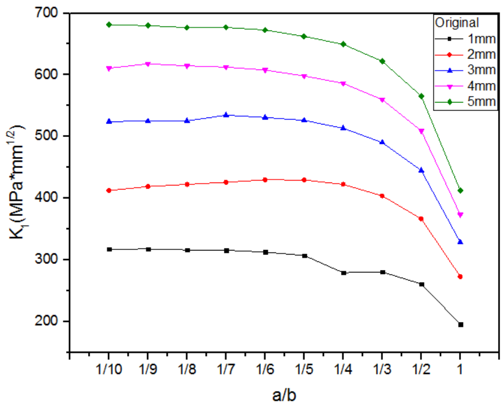
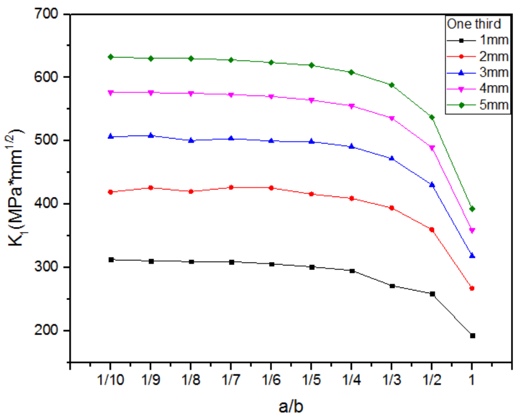


(a) Original size



(b) One third size

Figure 6. Simulation solution of stress intensity factor of different depth crack with different shape ratio

5. CONCLUSION

In this paper, the stress state of the hollow axle is analyzed, and the finite element model of the crack on hollow axle surface is established. On the basis of model, the stress intensity factors of the crack front are calculated and analyzed. The distribution law of crack front stress intensity factor of different initial shape is obtained. The conclusions are as follows.

(1) The results show that the finite element method is feasible and reliable to solve stress intensity factor of 3D surface crack.

(2) The distribution of stress intensity factors at crack front under different shape ratio and different depth on the surface of the hollow axle is analyzed under the allowable stress. The distribution law of stress intensity factor of crack on hollow axle is obtained. It provides a good reference to study the fracture reliability of hollow axles.

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NOMENCLATURE

σ_x	bending stress in X direction
σ_y	bending stress in Y direction
σ_z	bending stress in Z direction
τ_{xy}	shear stress in X direction
τ_{yz}	shear stress in Y direction
τ_{zx}	shear stress in Z direction
G	shear elastic modulus
μ	Poisson ratio
K_I	type I stress intensity factor
K_{II}	type II stress intensity factor
K_{III}	type III stress intensity factor