An investigation concerning the effect of canal width contraction that may be needed in the location of constructing some irrigation works

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Abstract:

The compatibility between the needed structural designed dimensions of the irrigation works and the dimensions of the water stream or the canal in which the irrigation work will be located has a great importance from more than one point of view. As it is well known, the main aim of the designer of such works is to reach the optimum design for maximum performance efficiency with economical cost, and minimize negative technical impacts that may be harmful to the safety of the whole work. Since the complete suitability between the obtained designed dimensions of the different construction elements of the work, and the original properties and dimensions of the canal in which the work will be constructed, is rarely occurring. The designer always has to make some changes in the original engineering properties and dimensions of canals, such as bed width, bed level, and/or inside side slope, to reach the needed suitable compatibility between the structural design and the natural original canal cross section. For the economical purposes, the design always needs less width of the work, than the width of the bed of the original stream cross section, so a contraction may be needed where the work will be constructed; the literature indicated that, such a contraction must not be less than 0.6 of the original bed width. That contraction, of course, has a direct impact on the different hydraulic parameters, such as water depth, velocity, and flow regime in the location of the work. Changes of such hydraulic parameters may exceed their safe permissible values, and so the whole structure may face some dangerous situations, which must be overcome. In this paper, we present a technical survey of the previous research concerning canal width contraction, with the needed technical comments, and comparisons as a logical approach for a master-thesis under the same title.

Keywords:

Width contraction, Open channel transitions, Specific energy, Local scour.

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