Guided wave tomography method based on Full Waveform Inversion (FWI) is developed for accurate and high resolution reconstruction of the wall loss on the plate-like structure. The forward model is solved by a full-wave equation in a 2D acoustic model and is used to predict the waveform of guided waves through the defect. The inversion is based on local optimization of a waveform misfit function between modeled and measured data and is iterated from low frequencies to high frequencies. The resulting wave velocity maps are then converted to thickness maps by the dispersion characteristics of selected guided modes. The performance analysis of the FWI algorithm is carried out by both numerical simulations and experiments. The results suggest that the FWI method is capable to reconstruct the thickness map of irregularly shaped defects as well as multiple defects accurately on a 10 mm thick plate. The resolution and the accuracy of FWI algorithm are discussed by the reconstruction of defects with various shapes and sizes.

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