

# **'Historical Perspective of Design and Analysis of Notre Dame Cathedral'**

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The recent fire has cast a spotlight and sparked an international effort to rebuild the Cathedral within the next five years. The Cathedral is a prime example of Gothic Architecture. The original building was started in 1163 and took two hundred years to complete. The original material was stone. The design tools were rudimentary and may be hypothesized as a form of limit analysis by static equilibrium. Most of the building technology was passed down in the form of master-apprentice training. There is a vast literature on the architecture of the Cathedral, mostly from an Arts point of view and until one gets into it, mostly in French.

The digital scanner has become a tool to record accurately the geometry of buildings. Andrew Tallon has scanned the Cathedral. The results are available through Archives at Vassar. The software game developer Ubisoft has also spent about two years digitizing the Cathedral for a game in the Assassin's Creed Series. It has made this free for a limited time for all interested parties. These two sources are the only known high fidelity record of the Cathedral. As such, they can be a starting point for us to understand the evolution of the architectural design and the tools available in the last nine centuries. Such an understanding will also form the basis of future plans for rebuilding.

We have made these references and others available in Pashpost.com under Architecture>Iconic Structures. See:--

<https://pashpost.com/group/iconic-structures>

We are soliciting papers on :-

The history when the original construction and various architectural innovations were introduced. Viz.

Stone construction, vault roof, beam reinforcement, flying buttress, cross spire, stained glass windows and etc.

[a] Conversion of digital scans of any of the above components to CAD or Finite Element or SPH format.

[b] Linear and nonlinear forms of analysis of [a].

[c] Pre and post processing of results in [a and b]

[d] Future evolved forms of the current components. Additive manufacturing?

[e] Monitoring of deformation during reconstruction.