Chapter

6.10

The Gothic Tower of Freiburg Minster, Germany: Analysis and Repair

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Introduction

The construction of the Freiburg Minster began around 1200 in the Romanesque style, and from 1230 onward, the master builders adopted the Gothic style. The tower was completed around 1330. It is 116 m in height and has survived until the present without major damage or alteration. The outstanding feature of the tower is the filigree construction of the octahedral-pointed spire, which has no internal supports (*Fig. 1*). Since its construction, no major alterations were undertaken, and no strengthening measures have been required. It survived several catastrophes, including one of the most destructive earthquakes in Northern Europe in 1356. It also survived the bombing raids of November 1944. Nevertheless, the masonry and the tracery had to be repaired at regular intervals, for instance, in the 1920s and 1960s. In 2009, a scaffold was erected once again after small pieces of stone fell onto the viewing platform. Originally, the intention was to undertake local repairs and stone conservation, but further cracks were discovered, which proved to be much more dangerous than expected. In particular, the cornerstones of the main struts of the octagon, which are structurally essential, showed several cracks. The crucial questions were what were the causes of this cracking and what kind of remediation measures would be necessary.

Construction

The lower part of the tower is square in plan and very solid, with only a few openings. At 40 m, there is the so-called star gallery and the belfry. Above the belfry, at a height of 55 m, there is an internal platform. From there, the tower is octagonal and free from any internal struc-