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The theoretical analyse of the surface acoustic waves propagated on the surface of the bulk materials with subsurface defect

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A theoretical model based on finite element method is used to analyse the properties of surface acoustic wave (SAW) propagated on the surface of the bulk materials with subsurface defect. The simulation results reveal the modes conversion between SAW and Lamb wave at the border of the defect and explain the diffusion properties of SAW propagated on the bulk material with subsurface defect. The modes conversion and wave reflection at the border of the defect are theoretically explained why there are a lot of riffles after the SAW passed through Al sample with circle subsurface defect, which detected by Laser ultrasonic method. The relationships between the wavelength of wave and the physical state of the defect in the bulk material are also fully described in theoretical simulation.