



## Strengthening and Reconstruction of the Hugo Treffner Gymnasium building in Tartu, Estonia

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### Abstract

Strengthening and reconstruction of Hugo Treffner Gymnasium building was carried out from 1994 to 1997 in four stages. The mandate of KAREG Consulting Engineers entailed designs of temporary and permanent structures as well as development of a monitoring system and examining the condition of the structure. The foundations on the yard side walls were placed two meter higher than the remaining of foundations of the structure. As a consequence, the above mentioned findings led to forming cracks and brought about the walls of the building to incline. The project involved corner walls and interior walls stabilization, exterior walls strengthening and a new basement area construction. A new reinforced slab was poured, designed using the yield line theory analysis. The use of the selected strengthening options and technique for structural intervention of the walls was found to be a suitable technique to achieve the desired objective.

**Keywords:** strengthening; structural intervention; stabilisation; foundations; piles; cracks; settlement; walls; concrete slab.

### 1 Introduction

Hugo Treffner Gymnasium (HTG) is a secondary school located in Tartu, Estonia with special emphasis on science education. Founded by a renowned scholar Hugo Treffner, it was the only large secondary school in 19th century in Estonia with dominantly Estonian students and no age restrictions. During the Estonian national awakening (1850 – 1918) the school greatly contributed to the number of Estonian intellectuals. In November 2011 HTG became the partner school of UNESCO.

Today, HTG is a modern and comfortable educational institution and a leading co-educational public school for students of age 16 to 19 (Figure 1).



Figure 1. Hugo Treffner Gymnasium today.

#### 1.1 Hugo Treffner Gymnasium building

The building has served as a school for centuries. Founded in 1883, HTG boasts a combination of a