International Journal of Engineering, Science and Mathematics
Vol. 7Issue 1, January 2018,
ISSN: 2320-0294 Impact Factor: 6.765
Journal Homepage: http://www.ijesm.co.in, Email: ijesmj@gmail.com Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A

THE ASSESSMENT OF DEVELOPMENT IMPACT BETWEEN THE DAMS OF FLOODPAIN AREA ON THE LENGTH OF THE COMPRESSION REGION

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Abstract: The article presents the results of experimental researches to assess the impact of development between the dams floodplain area on the length of the compression region.

Key words: Compound sections, development between the dams of floodplain area, coefficient of development, backwater, swirl of compression area.

Introduction: In designing of many hydraulic structures and, first of all, which designed to effectively protect of the shores, it is very important to know the patterns of flow in compound sections. In the purpose of determining the influence of the development of inter-living space on the flow regime, in the case, when the interaction between channel and floodplain flows has a significant influence on the processes, experimental researches were carried out on the schematized model. The experiments were carried out in the laboratory of the department "Hydraulic engineering structures and engineering constructions" TIIM (Fig.1.).

Object, problem and research method. The model installation is a concrete hydraulic tray with rectangular sections of the bed and floodplain. The width of the one-sided floodplain is 0.85 m, the channel width is 0.30 m. The length of the working part of the tray is 12.5 m.

Experimental researches were carried out on the model under the following conditions:

The degree of restriction of flow on the flow was changed

$$\theta_q = Q_{nep} / Q = 0...0,5$$

Where Q_{nep} -consumption on the overlapped part of the floodplain in the domestic mode; Q is the total of rate of flow.

The coefficient of development of inter-cum-space is

$K_o = l/(l_{III} \sin\alpha) = 0...1.0,$

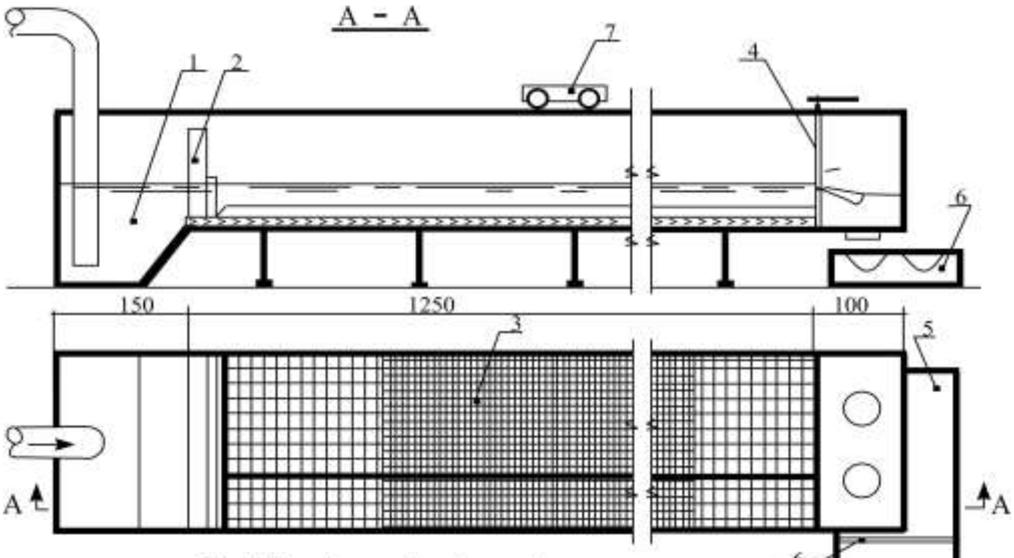


Fig.1. The schema of expiremental
1.Reservoir 2.Reduction of energy 3.Working part 4.Jalousie 5.Water well 6.Dimensional weir 7.Truck

where l_{III} - is the length of the spur; l - width of development;

Spur adjustment angle $\alpha = 30^0...135^0$.

