Plotting Measured Data

Both the TSA and the CGA data can be plotted on separate graphs to help understand the formability of a panel. Thickness information must be plotted on a bar chart and compared to thinning limits. Circle grid data must be plotted on a Forming Limit Diagram to assess formability.

Plotting Thickness Results

The chart below shows how thickness information can be plotted on a bar chart to better understand the thin out on a panel. Eight different locations of a control arm have been compared to the Thinning Strain Limit (TSL) and the Marginal Thickness (ML) lines. All but one location (location 2) will require circle grid analysis and likely part or process changes.

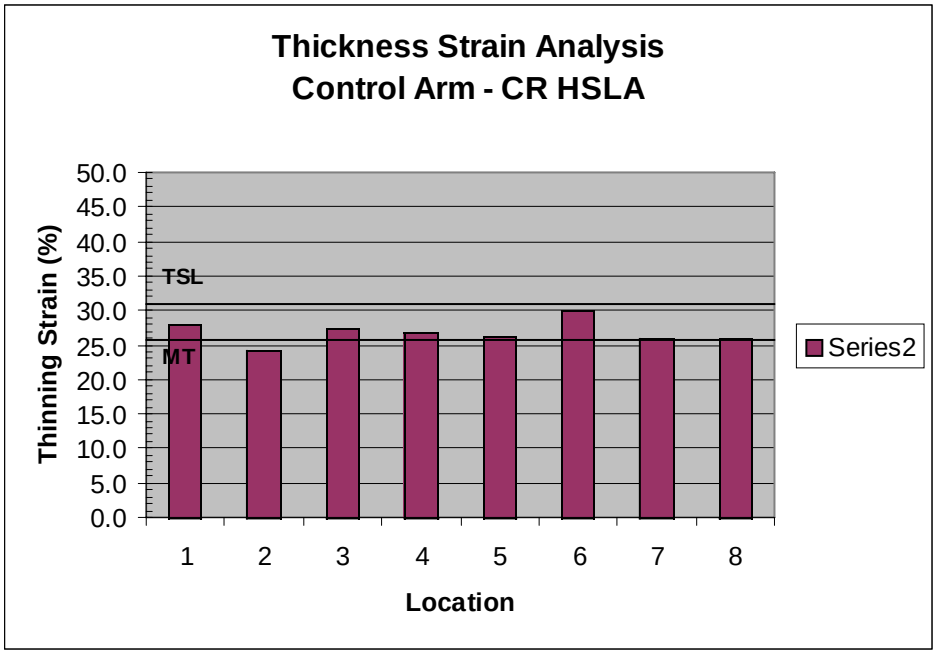

Figure 3-11. Sample Thinning Strain Results

Note: Thickness measurements from ultrasonic readings can be converted to thickness strain results, as shown here in %. See section 2.2.

Plotting Major and Minor Strain

Circle grid data must be graphed as pairs of data - the major and minor strain readings for each circle are considered a pair. These can be plotted on a major vs. minor strain graph.

Example:

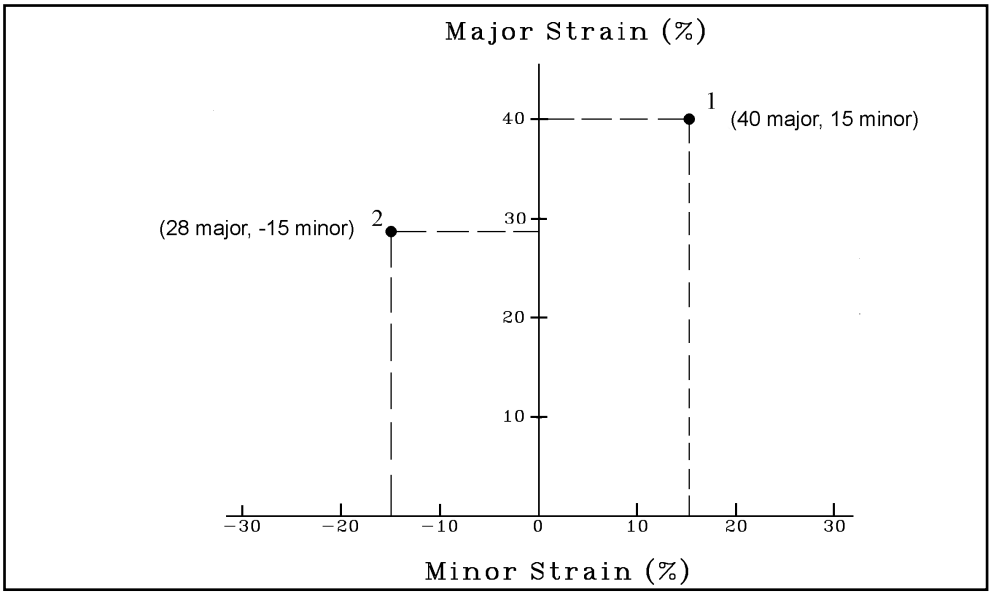

Figure 3-12. Strains plotted on a Major and Minor Strain Graph

In order to measure the formability of the panel, a Forming Limit Curve must be superimposed on the graph. Together with the major and minor strain points they will make a Forming Limit Diagram.