# THESIS

# VERIFICATION OF SELECTED ROUGHNESS COEFFICIENT IN A LINED DISTRIBUTARY AND ITS EFFECT ON WATER EQUALITY



By

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## ABSTRACT

Irrigation canal holds a key position in irrigation net work. Design parameters are selected on the basis of available data and past experience. Similar is the case for roughness co-efficient (n).With passage of time due to natural and living creature intervention, it is possible that the value of roughness co-efficient may deviate from the selected value. Variation in the value of roughness coefficient may cause changes in water surface profile elevation and resultantly the discharge drawn by the irrigation outlets from the canal.

In the present study the selected (design) value of roughness co-efficient for a lined distributary was verified and it's affect on water drawing capacity of irrigation outlets was determinated. This research study was conducted on Chena distributary district Kasur. The Chena distributary off-takes form left bank of Pandoki canal at RD 359020. The total length of Chena distributary is 25.46 km. The design discharge available at the head of the distributary is 3.81$m^3$/s. More than 50% of its length has been lined. In this study the reach from distance 0.00 m to 7590 m was considered, which is a trapezoidal lined section. Total numbers of outlets fed by the distributary are 62 and first 17 were in the selected reach.

In this study, results were obtained using three combinations of the data sets, design data vs. measured data, design data vs. design data model simulation and measured data vs. measured data model simulation. The mentioned comparisons of data sets were used to compare the water surface profile in the canal, selection of suitable value of roughness co-efficient for the canal depending upon prevailing conditions and effect of roughness co-efficient on equitable distribution of water through the outlets.

In this study the design data was taken from the department, while field data of the canal was measured at the site. The Canal flows at selected RD were measured with the help of digital current meter using velocity area method. The canal sections were divided in to four segments. Three point method was used to measure the velocity of water in each segment. The Segmental discharge of each sub-section of the canal was calculated by multiplying the segmental area with the segmental velocity. The total discharge flowing through the canal was calculated by adding the segmental discharges. Similarly the Segmental discharge of each sub-section of watercourse was calculated by multiplying the segmental area with the segmental velocity. The total discharge flowing through the watercourse was calculated by adding the segmental discharges.

A simulation of Chena distributary was made on SIC model for different roughness co-efficient values, the water surface profiles and discharge of outlets were noted for those roughness co-efficient values ,then a suitable roughness co-efficient value was selected at which the water surface profile in the canal and outlet discharge drawn, matched with the measured values.

During the present study it was observed that, the value of design roughness co-efficient in the selected canal is lower than the existing value in the canal. The water surface profile given by model using value of roughness co-efficient 0.020 matches the water surface profile observed in the field and at this roughness co-efficient value the outlets discharge are also satisfied.