

Reflection seismic 1 script

Educational Material

Author(s):

Kruk, Jan van der

Publication date:

2001

Permanent link:

<https://doi.org/10.3929/ethz-a-004363847>

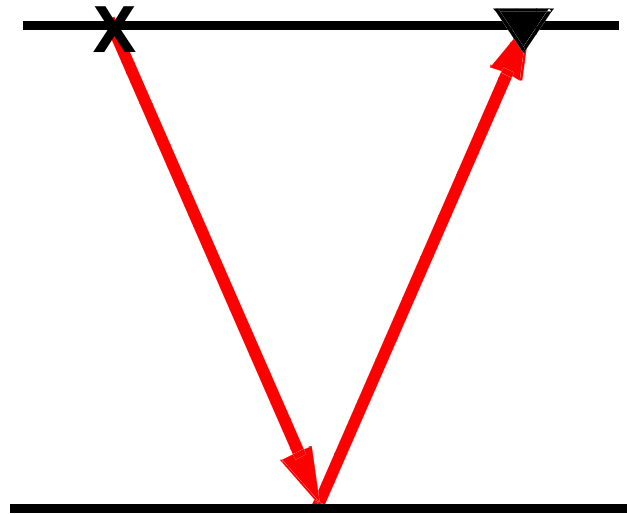
Rights / license:

[In Copyright - Non-Commercial Use Permitted](#)

Field layouts

- Common-offset & Zero-offset
- Common-midpoint method
- Up-dip and down-dip shooting
- Spread types
- Singlefold / Multifold recording
- Crooked line method
- Determining field parameters

