

# MANAGING WATER LOSS CONTROL TEAM IN WATER UTILITY COMPANY IN CONTEXT OF SOUTH EAST EUROPE

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Managing water loss control team in water utility company in context of south-east Europe is important to recognize in two levels of practical (effective) influence - managerial level and field workers level, and each side has different positions, influences and drivers for action. Positions of these two levels will be analyzed in this article and how to improve current practice. Crucial part for successful improvements is communication with top managers and regarding this element will be given some ideas for consideration. Here, it is important to mention that awareness regarding losses issues from top management level is often very limited from couple of reasons, most of these people are politically elected, with short period on top position (often 4 years), with limited knowledge about water distribution issues (and about water losses even less) and often without managerial skills.

Considering these divisions and circumstances, it is not surprising to witness high level of losses and slow process of development. Another important issue is technical improvement of the distribution system (introduction of DMAs, pressure

management, monitoring, etc.), but these elements of water loss control in this article will be addressed in relation with human resources. The main focus is on people and their effectiveness.

## Situation Today

Water loss control activities in water utilities in South-East Europe is still oversimplified and without proper recognition and support from top management level (general managers-directors) of the utility company.

Typical circumstances can be presented in couple of groups:

### Organization

- ▶▶ Prevailing passive leakage control (dealing only with reported leaks)
- ▶▶ In large utilities present dedicated teams for leakage control but without strategic planning (also often only dealing with reported leaks)
- ▶▶ In small utilities often non-existent dedicated teams for leakage control (technicians responsible for various tasks)
- ▶▶ In general without proper coordination with other parts of the utility
- ▶▶ Without proper documentation (maps, records, data bases)

### Equipment

- ▶▶ Old and insufficient equipment (often only



WATER LOSS MANAGEMENT IS COMPLEX AND CONTINUOUS ACTIVITY. FOR UTILITIES TO SUCCEED, IT IS IMPORTANT TO RECOGNIZE THAT PEOPLE MAKE CHANGE. TECHNOLOGY HELPS, BUT WITHOUT GOOD AND MOTIVATED PEOPLE THERE IS NO LONG TERM SUCCESS.

ground microphones, occasionally leak locating correlators, rarely mobile flow meters, pressure loggers, pipe locators)

- ▶ Without programs for regular renewal of the equipment
- ▶ Equipment used with minimal capabilities - for example no use of sound filtering on listening equipment
- ▶ Advanced equipment (flow meters, pressure loggers) if present is rarely used

**Knowledge**

- ▶ Without knowledge beyond personal experience (based on field work)
- ▶ Familiar with basic functions of the equipment
- ▶ Without advanced knowledge in water loss control (IWA methodology)
- ▶ Without education programs
- ▶ Without opportunity to participate on conferences and fairs

**Communication**

- ▶ Without dedicated reports
- ▶ Without regular meetings
- ▶ Without strategic programs and plans
- ▶ Rewarding - salaries
- ▶ Often people responsible for leak detection have same salaries as other technicians (plumbers)
- ▶ Without rewarding program

This neglected position of people responsible for leak detection and other tasks related with water loss issue has for outcome low motivation and insufficient results in water loss control activities.

Low motivation leads to bad habits and in many utilities is present attitude among people that can be present with following statement “you cannot pay me as little as I can work little”. In addition even if someone (managers) want to introduce and implement changes (improvements based on new approach, organization, discipline, control) what they will face is strong resistance from workers (why change, do we have any benefit from it, anyway our working position is not in jeopardy considering we are employees in public company with strong protection from workers unions).

In addition, we have problems of inappropriate staffing and non-existing communication among practitioners from different water utilities.

Most important problem in these circumstances is undeveloped water loss control program. Without proper motivation, organization and leadership it is hard to expect results and most importantly wide, complex and efficient strategy.

First important step forward in changing current situation involves recognition of it. Presented groups of problems is also list of opportunities.

**How to Implement Change**

As one of key tools for needed improvements is concept of Change Management and how it can be used for improvement of status for teams (people) within water utilities responsible water loss control activities. We have available many models for change management and for this paper we would like to present ADKAR model. This model was tested by one of co-authors (Jurica Kovac) in number of utilities and it has been proven to work.

