

An Example of River Training Works for Hydropower Production

Prof. Dr Jovan Despotović

Prof. Dr Miodrag Jovanović, Nikola Rosic

University of Belgrade – Faculty of Civil Engineering
Department for Hydraulic & Environmental Engineering

e-mail: irtcud@hikom.grf.bg.ac.rs; mjovanov@grf.bg.ac.rs



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Extended abstract

- **The Morava River** , meander cut-offs and immense excavation of sand & gravel from the river bed => significant morphological changes !
- **Due to regressive erosion**, the river bed elevations dropped for app. 3-5 m for 30 years on a river reach/ intake of the **Thermal PP „Morava“** , water **intake was left „dry“ during low flows**, with enourmous loss in power production.
- **Urgent measures** were necessary to stablize the river bed, terminate its degradation and provide demanded water level.
- The solution was **a construction of a sill** on the river bed, Figs. follow...

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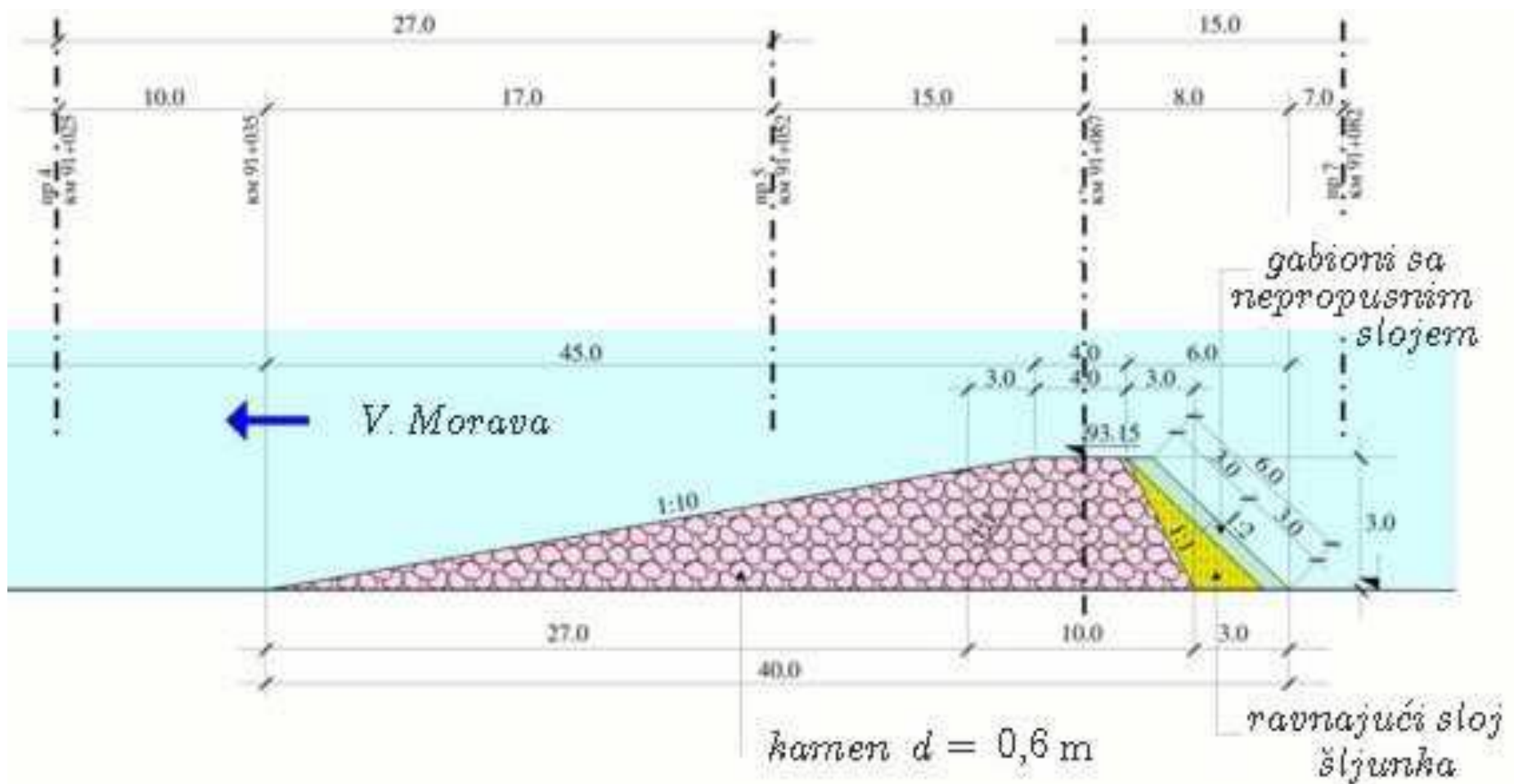
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The river V. Morava profile incl. damaged steel bridge on the bottom from the 2nd World War that was used as the foundation for the sill with upstream gabion revetment.