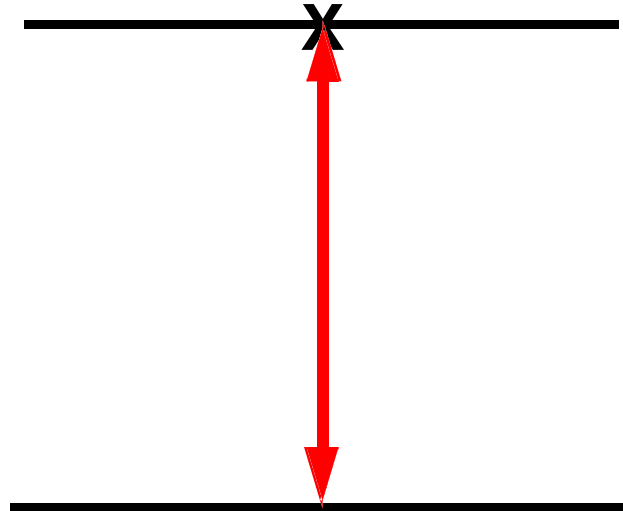
Common-Offset



Source and Receiver have always the same distance

Moveout must be corrected for

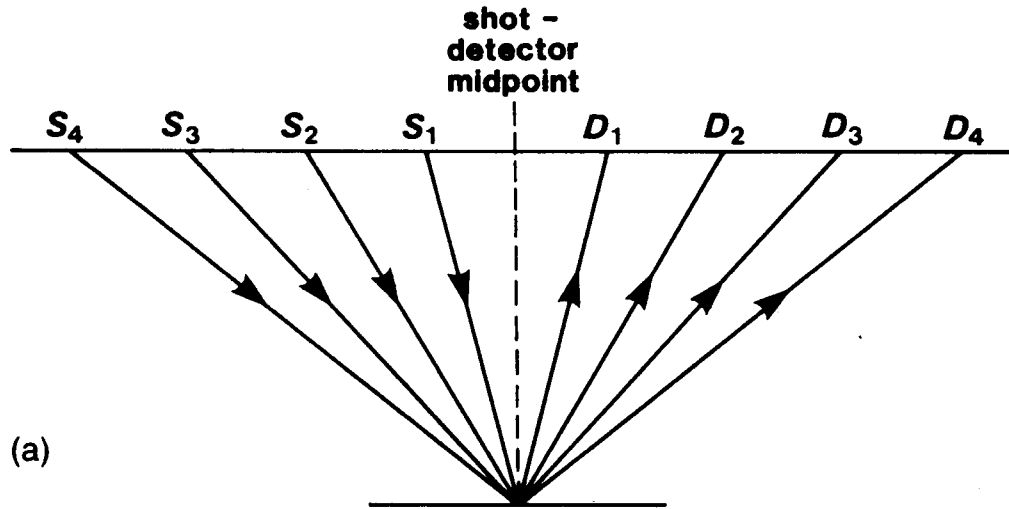
Zero-Offset



**Source and receiver are at the same location
(i.e. the offset is zero -> “zero offset”)**

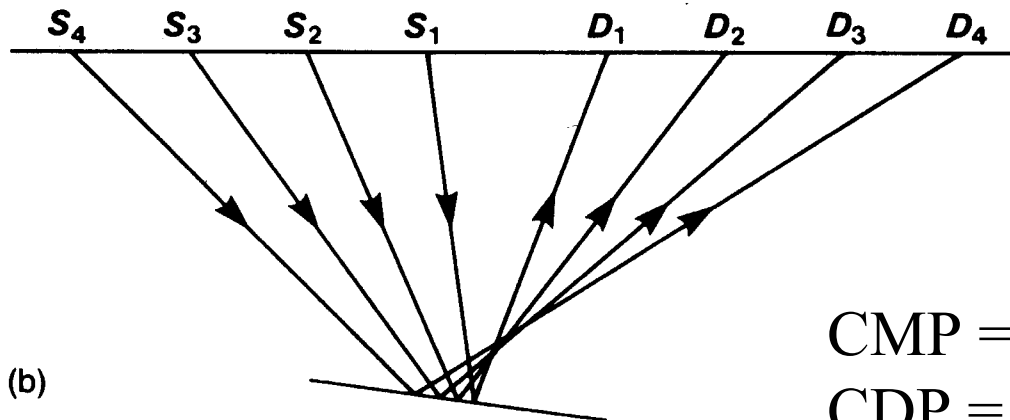
=> No Move-out

CMP - “Common Mid Point”



(a)

CMP = CDP

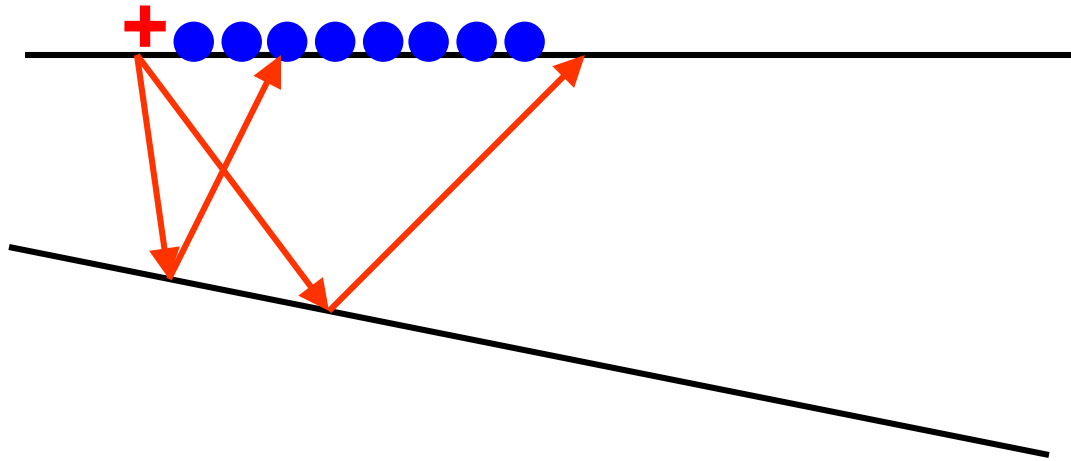


(b)