Key elements of implementation of change should

have following elements:

- ▶ Awareness - why change is needed
- ▶ Desire - motivation for change
- ▶ Knowledge - resources for change
- ▶ Ability - how to implement change
- ▶ Reinforcement - support the change

Manager can use this model to identify gaps in change management process and to provide effective coaching for employees. The ADKAR model can be used to:

- ▶ Diagnose employee resistance to change
- ▶ Help employees transition through the change process
- ▶ Create a successful action plan for personal and professional advancement during change
- ▶ Develop a change management plan for your employees

It is important to realize that change needs to be implemented following series of steps that will lead to desired goal. In implementing change it will need to change champion, someone within the utility who has understanding and leadership position. This person (usually mid level manager



already involved in maintenance issues and responsible as well for water loss control activities) will have so called 360 degrees influence, leading change process and influencing people in all directions considering company structure (workers below, other managers in his level and top manager above him).

**Awareness - Why Change is Needed:** It is necessary to inform people about reasons you believe the change is necessary. Review these reasons and rate the degree to which the person you are trying to change is aware of the reasons or need to change (1 - 5 where 1 is no awareness and 5 is total awareness). Our goal is to raise level of understanding that losses are important among all people in the water utility. People first need to understand why change is needed (and with special emphasis on perspective what will happen if we do not change).

**Desire - Motivation for Change:** Next step needed is to list the factors or consequences (good and bad) for each person (involved in change process) that will create desire to change. Consider these motivating factors, including the person's conviction in these factors and the associated consequences. Rate his/her desire to change on a 1 - 5 scale.

In respect to water losses we can motivate workers that new approach will lead to less reactive activities and more proactive and preventive activities, and in this way reduce stress and urgency of activities. Also new approach will make work they do more interesting and even lead to promotional opportunities. Important aspect to create desire must be development of benefits measures (rise in salaries based on results, other benefits like free days, rewards like opportunities to go on conferences and seminars). Regarding those above (top managers), they will have improvements in company functioning, reduced costs, better costumers relations.

For people to change they need internal drivers (motives) and this way we can reduce resistance to change.

**Knowledge - Resources for Change:** Next step involves building capacities among people

with skills and knowledge needed for new approach in work. List the skills and knowledge needed to support the change, including if the person has a clear picture of what the change looks like, rate this person's knowledge or level of training in these areas on a 1 to 5 scale.

In this area evidently IWA methodology should be foundation for knowledge build-up, but also we need to expand and integrate additional new know-how (for example here presented Change Management methods, general company management, and document management). Of course important will be also new skills about technology (DMAs, pressure management, measuring, monitoring, leak detection, pipe location, GIS, mathematic modelling, AMR).

**Ability - How to Implement Change:** Considering the skills and knowledge identified in the previous question, evaluate the person's ability to perform these skills or act on this knowledge. Rate this person's ability to implement the new skills, knowledge and behaviors to support the change on a 1 - 5 scale.

Here is very important understanding of required time for implementation. Learning and applying new skills and knowledge takes time. Use of new technologies requires investments. We need to have clear vision and strategy (plan) how to implement change, what are the goals, how we will know when we reached them (performance indicators, evaluations, milestones). We are living in a constantly changing environment (new knowledge, new technologies, economic situation, social situation, political influences) and our capacities for adaptation and flexibility will be very important.

**Reinforcement - Support the Change:** This is critical element of change. Without carefully planned and then dedicatedly implemented reinforcement plan, previously conducted steps can fall short. List the reinforcements that will help to retain the change. Are incentives in place to reinforce the change and make it stick? Rate the reinforcements as helping support the change on a 1 to 5 scale.

Within reinforcement elements most important

is support from top manager (general manager of the water utility). With his/her support we can count on structural change needed within the company, finances, guaranteed rewards scheme, improved communication (regular meetings, practical use of performance indicators) and recognition that our measures and activities have purpose. In majority of water utilities in our region involvement of general managers creates difference between successful and unsuccessful companies. This issue is very delicate especially considering that many general managers are politically elected to manage public utilities.

First of all water losses (and with losses related repair works, lost income, high maintenance costs, etc.) must be presented through financial perspective (not just in m<sup>3</sup> but also in euro or local currency). Next step is to establish regular update of information's regarding costs produced by high water losses (monthly balance). Then, regularly we must present success examples and financial outcomes (with cost-benefit analysis). Change champion must realize that he/she is the only one who can do this promotion toward top manager. No one can or has capacity for this.

