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July 1993

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How Belmont uses vacuum excavation

by Tim Peters

Recently, during the preliminary design stage of an upcoming underground project by the City of Belmont, California it became necessary to verify the horizontal location and determine the vertical elevation of various utilities within the limits of the proposed project. The fact that the subject street was very narrow and of steep grade, made it desirable to limit the size and pieces of equipment as much as possible. Lyle Johnson, Contract Engineer for the City of Belmont, contacted Miller Pipeline to perform vacuum excavations at the site.

Existing utility locations were painted on the street by the corresponding utility companies throughout the limit of work. Johnson then marked areas of possible conflict (with the upcoming project) to be potholed.

On the job

The excavation began after a small area of pavement — about 18- by 18-in. — was removed with a jack hammer.

Once the asphalt was removed, an air lance was used to loosen the soil while, at the same time, a vacuum hose removed the spoils from the excavation. The spoils were stored in a 15-cu.ft. collection tank on the utility truck. This operation continued until the subject utility was located. Once the utility was located, the distance from the street surface to the pipeline was measured and painted on the street at that location and noted on the plans.

The contractor also electronically traced some utilities at the site which had been inaccurately located by the corresponding utility company. All stages of the operation were carried out from above the street surface using the appropriate tools which have been designed and manufactured by Miller Pipeline. The compressor (rated at 185 cu.ft./min.), vacuum (rated at 14-in. HG), and storage tank were all mounted on a single truck chassis.

The backfill operation was equally simple. Because of its granular texture, the spoils were used as backfill material. We didn't need to import any material or bring additional pieces of equipment to the site to complete the backfilling.

Some of the spoils were then deposited in a small pile next to the excavation, by use of a pneumatic dump gate on the collection tank. Using a pneumatic compactor, the excavation was backfilled and compacted in lifts. Since construction will take place at this site in the near future, the top 2 in. of the excavation were backfilled with cold patch asphalt.

We had improved production using the vacuum excavation method. Thus Belmont accomplished the task of utility location at a cost savings when compared to conventional methods. The average depth of the excavations was 36 in. This procedure at each of our locations took only about 30 min., from start to finish, depending on the depth.

The advantages

There were many advantages to this operation when compared to conventional methods. Small excavations were only about 18-in. square. The small, contained holes made backfilling and compacting much easier.

Granular material

The granular material was good for backfill.

The contractor provided an experienced crew which required direction only for the locations of the excavation. The foreman assisted us further by electronically tracing some utilities which had been inaccurately located by the utility company.

It minimized excavation and surface rehabilitation while enhancing public relations. The crew and equipment occupied only one lane of the street.

The entire operation was completed from above ground. The vacuum excavating equipment is designed for a variety of operations (and depths), all using the small hole, above-ground slot technique.

This method of excavation virtually eliminates the chance of damage to surrounding underground utilities. (We didn't have any utilities damaged!) In my opinion, this is one of the best advantages to using this operation in the future. ❐

Tim Peters is a Construction Supervisor in Belmont, California.

Shoring can eliminate soil classification tests

Use of adequate shoring devices can eliminate the need to complete soil classification tests prior to trenching, as well as providing needed safety for workers.

Under OSHA interpretations, the employer who regards all soils as type C and provides required protection — shoring, shielding, or sloping — need not conduct field tests.

Trench boxes are most commonly used by utilities, with most using steel or aluminum models.

Aluminum hydraulic shoring that begins in widths of 17 inches are another option. These systems may be made of composites or fiberglass, as well. Crews like them because they are easy to move from site to site in a pickup.