close combat support. Annex A of the BGCM project analyses the capability of executing gap crossing tasks by bridge types using the following categories:

- a. Fully capable to execute task;
- b. Partially capable with minor restriction and low risk of failure;
- c. Negligibly capable with major restrictions and high risk of failure; and
- d. Not Capable to execute.<sup>24</sup>

18. Of the 43 tasks highlighted in the BGCM project document, the Assault bridging capability is able to fully execute or partially execute 36 of the tasks. In comparison to other bridging capabilities that are being acquired, Short and Medium Support Bridging can execute 26 tasks, while the more specialized categories of LOC, Long Support and Floating Bridging could be employed in 17 or less tasks.<sup>25</sup> From this perspective, the Assault Bridging provides the CA the ability to employ Land Power in tasks across FSO, and is not as limited in employment in comparison to other bridging capabilities.

19. As explained in the BGCM PSOR, Assault Bridging serves a key role in providing mobility and survivability to friendly forces in combat operations; but this concept also applies to platform-based Explosive Breaching. The key tasks of these capabilities in a major combat environment include: maintenance of FoM to preserve the momentum of attack; avoid decisive engagement; open routes and lanes through enemy barriers; and provide mobility support to counter-moves forces through friendly force obstacles used to deny FoM to the enemy.<sup>26</sup>

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<sup>21</sup> Canadian Army DLR 7-2, ‘Preliminary Statement of Operational Requirements C.000827 - Bridge and Gap Crossing Modernization’ (DND, November 2019), 7.

<sup>22</sup> Ibid., 7.

<sup>23</sup> Ibid., 14.

<sup>24</sup> Ibid., A-1.

<sup>25</sup> Canadian Army DLR 7-2, ‘Preliminary Statement of Operational Requirements C.000827 - Bridge and Gap Crossing Modernization’ (DND, November 2019), A-2 to A-4.

<sup>26</sup> Ibid., 17.

20. Further analysing impacts on manoeuvre in major combat and peer-to-peer environment, complex man-made obstacles including minefields, wire fences and/or wooden obstacles that hinder or prevent mobility would be common. Explosive breaching platforms such as the Python Mine Clearance breaching system or a mine clearing line charge (MICLIC) rapidly create openings in such obstacles. Thus, forces can rapidly breach obstacles obstructing movement. Possessing a single platform for breaching these obstacles ensures the maintenance of speed and tempo, preserves combat power, and provides FoM during offensive action. Currently, the CAF is restricted to mechanical breaching platforms and rudimentary methods that affect the ability to maintain high tempo operations.

21. Skill Fade and Training. Another key component of Land Power is a combat-effective and multi-purpose land force.<sup>27</sup> The CA is without a doubt a multi-purpose land force, but its effectiveness in a peer-to-peer major combat environment is questionable. Training plays an important role in achieving and maintaining a military's effectiveness in major combat operations.<sup>28</sup> Unfortunately, the deficiencies in Engr close support equipment means the CA is unable to properly train for peer-to-peer combat. Obstacle breaching and gap crossings are generally complex operations which take time to plan and execute.<sup>29, 30</sup> The CA does well to train in the planning of these complex operations, but the lack of relevant equipment means these operations are not actually executed in training. As such, Commanders, and members of combine armed elements in Bde Gps, BGs, and Cbt Tms do not experience the frictions and time faced in execution. Furthermore, as the CA does not sufficiently execute training for these operations, significant skill fade for both Engrs and other combat elements occurs. This undermines the ability of the CA to operate effectively in a peer-to-peer environment without significant workup.

## CONCLUSION

22. Modern conflict continues to trend toward a complex and volatile environment where states are increasingly capable of engaging western forces in peer-to-peer, or at least near-peer combat. As such, for Canada to maintain its influence, it requires the ability to project and employ Land Power through elements such as Bde Gps, BGs or Cmbt Tms. It must be able to do so independently, and not rely on coalition or multinational capabilities. The current lack of close support Engr capabilities of Assault Bridging and Explosive Breaching are limiting the CA's ability to employ Land Power across FSO. This deficiency is affecting the CA Land Power by limiting the manoeuvre of its own forces, and the effects will continue to compound due to skill fade and lack of training. The CA and Engr Corps are a strong and capable forces, but are currently unable to effectively operate across FSO.

## RECOMMENDATIONS

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<sup>27</sup> Canadian Army Land Warfare Center, Close Engagement - Land Power in an Age of Uncertainty - Evolving Adaptive Dispersed Operations (Kingston, ON: DND, 2019), 9.

<sup>28</sup> Canadian Army, B-GL-300-001/FP-001 Land Operations (Kingston, ON: Army Publishing Office, 2008), 3-15.

<sup>29</sup> Ibid., 386.

<sup>30</sup> CADTC, B-GL-321-005/FP-001 Battle Group In Operations (Kingston, ON: CA, 2012), 114.



23. It would be unfair to postulate on actions the CA and Engr Corps should take to ensure the close Engr support capabilities of Assault Bridging and Explosive Breaching are procured without acknowledging the challenges both entities are currently facing. Common to the CAF, a lack of personnel, limited funding, and a cumbersome procurement process will continue to impact CA's capability project prioritization and approval. With that in mind, to enhance the CA's ability to project and employ Land Power across FSO, the following recommendations are offered:

- a. Prioritizing Assault Bridging and Explosive Breaching over other Engr specific capabilities is not a feasible option at this stage, as most large capability projects have been approved already. Prioritization over other CA capabilities might be an option, although it would be difficult to achieve. For Assault Bridging, an option to reroll the project into the tank replacement project instead of being an independent project, might increase likelihood of project approval and funding. For explosive breaching, I would recommend purchasing an existing platform or capability, such as the Python or MICLIC, as a small capital project until the full scope of requirements can be defined.
- b. An alternative, and out of the box method to pursue these capabilities would be to leverage the Ukrainian requirements and donations to do a joint venture. As tanks and conventional force capabilities are donated to Ukraine, the CAF could leverage the opportunity with the GoC to execute a joint purchase where the assault bridge and rapid explosive breaching capabilities are procured for both forces.
- c. To enable Combined Arms training, the CAF should request Engr resources from allied nations for exercises. The CAF could bring over British or American Engr units who possess both Assault Bridging and Explosive Breaching capabilities to integrate into Level 5 and 6 training. This will mitigate the effects of skill fade and improve CA efficiency in major combat operations until the CAF has procured and integrated the capabilities.

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