

THE ROLE OF MATHEMATICS IN THE GOTHIC ARCHITECTURE STRUCTURAL ANALYSIS

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Abstract: *For centuries the restoration works made on gothic heritage buildings were based on experience and intuition, as there was no methodologies or mathematical models to simulate accurately the complexity of Gothic structures.*

Nowadays, the development of new technologies like the Finite Element Method, the computer monitoring of structural elements or the stress measurements techniques provide the necessary data to establish the intervention criteria based on scientific results.

The geometry of the Gothic structure must be carefully measured using techniques like topography or photogrammetry. The data obtained from the measurement process, the experimental techniques and the mechanical analysis is used to create a computer model that represents the structural properties of the structure.

This work will show the mathematical processes involved in all these processes. We will discuss the mathematical idea philosophically, with an emphasis on presenting a wide range of graphical applications.

Below is the entire Power Point presentation of Prof. Barallo's contribution.

THE ROLE OF MUSIC IN THE GOTHIC CULTURE STRUSTRUP

by **Andreas Strup**

...the gothic culture is a very complex and multifaceted phenomenon. It is a culture that has been around for centuries, and it has evolved over time. The gothic culture is a culture that is based on the gothic novel, the gothic architecture, and the gothic music. The gothic music is a very important part of the gothic culture, and it has played a significant role in the development of the gothic culture. The gothic music is a music that is characterized by its dark, moody, and atmospheric sound. It is a music that is often associated with the gothic culture, and it has been a major influence on the gothic culture. The gothic music is a music that is very different from other types of music, and it has a unique sound that is not found in any other type of music. The gothic music is a music that is very important to the gothic culture, and it has played a significant role in the development of the gothic culture. The gothic music is a music that is very different from other types of music, and it has a unique sound that is not found in any other type of music. The gothic music is a music that is very important to the gothic culture, and it has played a significant role in the development of the gothic culture.

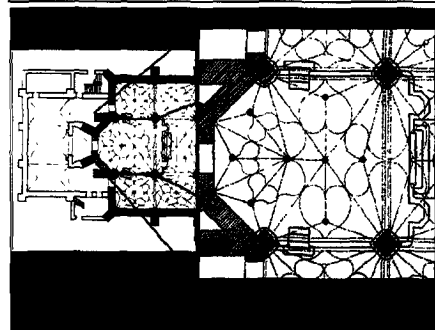
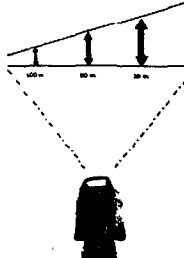
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The diagram illustrates the process of creating a stereoscopic image. At the top, a camera is positioned to capture a scene. The scene includes a horizontal line with a small square object on it, and a large black circle below it. Below the camera, two eyes are shown, labeled "LEFT EYE" and "RIGHT EYE". To the right of the eyes, two rectangular frames are shown, labeled "LEFT EYE" and "RIGHT EYE". These frames contain the images captured by the left and right eyes, respectively, showing the horizontal line and the black circle from different perspectives.

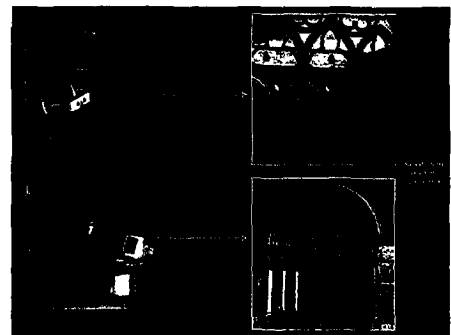


LEFT EYE RIGHT EYE

TOPOGRAPHY

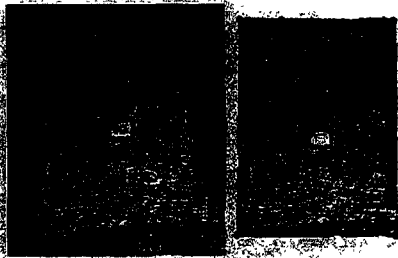


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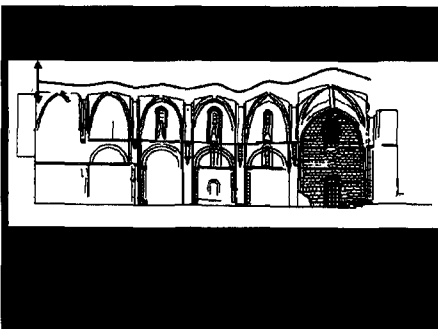
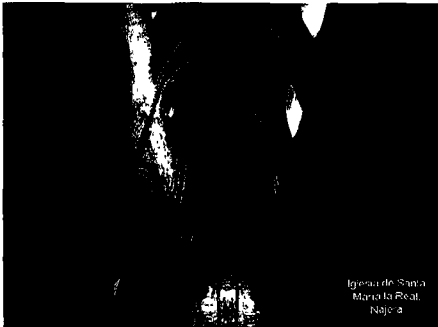


