On the Inclination of a Flying Buttress Arch

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Abstract

Historically in architecture, the inclination of a flying buttress arch is determined as the amplitude of the angle that spans between the horizontal straight line and the straight line connecting the two ends of the arch's lower edge. Nonetheless, this inclination does not represent the entire flyer, but at most only its lower edge. Therefore, using techniques based on geometrical and mechanical criteria, applied to twenty flyer arches belonging to twelve flying buttresses from several European Gothic cathedrals, we present a new proposal for a definition of inclination which represents the entire arch.

Keywords Flying buttress · Flyer arches · Inclination · Geometric regression · Gothic cathedrals

Introduction

Many authors have carried out research on the origin of flying buttresses (see, for instance, Lefevre-Pontalis 1919; Prache 1976; Henriet 1978, 1982; Stanley 2006). We wish to highlight the work by Viollet-Le-Duc (1996) and Choisy (1899), who theorized the use of the first flying buttresses to strengthen the structure of Vézelay Abbey, which was built in the year 1138. Both authors pointed out that, over the years, the abbey's structure experienced a progressive deformation due to the height of the central nave vaults. They formulated similar hypotheses about the actions taken by the builders in order to counter the thrusts of the central nave and avoid

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