EXPERIMENTAL STUDY OF COLD WATER METER READING BY RADIO

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Abstract: This paper presents an experimental model of cold water meter reading by radio. We studied in particular the ability to read, sending and receiving information in meters mounted in diverse conditions that disadvantage transmitting radio waves. Processed information from data collection have been downloaded, analyzed and interpreted in a dedicated software.

1. INTRODUCTION

To achive the experimental model, equipment needed was chosen: pre-equipped for remote reading meters, the radio module type Sensus ((S)) cout-S which is mounted directly on the counter, PSION handheld terminal that incorporates a radio receiver and a dedicated software to process the data collected in the field.

Purpose of this study is to experimentally determine the limit conditions which can not achieve transmission, reception of radio waves that are communicating reading of water meters with appropriate equipment.

Generally, the vane water meter reading is done by counting revolutions of a magnetic pointer indicating a complete rotation around the axis and passing through the meter 10l, 100l or 1000l depending on meter size. Rotation pointer that is impregnated magnetic film by the law of another magnet placed in close proximity causes a magnetic flux that is converted into an electrical signal which in turn is converted to volume of water.

Electrical impulse produced, with an intensity of 5mA pulse is transmitted to a reader that converts or passes them using radio waves, wireless, cable, electric, etc.

This has been done several readings at different distances in different conditions shielding of communication by radio and has established that the transmission of radio waves occurred at a maximum distance of 20m in the toughest conditions and maximum 120m in the best conditions.

The results are very satisfactory because the legislation provides the location of water meters to be done to limit property within 1m away from the public, inside the property.

In these conditions water meters can be read even if there is access to the meter at any time of day, and the data collected in the field can be collected daily in dedicated software in seconds, after which it can analyze and share other programs used by water companies. [1]

2. EXPERIMENTAL MODEL

2.1. SELECTION OF EQUIPMENT FOR THE MODEL

Model experiments were chosen two meters DN 20 mm with the following main:
> accuracy class **R 160** conf. NML 003-5;

- nominal flow **Q_3= 4 m^3/h**;
- maximum permissible errors at the minimum flow is ± 2%;
- nominal operating temperature: 30 ºC ;
  For the counters were originally checked metrological bench of Oradea Water Company were issued protocols showing the operation meter tolerances. [3]

Figure 1. Metrological stand of water meters [1]

Figure 2. Metrological verification of water meters [1]

Also on the verification stand was mounted the radio module type Sensus (S) cout-S:

Figure 3. Radio module type Sensus ((S)) cout-S [5]

Figure 4. Presenting radio module the meter system and type portable terminal PSION [1]

After setting the meter data and your water meter installation so equipped, the software program installed on PSION shown in fig.4, water meter was installed on water mains connection of a building.

2.2. TESTS AND MEASUREMENTS IN THE EXPERIMENT

Later attempts by meter reading at varying distances and under certain unfavorable conditions such as radio transmission: shielding metal (iron cap over the fireplace), metal obstacles (fences, concrete walls), water flooded home.

Meter reading by the tests under these conditions it was found that reading by radio may be the most difficult conditions to a maximum distance of 20 m.

This is a success because no water meter is installed at a distance of 10 m from the public domain. In these conditions can be read counter 24 h of 24 h and does not require access working staff of the Water Company, the private sector.

Downloading data from portable terminal type is PSION computer where you installed software that allows centralized dedicated Sensus READ read data in a table can be interpreted in various ways. [1]

Figure 5 Sensus READ dedicated software installed on your computer and the portable terminal [1]
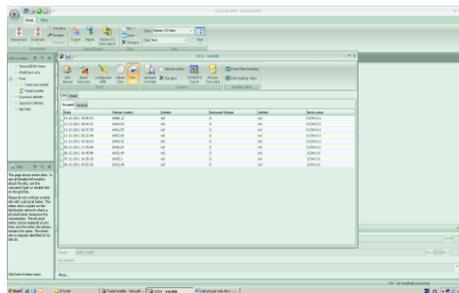
Figure 6. View daily readings [1]
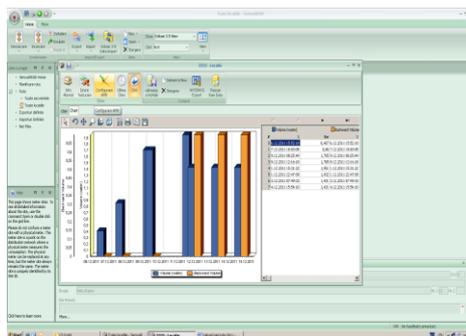
Figure 7. Graphical representation of consumption registered to an address [1]

3. CONCLUSIONS

- ➢ Meters can be read at any time of day for at least 20 m to 120 m maximum.
- ➢ This reading by radio, allowing the data collection reading from a radius of about 100m in minutes.
- ➢ It can easily detect water loss or theft of water through a graphical interpretation.
- ➢ It can read data directly over billing given that readings taken by dedicated software is the Excel table.

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