**Weld Lines**

- Weld line proximity does not affect strength
  - Statistical analysis shows no difference between interaction locations
  - Weld lines are negligible relative to other factors

- According to Moldflow™, weakest teeth are above the weld lines
  - Residual shear stress was highest at the top of the gear
  - Residual shear stress may reduce the required torque to break the gear
    - Residual shear stress may break polymer chains during formation
    - Residual shear stress may add with bending force to produce failure

- A sprue in the center posses new risks and little benefit
  - Location allows for even distribution of plastic flow
  - Fill time decreases slightly by a tenth of a second
  - Residual shear stress fields form a band across gear
    - Band may induce total gear break failure
    - Weld lines affect same teeth as residual stress field
  - Air pockets form around entire perimeter and more frequently

![Largest Residual Shear Stress at Top of the Gear](image1)

![Residual Shear Stress Forms a Band Though the Middle of the Gear](image2)