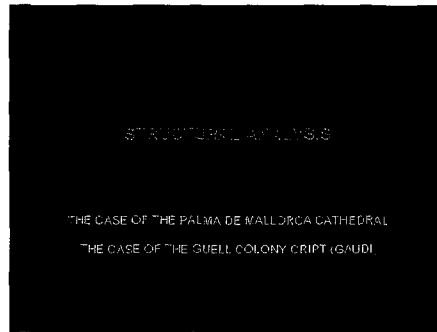
OTHER METHODS



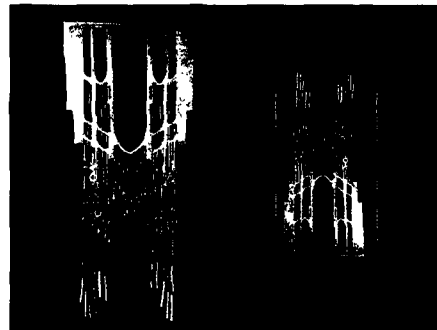
USE OF GEOMETRY IN THE DETECTION OF STRUCTURAL PROBLEMS

THE CATHEDRAL OF MEDINA DEL CAMPO
SAN LUIS DE LOS REYES, VALENCIA, SPAIN

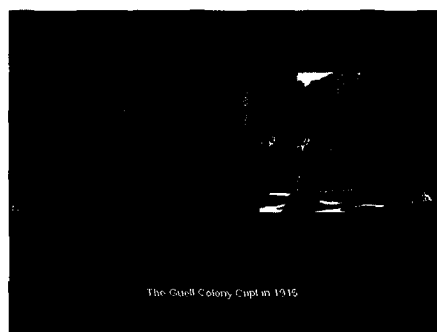




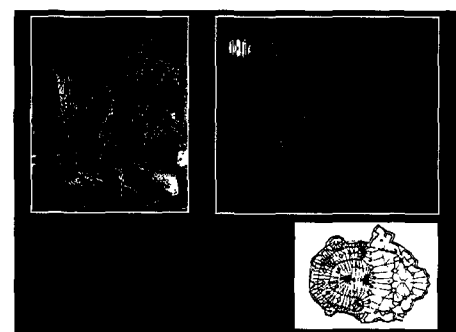
Palma de Mallorca Cathedral

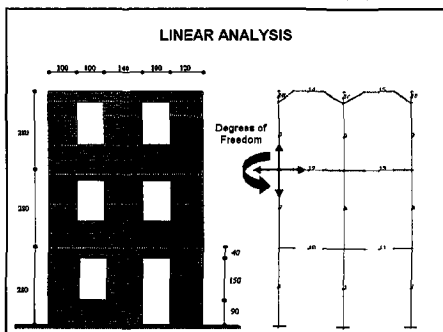
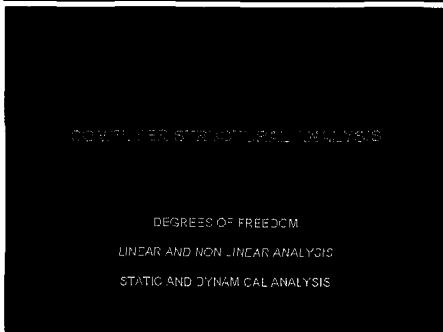
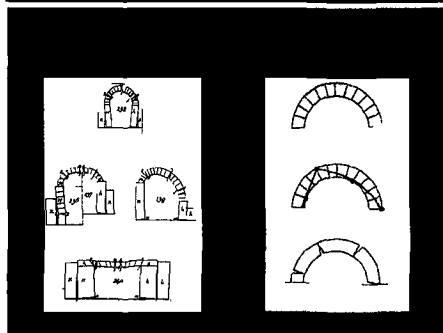
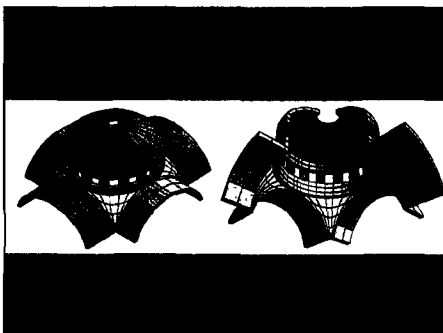
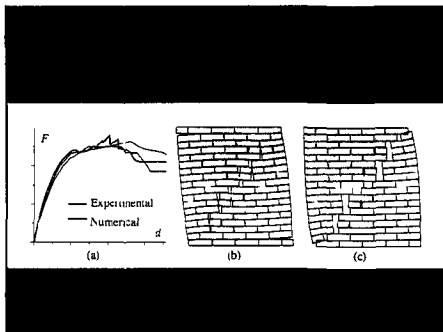
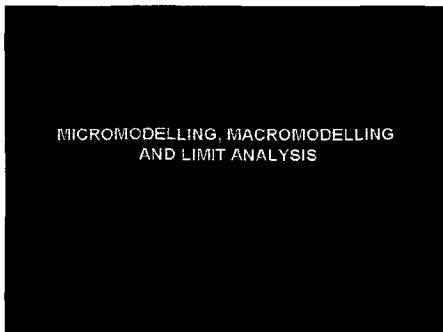
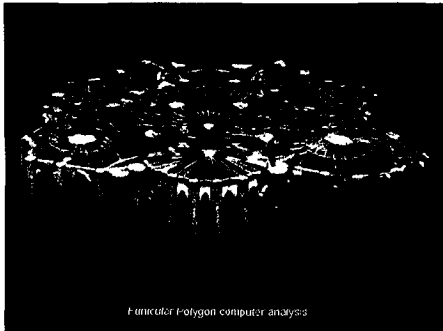


