

Parameter	Option-1 Piezo + ESP32	Option-2 Servo Tap + Mic	Option-3 Magnetic Slug + Mic
Signal quality	Medium	High	High
Repeatability	Medium	High	High
Sensitivity to cracks	High	High	High
Noise immunity	Medium	High	High
Mechanical stability	Medium	Medium	High
Setup consistency	Difficult	Easy	Very Easy
Failure points	Many	Few	Almost none
Calibration needed	Yes	Minimal	Minimal
Real-world robustness	Medium	High	High
Overall performance	Medium	Good	Best