



## Performance of early RC structures of high cultural value in view of future utilization

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### Summary

Three early reinforced concrete structures of high cultural values located in Switzerland are investigated in view of their future utilization: (1) Schrärbach Bridge, probably the World's first stiffened arch bridge structure designed and built in 1923 by Robert Maillart, (2) Hauteroche Mansion, a three storey monolithic reinforced concrete building designed and built by François Hennebique in 1913, and (3) Guillermaux Bridge from 1920 which is a flat three hinge arch bridge designed by Louis Bosset. Examination of the actual performance revealed that all three structures can be restored and strengthened to meet the requirements of future modern utilization. While in one case the early RC structure is condemned to be demolished and replaced, a restoration project is in progress for the future utilization of the two other structures. From these three cases it must be concluded that appropriate treatment of and interventions on structures with adequate respect of cultural values depend primarily on the motivation and know-how of the persons involved as well as on the legal and regulative bases. Technical facts and economic evidence are not always sufficient for the preservation of structures of high cultural value. Yet, preservation of cultural values may go hand in hand with socio-economic, environmental and technical requirements. These requirements are often met by the application of advanced structural engineering methods specific to existing structures.

**Keywords:** existing structures, early reinforced concrete structures, examination, preservation.

### 1. Introduction

This paper reports on the methodology and results of the examination of three early reinforced concrete structures of high cultural values located in Switzerland in view of their future utilization: (1) the Schrärbach Bridge probably the World's first stiffened arch bridge structure designed and built in 1923 by Robert Maillart, (2) the Hauteroche Mansion a three storey monolithic concrete building designed and built by François Hennebique in 1913, and (3) the Guillermaux Bridge from 1920 which is a flat three hinge arch bridge designed by Louis Bosset. While Maillart's Schrärbach Bridge currently is condemned to be demolished and replaced, restoration projects are in progress for the future utilization of the Hennebique building and the Guillermaux Bridge.

First, three structures are briefly described. Then, requirements for their future utilization and the main results of structural examination according to the Swiss Standards SIA 269 "Existing Structures" [1] are given. Based on the structural performance and potential of the three existing structures, concepts for renovation and strengthening interventions in view of the future utilization of the three structures are developed to meet the requirements of their future modern utilization.