Guell Colony Church (project drawings by Antoni Gaudí)

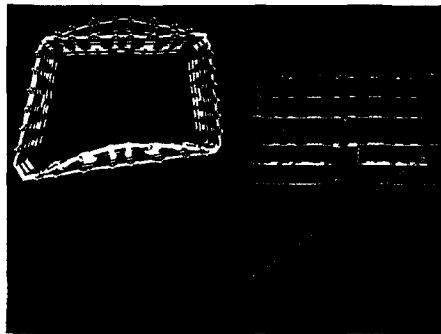


The Guell Colony Crypt in 1915

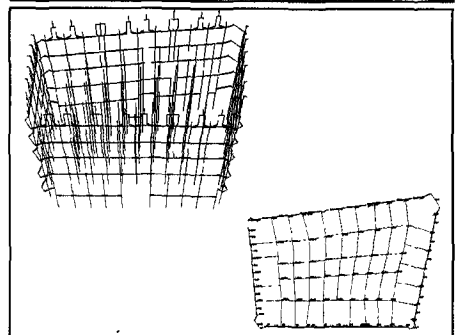
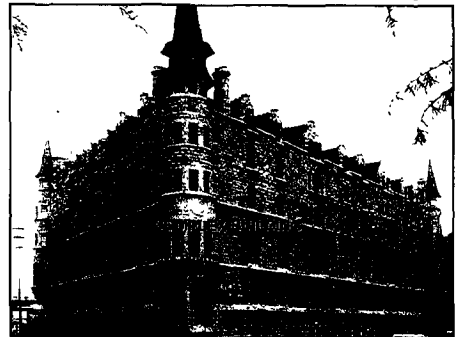
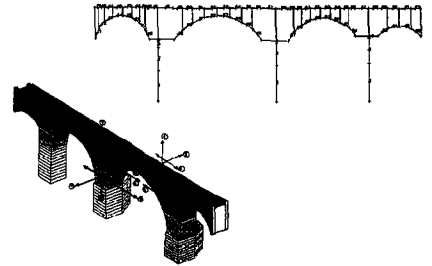