Relative interdigital distance

$\xi = L/(l_в + l_н) = 0.5...1.0$,

where L is the actual length of the section between the dams; $l_в$ - the length of the whirlpool; $l_н$ - the length of the bottom vortex.

Froude number in domestic conditions on the floodplain is less than 0.2

$F_{r_n} < 0.2$

The Reynolds number on the floodplain is more than 4000, in the channel of more than 10,000. the turbulent regime was maintained.

The carried out researches have been directed on studying of influence of the development of inter-mine floodplain space in compound sections on hydraulics of the deformed stream. During the research, the level and velocity regimes of the flow were measured in the tray, the planned dimensions of the deformed flow.

On the basis of experimental researches, the profiles of water level changes in dimensionless coordinates were constructed:

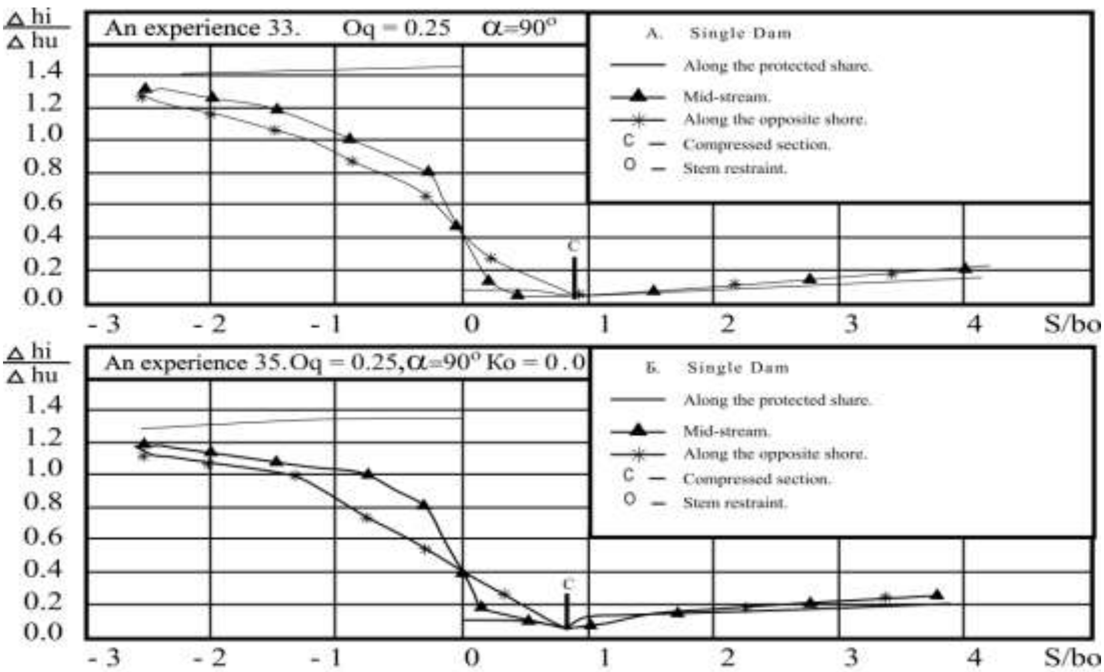
$$\Delta h_i / hu = f\ (S/b_o, \theta q, \alpha, K_o, \xi),$$

where $h_i = h_i - h_c$ is the difference in water levels between the calculated and compressed cross-sections;

$h_u = U^2_{ЯC} / 2g$ - high-speed head in a compressed line;

S-distance from the confines of restraint to the settlement line.

From Fig. 2, 3, 4. we can judge the nature of the change in the longitudinal and transverse differences in the levels of the flow deformed by the system of dams. In the region of the support, the resulting transverse changes in the water surface level deflect the streamlines from the shore, where the structure adjoins the opposite. In the range of restraint, the water levels of the transit flow are equalized. In the compression region, a transverse slope of the free surface of the water appears, which directed toward the protected shore. The transverse slope of the water surface in the spreading area is also directed towards the protected shore and practically is zero.