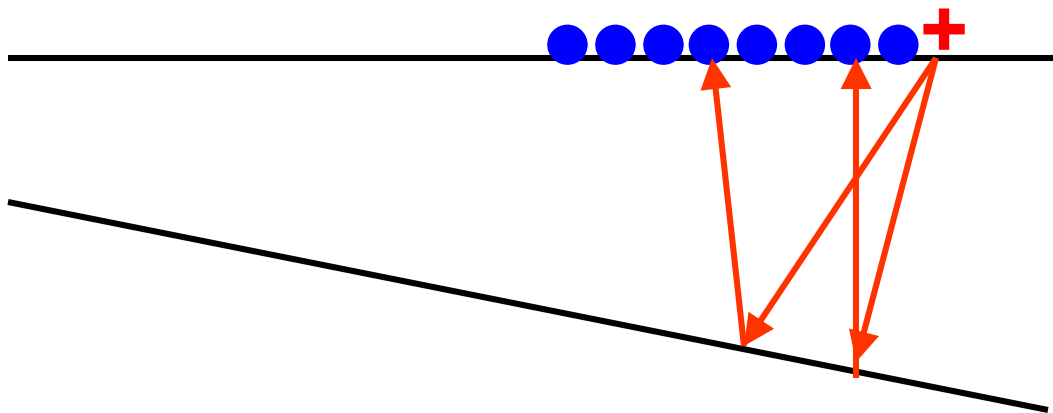
CMP \neq CDP

CMP = common mid point
CDP = common depth point

Down-dip and Up-dip shooting



Down-dip
shooting



Up-dip
shooting

Common field layouts

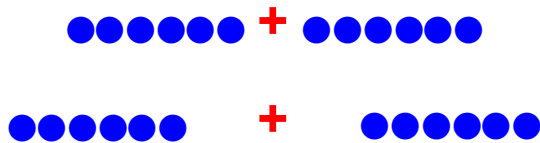
single ended (end on)



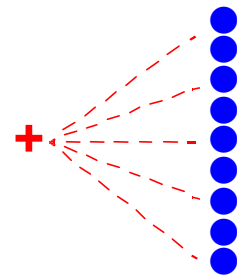
single ended (inline offset)



split spread



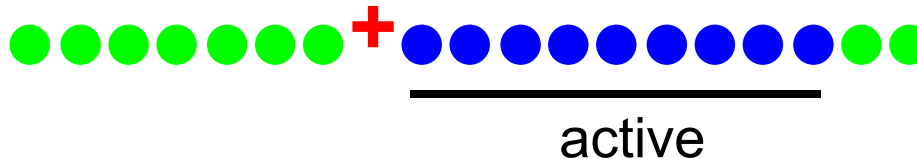
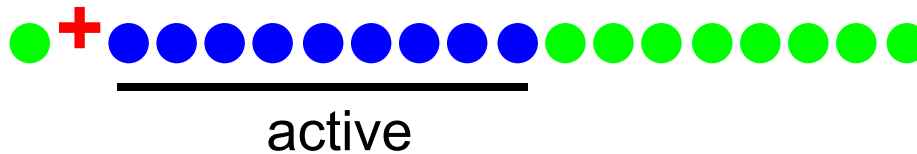
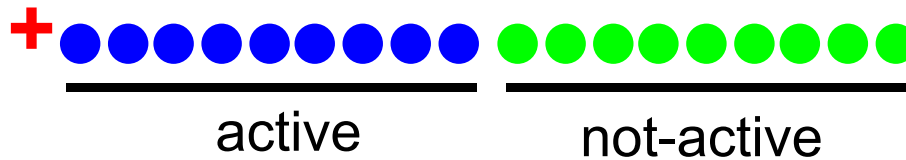
fan shooting



(Top view)

