



**ACADEMIC YEAR 2013 – 2014**

**TITLE OF DIPLOMA THESIS:**

SELECTION OF PIPING TYPES FOR THE PROJECT " REPLACEMENT OF WATER SUPPLY NETWORKS IN PLATFORMS " OF TPA SA WITH USE OF DECISION-MAKING METHODS

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**ABSTRACT**

This thesis investigated the type selection in Thessaloniki's Port Organization's piping work "replacement of water supply network in platform" budget 340.000,00 Euro (without VAT). The previous system consisted of cast iron pipes which show huge amounts of wear and corrosion. These were replaced by high-density polyethylene pipes with nominal pressure 16atm and external diameter of 125mm and 160mm. In this thesis two other materials were tested (stainless steel and glass-fiber reinforced plastic) and multi-criteria analysis took place in order to select the most suitable material. The materials were chosen due to the existence of pipes with equal outer diameters with the dismantled network so as to be compatible with the single special fittings. The materials were tested for their mechanical properties, costs of purchase, repair damage and regular maintenance, resistance to corrosion, the material flow under the Hazen-Williams equation and lifetime. Then the properties of the materials which are the criteria for selection of materials were calibrated and were given severity grades. The methods of multi-criteria analysis that were chosen was TOPSIS and PROMETHEE due to advantages relating to ease of use, the diversity of models, existence literature etc. The results show that stainless steel was the best material for the project according to the criteria weights that were given.

**KEYWORDS**

Water supply network, Materials, Multi-criteria analysis, TOPSIS, PROMETHEE