Eventually one alternative exist; to hire outside consultant/expert who will influence top manager. This is often very successful option. Reason for this is rather simple and sometimes absurd; top manager has high level of distrust in lower management and in combination with own arrogance and low level of personal knowledge in the subject of water losses creates impossible conditions for change. Here can be very important role of outside consultant (beneficial will be water loss expert/or company, but who has also knowledge in change management), since he comes with credentials and can overcome communication dysfunction within the utility.

### Implementing Change

When we have defined and organized change management process as described in previous chapter, next phase is implementation.

Implementation should be organized with following elements:

**Making sense of change:** We must be result



oriented what in water loss management is easy to do. Important to mention is that anticipated results must be logical and rational (do not overestimate your capabilities, this can ruin your credibility toward top manager). Start small, build experience and confidence, build trust from top manager, build communication channel.

**Using tools for change:** We must be aware that some management tools are necessary for successful change process. Here is list of them (many tools exist and here is possible selection, for more research Project management):

- » Planning
- » Roles and responsibilities
- » Time
- » Finances
- » Communication plan
- » Sponsor roadmap
- » Coaching
- » Resistance management
- » Training

Explaining each of these tools is beyond scope of this paper, and those of you interested will need to look for explanations in widely available management resources (Google is best place to start).

**Measuring Progress:** We just need to measure, monitor and gather data, produce PIs and evaluate results after particular improvement measure was implemented (volumes of water, burst frequency, financial aspects, KPI - for guidelines use IWA Performance indicators). We must have ability to compare situation (PI) before and after some measure was implemented. So, start measuring and data collecting as soon as possible (before starting to change things). This way you will gather valuable data to compare with when results come.

**Gaps Diagnostics:** In previous chapter was advised to evaluate people regarding ADKAR model. Use this evaluation (from 1 to 5) to analyze gaps. This will help you to understand difficulties and to consider different options. It is necessary to develop gap monitoring plan.

**Corrective Actions:** For every problem there exists a solution. An important advice is

development of good communication channel between all sides should be involved. Most of the problems in companies are related with poor communication and misunderstanding.

**Create Change Managers:** Recognizing people within the company with capacities and motivation to lead change process is very important. Creating change process is one thing (and can be initiated and developed by one person), but running it is different. We need more people motivated to take responsibilities and even more important, those who will take initiative.

Every person is important, no matter what position he/she holds. Good ideas and recommendations can come from anybody. Those people must be rewarded and encouraged (important element of Reinforcement planning). The more people rise-up to the level of change developer, higher are chances your plan will proceed and accomplish long term sustainability (and goals of course). Having more people actively involved (not as passive executors) improves one of the key elements in any project - communication.

**Results Recognition:** Public recognition for accomplished results is final and also critical success factor. Contributors in success must have public recognition in own company. Here is again important role of top manager. A top manager must express satisfaction and admiration with people (teams and whole departments) who have accomplished good results.

This should be done each year, and if and when particular projects are finished and results are known. In water utilities is complicated to establish good financial reward scheme, and minimum what can be done very easy (and with no costs) is to have public recognition.

Of course this needs to be based on clear rules and with consideration regarding all employees in the utility. Best way is to establish PIs system for each employee and function, and emphasis should be given to those who have added value to their work (innovation, motivation, etc.). Evaluation should be organized in a way that beside PIs, additional values can be rewarded from colleagues, supervisors and coworkers.

## Example of Success

### **Pula Water Utility, Croatia, 900 km Network:**

Equipping, organizing and training personnel (trainings, seminars, conferences, literature, etc.) for activities of leakage detection are part of the regular annual improvement program and are identified from year 2004 as a key element of the strategy.

The management of the company has a clear understanding that only trained, organized and motivated people can achieve results, and technology is only a tool that can help in that. Communication among key managers and with general manager is regular (daily) and proactive.

Leakage control has been organized using a special service team for leakage control fieldwork (2 teams with 4 workers in total). They use all today available equipment - ground microphones, correlators, mobile flow and pressure meters, pipe locators. Important to mention is that ground microphones and other frequently used equipment is regularly replaced every 5 years.

Targeted night-time acoustic testing of pipelines is carried out extensively each year in May and June, the oldest parts of the system and elsewhere where frequent leaks were detected is necessarily examined. These tests are conducted by a team for leakage detection and another team works during the day to resolve reported leaks. The rest of the year two teams cover the activities of reported leakages and unreported leakages i.e. monitoring the DMA zones (and testing in zones when an increase in the minimum night flow is noticed).

