



# Geophysical Development Corporation

## **SOLID** **Elastic** **Modeling**



# Functionality of SOLID

- ◆ **Creates Synthetic Seismic Traces using a horizontally layered solid medium as the model.**
- ◆ **Production of more accurate Seismic Models compared to traditional Ray Tracing.**
- ◆ **Allows inclusion of Elastic Modeling + Traditional Ray Trace Techniques.**
- ◆ **Linked to the Log & Ray-Trace Output to produce a quick comparison of two methods.**

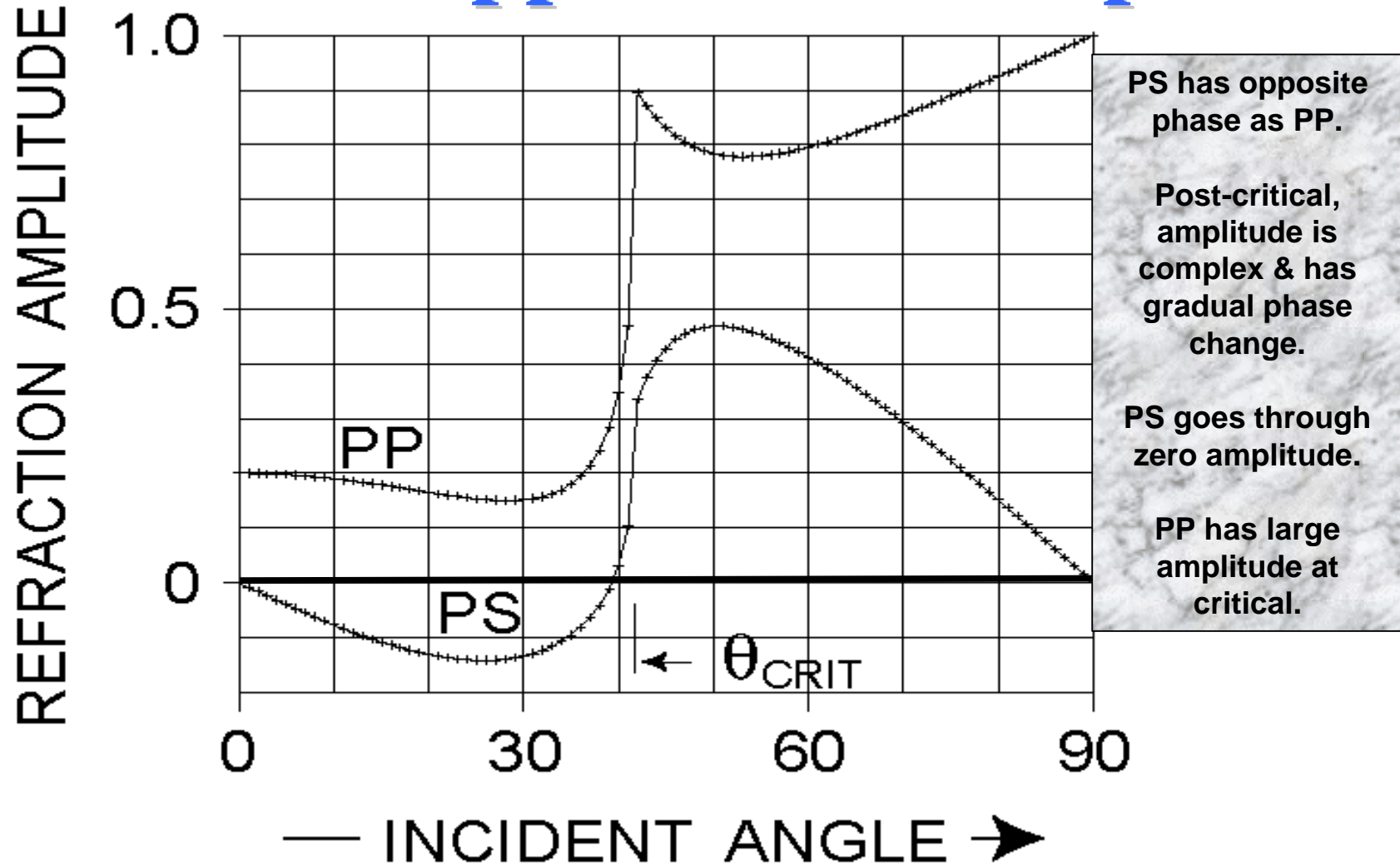


# SOLID Elastic Modeling

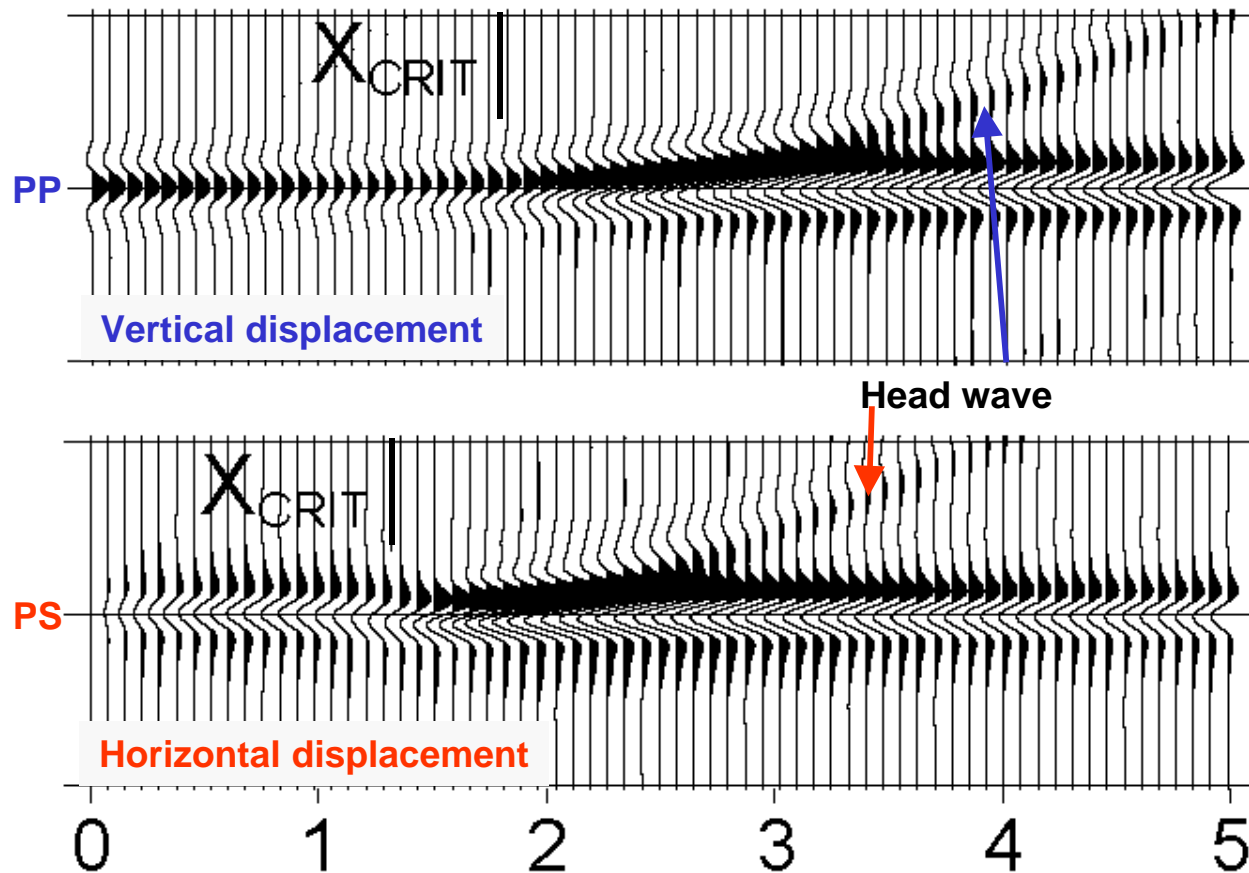
- ◆ Differences from ray trace
  - ❖ Mode conversions
  - ❖ Multiples
  - ❖ Head & surface waves - beyond critical
  - ❖ Various receivers - pressure, vert, horiz
  - ❖ VSP's
  - ❖ Correct response near & beyond critical
  - ❖ Includes Q
- ◆ Integrated with GDCMOD