2. Longitudinal surface profiles

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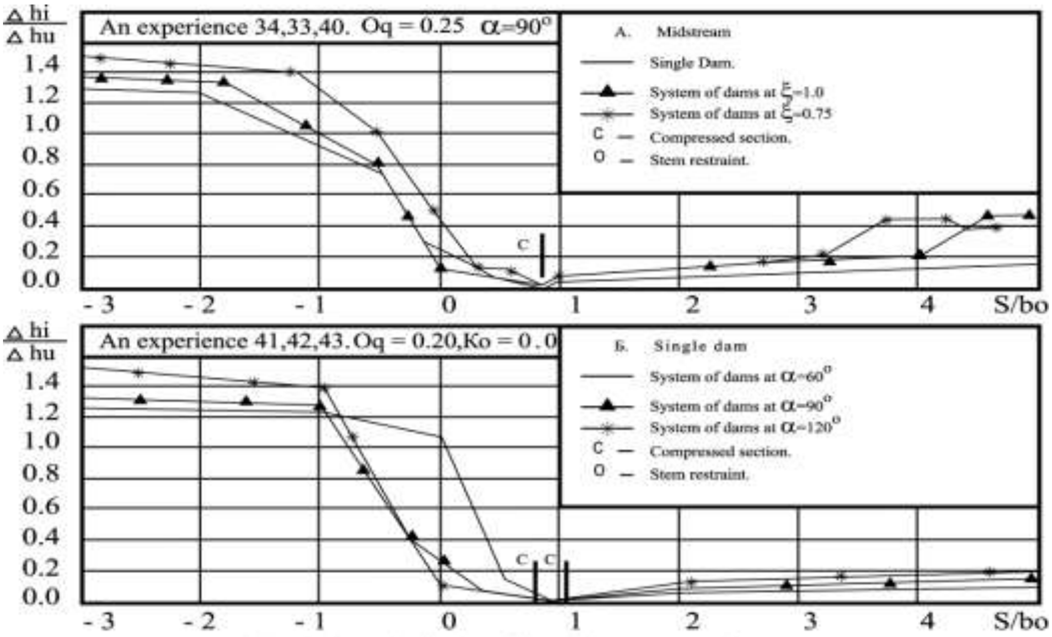
For a compressed cross section, with a free spreading of the deformed flow, the depth increases gradually. And in installing the dam system, under the influence of the underlying dam, the depth behind the compressed section increases more intensely Fig. 3, 4. In this case, the magnitude of the distance between the dams exerts a significant influence. The value of the backwater before the underlying dam varies in proportion to the distance between the dams.



3. Longitudinal profiles of the water surface

Reducing of this distance leads to an intensive increase in the depth of water in the spreading region. If the relative inter-mine distance is less than 0.5, the underlying dam falls into the area of the whirlpool.

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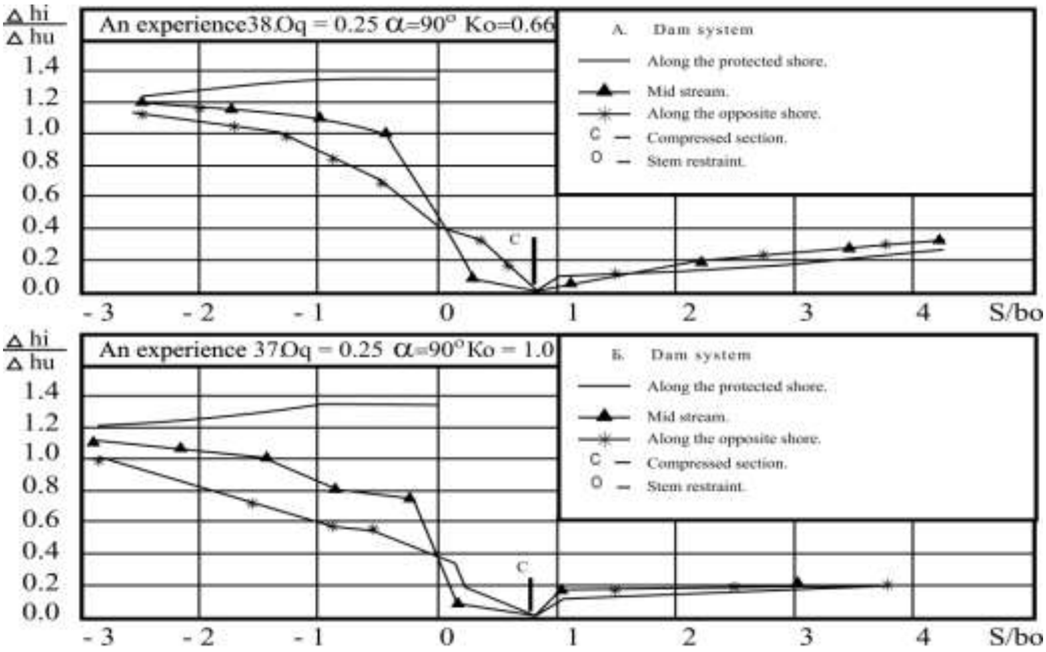