**Results:** From 2004 till 2013 NRW was reduced from 34.5% to 22.8%. Considering problems in presenting losses in percentage Waterworks Pula introduced use of other indicators based on IWA methodology (ILI, CARL in liters/service connection/day) and for 2013 ILI was 2.9 (among the best waterworks in Croatia). The volume of NRW in 2004 was 3.77 Mm<sup>3</sup>, and in 2013 it was 1.94 Mm<sup>3</sup>, making a difference of 1.83 Mm<sup>3</sup> (48.5% savings in volume), but making also a financial impact by reducing expenses for more than euro 700.000 in one year!

## Final Recommendations

Water Loss Management is complex and continuous activity. For utilities to succeed (and that means to maintain losses on acceptable level), it is important to recognize that people make change. Technology helps, but without good and motivated people there is no long term success.

Some general recommendations for water utilities:

**Importance of Water Loss Team:** In today's water utilities becomes evident need to have permanent Water Loss Control Teams. In small utilities maybe this team requires only one or two persons, but it must be recognized that water loss control is one of most important activities in any water utility.

Top Managers must realize that water loss control is not just leak detection, but today involves many additional activities like; flow and pressure measuring, pressure control valves control and maintenance, data gathering, data analysis, reporting, use of advanced tools like GIS, SCADA, AMR, involvement in network design (DMAs, PMAs, pumping protocols, measuring locations) etc.

**Position and Influence:** Water Loss Team should be part of Maintenance Department or closely related with it. In addition, people responsible for water loss control should be actively connected with Planning Department since they have firsthand experience with the network and can give valuable recommendations in new network design (and reconstruction of existing network).

As mentioned before, active communication (horizontal and vertical) is crucial and from this point everything else proceeds. So water loss team members or leader must have excellent and regular communication up to the top manager in the water utility.

**Leadership and Staffing:** It is advisable that jung engineer (technical sciences) lead water loss team, considering complexity of responsibilities and needed know-how, but in small utilities this role can be performed also by someone without

university degree. Important to emphasize is that very important foundation for anybody involved in water losses is good knowledge about water network (pipes, valves, basic hydraulics) and perfect solution to start with, is to have older employee who knows network well and new jung employee who is friendly with new technologies and computers. To become expert in water loss control takes time (couple of years).

Number of people in a team depends on the network size, complexity, level of losses, number of DMAs, pressure management, available leak locating and measuring technology, level of knowledge, costs, etc.

**Equipment:** In today's conditions and with networks becoming larger and older various technologies are needed for water loss control teams. Following equipments are necessary:

- ▶▶ Ground microphones
- ▶▶ Leak locating correlators
- ▶▶ Mobile ultrasonic flowmeters
- ▶▶ Mobile pressure loggers
- ▶▶ Metal detectors
- ▶▶ Pipe detectors
- ▶▶ Leak noise loggers

Number and variations for mentioned equipment depends on the network and people responsible. Important is to have established policy of regular replacement of old or used-up equipment (for example for ground microphones every 5 years, for correlators every 5-7 years, mobile meters every 7-10 years).

**Education:** Education must be constant and planned. Our water networks become more complex every day, and in the same time technology we use for water loss control become more sophisticated as well. Water loss issue requires various know-how and time factor is very important (personal practical experience).

**Performance Indicators:** Various performance indicators can be used (for more details see IWA PIs), depending on level of development in particular water utility, but for beginning key numbers to look for are; volumes of water according to IWA water balance, ILI, CARL,

pressure, MNE.

Very important is to collect data about leaks (reported and unreported) and establish burst frequency index for pipes and service connections.

## CONCLUSION

Managing water loss control team in water utility company in context of South East Europe is very complex issue. High water losses were mainly related with neglected position and importance of people responsible for leaks detection.

It is important that key people and top managers in water utilities realize that water loss control teams are essential and crucial for successful control and reduction of water losses. Companies who are successful in water loss control have very good management in all aspects of water supply and water loss control teams are highly valuable and respected.

[www.prosci.com/adkar-model/overview-3](http://www.prosci.com/adkar-model/overview-3)

## About the Authors

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**Prosci** stands for Professional Science. It was established in 1994. The company is a largest body of knowledge on change management, constantly asking new questions about how to better manage the people side of change in a structured and repeatable way.

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