The designed stone sill with upstream gabion revetment (flow from the right to left).



The designed sill under construction in allignment with the damaged old steel bridge at the bottom as the foundations.



Overflow at sill which was noticeable but regular during first year after construction works at the end of year 2008.



Overflow at sill which can be easily noticed during the low flows in the year 2011.



Overflow at sill, the effects of which couldn't be noticed, during high flows in the year 2010.

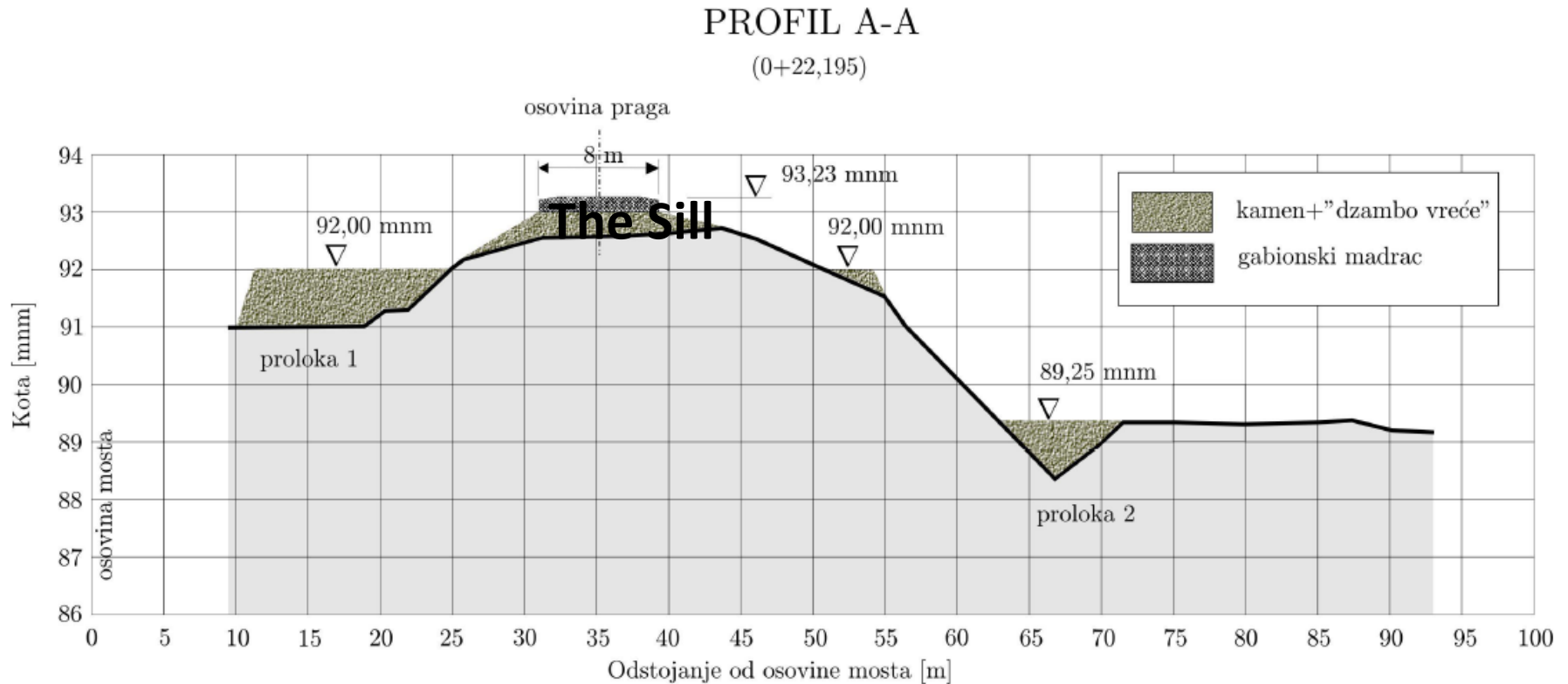


The comprehensive measurements of the sill dimensions and the river V. Morava bed deformations upstream and downstream the sill / holes, dunes, deposition/ after almost 4 years of the completion of the construction works in the year 2011.

