

# Testing Existing Structures – Compressive Strength and Tensile Splitting Strength of the Lahntal Bridge Limburg

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## Abstract

In 2016, the Lahntal Bridge near Limburg was replaced by a new structure. The existing bridge was deconstructed on a formwork carriage. Before the deconstruction, more than 250 concrete cores and other specimens were taken from the existing structure. The samples are located all over the cross section and the length of the bridge. These specimens are examined for their material properties.

The investigations include the experimental determination of the compressive strength, the tensile splitting strength, the creep behaviour, the chloride ingress, fatigue tests and the anchoring behaviour of the tendons. This paper deals with the compressive strength and the tensile splitting strength.

The results of these tests are statistically evaluated by determining the mean value, the standard deviation and the coefficient of variation. In addition, it is examined whether there are any correlations between various material properties. The results are also compared to the normative expectations of Eurocode 2.

**Keywords:** Existing structures, deconstruction, material properties, compressive strength, tensile splitting strength

## 1. Introduction

The Lahntal Bridge Limburg was a continuous prestressed bridge built in the 1960s. Because of the high traffic, the bridge has to be replaced by a new structure. This gave the opportunity to intensively sample this over fifty-year-old structure and gain insight into the development of the material properties. The following investigations deal with compressive and tensile splitting strength and their correlation.

## 2. Deconstruction of the Lahntal Bridge Limburg

### 2.1 History of the Bridge

The first autobahn bridge crossing the Lahn River near Limburg was a massive viaduct after a design of Paul Bonatz. This bridge was blown up in 1945 during the fallback of the German Wehrmacht [1]. To meet the requirements of the ever-growing traffic, the provisional truss bridge of the post-war