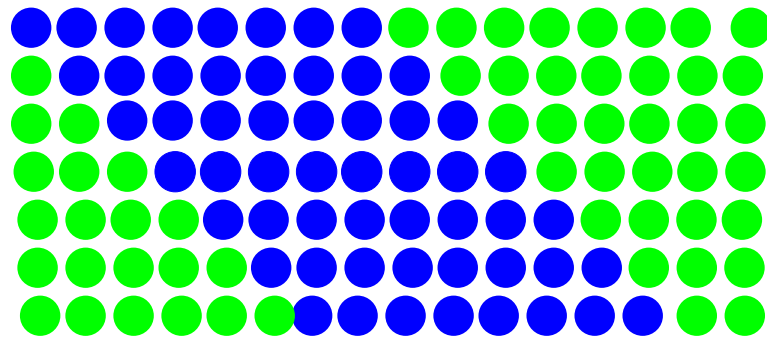
roll along

more Geophones in the Field than active channels



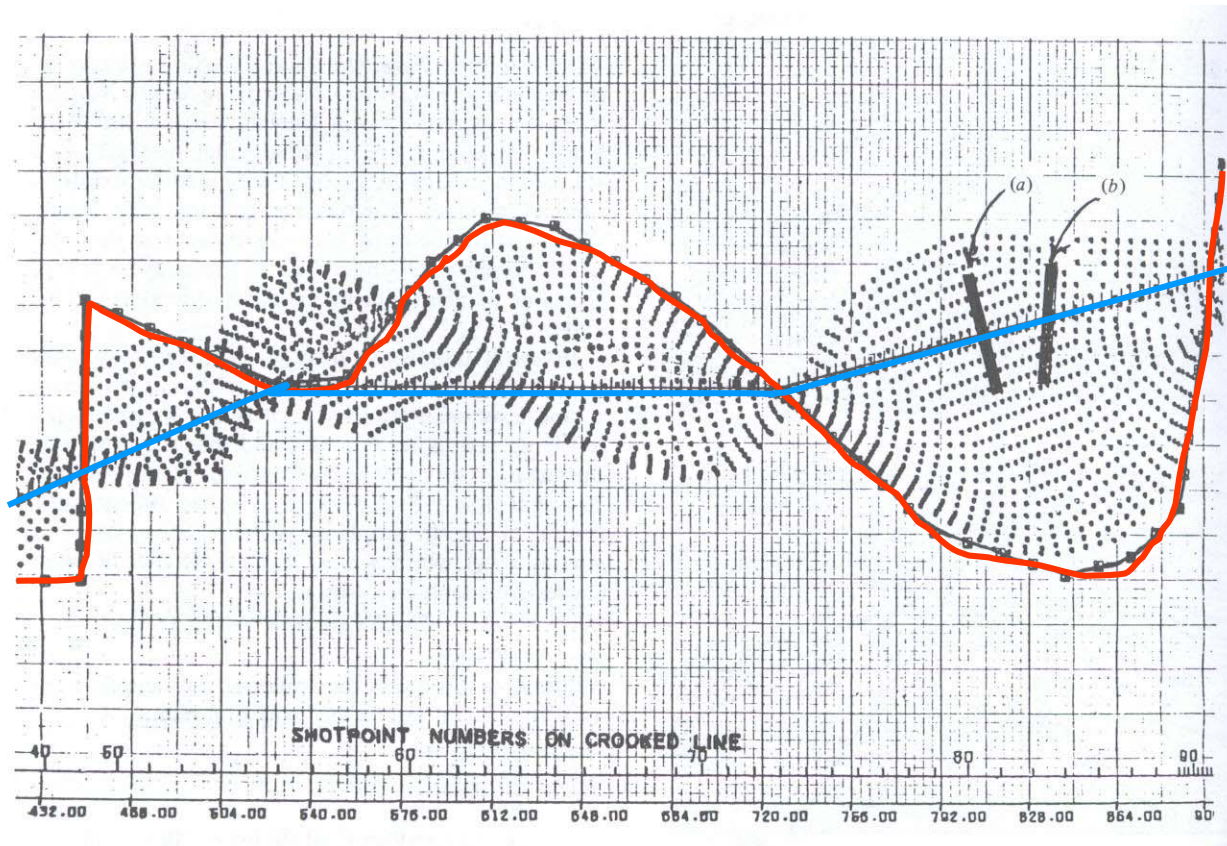
➔ **Geometry of Geophones relative to the source remains the same**

“roll along acquisition”



