

3D Seismic Design and Quality Control for Land Acquisition 2-DAY COURSE OUTLINE

Day One

1. **Overview and Introduction (8:00-8:30)**
Introduce Mustagh and instructor(s)
Introduce participants and background
2. **Review of Basic Concepts (8:30-10:00)**
Stacking and Random Noise
Bandwidth and Resolution
The Seismic Wavefield
Spatial sampling at the surface
Sparse sampling of wavefield
Case history 2D vs 3D

- 15 Minute Coffee Break -
3. **Types of Noise (10:15-12:00)**
Random – time variant
Source Generated – offset variant
 Trapped Mode
 Guided waves
 Scattered surface waves
 Ground Roll
 Shear converted surface waves

- 1 Hour Lunch Break -
4. **Basic 3D Grid (1:00-2:30)**
Definition of terminology
Coverage with single shot
Basic building blocks – 1 fold
Fold, Bin Size and Trace Density
Example of how Fold can be mis-leading
Development of 3D fold equation
Offset Limited Fold

- 15 Minute Coffee Break -
5. **Examples of Design (2:45-3:30)**
Modeller versus Designer
2D versus 3D considerations
 Full offset
 Limited offset
 2D vs 3D consequences
6. **Aspect Ratio (3:30-5:00)**
Bin Size versus Statistics
“Analogue” statistical patterns
Box Size versus Statistics
Aspect Ratio
 Imaging considerations
 Operational considerations
 Cost considerations

Day Two

7. **Geometry Imprinting (8:30-9:30)**
Statistical patterns
Patterns due to perturbation
Skid and Offset guidelines
Examples
8. **LiDAR (9:30-10:00)**
As a mapping and planning aid
Analogy to 3D Philosophies

- 15 Minute Coffee Break -
9. **Model Types (10:15-12:00)**
Three Orthogonals
Two Bricks
Two Diagonals
Random
Available statistics
 Fold, Midpoint Scatter
 Deviation in Offset
 Missing Offsets
Data Simulation

- 1 Hour Lunch Break -
10. **Design Considerations (1:00-2:30)**
Overall Size and Shape
 Rolling the Patch
 Recording limitations
 Migration margin and artefacts
Deciding on the Desired Fold
 Basic Structure
 Wavelet Analysis
 AVO
 AVA
 Structural Complexity
 Noise

- 15 Minute Coffee Break -
11. **More Design Considerations (2:45-4:30)**
Offset Considerations
Source / Receiver line spacings
 Flared Grids?
Bin Size
Bin geometry and mid-point scatter
 Migration
 Pre-Stack Migration
 Limits of Spatial Resolution
 Spatial sampling of 3D operators
12. **Case History and Wrap-up (4:30-5:00)**