

Abstract

Many companies adhere to standards (such as API 653) that stipulate regular inspection of tanks. The location and environmental conditions at some sites make the movement of personnel, equipment and scaffolding required, quite inconvenient, dangerous and costly. There is, therefore, an incentive to develop autonomous robots capable of accomplishing the inspection task.

This work presents a conceptual design of a climbing robot specifically geared to the task of steel tank inspection. A prototype was designed, fabricated and tested. Cost was an important consideration and so a strategy of utilising off the shelf components was adopted. Theoretically this robot is capable of functioning at any angle on any flat steel surface, given the thickness of the sheet allows the electromagnetic clamps to generate sufficient force to support its weight.

Though not specifically designed to function on flat non-ferrous surfaces, the robot can be made to do so by replacing the electromagnetic clamps on the feet, with suction cups. No further modifications are required.

The underside of the central portion of the robot was left free of any mechanism to accommodate testing equipment. The volume available is approximately nineteen thousand cubic centimetres.

Keywords: climbing robot; steel tank inspection; hexapod.