● active
● not-active

Crooked line method

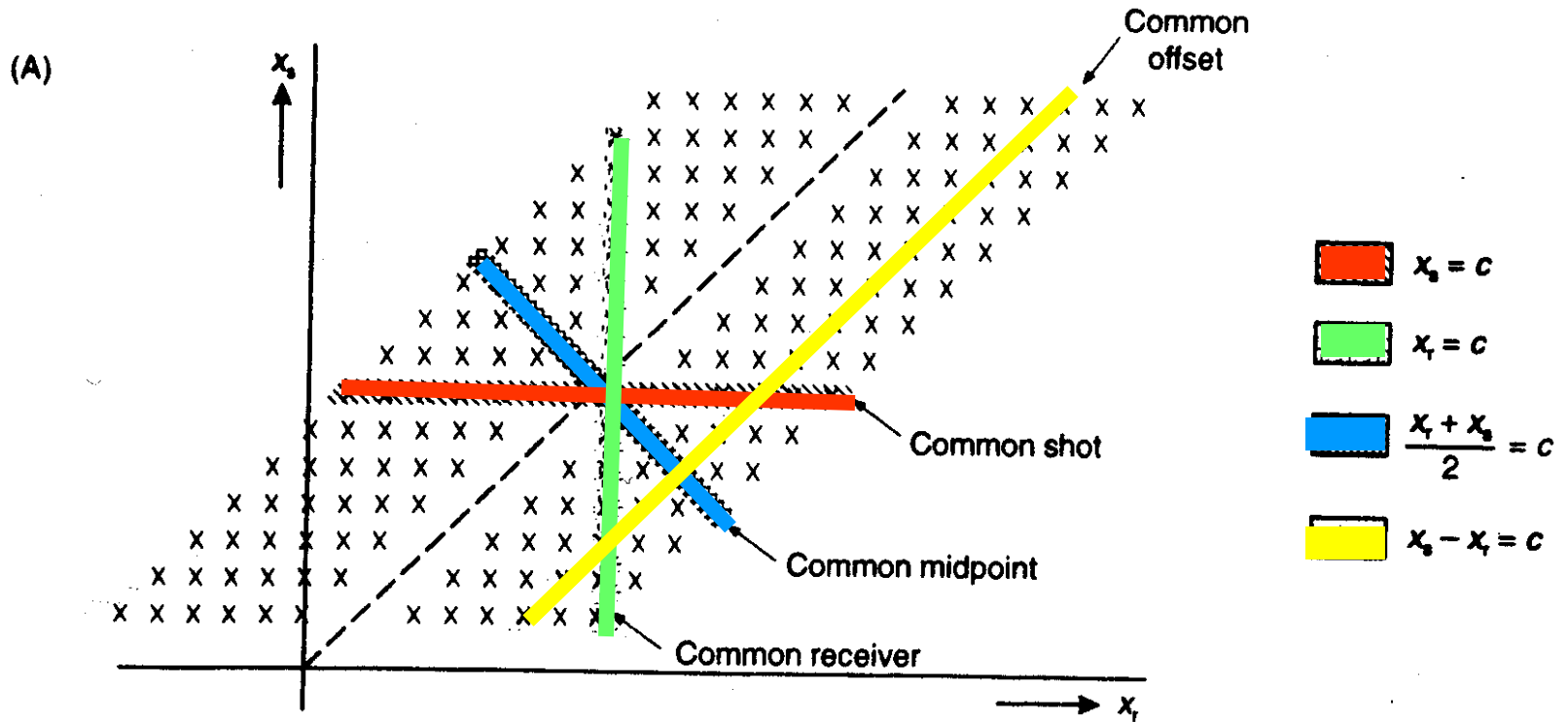


— Sources and receivers on a road

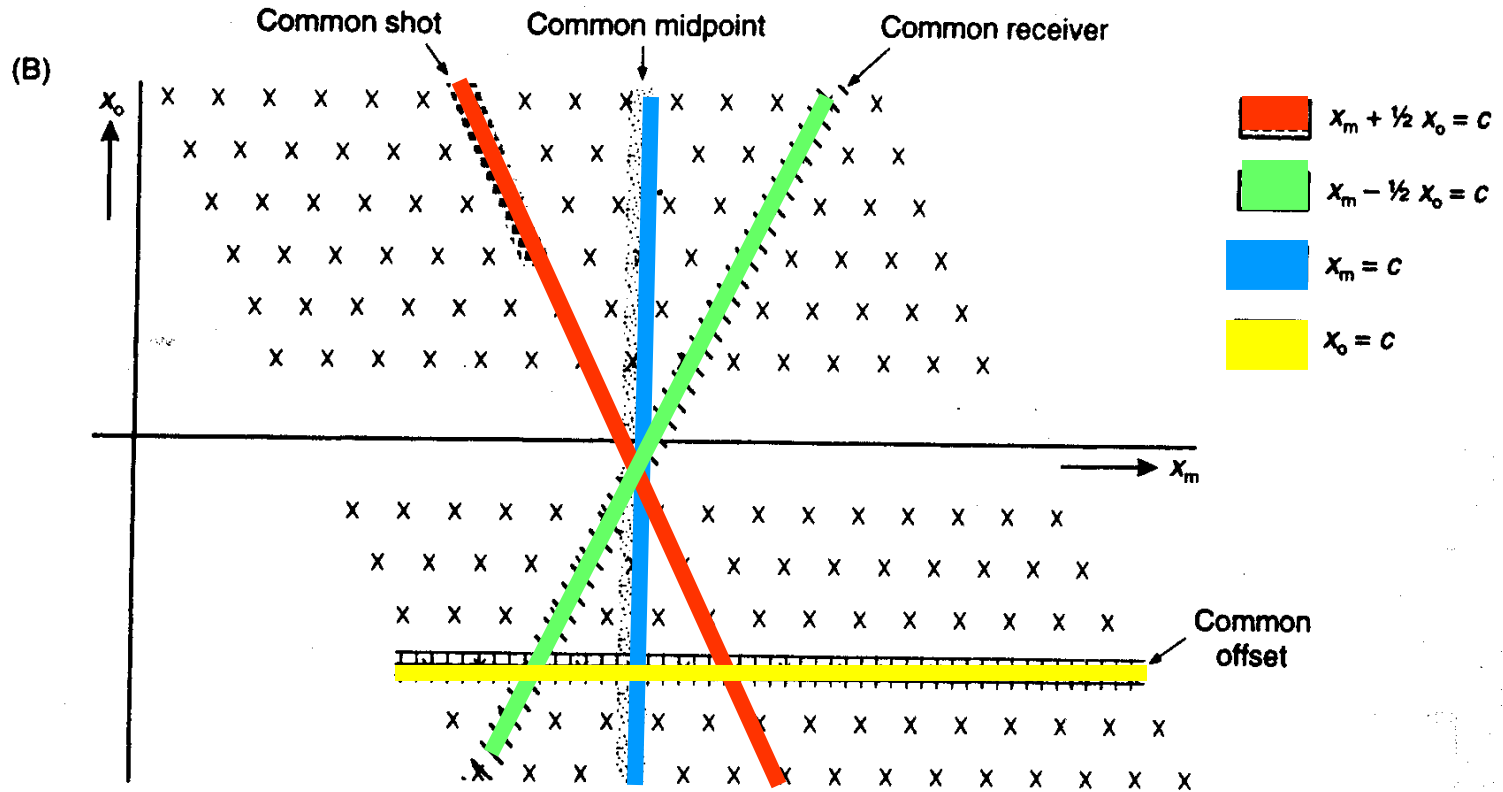
— Resulting line

From Sheriff, 1995

Shot-receiver coordinate system

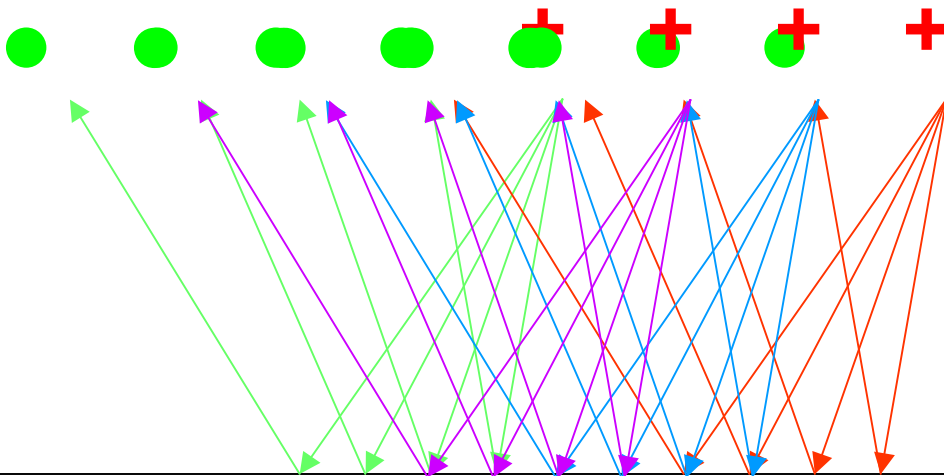


Midpoint-offset coordinate system

