A method and apparatus for detecting and classifying cracks in pipelines is disclosed. The method for detecting and classifying cracks comprises the steps of: emitting a first shear wave along a region of inspection, the first shear wave being polarized in a first direction; receiving the first shear wave; emitting a second shear wave along the region of inspection, the second shear wave being polarized in a second direction at a minimal angle of about 10° different from the first direction, preferably at an angle of about 30° or more; receiving the second shear wave; examining the anisotropy of the first and second received shear waves by comparing at least one wave property of said first and second received shear wave for detecting and classifying cracks in the region of inspection. Said apparatus as disclosed herein comprises emitting and receiving EMATs, and is configured to carry out said method.