Adfreeze Piles

Adfreeze piles are designed to transfer the load of above ground structures directly to the ground using the bond of the surrounding frozen ground to the surface of the pile. In permafrost regions, adfreeze piles are generally embedded in the permanent ice layer. As with end bearing piles, this foundation type can be considered to be costly or impractical if the structure load is high, if the soil is bouldery, or transportation to the site is a challenge. The type and size of the pile will be determined by available materials, cost, labor, and site conditions. Piling foundations have advantages because they can be constructed with minimum disturbance to the thermal regime and also isolate the structure from seasonal changes. Piles can be timber, concrete, steel, or composites. Some pile types (such as steel) may be driven while others (such as concrete) require excavating or auguring a space, installing the pile, and backfilling with a slurry mixture to promote adfreeze.

Adfreeze piles to the permanent ice layer are used throughout arctic regions. While engineering calculations will dictate the proper sizes and depths of end bearing piles to the permanent ice layer, the depth of piles are generally equal to at least twice the active layer thickness, and preferably more so as to resist heave forces coming from the active layer during the winter. These foundation types are at risk of potential climate change impacts to permafrost.