

# **ROCK REMOVAL TECHNIQUES AND EQUIPMENT IN TRENCH EXCAVATION AND PIPELINE CONSTRUCTION. A COMPARISON**

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## ABSTRACT

In the underground construction industry, when bidding work, not only is the contractor faced with determining if rock is in existence within the parameters of his work, he must also estimate the quantity and the most efficient method of removal.

In our experience, we have found little reference data available to assist the average contractor in these determinations. The accuracy of soils reports generated by the design engineers is, at times, questionable. For obvious reasons, manufacturers of rock removal equipment will promote their method as the most effective. Segregating useful, accurate information from these two sources can be both tedious and costly.

Our company bid and completed a wastewater collection system for a northern California community between September of 1988 and May of 1989 that lends itself classically to the described circumstances. This project also provided the unique opportunity to test, in the field, a multitude of rock removal techniques and equipment currently in use throughout the Industry.

This paper will present our experience on this project with:

1. The prebid inspection and the information available at the time of bid compared to what actually existed.

2. The use of the four (4) following rock removal techniques:

- Backhoe mounted hydraulic breakers
- Close quarter blasting and vibration levels
- Open area blasting
- Hydrostatic rock trenchers

Each technique will include a review of the cost efficiency and productivity of each method and an account of specific conditions or problems encountered.