

Comparing the Results of Two Simulating Models of the Water Hammer Phenomenon: Bentley Hammer V8i and Greek Legislation

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SUMMARY

Hydraulic transients, also known as Water Hammer, are phenomena that can occur among others to irrigation networks and may lead to a system's failure causing destructive results. There are many techniques that can be used during design and devices that can be installed in order to prevent that phenomenon. Understanding the way these phenomena work in the stage of the network's planning will minimize its construction cost and protect it from possible disasters during its operation. The network was modelled using utilized software (Bentley Hammer V8i) in order to calculate maximum and minimum growing pressures along with the network and check its adequacy. In addition to that, the corresponding variables were calculated made on the basis of the theory defined by the applicable Greek legislation (Circular D.22.200 / 30-07-07 of Ministry of Public works entitled "Instructions for the control of tubular studies irrigation networks") as described in its chapter 12. According to the results derived from the simulation of the irrigation network, the developed maximum pressures don't exceed pipes' strength and the minimum don't exceed the vapour pressure. The final stage refers to a comparison among the maximum pressures calculated by the Greek legislature formula and the maximum pressures calculated by the simulation of the software Bentley Hammer. As a result, this comparison proved that in some cases the Greek legislature isn't enough to protect the network when most of the times would lead to oversize it. The statistics of that comparison are proving that the difference of the results between two models, may be crucial factor of the cost and the operation of the pipeline system.

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