

MONITORING COLD WATER METER USING A COMBINED METHOD CABLE AND RADIO WAVES

Botiș Aurel Cristian¹, Mihăilă Ioan²

¹ SC Compania de apă Oradea S.A, botis.cristian@yahoo.com

² Faculty of Industrial Engineering

Keywords: water, water meters, water network, transmission, signal.

Abstract: For the experimental study presented in this paper have used two methods of reading and data transmission:

- data transmission cable from the electrical signal obtained by cold water meter electromagnetic induction;
 - data transmission by radio waves from the radio module to a portable radio terminal, PSION;
- Experiment purpose at determining the minimum conditions that data transmission is possible.

1. INTRODUCTION

The monitoring systems existing water meter was found that in almost all cases were chosen individual methods of transmitting information: electric cable, radio waves, wireless, GPRS, etc.

Each has advantages and disadvantages, however materializing in additional costs to compensate for the shortcomings of the method.

Analysing the advantages and disadvantages of these methods of transmission of data it was concluded that one can use a combined method of transmitting data at minimal cost to remove the disadvantages that arise from a certain level when using a single method.

The most used, low cost and high reliability are the data transmission cable (long distances) and wireless (for shorter distances) for which this work was chosen for study combined cable-way radio.

Currently in Oradea on water taps supplying blocks of flats are equipped with water meters installed REED relay that allows data transmission cable.

Since the cable routes are very long and there are many connections route the existing monitoring system maintenance is very expensive, the idea behind this work is to replace the cable network meter reading system using radio waves using a hand the existing system, optimizing the investment costs and subsequent maintenance.

First were retained in the existing system only counter mounted branch, equipped with REED relay and cable about 15m, on average, the meter reader to electronically block located in the stairwell.

Electronic reader (electronic impulses concentrator) from the staircase was replaced with a module transmits information by radio waves received from the meter through the electric cable above.

Data transmitted by the radio module type Sensus ((S)) cout-P2, were received by a portable terminal with built PSION type radio receiver and to download data collected in a dedicated software.

From measurements found that the maximum distance is 25m under the most severe and 130m shielding minimum

The experimental model was developed on the ground inconditions. [1]

2. EXPERIMENTAL MODEL

2.1. SPECIFIC EQUIPMENT SELECTION METHOD APPLIED

In order to implement monitoring of cold water meters using pre-equipped meters REED relay to convert the motion into an electrical signal rotor electromagnetic induction or HRI Data module.

How to buy a Sensus ((S)) cout-P2 is provided with connecting cables between the meter and module Sensus ((S)) cout-P2 portable receiver PSION radio signal. [1]



Figure 1 DN 32mm water meter equipped with REED relay data transmission [5]



Figure 2 Radio module type Sensus ((S)) cout-P2 [5]



Figure 3. Meters installed in network mode DATE HRI [5]

In the first phase were checked water meters metrological verification bench of Oradea Water Company to fit the maximum permissible errors.



Figure 4. Metrological verification stand of water meters [1]

To achieve a connection experiment was chosen to be fitted with a loop as: meter relay Reed, module type Sensus ((S)) cout-P2, aprox.20m cable connection were made more consecutive readings, the disadvantageous position as regards the transmission-reception capacity of the equipment used. Counter mounted on a water branching

apartment block module was installed module type Sensus ((S)) cout-P2 in a metal box inside the block staircase.



Figure 5. Replacing electronic reader CF M-BUS COMBI network radio module Sensus ((S)) cout-P2 in block staircase [1]

2.2. EXPERIMENTAL RESULTS

Readings were made at various distances and found that the reception did not occur at a distance of about 20 m of module Sensus ((S)) cout-type portable terminal P2 and PSION.

The maximum distance that could not make the optimum reading was about 150 m.

Given that generally blocks of flats are located focused radio meter reading method can be efficiently and as necessary for billing costs, detecting water losses downstream of its water meter, to the detriment of water users.

Download data collected in the field can be directly installed on the server to a dedicated software program, then you can export to dispatch and billing service. By using dedicated software can perform various graphical analysis: estimation and interpretation. [1]

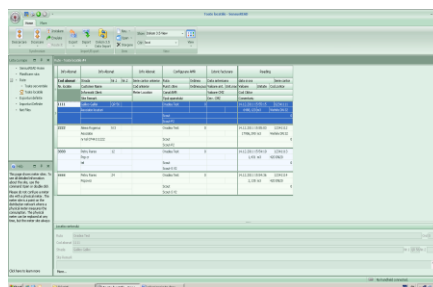


Figure 6. Opening routes (addresses visited) read [1]

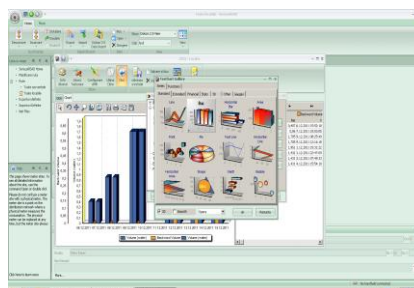


Figure 7 Setting new types of graphics [1]

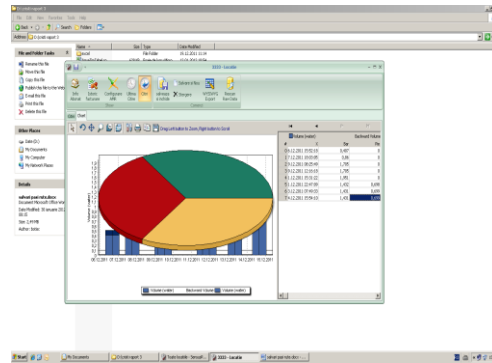


Figure 8. Graphical sector [1]

3. CONCLUSIONS

- Using data transmission cable and radio offers the possibility of using a wide variety of water meters.
- You can use the counters in the system without having to replace them.
- Costs combined approach using cable-radio are strictly smaller than using a single method (unique within a locality), centralized data collection.
- Allows expansion of monitoring either by cable or by radio to the central system (dispatcher), being able to choose the most economical method based on existing conditions in the field.
- The combined method reduces the number of electrical connections to the imperfect method of data transmission cable from one transmitter to another.
- Transmission of data through radio waves do not involve additional costs (subscription, rent, compensation) because it can only use the clear.

References:

1. Botiș, Aurel Cristian. Report 3: "Experimental model of meter reading by radio" -2012;
2. Database About Oradea Water Company;
3. NML 3- 03-1/94: Meters for cold water;
4. xxx – Fascicle of Textiles – Leatherwork, vol.XI. Ed.Universității of Oradea, 2010;
5. <http://www.fgh.ro/2005>