4. Longitudinal profiles of the water surface

The location of the compressed section, in the experiments, was previously determined visually, with the help of bottom and surface floats, and then refined according to the velocity diagrams. Experimental data show that the location of the compressed section is mainly influenced by: the degree of constraint of the flow by the flow rate θq , the installation angle of the dam α, and the development factor of the intermodal floodplain space Ko. Analysis of graphical dependencies (Fig. 5) shows that with increasing the degree of constraint of the flow, the relative length of the compression region lcc / b_o increases. The intensity of the increasing in the

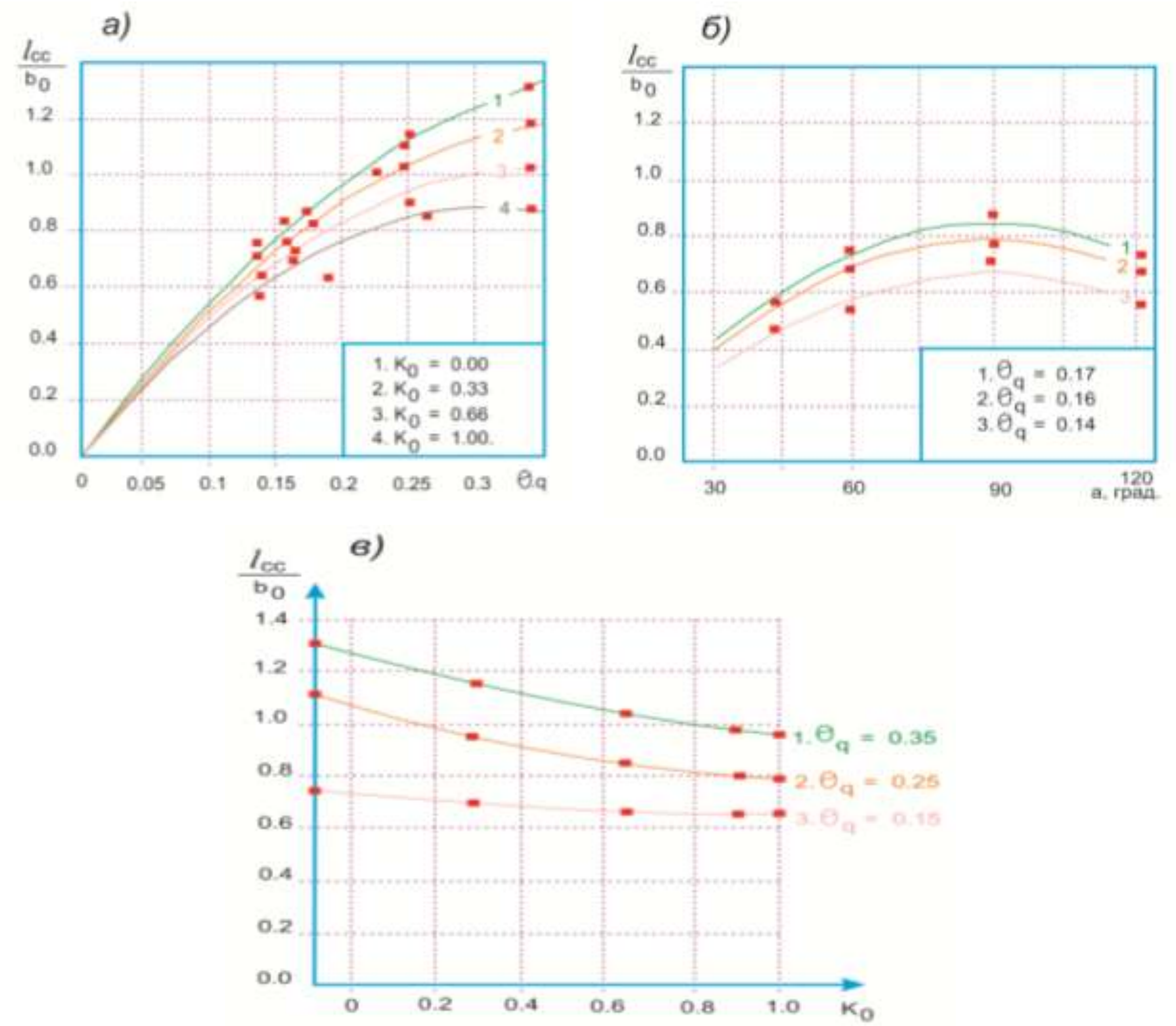

Fig. 5. Dependency graphs

relative compression of the length is uneven. At θ_q>0.24, the increment of the abscissas of the function decreases with constant increments of ordinates. And for Ko = 1.0, even a certain decrease in the value is observed for θ_q>0.3. Analyzing the influence of the development coefficient Ko, we can note that the influence of Ko is insignificant up to θ_q=0.1. With a further increase in the degree of restraint, the influence of the development factor increases. The relative length of the compression region (lcc/b_o) is described by the following analytical dependence:

$$l_{cc}/b_o = \left[(1{,}92K_o + 6{,}95)\theta_q^2 + (0{,}6K_o - 6{,}2)\theta_q\right]\sin(\pi + \alpha)$$

Where l_{cc} - is the length of the compression region;

b_o - the width of the unrestricted flow in the constraint range