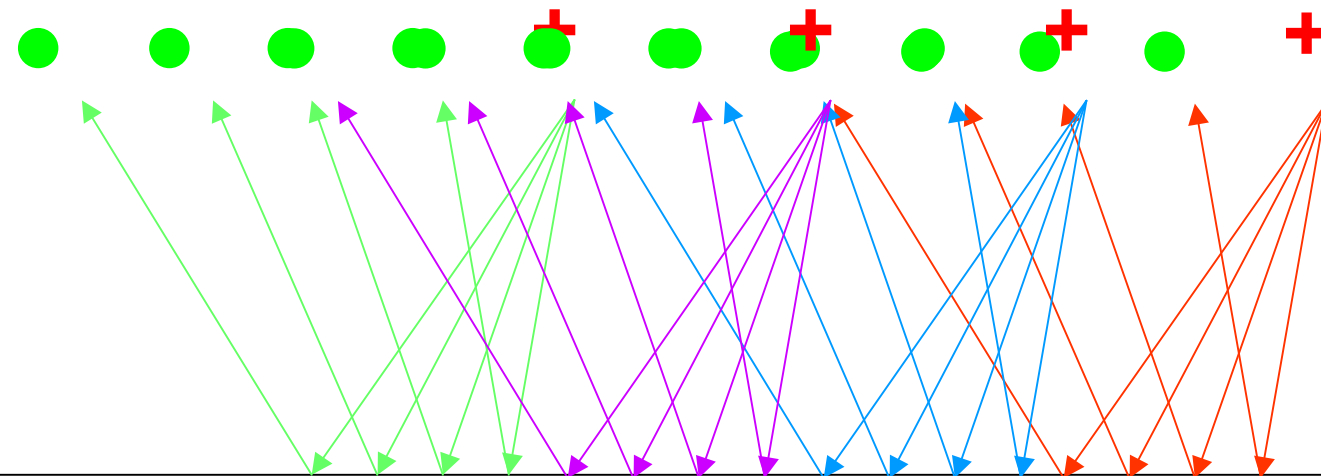


$$X_o = (X_s - X_r) / 2$$

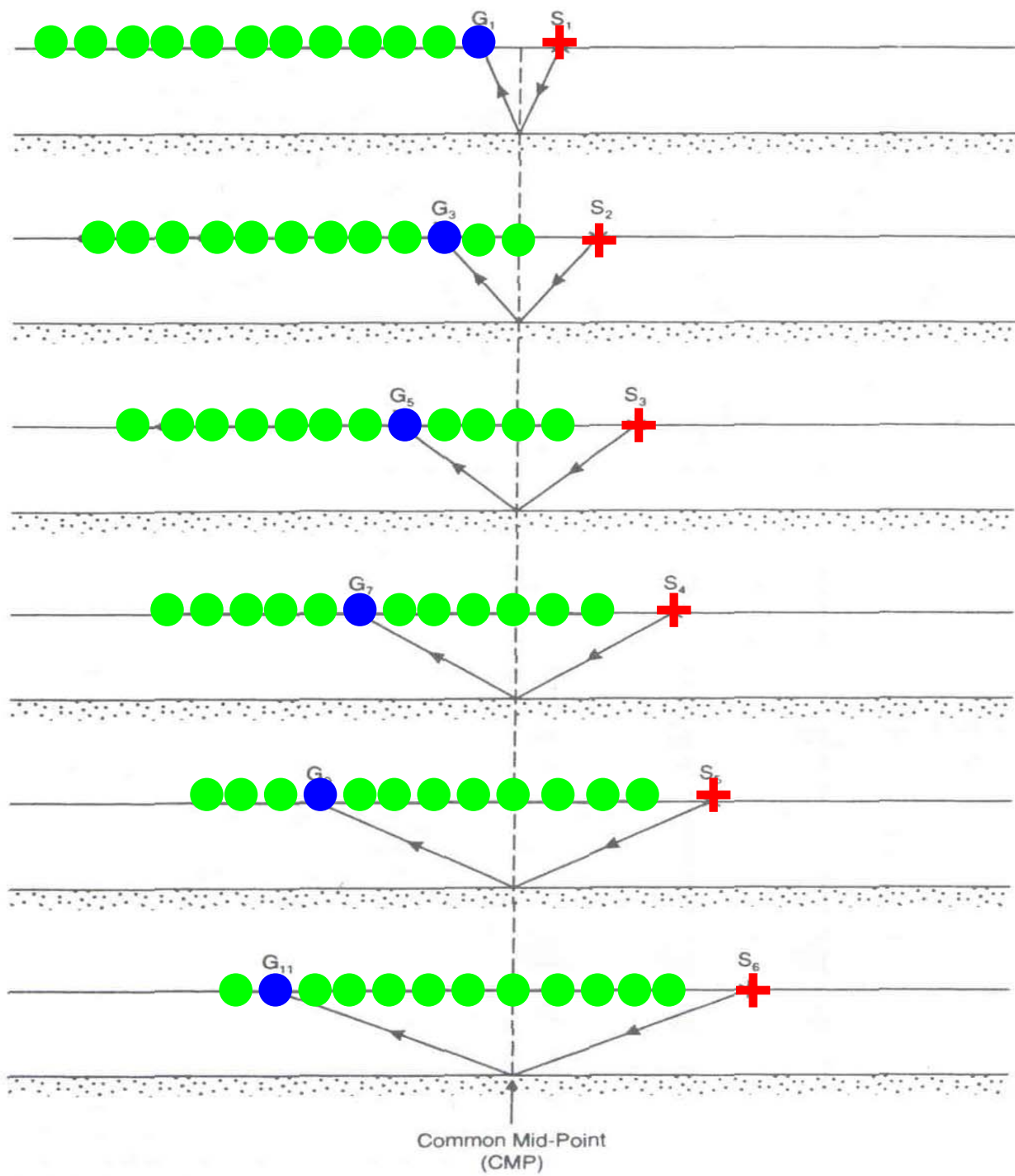
$$X_m = (X_s + X_r) / 2$$



No. geophones: 4,
 distance geoph: 1,
 distance source: 1,
 Fold: 2



No. geophones: 4,
 distance geoph: 1,
 distance source: 2,
 Fold: 1



