

THE MAINTANCE OF GEOMETRICAL PARAMETERS OF CONSTRUCTIONS WEIRS AND THEIR DURABILITY

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1. Introduction

Safety and durability of hydrotechnical structures have significant social and economic meaning [1]. Most of all, weirs serve as the adjustment of the water level for navigation and flood protection. One of elements which has great influence on safety and the durability of hydrotechnical structures is maintaining of the geometrical project conditions. The maintaining of geometrical conditions by movable units such as flap of weirs is particularly essential [2]. The article describes problems appearing while executing the alignment works of the flap on the example of a survey check on the flap weirs on the Oder river. Moreover the article contains proposed solution to above mentioned problem. The article presents the author's own experience gathered at execution of alignment works of flap weir.

2. The researched flap

The flap width amounts at 30,0 m, fig.1. The scope of survey works comprised the coaxial positioning of bearings of the weir at the time of its renovation, fig.2. Both the investor and the designer set the alignment accuracy at least 0,3 mm [3]. The lack of smooth adjustment of positioning of the bearings was an obstructive factor in obtaining the required accuracy. When adjustment was needed, it was necessary to unscrew the whole bearing, put on or take out a distance washer of relevant thickness and screw it up again. The number of such operations was considerable and it required high qualifications from the workers as well as relevantly long time.

3. Methodology of research

Positioning of the bearings in vertical plane was measured by a total station Leica NA 3003 and a code invar leveling staff (fig.3). Due to lack of space, a special stand was used to put the survey instrument. Coaxial survey was made according to the constant straight line method. It has been assumed (following agreement with the investor and the contractor) that the reference straight line would be the line marked by the ending bearings.

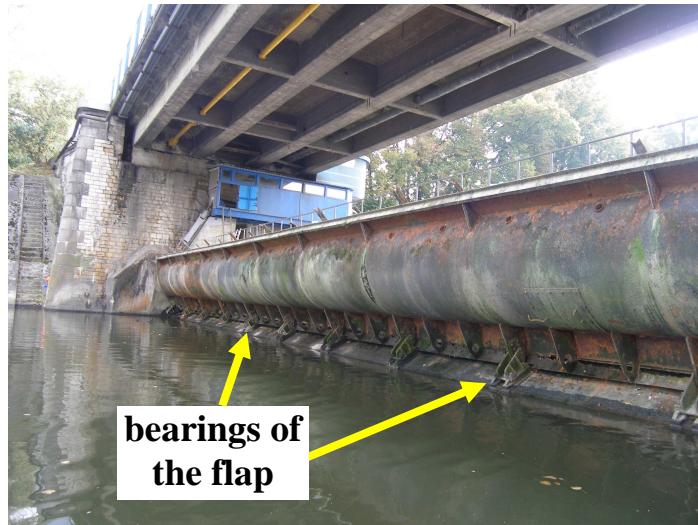


Fig. 1. The flap of weir before exchanging, view from the side of tail water

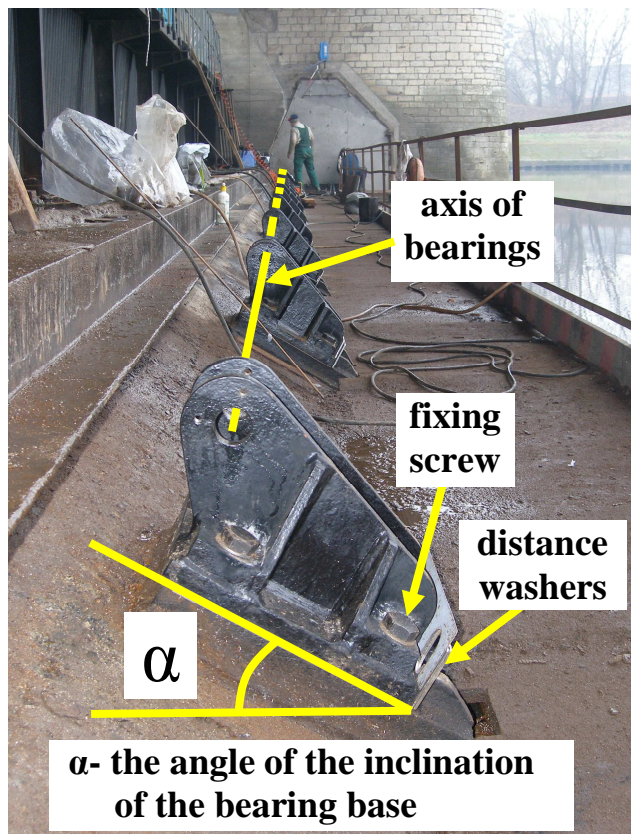


Fig. 2. The bearings of the flap



Fig. 3. The level NA 3003 on the observation station



Fig. 4 .Total station TC 2002 with precision translation stage GAD12

The survey points were signaled using special targets. To increase survey accuracy and to define numerically the deviation from a straight line, a precision translation stage GAD12 was used with a micrometric screw of 0,01mm accuracy, fig.4. The task described just in one sentence took the surveyors two working days, fig.5.



Fig. 5. The flap of weir after exchanging, view from the side of tail water

4. Conclusion

Coaxial of the bearings axis has been set out with the required accuracy i.e. 0,3 mm. Measurements were executed with use of standard instruments and supporting equipment of renowned brands as well as the contractor's own innovatory solutions of the highest accuracy parameters.

The bibliography

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Streszczenie

W artykule przedstawiono problemy związane z zachowaniem współosiowości łożysk kłapy jazów. Trudność w zachowaniu współosiowości łożysk polega między innymi na: braku płynnej regulacji położenia osi i nie dostosowaniem standardowego wyposażenia pomiarowego do tego typu zagadnień pomiarowych. Zachowanie geometrycznych warunków projektowych ma istotne znaczenie dla trwałości i bezpieczeństwa budowli hydrotechnicznych. Do ilustracji prezentowanego zagadnienia wybrano jeden z jazów na Odrze, w którym w roku 2009 została wymieniona kłapa.