Examining of Public Water Supply System

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Abstract: *Water supply systems are becoming more important in our life. The increase in population increases the demand of drinking water. A water supply system delivers water from sources to population. The water supply systems influence all our lives directly or indirectly. For the safe operation of the water supply systems, it is essential to examine the operating parameters. I my study I will present an examination of a main water pipe. My goal is to call attention to the proper way of operating water supply systems, the transient generated during operation as a harmful phenomenon.*

Keywords: *Drinking water, water supply system, burst pipe, transient*

1. Introduction

The field measurement's location was a main water pipe, which is part of the water supply system. On one end of this main water pipe, a water tower is located. The primary function of water towers is to pressurize water for distribution. In the previous period multiple pipe bursts on this section occurred. The examined pipe section consists of pipes made of different materials. The instrument was connected to the hydrant located 20m away from the water tower. Burst pipes can cause a number of different problems in the water supply systems. It is costing a great deal of money, time, effort, so water supplier must do everything in power to prevent water pipes from bursting. Water pipes burst for a range of reasons, from physical effect, to the weather, to environmental changes, and more [1-10].

Fig. 1 shows a water pipes burst in the water supply system.

Fig. 1. Burst pipe

2. Examining the water supply system

The applied measuring instrument is TSI Digital 250 DL. The TSI Digital 250 DL Flowmaster is hydrant flow and pressure test instrument. The TSI Flowmaster suitable for hydrant testing pump testing and water main condition testing. The measuring instrument provides the accurate and reliable flow and pressure measurements. It measures flow rates up to 3,000lpm and pressures up to 25 bar.

Fig. 2 shows the TSI Digital Flowmaster 250 DL.

Fig. 2. TSI Digital Flowmaster 250 DL

Table 1 shows the Technical Data for Flowmaster.

Table 1: Technical Data for Flowmaster

Item	Value
Type	Electromagnetic
Operating Range	30 to 3,000 lpm
Accuracy	30 to 750 lpm: ±15 lpm > 750 lpm: ± 2%
Operating temperature	-10 to +50 ºC
Weight	12.5kg
Dimensions	210 (H) x 240 (W) x 390 (L) mm
Housing	Solid and corrosion resistant LM25 aluminium
Sensor	Piezoresistive pressure transducer
Range	0-25bar in 0.1bar increments
Accuracy	± 1%

2.2 Presenting measurement results

I used FMSv4.5 software for evaluating the results of the measurement.

Fig. 3 shows the change of pressure value. The figure demonstrates that the phenomenon of transiency is detectable in the system. The pressures generated by transient conditions in pipe systems are frequently more times the value of normal operating pressures.

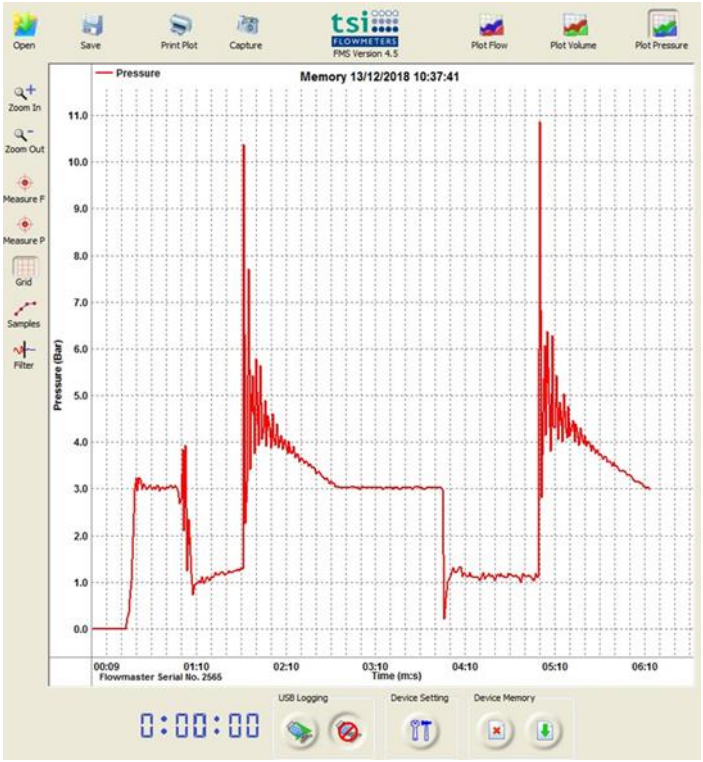

Fig. 3. The change of pressure value.