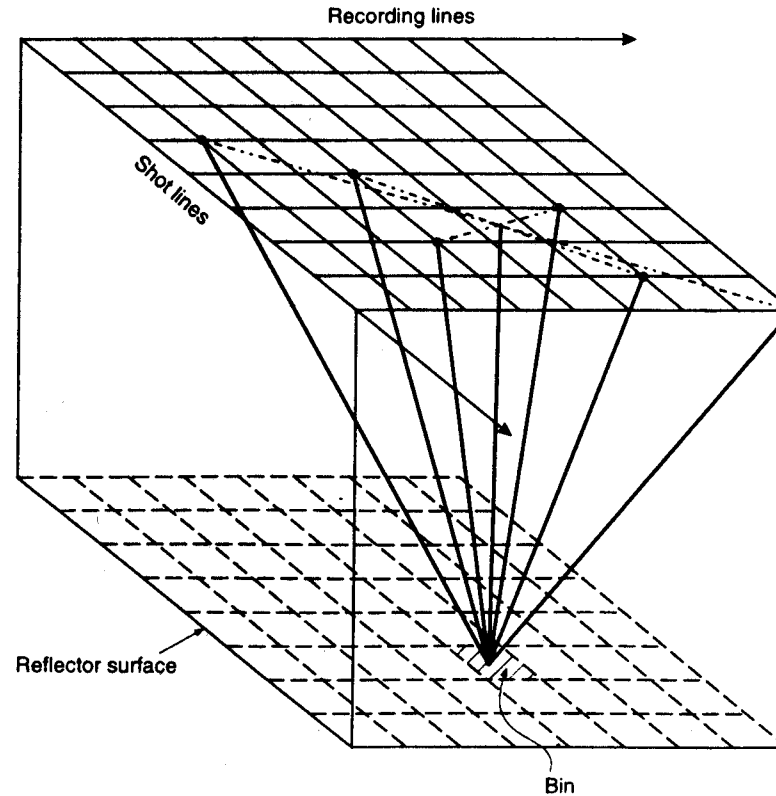
Coverage (“fold”)

Number of traces per CMP

$$\text{Fold} = \frac{\text{Number of geophones} * \text{Distance between the geophones}}{2 * \text{Distance between the shots}}$$

$$\text{Coverage} = \text{Fold} * 100\%$$

Raypaths for a given bin



Determining field parameters

- Maximum offset \approx Depth deepest zone of interest
- Minimum offset \approx Not greater than shallowest section of interest
- Maximum array length is determined by the minimum apparent velocity of reflections
- Charge size determined by ambient noise late on the record
- Line orientation (up-dip, down-dip)