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Use of Digitization for the Design of a Railway Arch Bridge in Azerbaijan

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ABSTRACT

For several years, and to an increasing extent, BIM techniques have yet been used by Yüksel Proje for the design process of their projects. One of these projects is the Shusha Bridge in Azerbaijan, where, due to its complex geometry, several challenges arose in choosing the right procedures for an efficient application of the used modelling software. A whole series of parametric techniques had to be applied to suitably capture the various structural components. The variability of the geometry of the individual components as well as the detailed tendon layout were recorded with using tables and formulas assigned to the geometric parameters. Advanced techniques such as using Excel sheets and TCL programming complemented the spectrum of applied functionality. Python parts were used for reinforcement modelling and outright assignment of IFC attributes supported data exchange and interoperability.

Keywords: Bridge design, Open BIM, Python parts, Interoperability

1 INTRODUCTION

The Shusha Bridge is planned to cross a deep valley near Shusha on the single-track railway line connecting the Fuzuli and Shusha regions in Azerbaijan. Due to cost valuation and the rigorous alignment restrictions of the railway it was inevitable to choose a special bridge layout with avoiding high piers in the valley. Consideration of aesthetics led to the design of an arch bridge in harmony with the surrounding nature (Figure 1). However, the complexity of this design with superstructure, arch, footings, abutments, and piers implied a big challenge for the design and the modelling procedure.

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