

Item	Risk	Likelihood	Consequence	Rating
1	Risk: Thermal process model does not predict temperature transients accurately.	3 (> 30%, Moderate)	3 (Moderate)	Y
	Impact: Degrades all downstream analyses.	↓		↓
	Mitigation: Add measurements to improve heat transfer predictions.	2	3	G
2	Risk: Stress relief predictions do not match measured forging data after heat treatment	2 (>5%, Low)	3 (Moderate)	G
	Impact: Some effect on residual stress magnitude predictions.			
	Mitigation: None required: monitor.			
3	Risk: Range of microstructure and grain size predictions exceeds desired control limits	3 (> 30%, Moderate)	2 (Some impact)	Y
	Impact: May affect life prediction with residual stresses	↓		↓
	Mitigation: Extend control limits; monitor production.	2 (>5%, Low)	2 (Some impact)	G
4	Risk: Machining distortion requires cold-straightening and stress relief to meet final envelop	2 (>5%, Low)	3 (Moderate)	G
	Impact: Extra process & modeling step, but predictable			
	Mitigation: None required: monitor.			
5	Risk: Uncertainty quantification indicates RS values have insufficient fidelity for life prediction	4 (>50%, More likely than not)	4 (Significant impact)	R
	Impact: Cannot include residual stress predictions directly in life predictions.	↓	↓	↓
	Mitigation: Consider alternate process or use bounded rather than explicit values.	3 (>30%, Moderate)	3 (Moderate)	Y