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Call for Papers

Special Collection on the Battle of Intermittent Water Supply (BIWS)



Introduction

Intermittent water supply affects 1.3 billion people worldwide, mainly in South Asia, Latin America and Africa. The main cause for this situation is due to lack of maintenance and lack of control of consumption, which greatly increases leaks and non revenue water. A network with uncontrolled demand cannot be pressurized beyond a few meters of water column. A last solution to recover some pressure in the network is to fall back on intermittent supply by zones. There is great interest worldwide in recovering the 24-hour continuous supply in these networks and restoring the supply pressures to standard values.

In conjunction with the organization of the 2nd International Joint Conference on Water Distribution System Analysis & Computing and Control for the Water Industry (WDSA/CCWI), the ninth edition of the Battle of the Water Models challenge series is being held. On this occasion, the selected topic has been Intermittent Water Supply. So far 15 different teams, from the following countries, have already applied: Austria, Brazil, Colombia, China India, Israel, Hungary, Italy, Mexico, Netherlands, Spain, United Kingdom and United States. Each team has prepared a paper for the conference with the methodology used to solve the challenge. At the same time, all solutions will be presented in a special session to be held at the conference.

The aim of this proposal is to publish the contributions presented by each of the participating teams in a Special Collection of the Journal of Water Resources, Planning and Management. Therefore, if this Special Collection is accepted, the papers presented will not be part of the Proceedings of the Conference. Authors will be invited to write a full paper following the publication guidelines defined by the Journal.

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Aims & Scope

The challenge of the 9th Battle Competition is to find the best solution to reverse the situation of a network from intermittent supply to continuous 24×7 supply with enough pressure. The current state and mode of operation of a given pilot network will be the starting point of the battle. Leaks are assumed pinpointed and will be provided as starting data. The demand is satisfied currently through household roof tanks or ground level tanks, whose data are given as well. Besides, the total quantity of water available is limited.

Although recovering normal supply conditions is a complex problem, the battle will focus on improving the network infrastructure. It is assumed that the manager has a certain amount of money to invest annually, for a period of five years. A series of possible actions to take are defined, each with an associated cost and a degree of achievement of the objectives. The final decisions taken by participants will be evaluated through a set of key indicators. Finally, the best solution will be the one that maximizes the sum of all these indicators, previously normalized, to obtain a single score per participant. One of the objectives of this Battle is to stimulate the development of methodologies to develop the transition from intermittent to continuous supply systems. Specifically, the aim is to analyze the capacity of hydraulic models such as EPANET 2.2 to analyze this type of transition from intermittent consumption to continuous supply. In this sense, a double representation of the possible consumptions of the network is intended. Controlled consumption (demand users) will be modeled using the PDA model of EPANET 2.2. Uncontrolled consumption (leakages) will be modeled by means of emitters. In addition, the transition from a defective system to one that guarantees the required supply conditions may require very large financial investments. The budget available for investments can sometimes be limited. Therefore, another objective of the challenge is the development of tools to optimize the transition but with a limited budget. In this way, action on the network must be planned over time, as is the case in most rehabilitation plans.

Proposed Schedule

The proposed schedule for the Special Collection starts with the BIWS session to be held at the Conference. From that point further, the three main items are developed: call for papers, submission deadline and the estimated deadline for the completion of the Special Collection.

The proposed dates are:

- Special session at the 2nd International WDSA/CCCWI Joint Conference, where each of the teams presents its solution and the evaluation of each of the teams takes place: July 21, 2022.
- Call for papers: October 1, 2022
- Submission deadline: January 31, 2023
- Target to complete: September 30, 2023

Note that the “Target to complete” is the estimated deadline for the publication of the Special Collection. In any case, this deadline will be set by the review process of the different papers and by the journal’s own publication deadlines.

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Proposed Contributors

The contributions to this special collection are as follows:

- A contribution with the presentation of the challenge instructions. This contribution will make an important review of the state of the art and define mathematically the conditions under which the challenge should be developed. It will also define the evaluation criteria for each of the potential solutions presented. This paper will also include as supplementary material the complete definition of the network and the location of the different leaks in the network.
- A contribution submitted by each of the teams participating in the battle. In each contribution, the presentation of the objectives of the battle will be omitted, as they will be defined in the introductory paper. The contributions, developments, methodologies and procedures used to solve the problem should be presented. All the data of the solution presented will also be published, so that the results obtained can be reproduced. Initially 21 different teams have submitted abstracts to participate in the battle. At this stage, 15 teams will eventually participate in the Battle. Therefore this number of contributions is expected for the Special Collection.
- Only if necessary, a final paper analyzing the different solutions obtained will be included, comparing the different solutions and presenting the final assessment. In the case of not having sufficient entity to be an individual paper, all this information will be included in the introductory paper.