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Analytical Analysis of the Mechanism of Effects of Machining Parameter and Tool Parameter on Residual Stress Based on Multivariable Decoupling Method

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Highlights:

- Heat conduction and heating time are dominant factors to affect penetration depth of temperature and residual stress.
- Friction coefficient on tool flank and tool flank wear length are dominant factors to cause the generation of tensile residual stress in surface layer.
- Cutting force only affects magnitude of residual stress profile, it has no effects on residual stress penetration depth.
- Relationship between highest temperature and temperature penetration depth is the dominant factor to influence surface residual stress.

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