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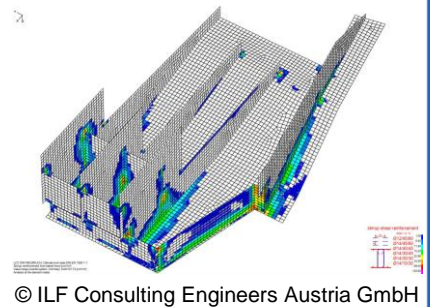
*„Enabling accountability and collaboration during
the detailed design phase of small hydropower
projects“*

USING BIM FOR DETAILED DESIGN

► RESULT IN A NUTSHELL

BIM stands for Building Information Modelling. The approach represents the state of the art in planning architecture, engineering and construction

- It can be used for: Visualizations, plausibility checks, drawings export, structural calculations, etc.
- An integrated BIM approach enables all relevant project participants to gain an insight into progress.
- Having the full project with its information in one single model is one of the main benefits.



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► DEMONSTRATION-SITE



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Country: Kyrgyz Republic
Region: At-Bashy District
River: At-Bashy

Site Parameters:

- Existing diversion weir with around 7 m head and three pressure segments
- Emergency spillway for water diversion during construction in place
- Elevation at 2,400 m

CONTEXT

Hydro4U overall...

... is an EU-funded project with 13 partners from 8 countries with the goal of implementing sustainable small-scale hydropower in Central Asia.
... focusses on the modularity and pre-fabrication of hydropower plants to enable a fast and simple implementation also at remote sites.
... will demonstrate EU quality standards and create entry points in developing markets for the European small-scale hydropower industry.

ILF Consulting Engineers Austria GmbH - Role in Hydro4U

Support in the design process:

- Providing expertise on geology and geotechnics
- Preparing the detailed design report including formwork and reinforcement drawings of hydropower plant
- Site supervision of the implementation

Global project

EU-Programme: Horizon 2020
Activity type: Innovation Action
European grant: 9.9 M €
Duration: 06/2021 – 05/2026

Coordination:

Technical University of Munich
eMail: coordination@hydro4u.eu

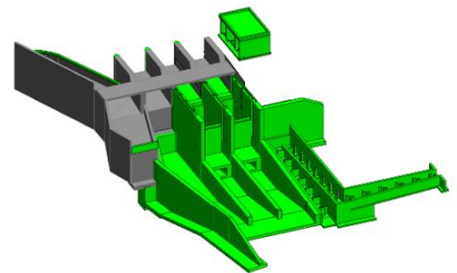
www: <https://hydro4u.eu/>

LinkedIn: [Hydro4U](#)
X: [@Hydro4Uproject](#)
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Technical aspects

- Cloud-based building information modelling
- Visualisation
- Interface management
- Detailed Design



BIM visualisation
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Value Proposition

ILF prepared the detailed design of the At-Bashy demonstration hydropower plant, including formwork and reinforcement drawings. During this process, optimizations and structural adjustments were made to the design using a Building Information Modelling (BIM) tool.

The three-dimensional (3D) structural Finite Element Model (FEM) **is a supplement to the larger BIM model, allowing plausibility checks regarding the location, quantity and spacing of the reinforcement** to be conducted easily, and thus helping to ensure the practicality of its installation on site.

BIM models can be **visualized using different views**. In addition to full 3D views, sections and viewing angles can be displayed. Dimensions and further information can be added to the views. As **only one model** is used, these individual views can be used for formwork and reinforcement drawings. The reinforcement material list generated by the software can also be added to the drawings.

The BIM approach makes it **possible for everyone involved in a project to have a good overview of the project at all times** by using a cloud-based setup. The model is stored on a platform so that multiple users and experts from different disciplines can follow the progress of the project and intervene, if necessary.

In Hydro4U, the 3D model was stored in a cloud to give all relevant project members insight into the progress of the design work. The **3D model was used as the basis for discussing all coordination issues, which were resolved before the 2D drawings were started**. The reinforcement was also part of the 3D model which allowed a high level of accuracy to ensure practicality on site.

FURTHER DEVELOPMENT

BIM is already state of the art in terms of design and construction.

The application of an integrated BIM tool enables even more extensive processing of the project. This means that not only the structural calculations carried out here can be used, but also, for example, work processes, costs and mass management can be integrated and visualised.

► REPLICABILITY ASPECTS

Planning largely depends on basic data and knowledge of local conditions. Particularly in areas that are difficult to access, not all the necessary data is available. This can lead to multiple redesigns, even later in the implementation phase. With a BIM approach, a change can be recorded across all interfaces. This enables faster adaptation without loss of information.