Conclusions. The location of the compressed section is mainly affected by the degree of constraint on the flow rate of development θ_q of the intermodal floodplain space K_o, the angle of installation of the dam α.

Increasing of θ_q leads to increase in the relative length of the compression region of l_{cc}/b_o, the increase of K_o leads to decrease of l_{cc}/b_o, while for the $K_o = 1.0$ values there $\theta_q > 0.3$ is a slight decrease of l_{cc}/b_o. At the time of $\theta_q \le 0.1$ constraint, Ko s influence on the l_{cc}/b_o insignificant, and the further increase of θ_q leads to decrease of l_{cc}/b_o.

An increase α to 900 leads to increase of l_{cc}/b_o with a further increase α in its decrease.

References

1. Baryshnikov NB Morphology, hydrology and hydraulics floodplains. L, Gidrometeoizdat, 1984, 280 p.

2. Rakhmatov, N., Hydraulics of the cramped flow in the partial development of the inter-ambomb space. Avtodor .Diss. Ph.D., Alma-Ata, 1990, 18 p.

3. Bakiev M.R. "Perfection of designs, methods of calculation and design of regulatory structures". Author's abstract. etc. so-called. M.1992, - 57 p.

4. Ibragimov A.G. & Durmanov A.Sh. Issues of the development of competitiveness and the prospects of specialization in rice farms // SAARJ Journal on Banking & Insurance Research (SJBIR). Vol 6, Issue 5, September 2017. DOI:10.5958/2319-1422.2017.00021.2

5. Umurzakov U.P., Ibragimov A.G. And Durmanov A.Sh. Factors Of Stability Of Development Of Regional Agricultural Rice Production. International Journal of Management, IT & Engineering. November s2017 Volume-7, Issue-11. – 4-6 p.