

Guided Auger Boring Tooling for Hard Ground – Upsize Bearing



Pilot Tube Guided Auger Boring (PTGAB) remains one of the most common trenchless applications in North America for the installation of underground utilities requiring exact line and grade tolerances. Manufacturers such as Akkerman continually seek ways to improve performance and efficiency for trenchless contractors.

Decades ago, pilot tube installations were limited to displaceable ground conditions and short crossings. Today, contractors are utilizing pilot tube systems to conquer increasingly difficult projects including hard rock with the use of guided DTH hammers. Options for increasing the borehole diameter after the pilot tube installation in soft grounds are well established with common Weld-On Reaming Heads, however effectively upsizing beyond 36-in steel casing in stiff, non-displaceable ground, and rock require alternative solutions.

As an industry recommendation, steel casing up to 36-in OD can generally be directly linked to a pilot tube string. Larger casing installations require a two-step process to minimize deviation and ensure line and grade tolerance. The general rule-of-thumb has been to install an initial steel casing directly behind the pilot tubes that is approximately 1/2 the diameter of the final diameter. As ground conditions transition from soft to hard, it becomes important for the leading edge of the upsize tooling to engage the ground with a cutting action versus displacement arms.

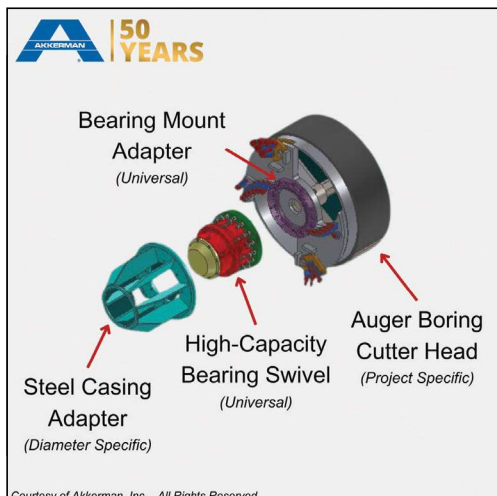


however the transition can be affixed to a myriad of head types including Rock Boring Units (RBU's). When using a retractable type of ABM cutterhead during this stage, the upsize bearing assembly will allow the operator to trip augers and repilot the bearing assembly for continued operations.

During development, the City of Parkville, MD required 230-ft of 42-in steel casing with tight tolerances due to the proximity of existing utilities. Upon excavation of the shaft structures, the contractor quickly realized the ground conditions consisted of hard gneiss, marble, and schist. Standard Guided Auger Boring upsize tooling such as Weld-On Reaming Heads were not going to be effective, while alternative trenchless methods such as slurry microtunneling was not practical.

The 42-in casing was successfully installed by using a guided hammer pilot tube to set line and grade accuracy. Once surveyed and approved, the pilot tubes were followed with an RBU24 fitted to follow the pilot tube bore path. This step increased the borehole diameter and installed 24-in SC across the entire 230-ft. To upsize to 42-in OD, an Upsize Bearing Assembly was installed in between the 24-in SC and Akkerman RBU 42. The bearing assembly allowed the RBU42 cutterhead to rotate freely, while the bearing housing provided stability and support for alignment correction. During the installation of the 42-in SC, the contractor achieved advance rates up to 30-lf/shift.

A limited production run of Upsize Bearing Assemblies is currently being manufactured at Akkerman's facility in Brownsdale, Minnesota, USA. To secure your inventory, please contact your Akkerman sales representative at 1.800.533.0386.



The robust 100-ton upsize bearing package includes a Steel Casing Adapter that pilots inside the first casing upsize (16-30 inch). The bearing assembly affixes to an ABM cutterhead of the contractor's choice by attaching it to the Bearing Mount Adapter ring located at the center of the face plate. A retractable type Akkerman cutterhead is shown in the illustration,