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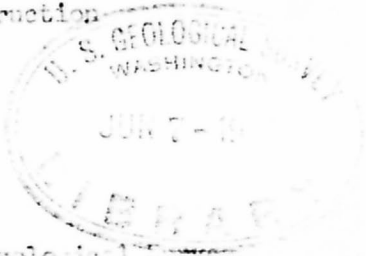
File Report

Geologic Interpretation of Seismic Data

Sturbridge

Union-Nashua Road Reconstruction

Stations 208-216



by

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and

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3 pages of text
1 plate

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Seismic Series _____

Geologic Interpretation of Seismic Data

Sturbridge

Union-Washapaug Road Reconstruction

Stations 308-316

by

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and

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General Statement

The work on which this report is based was done to obtain information that would be of aid in selecting the most suitable location for one of the segments in the proposed reconstruction of Union-Washapaug Road (Route 15) Sturbridge, Mass. Field work was done in June, 1948 as a part of a cooperative program between the Commonwealth of Massachusetts, Department of Public Works, and the United States Department of the Interior, Geological Survey.

Surface Geology

Between stations 308 and 316 northbound highway, Union-Washapaug Road crosses a gravel terrace that flanks the west side of a north-south elongated till hill. The boundary between the terrace and the till hill is approximately 50 feet east of the base line. The area investigated seismically, although composed dominantly of till, included a small section of the gravel terrace. Where examined at the surface the till is loose to

moderately loose in texture and contains numerous medium to large angular boulders of a well-banded granitic type rock (gneiss). Bedrock is not exposed in the vicinity of the site.

Seismic Traverses

The plan of the seismic traverses is shown on sheet 1.

Two consecutive seismic traverses J-K and K-L, each 330 feet long, were run east of the base line and nearly parallel to it. Shot point J was located 140 feet east of station 309, K 148 feet east of station 312+29, and L 164 feet east of station 315+58. Three cross-traverses, M-N, O-P and Q-R, each 220 feet long, were made also. For traverse M-N shot point M was located 273 feet east of station 314+03, and shot point N 53 feet east of station 313+83. For traverse O-P shot point O was located 253 feet east of station 312+54, and shot point P 39 feet east of station 312+02. For traverse Q-R shot point Q was located 270 feet east of station 310+86, and R 52 feet east of station 310+49. Traverse M-N intersected traverse K-L at a point 164 feet from K and 104 feet from N; traverse O-P intersected traverse J-K at K, 112 feet from J; and traverse Q-R intersected traverse J-K at a point 165 feet from J and 93 feet from R.

Depths to Bedrock

The calculated depths to bedrock at the mirage points below the shot points are: (see note).

J,	22 feet	N,	12 feet
K,	13 "	O,	12 "
L,	12 "	P,	13 "
M,	18 "	Q,	21 "

Two detectors failed to register in shooting from C to R, and hence two different values can be calculated for the depth to bedrock at shot point R; one of these is 6 feet, the other 24 feet. Other data collected at this site tend to support rather strongly the figure of 6 feet; both have been shown on the geologic sections.

Interpretation of Seismic Data

The interpreted positions of the bedrock surfaces along the seismic traverses between the shot points are shown on the geologic sections, sheet 1. The depths to bedrock as indicated by these sections must be used with caution for they only represent approximations that have been interpreted from the slopes of the seismic velocity curves, some of which are exceedingly complex. Inspection of the interpreted geologic sections shows that this site is underlain by bedrock at relatively shallow depths, in general from 6 to 27 feet below the surface. Although all the sections suggest a rather smooth undulatory bedrock surface, it is probable that many small ridges, benches or knobs are present some of which may be at elevations markedly above the elevations as represented by the smooth section lines.

The seismic velocities show that the till overlying the bedrock is of rather loose texture and, on seismic data alone, probably impossible to differentiate from dry gravel.

NOTE: Actually, the depth is calculated for a "mirage point", not exactly beneath the shot point, but a very few feet toward the other end of the traverse, the exact distance being a function of the depth to bedrock. This explains why two shots made at a given shot point but for separate traverses may indicate different depths, these depths being for points on the bedrock surface that are a few feet apart horizontally.