Parallel Seismic (PS) Data Examples

When determining quality of Parallel Seismic data, it may be difficult initially to differentiate between good and poor quality data unless the time is taken to export the traces and stack them in the IX Foundation® Software. This is usually done back in the office. The difficulty arises because PS data is often taken starting at the bottom of the borehole and moving up. The data taken at the deepest depths often have low amplitude arrival times (because the wave is attenuated in the soil) and the data are somewhat masked by hash (low-pass filtering helps with this problem). The example below displays the difficulties associated with deeper depths; compare this data to the second plot.

Although it may seem that this data is of poor quality, the quality of the data is actually quite good. Good data is determined by five separate factors:

1. The signal should originate at zero volts.
2. There should be a clear break either up or down indicating the wave arrival.
3. The scale percentage when acquiring the data should be between 10% and 80%.
4. The impact on the shaft should be considered as a single well-coupled impact, not multiple impacts.
5. The hit location and orientation may also affect data quality. Therefore, it is useful if time permits, to try multiple orientations and hit locations.

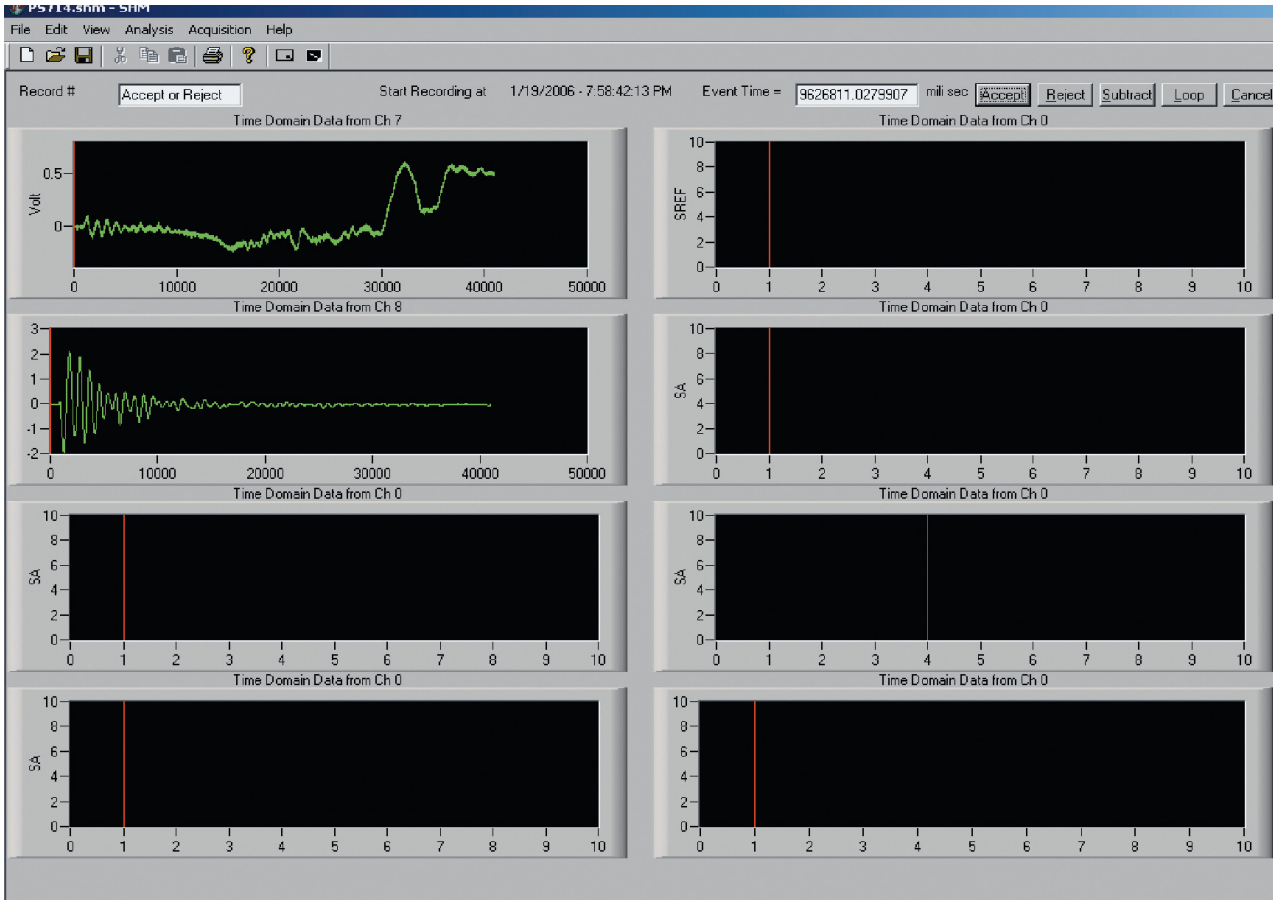

Figure 1. PS results showing a good quality data

If the field technician is in question of the data quality, he or she should acquire the entire data set and export the data to IX Foundation®. If the clear break indicating the pile depth is seen in the stacked data, then the data quality is acceptable. See the next plot (figure 3) for an example of a clear break in stacked data.