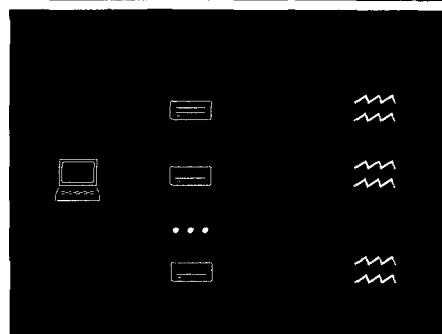
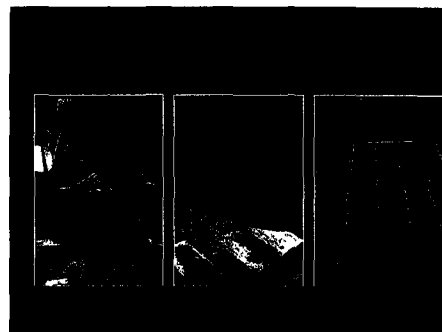
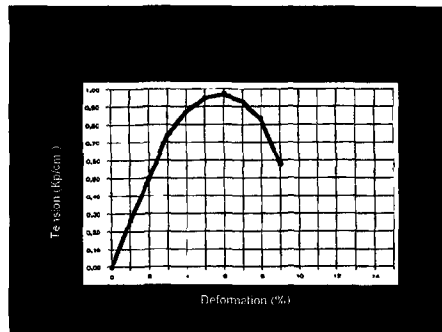
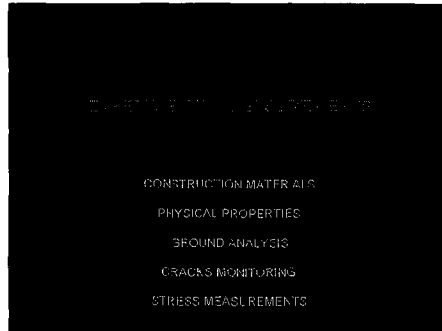
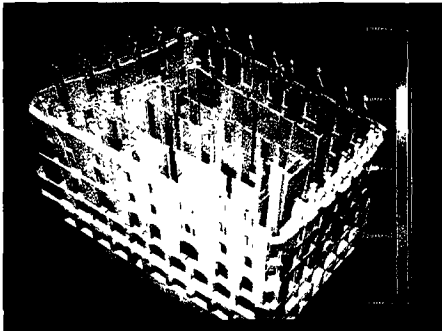


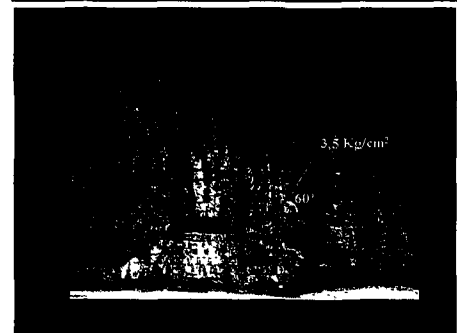
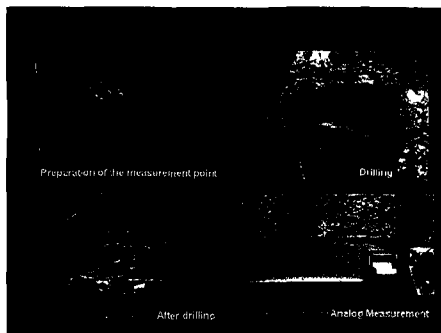
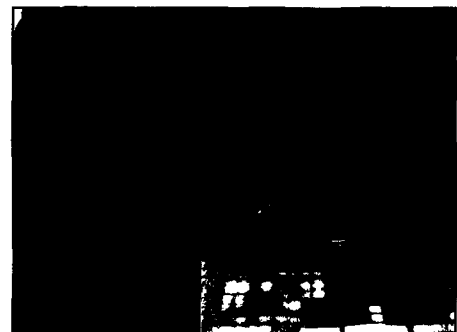
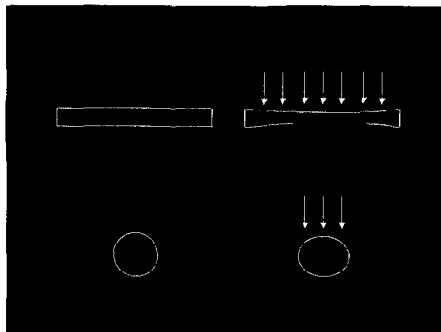
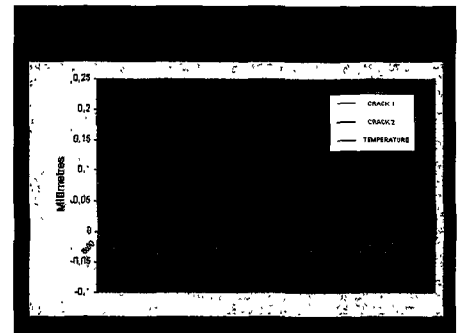
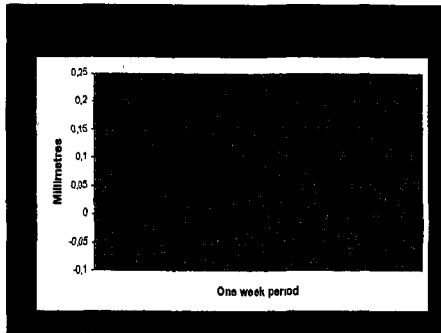
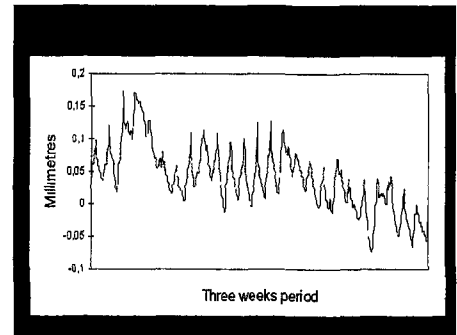
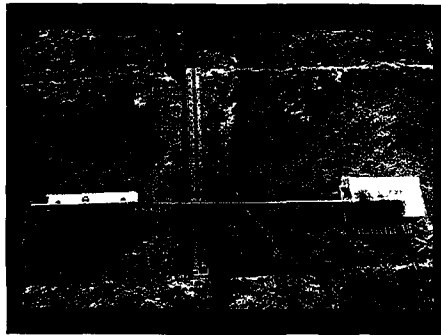
NON LINEAR ANALYSIS



