

## Design and development of a device for area corrosion defects measuring on pipe-lines.

*Čáp J., Valenta F.*

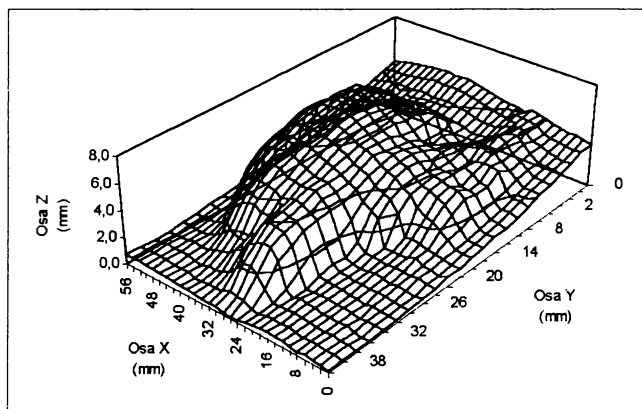
There is described a design of a portable three axis measuring device in this article. The measuring device will be used for scanning of pipe-line surface shape damaged by water corrosion. The device will produce a three-dimensional map of this surface and the map will be used for following firmness analysis of pipe-line tube.

The designed device would be able to work in real conditions on uncovered pipe-line. It would be able to make a 3D map of defects on the tube surface. The device would scan length of 600 mm in axial direction and 300 mm wide area on the surface. Because of following computing, the device would work in polar axis system. It may have small mass because of transportation and easy handling.

Other properties required:

- ♦ accuracy of measuring: from 0,1 to 0,2 mm
- ♦ intervals of measured points net: from 1 mm to 5 mm
- ♦ scanning speed: 0,01 second per one point
- ♦ diameters of measured tubes: from 500 mm to 1200 mm

Considering high speed of measuring, we have chosen the method of optical triangulation to measure radial dimension. Because the method is contactless, it enables to achieve required speed and accuracy of measuring. For measuring other two dimensions we can use standard incremental sensors. We have developed laboratory model of a part of this device to measure specimens of damaged tube surfaces. We get maps of the surface as indicated in the figure below.



Ing. Jiří Čáp, Prof. Ing. František Valenta  
ČVUT Fakulta strojní  
Technická 4, 166 07, Praha 6  
tel.: 02/24 35 25 18, e-mail: valenta@fsid.cvut.cz  
tel.: 02/24 91 53 19, e-mail: cap@fsih.cvut.cz