CAPABILITIES AND LIMITATIONS OF PRESENT MsS SYSTEM FOR PIPING INSPECTION

Item	Capabilities/Limitations	Remarks
Dead Zone	14 inches (35 cm) at 64-kHz L-wave or 32-kHz T-wave	Using a two-cycle pulse; will vary with frequency and number of cycles in pulse
Spatial Resolution	7 inches (18 cm) at 64-kHz L-wave or 32-kHz T-wave	Using a two-cycle pulse; will vary with frequency and number of cycles in pulse
Pipe Material	Any material	For nonferrous pipe, a thin nickel strip is bonded
Pipe Size	Up to 24-inch (610-mm) diameter and less than 0.5-inch wall thickness	Outside the range, performance will be reduced due to lower MsS sensitivity
Inspection Range	100 feet (30 m) or greater	In bare, straight pipe in good surface condition
Detectable Defect Type	Isolated corrosion pits and circumferential cracks	Longitudinal defects could also be detectable if their circumferential cross section exceeds minimum detectable defect size
Minimum Detectable Defect Size	2 to 3% of pipewall cross section	Isolated defects in pipes with otherwise good surface condition; varies with frequency and defect shape
Defect Location	Axial location within ±2 inches (5 cm) at 64-kHz L-wave or 32-kHz T-wave	Cannot determine circumferential orientation
Defect Characterization	Limited to rough estimation of circumferential cross section	Cannot determine depth, width, and length, whether it is on OD or ID

EFFECTS OF PIPELINE GEOMETRIC FEATURES AND OTHER CONDITIONS ON INSPECTION CAPABILITIES

Features/Conditions	Effects
Flange/Valve	Prevents wave propagation; forms end point of inspection range
Tee	Causes a large disruption in wave propagation and limits inspection range up to that point
Elbow	Causes a large disruption in wave propagation and limits inspection range no farther than the elbow region
Bend	Has negligible effect if the bend radius is greater than 3 times the pipe OD; if the bend radius is less than the above, behaves like an elbow
Side Branch	Causes a wave reflection and thus produces a signal; no significant effects on inspection capabilities
Clamp	Causes a wave reflection and thus produces a signal; no significant effects on inspection capabilities
Weld Attachment	Causes a wave reflection and thus produces a signal; if the attachment is large (such as pipe shoes), can reduce inspection range
Paint	Has negligible effects
Insulation	Has no effects unless the insulation is bonded to the pipe surface, in which case the inspection range will be shortened due to higher wave attenuation
Coating	Has negligible effects if the coating is thin (e.g., fusion-bonded epoxy coating); thicker coating (e.g., bituminous coating, polyethylene coating) increases wave attenuation and shortens inspection range
Liquid in Pipe	No effect on T-wave; significant degradation on L-wave
General Surface Corrosion	Increases wave attenuation and shortens inspection range
Soil	If pipe is buried, the surrounding soil increases wave attenuation, and the inspection range is shortened