THESIS

EVALUATION OF PROPORTIONAL CANAL WATER DISTRIBUTION AT HIGH AND LOW DISCHARGES, AND REQUIRED MODIFICATION IN THE DESIGN OF OUTLETS OF UCH DISTRIBUTARY, BALOCHISTAN

SUBMITTED BY

MUHAMMAD SAQIB RIAZ
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ABSTRACT

The distributary canal is that part of the canal system, which provides irrigation water to the water courses through outlet structures. Pakistan is basically arid to semi-arid country where the River Indus and its tributaries are the main source of water supply. The subject in this research is Uch distributary situated in Balochistan, Pakistan, constructed in 1901 before construction of Guddu barrage and off takes from desert canal at RD 44. Design discharge of Uch Distributary is 700 cusecs and operates during Kharif only. Non perennial portion of the canal is considered in present study. In association with the Hairdin Drainage Project, 200 cfs is proposed to be supplied to the Uch distributaryy at RD 9 from Pat Feeder canal to support small wheat cropping over 40 % of CCA in Rabi. APM type outlets are used at Uch distributary, but performance of these outlets at low discharges is not known. Therefore the hydraulics of the distributary and proportionality of the outlets' discharge was to be evaluated. Objectives of research were to understand the hydraulic performance of the distributary at its design discharge (700 cusecs), hydraulics of outlet deliveries for small Rabi flows (200 cusecs) and to evaluate changes in outlet deliveries for proportional flow for selected modification in the outlet design.

The computations like water surface profiles, discharge variation along the distributary canal and the outlets' discharges were worked by developing excel spreadsheets for the case studies of design and low discharges conditions. For the third case, in order to improve outlet performance, the effect of adjustments in their dimensions (width of outlet) is evaluated by decreasing outlet width by 25 %.

Outflow of outlets were satisfactory at distributary design discharge of 700 cusecs and outlet flow is found as 97.83% of outlet discharge. At low distributary flow of 200 cusecs the outlet discharge is about 25.37% of outlet design discharge showing fair outlet equity in comparison to 28% discharge of the Uch distributary. The selected outlet modification did not prove beneficial in improving the outlet equity. It is recommended that 200 cusecs may be supplied to Uch distributary from Pat Feeder canal for Rabi and existing outlets will be able to draw fairly uniform flow along the distributary length.