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3D finite element investigations on textured tools with different geometrical shapes for dry machining of titanium alloys

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Highlights

- 3D finite element simulations are carried for machining of Ti6Al4V using textured tools and experimentally validated from machining experiments.
- Different geometrical shapes (circular, square, triangular, and elliptical) were modeled on cutting tools to study effect of texture shape on machining using FEM simulations.
- Different texture shapes, texture area density and depth of texture are evaluated for variation of cutting forces and friction coefficients.
- For the first time, tool chip contact length model is developed for textured tools and the variation of tool chip contact length is compared for plain and textured tools.
- Effect of chip serration and contact length fluctuations are considered to develop contact length model with the help of 2D FE simulations for both plain and textured tools.

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