



FIG. 17

Interior of an adobe building, during construction (Özalp, Eastern Turkey) . The window and door openings have timber lintels on the top, and sills in the bottom. However, no continuous timber bond beams exist in the walls, at proper levels. Also note the lack of collar beams, along the supports of the ceiling beams ; the latter rest on the adobe walls, directly. The solid wall portions between openings , are not adequate. Finally : this is not a good example for an earthquake resistant adobe building.

4. The Need for Training the Local Builders

Although the existing Earthquake Code of Turkey (1) has a section on adobe buildings (APPENDIX I), still in rural areas various problems exist in implementation (4). FIG. 17 shows the interior of an adobe building in a major earthquake zone. The deficiencies are described under the figure. Considering this reality, education of the local builders should be given due consideration. The Ministry of Reconstruction and Resettlement has conducted local courses for builders, and also prepared and distributed colored posters, carrying practical, illustrated instructions.

5. Conclusion and Areas where Research is Needed

Adobe is a heavy, weak and brittle building material. The heavy roof makes it more vulnerable. As understood, the elastic and rigid behavior can be expected only in earthquakes of low intensity. In earthquakes of moderate or higher intensity, cracks will inevitably occur, impairing the monolythical behavior of the building. Still, considerable improvements in strength and ductility can be achieved through the provision of the mentioned measures. The recommendations made in the previous sections, are also applicable in repair work of adobe buildings.

The adobe buildings should not be expected to be as resistive as reinforced concrete buildings, however, by using the good quality adobe blocks, they can exhibit better earthquake performance than rubble stone - mud mortar, and even better than some brick masonry buildings.

Although there are works to improve and stabilize the adobe blocks in Turkey, no extensive implementation has ever been involved.

(a) Benefits of adobe stabilization should be investigated for Turkey. As adobe buildings constitute 28 % of the rural houses in Turkey (1.2. above), the introduction of stabilization will have improving effects. However, problems of education and acceptability should be considered.

(b) The utilization of stabilized adobe blocks -if possible- in basement or foundation walls, should be investigated. The problems of conforming with traditional adobe and repairability should also be considered.

(c) The utilization of stabilized mixtures for plastering should be investigated. This should also cover the bonding to the traditional adobe. For acceptance, the continuous availability of the stabilizing agents is important.

(d) Better and simpler details of connection of adobe walls to timber bond beams should be investigated, as presently suggested details (FIG. 8) offer some difficulties in laying the first row of adobes, immediately on the bond beam.

(e) Possibility of construction of buildings of more than 2 stories should be investigated, by improving the compressive strength. Considering the energy required in brick making, and the low quality of bricks in general, adobe blocks may prove to be a better alternative.