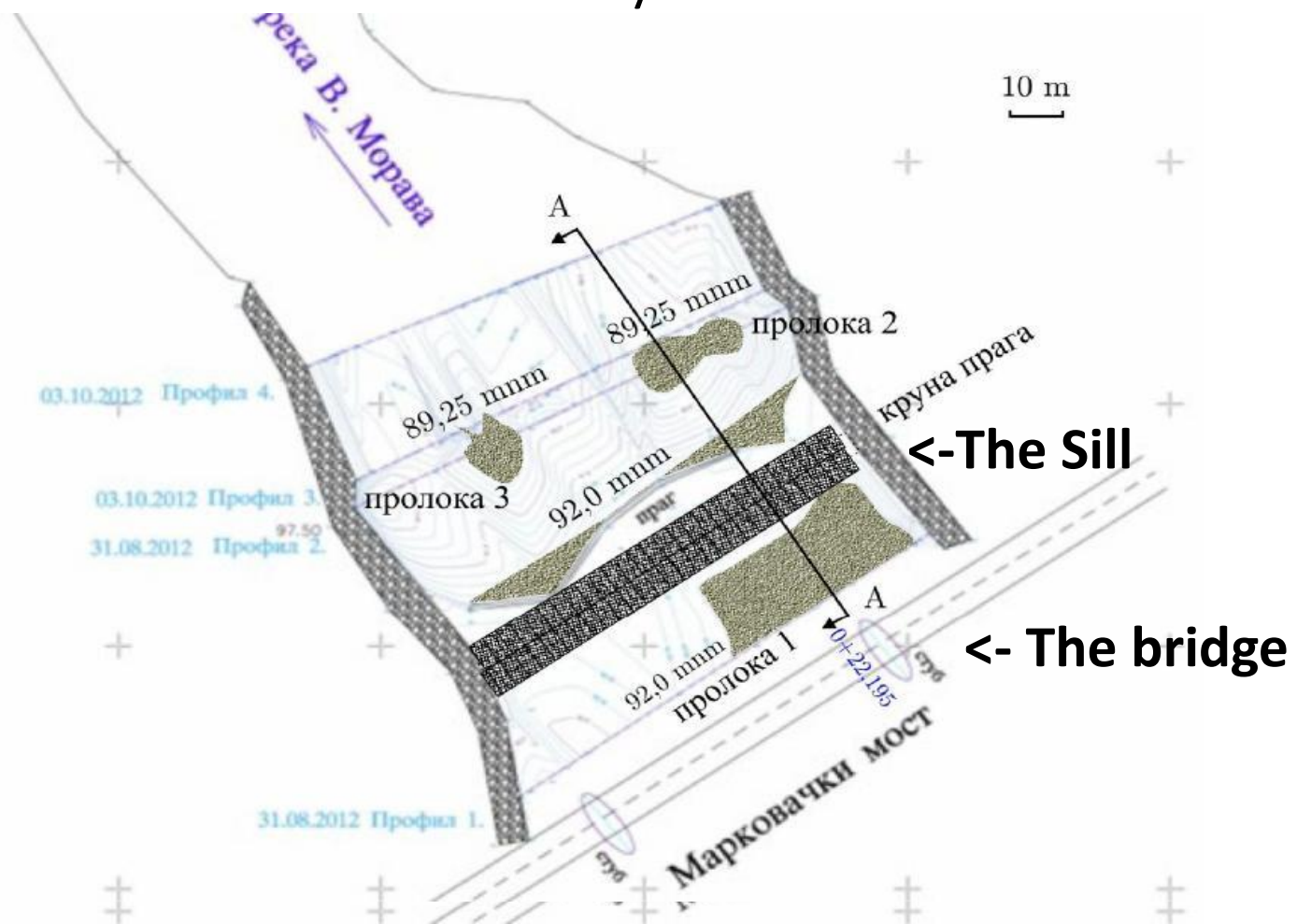


Monitoring of the sill has shown deformation of its body and the characteristics for stone structures after severe floods.

Systematic continuous maintenance that was emphasized is needed, for which adequate amount of money has to be provided on regular basis.