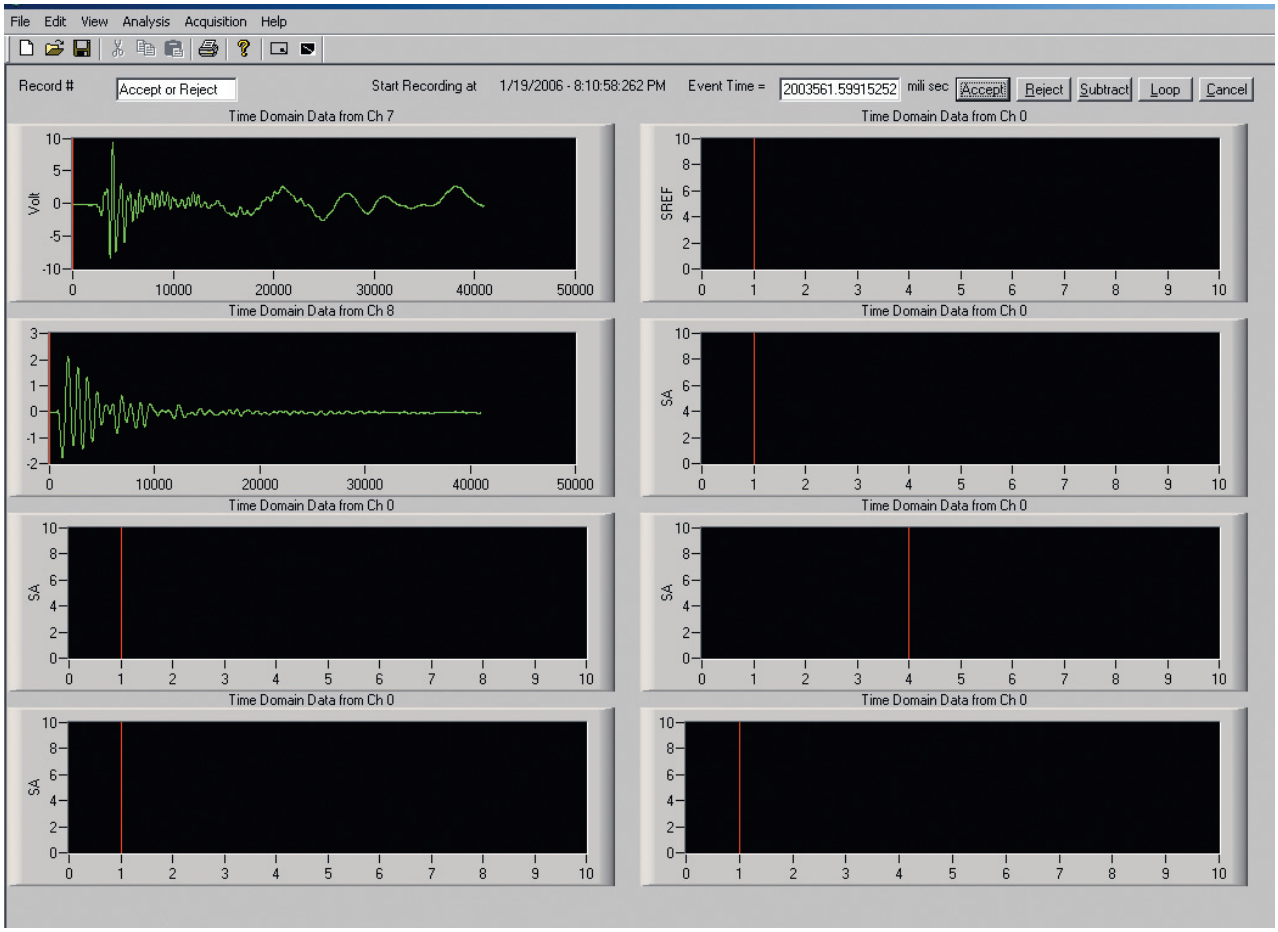

Figure 2. PS results showing good quality data

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The clear break is seen because the velocity of the concrete is much higher than the velocity of the surrounding soil. Therefore, when the wave must travel through more soil, the wave arrives at the transducer later in time. When