

Aerated Autoclaved Concrete (AAC) for Masonry Vaulting

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EXECUTIVE SUMMARY

This research merges traditional Catalan vaulting with lightweight concrete foam. The aim is to evaluate masonry structural spans in light of the formal, material, and economic possibilities offered by using aerated autoclaved concrete (AAC) in place of traditional terracotta bricks. My investigations into this intersection of technique and technology suggest that indeed the possibility exists for greater formal variety within a buildable family of structural forms. The ongoing work involves full-scale mock-ups and load testing, as well as plausible building designs using the system.

Aerated Autoclaved Concrete (AAC) is an advanced masonry product that is used in residential and commercial structural walls. It has many advantages in the building trade, including light weight, high R-value, fire resistance, ease of cutting and assembly, and ready-to-finish surfaces. These qualities make AAC an excellent material for ongoing investigations into advanced structural forms at the Building Technology Program at MIT. Research programs at MIT are working both theoretically and practically to engage in the design and construction of load-bearing masonry.

The research demonstrates that AAC is an ideal material for structural masonry spans built in the Mediterranean tradition of Catalan vaulting. Qualitative and quantitative tests on the construction of vaults using AAC indicate that it has potential for both innovative and traditional structural forms. AAC has distinct qualities that make it an ideal material for vaulting, particularly its light weight and its workability. The qualitative tests suggest that a variety of block sizes will work with the Catalan constructive system, and that the versatility of bearing conditions, and strong adhesion with plaster allow for innovative structural form. The quantitative tests show that AAC is absolutely strong enough for structural spans and that it behaves in a brittle manner similar to traditional masonry.