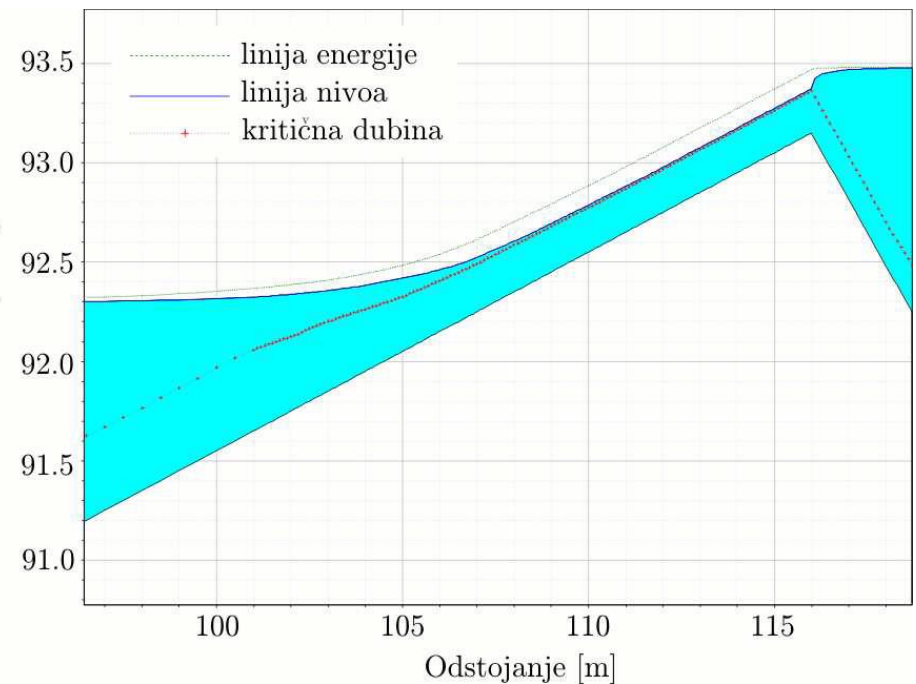
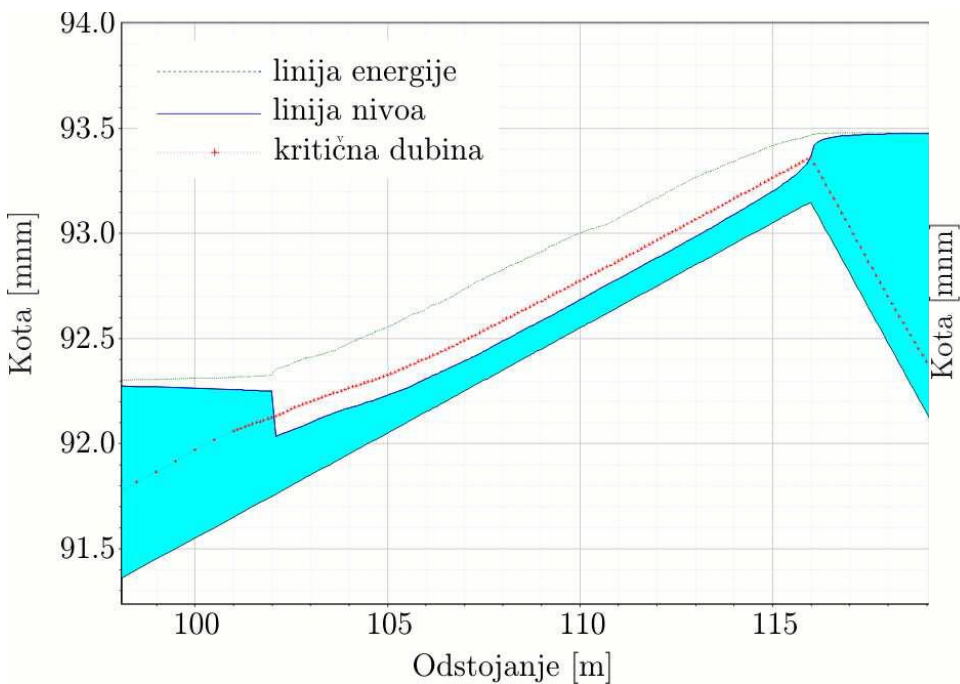


Monitoring of the sill including the both banks: severe deformation of its body and the characteristics of the stone structures (after several severe floods from year 2010, including 2014)
Systematic continuous maintenance is needed on a regular basis.
In year 2013 is done a design project for rehabilitation was done and in the year 2014 must be constructed!

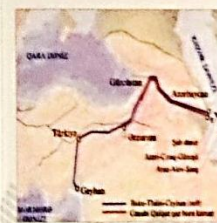


At left Fig.: water flow over sill modelled with only Manning roughness,

At right Fig.: water - air mixture flow with roughness defined according to Hartung & Scheuerlein method (1999)



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Спасибо, Çох sag olun, thank you.

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