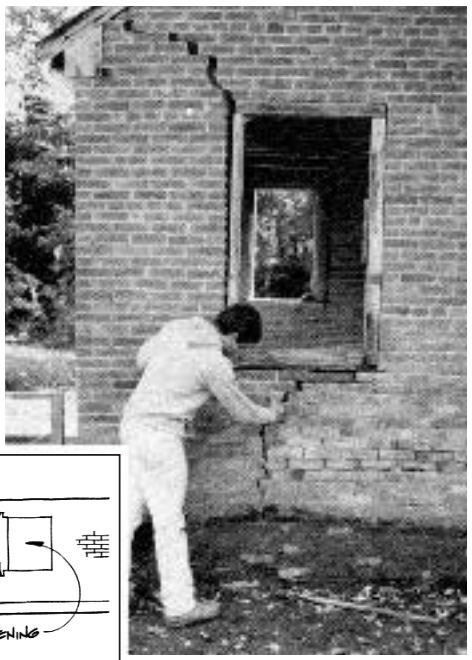
DETAIL

CINCHING UP AN OLD SCHOOLHOUSE



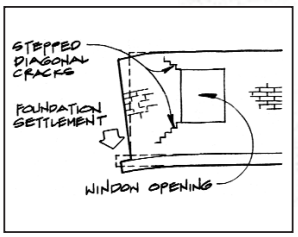


Figure 1. *Stepped cracks opened up at the window corners when one corner of the building settled. The inset illustrates how the wall pivoted outwards when the fieldstone foundation sagged.*

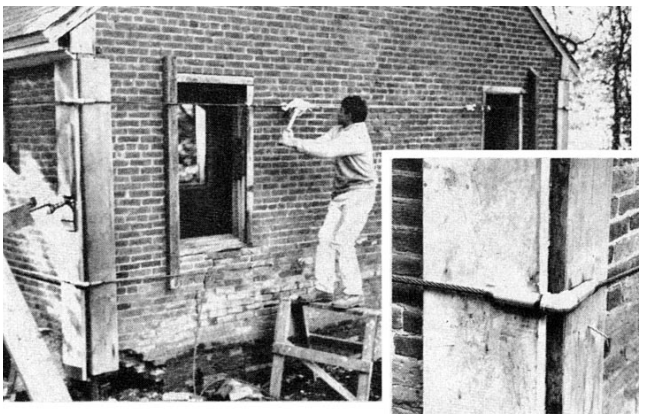


Figure 2. *To draw the cracks together, cables were wrapped around the house and drawn tight with come-alongs while the fallen corner was jacked up. An additional jack, braced at a diagonal, helped push the structure back in place. Note the cable runners made of steel pipe (inset) to prevent the cables from binding on the corners.*

by Richard Ewald

Remodelers counteract earth movement with cable compression and a concrete grade beam

When asked last fall to convert a 21x21-foot brick schoolhouse in Westminster, Vt. to a private residence, Wells & Company faced a considerable challenge. The nineteenth-century, one-room schoolhouse had stood unused for about 70 years. In that time the old dry-laid fieldstone foundation had settled, and this caused one corner to fall and the walls to pivot out at the top and in at the bottom. This opened cracks of up to 2 inches in the back wall (see Figure 1).

One goal of the renovation was to preserve as much of the existing structure and appearance as possible. That meant leaving the unmortared fieldstone foundations largely intact. The foundation extended slightly above grade on all sides. The solution was to jack the sagging corner up while squeezing the building together to close up the cracks. A concrete grade beam was then poured on the inside. This beam would spread the load of the brick walls to resist future settling, and keep the lower part of the walls from pushing in and the upper part of the walls from pivoting out (see inset, Figure 1.)

Squeeze play. None of the floor joists and boards remained, so it was a fairly simple matter to excavate the dirt around the interior of the foundation with handtools to an average depth of about 2 feet. The crew removed loose bricks in a number of the bottom courses in several locations. They pulled the old plaster off the walls, but the lath was in good condition so it was left in place, as were the window trim and the original baseboards.

