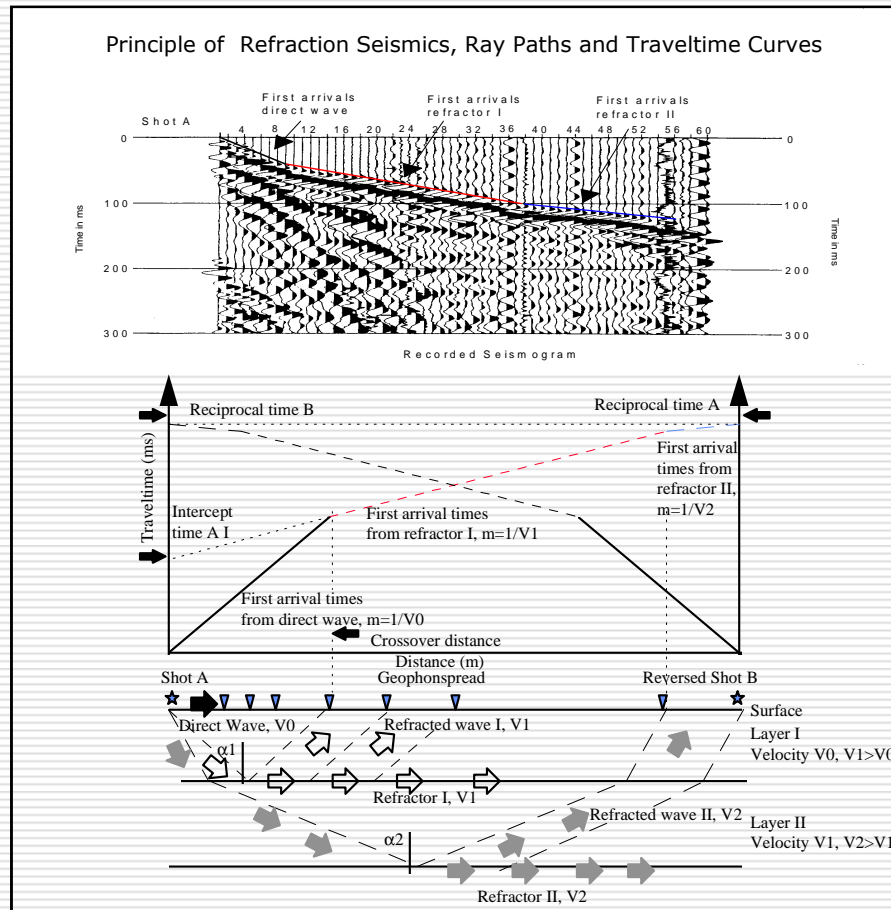


Applied Seismic Methods – Standard Refraction Seismics



SNELL'S LAW:

$$\sin(\alpha_i) = V_a / V_b$$

with V_a = Velocity above the refraction horizon
and V_b = Velocity below the refraction horizon

All Velocities (V_p) are velocities of p-waves
(primary wave or longitudinal wave)

REQUIREMENTS AND LIMITATIONS OF REFRACTION SEISMICS:

- ❑ Each layer consists of a nearly constant seismic p-wave velocity.
- ❑ The seismic p-wave velocities increase with depth.
- ❑ The thickness of the subsurface layers should be large enough to allow the generation of head waves (refracted waves).
- ❑ The length of a standard refraction line on surface ideally should be 3 – 4 times longer as the maximum depths of the estimated refractor.
- ❑ The direct detection of weak- or fault zones with standard refraction seismic methods is virtually impossible.

Seismic Equipment – Recording Parameters



RECORDING PARAMETERS:

Instrument:

GEOMETRICS StrataVisor NZ II
(48 Channels)

Source Type: 10 kg Sledgehammer

Source Spacing: 3 m

Source Offset:

Refraction Survey: 9 m / 0 m /Mid Spread

Receiver Spacing: 3 m

Receiver Type: GEOSPACE 4.5 Hz

Receiver Configuration: Single Geophone

Spread Layout:

Refraction Survey: 24/32/36 Channel Fixed
Spread

Trace Length: 1.000 ms

Sample Rate: 0.5 ms

Processing Sequence

□ REFRACTION SURVEY

- Geometry Setup
- Shot & Trace Edit
- First Break Picking
- Arrival Assigning to Layers
- Velocity Analysis (GRM)
- Velocity & Depth Section

□ Used Software:

- Firstpix (Interpex)
- Gremix (Interpex)