DYNAMICAL ANALYSIS

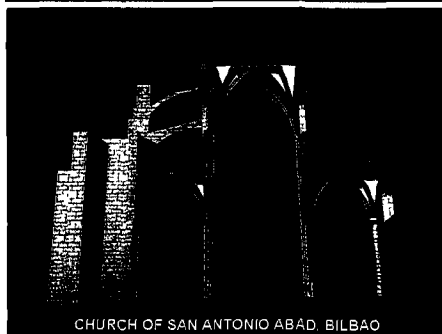
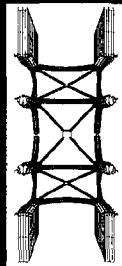
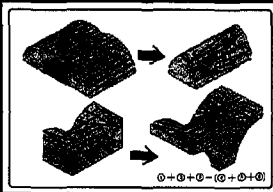
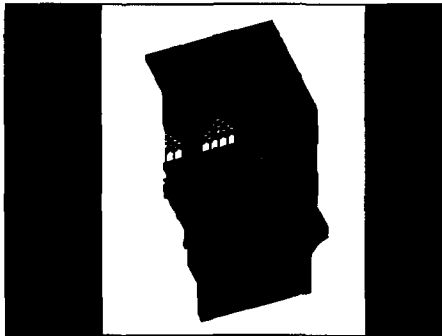






FINITE ELEMENTS METHOD

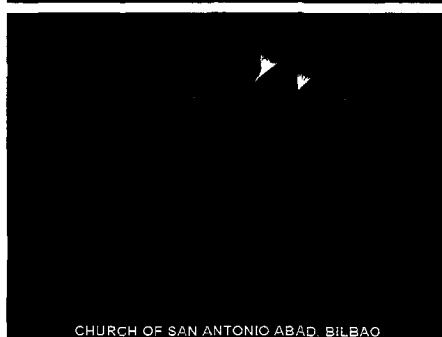
THE CASE OF THE CHURCH OF SAN ANTONIO ABAD, BILBAO
THE CASE OF THE BARCELONA CATHEDRAL DOOM



CHURCH OF SAN ANTONIO ABAD, BILBAO

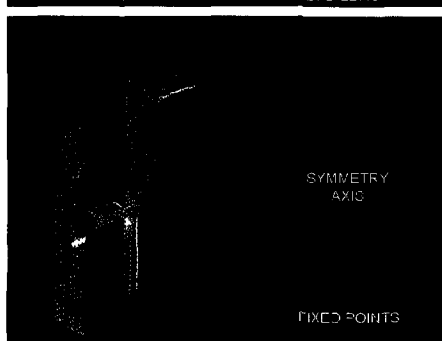
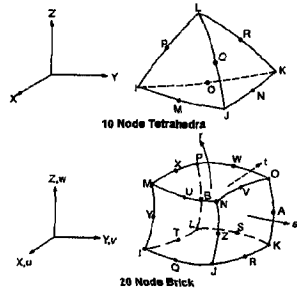


CHURCH OF SAN ANTONIO ABAD, BILBAO



CHURCH OF SAN ANTONIO ABAD, BILBAO

3D ELEMENTS



SYMMETRY
AXIS

FIXED POINTS

