

## ***Bridging the Bridge***

The devastating Mason City floods of 2008 brought heavy damage to the historic Egloff House and others in the East Park Place historic district. The subsequent decision to relocate this and several other important houses immediately turned the focus to another historic structure.

The North Carolina Avenue bridge is a charming arched concrete structure that was built in 1914. And it's a vital link on the only route over which the houses could be moved. A 400-ton house (so large it had to be split in two for the move) rolling across a quaint, 100-year-old bridge would give any engineer nightmares so the City Engineer asked WHKS to examine the bridge and see if it was up to the challenge.

The bridge is a two-span earth-filled concrete arch structure. Strong enough for conventional traffic, but certainly not designed for rolling houses. The biggest concern was how the structure would respond when the weight of the houses bore down on the outer ends of the arches. Working from three ancient, and hard-to-read drawings, the engineers were forced to develop their own formulae for load and stress calculations, since no one had built a bridge of this sort for the better part of a century.

While they determined that the bridge could — just barely — hold the weight of the three smaller houses, it was definitely not up to the loads that would be imposed by the brick and stucco Egloff House.

After several different schemes and configurations were suggested, the final solution was to build a temporary bridge over the bridge. Using massive steel I-beams, each about 65 feet long, almost four feet deep and weighing close to 20,000 pounds, a structure was assembled above the deck of the old bridge. The new bridge distributed loads to the two abutments on either side of the river and the concrete pier at the center.

The engineers involved in the project as well as City staff readily admit they were sweating as the houses inched their way across the century-old bridge. But in spite of the silent creaking and groaning as the old bridge complained about its new duties, all four houses made it safely to the far side and will soon regain their grandeur on higher, flood-proof ground.



*One of three "smaller" houses supported directly on the bridge*



*Moving contractor constructing the "bridge over the bridge"*



*280-ton section of the Egloff House as it rolls along the "bridge over the bridge"*

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