# Exact Zoeppritz - 2 Halfspaces



# SOLID Model - 2 Halfspaces



Smooth amplitude & phase change for PP through critical

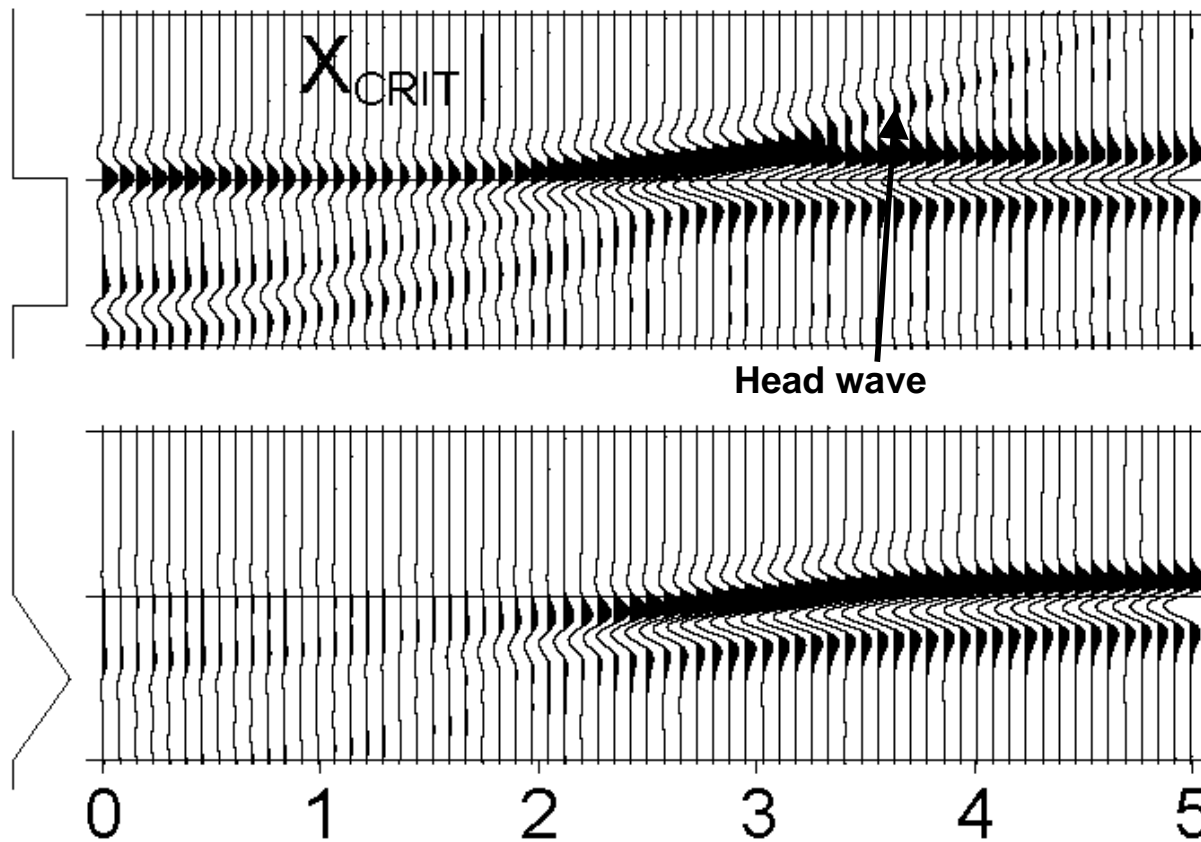
PS does not go through zero or reverse polarity

Head waves make a significant contribution to amplitude

— OFFSET IN FACTORS OF DEPTH —>

# SOLID - Thick & Transitional

— P-WAVE →



Head wave disappears in transitional case.

PP has gradual phase change in transitional case.

— OFFSET IN FACTORS OF DEPTH →



# **Advantages of SOLID ?**

- ◆ **Better prediction of lithology & fluid through use of long-offset and converted wave data**
  - ❖ **Salt identification**
  - ❖ **Carbonate rock properties**
  - ❖ **More constrained lithology & fluid prediction overall**