Fig. 4 shows the change of volume flow value.

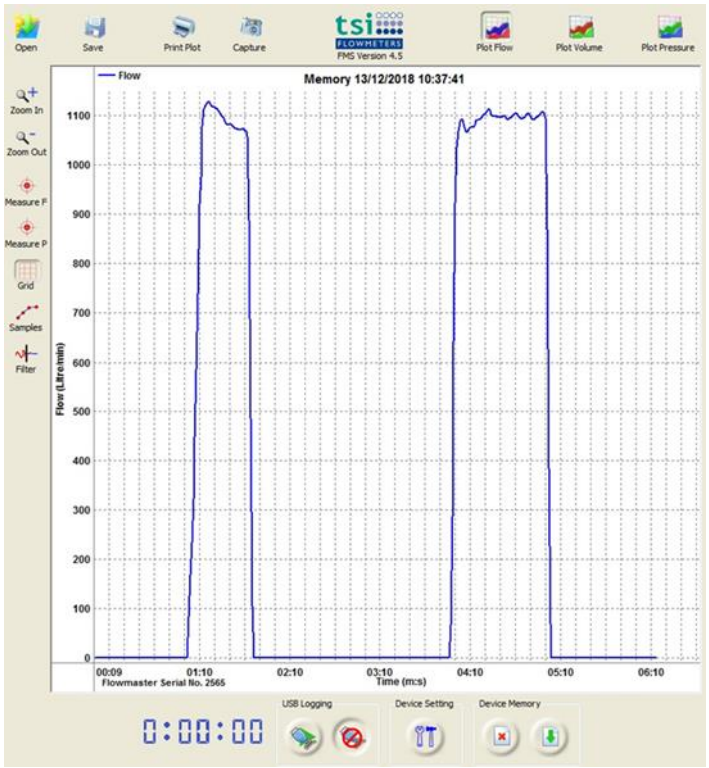

Fig. 4 The change of volume flow value

Fig. 5 shows the change of pressure and volume flow value.

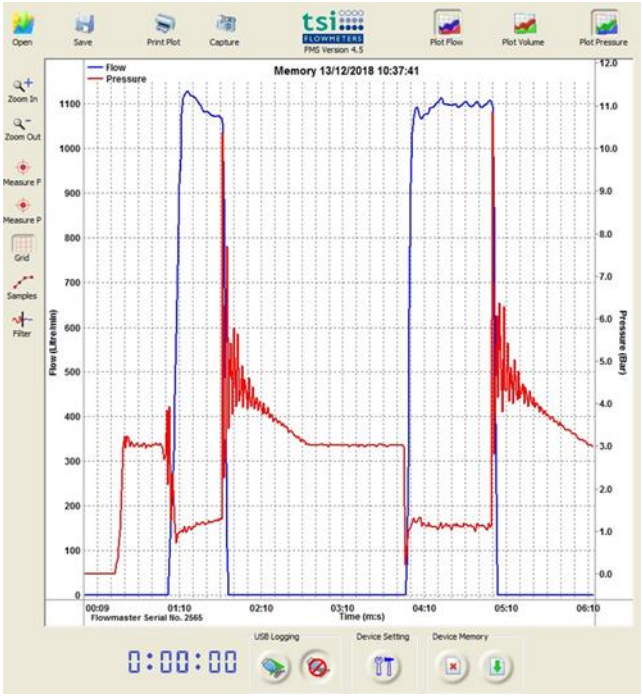

Fig. 5. The change of pressure and volume flow value

The suddenly opening and closing taps caused the significant pressure changes and the appearance of transient phenomena in the water supply system.

3. Conclusions

If the valve openings and closings are not carried out slowly enough in the systems of large water pipes, they might generate quick changes in pressure. The pressure changes may cause the appearance of transient phenomena in water supply systems. These phenomena can have harmful effects on the water pipe systems. This phenomenon often leads to pipe bursts. I would like to research the phenomenon of transient in other areas in the future [11-17].

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