

Prioritization of maintenance actions in water distribution systems

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ABSTRACT

Industrial water distribution systems (IWDSs) are paramount in many manufacturing systems [1] to optimise the related industrial plant availability and consequently the level of production. A strategic action of planning and implementing of suitable maintenance activities [2] is necessary to assure the objectives previously described. IWDSs are crucial for many industries [3,4], because of the primary need to maintain standards of production and hygiene [5] of workplaces and machines.

Various faults may affect IWSSs that have a negative impact on the related industrial plant and may possibly lead to the worst event of a plant shutdown [6]. Various maintenance measures, tailored for the features of the IWSS under analysis, can be implemented, based on the kind of maintenance policy [7] preferred by the organization on the basis of different criteria. This choice depends on the operative context and business strategies [8].

This contribution proposes the Analytic Hierarchy Process (AHP) [9], a multi-criteria decision making approach, for prioritization of maintenance actions in a certain time horizon. This prioritization seeks to pursue technological innovation and may represent a long-period strategy for the organization. Measures with a lower degree of priority will be postponed on the basis on appropriate time planning. A case study on the IWDS of a manufacturing firm is finally presented. The measures taken are aimed at integrating both corrective and predictive/preventive maintenance policies [10]. The alternatives are evaluated by means of various criteria weighted by a panel of experts. Consensus in the decisional process is approached through experts' weights.

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