

Engineering Design Provisions for Prestressed Masonry, Part 2 – Steel Stresses and other Considerations

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Abstract:

Masonry can be strengthened through controlled precompression stresses which reduce or eliminate tension. In other countries, primarily the United Kingdom, prestressed masonry has been used for three decades and engineered masonry codes currently include design provisions for this system. However, prestressed masonry construction is practically nonexistent in the U.S., and American building codes and standards of practice have yet to include provisions for prestressed masonry. A comparison of American design practice for unreinforced and reinforced masonry and British design practice for prestressed masonry is undertaken with the overall goal of promoting the use of prestressed masonry in the U.S. The study, which is presented in a two-part article, suggests changes and modifications to the current ACI-530/ASCE-5 standard that are needed to address prestressed masonry. Steel stresses, prestress losses, bearing stresses, development lengths and deflections are discussed, as well as future considerations for design strength.

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