

1979/17. Seismic survey at Fishermens Dock, Stanley

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*Abstract*

A high resolution seismic refraction survey of the unloading berth at the Fishermens Dock, Stanley has shown the presence of basalt boulders up to 1.5 metres diameter in a matrix having a velocity between 1100 and 2100 m/s. Provided that adequate equipment is available, the unloading berth may be excavated to a minimum depth of three metres below low water without the use of blasting. To provide maximum cutting effect if using a drag, the direction of pull must be from south-east to north-west.

INTRODUCTION

The Fishermens Dock at Stanly [CQ566854] lies on the south-eastern side of The Nut. The north-western corner of the dock consists of a weathered tuff shelf dipping to the south-east. To the north-east the tuff is covered by basalt boulders and silt.

The area of interest was surveyed using a high resolution seismic refraction technique to determine the size and position of boulders within the matrix as well as the nature of the matrix itself. Data was recorded using hydrophone and spread spacings of two metres with a cross-tying spread every six metres. To allow for the removal of water statics the depth of water was measured at each shotpoint and hydrophone.

RESULTS

Several spreads recorded on the north-west side of the dock at low tide showed velocities of less than 2100 m/s within the top 25 m of the weathered tuff. Thus on the marine refraction recordings, the presence of any high velocity (>2100 m/s) segment producing a step in the travel-time curve or a local 'early' arrival indicates a wholly or partially embedded boulder in the lower velocity matrix. Depth resolution of this method is poor, but good accuracy is achieved in horizontal positioning and boulder size.

The velocity of the matrix was less than 2100 m/s with most of the area to be deepened showing a velocity of less than 1600 m/s, consistent with a weathered tuff. This lower velocity material could be removed using a backhoe or similar piece of equipment. There are no substantial increases in velocity (and hence rock strength) with depth in the volume of material to be excavated. Boulder size is less than 1.5 metres for all boulders noted.

If a drag is used for the excavation, it is recommended that the direction of cutting be from south-east to north-west against the dip of the tuff. Precautions should be taken against the collapse of the unstable bank at the north-west end of the unloading apron.

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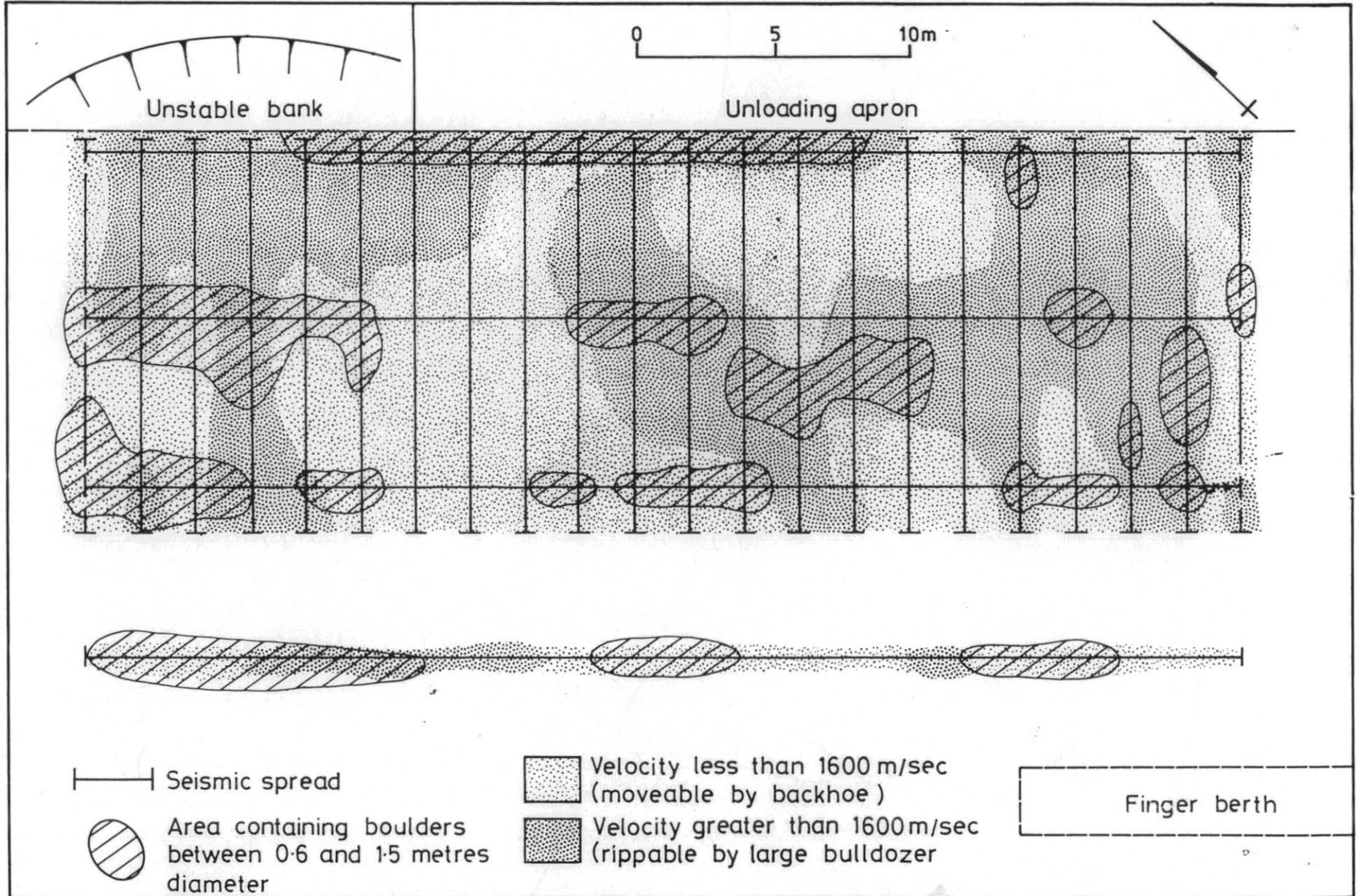


Figure 1. Seismic survey at unloading berth, Fishermens Dock, Stanley.

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