

Category: Design for Manufacture and Assembly (DFMA)

Example: Making glue pour operation more robust by modeling glue track strength

Situation: Tongue-In-Groove glue joints comprise the primary means of joining automotive lighting lenses to bodies. Robots often need to trace complex paths to keep the glue tip in the proper position for correct dispensing.

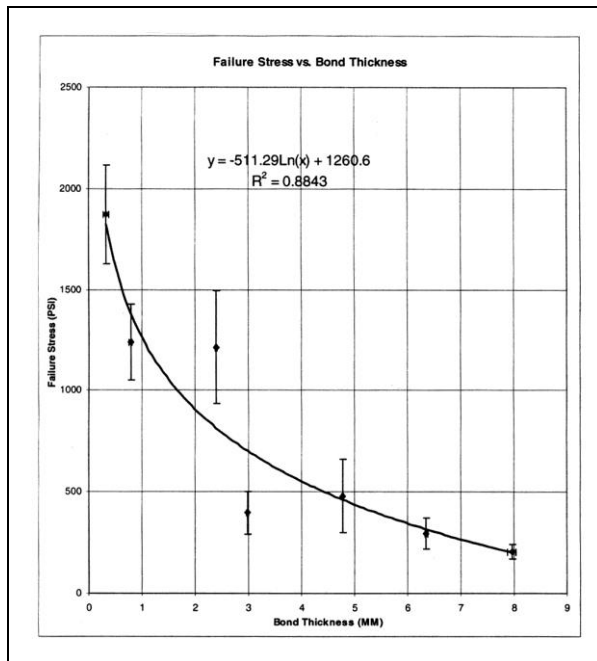


Image 1: Glue strength data

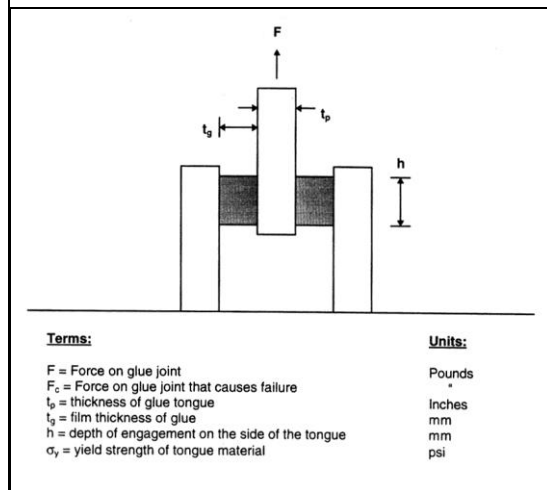


Image 2: Simple model of glue track

Problem: Narrow glue tracks led to high scrap. Widening the track would make the glue dispensing process more robust, but glue joints get weaker as the glue film thickness increases. Was a 2mm glue film thickness viable?

Action:

1. Obtained data on glue joint strength vs. film thickness from supplier (Image 1)
2. Modeled glue track in simple model (Image 2)
3. Was told key criterion was keeping the glue joint strength above the strength of the tongue

Result:

1. Model showed glue film could be widened up to 6 mm without exceeding tongue strength
2. A 2 mm glue film thickness resulted in a joint almost 200% stronger than the tongue's expected strength
3. Widened glue track increased process robustness, reducing scrap related to the gluing process