the waves arrive at earlier times they are not traveling through as much soil. This generates a difference in first wave arrival times that occurs at the base of the pile, indicating its depth.

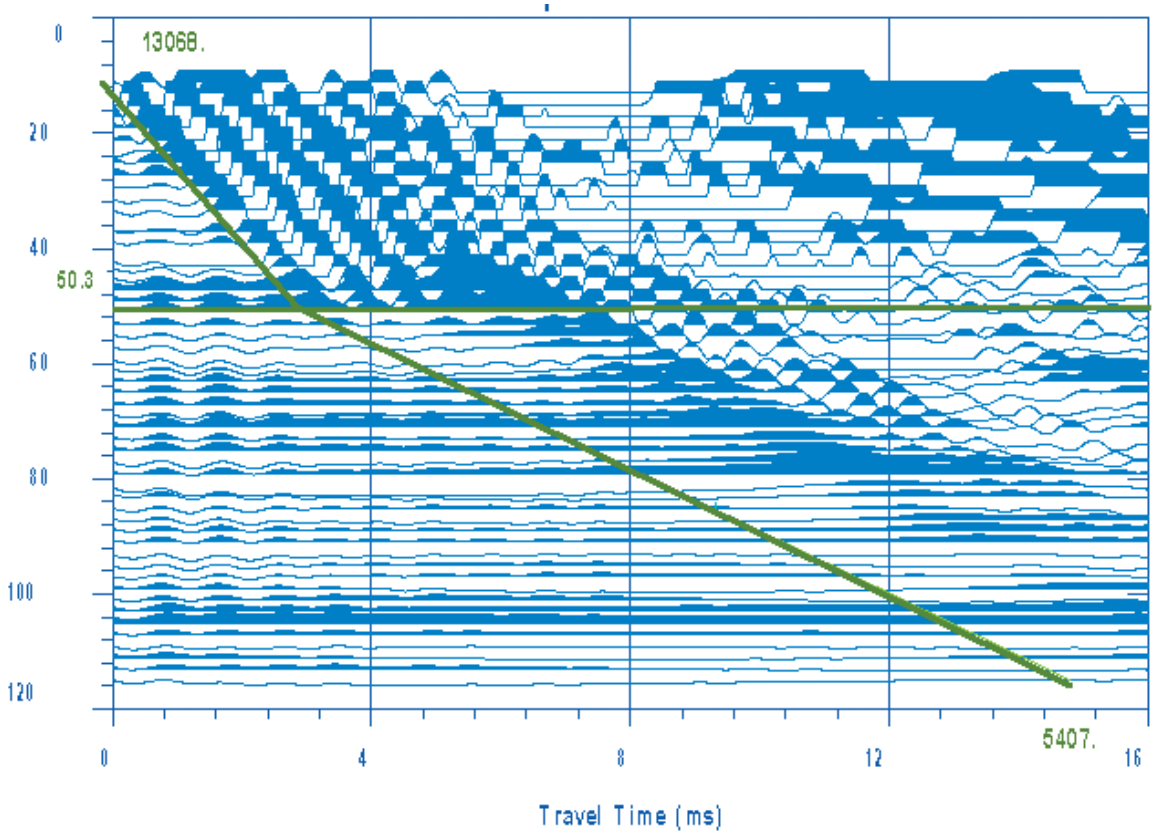

Figure 3. PS results showing an example of a clear break in stacked data

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