Before the grade beam was poured, the house was wrapped with cables at heights about 3-feet and 8-feet above the foundation. Then, while the northeast corner was gradually jacked up, the cables were cinched up with two come-alongs (see Figure 2). To protect the corners and ensure that the cables didn't bind, the corners were boxed with vertical 2x12 planks and the cables were run through corner assemblies made of 1-inch steel elbows with 4-inch-long nipples on each end (see inset, Figure 2). Another jack was braced at a diagonal against an earth bank about 10-feet away to help draw the walls together. An old railroad tie plate served as a jacking plate on the corner boards along the fallen corner.

Pouring the beam. On the inside, the crew set 18-inch-high plywood forms about 2 feet in from the interior wall along all sides. The spaces between the unmortared fieldstones provided strong keys to tie the old foundation to the grade beam. In addition, rebar was driven into the ground and slipped into the spaces between the unmortared stones. This reinforcement tied the entire perimeter of the room in a continuous loop to support the walls from pushing back in when the cables were removed.

The forms were designed to create pockets at the midspan for a joist beam. And to ensure a good bond to the old foundation, the fieldstones were brushed clear and then wet down with a hose before the pour (see Figure 3).

The schoolhouse had been missing its one door and six windows for years, so there wasn't much problem getting the concrete chute inside. But an additional wooden trough helped get to the far wall so the truck didn't have to move (see Figure 4). After the concrete cured, missing bricks in the lower section of the walls were replaced and the cables were removed. I guess that old school house got a passing grade beam. ■

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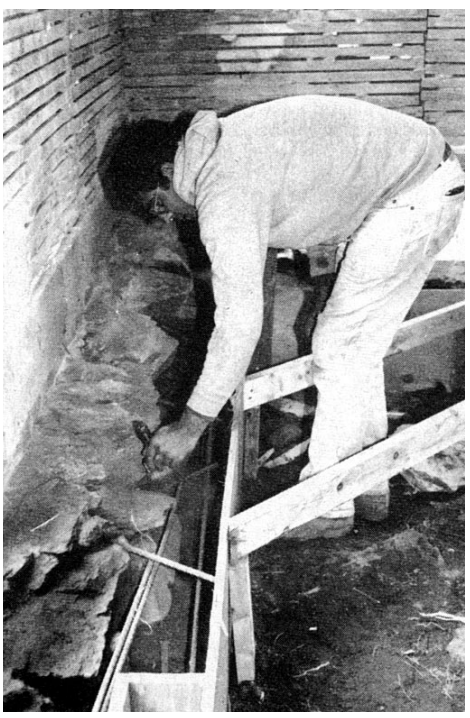
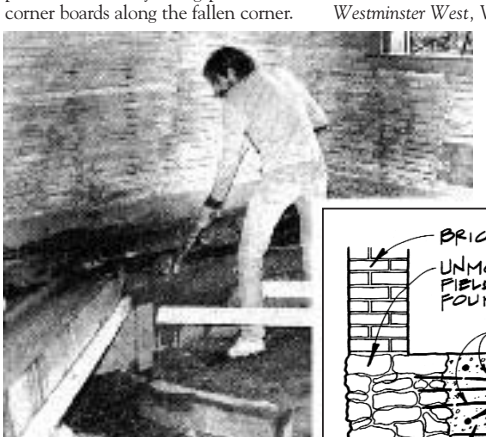


Figure 3. *The old fieldstones were dusted off and then wetted to ensure a tight bond with the concrete. Note the pocket built into the foundation in the foreground of the photo for a midspan joist beam.*



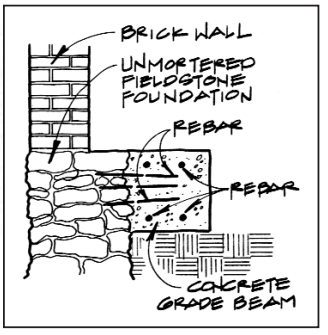


Figure 4. *The grade beam was poured on all sides of the perimeter of the building. Rebar tied it to the ground and the fieldstone foundation wall.*