

SOCIAL AND CULTURAL ASPECTS OF AN EARTHQUAKE
RESISTANT ADOBE HOUSING PROGRAM

DAVID OAKLEY

VICE PRESIDENT PADCO INC WASHINGTON DC

ABSTRACT: Failure to consider social and cultural aspects of reconstruction housing can create obstacles to the introduction of earthquake resistant adobe. The interweave of three themes is explored: that of built fabric, that of activity and environment and that of society and culture. Changes in the forms of dwellings may be more than some communities can absorb after disaster. Program and design preparedness makes acceptance easier for helpers and the helped.

A

ORIENTATION

This paper focuses on the social and residential needs of earthquake victims over the long term. These will structure the physical design of earthquake resistant adobe housing to the same degree as the aftermath of the disaster itself.

A disaster is an interruption in the normal pattern of habitat that defines a location, a community and its dwellings. Recovery and reconstruction will inevitably contain elements of upgrading and in part be new. But continuity is also important to the sense of community identification that families in new dwellings and perhaps on new sites desire so badly. If continuity is to be offered, then those who assist in reconstruction programs need an awareness of what has constituted the traditional habitat. The design attitude is preferably that of 'designing with' rather than 'designing for'.

B

ISSUES IN ADOBE RECONSTRUCTION PROGRAMS

1. Influences in Habitat and Building Form.

It is useful to relate design criteria to three themes, all of which contribute to building form:

- (A) Building fabric. Building materials, building structure and stability in the face of the earthquake hazard.
- (B) Activity and environment. Geography and place, climate, tenure activity (i.e. domestic life in and around the dwelling and in community), services and utilities, water sanitation, cooking and lighting.
- (C) Society and culture. Psychology, including attitudes to the earthquake risk, family mores, social order and community life, beliefs, signs and symbols.

There is a tendency in long-established, slow developing societies for these themes to form an interweave. House form and settlement patterns become expressive of a cultural unity and a whole way of life. The building process and its customary ways form an integral part of this pattern.

2. Changes in the Pattern of Built Habitat

The foregoing is of direct relevance to earthquake resistant adobe project preparation after disaster. The introduction of change into any part of a long-held pattern has reverberations throughout the whole. These will be experienced by most people as being unsettling, however "good" or "bad" external observers may view matters.

A disaster disturbs a long-held pattern. The possibility of a new site to live on with new neighbors is a further disturbance. New materials that lead to new forms is a further disturbance. New conceptual knowledge that makes disaster-avoiding layouts possible and disaster resistant structures possible, offer further disturbances to long-held building practices. Unless all this change is strongly held in a comprehensible program and victims are led into its acceptance, chaos is seen to replace their former patterns. Program planners need to work with community leaders in order to ensure the permanent solutions are relevant in every sense.

To lead change, it has to be understood. We have some understanding of change yet not enough. Change can exhibit a number of characteristic forms - all demand a specific response:

- (a) Sudden (i.e. the earthquake disaster).
- (b) Fits and starts (i.e. floods, hurricanes, boom and slump economics, onset of monsoon rains).
- (c) Evolution (of institutions, forms, ideas, techniques).
- (d) Diffusion of ideas, techniques, etc., leading to changes of perception with reference to the long-established pattern (i.e. perception that hazards can be mitigated).
- (e) Spread of urban life; can be seen as a special case of (d)
- (f) Original ideas.

A reconstruction housing project is likely to encompass many of these kinds of change. Unless people affected by disaster participate in the project formulation and are kept informed of administrative progress, particularly in the early stages, reactions are likely to group around the hostile end of the spectrum and be expressive of resistance, and reluctant acceptance; rather than be welcoming and accepting.

C. FORMATIVE ISSUES IN EARTHQUAKE RESISTANT ADOBE HOUSE DESIGN

1. Building Fabric

a, The Local Building Process

The building process is among the many processes that are formative to housing and shelter. The same recognizable elements are always found whatever the different form they take in different contexts.

- * Initiation - someone sets in motion the notion of meeting the need.

- * A design is selected or a design specially commissioned.
- * Preparation is made for construction - funds are organised, orders are placed, specifications are prepared.
- * The construction sequence is organized.
- * The building work is executed.

A little to one side of this process but integral to its success are the building material manufacturers and suppliers. These may be family or friends: or commercial.

The patterning that the building process takes is dependent upon the character of the developmental environment and the post-disaster situation. Characteristic differences can generally be recognised between practises in central urban areas, in middle income residential suburbs, in urbanizing rural regions, in squatter and freestyle housing settlements and in rural regions.

This underlines the importance in earthquake adobe project preparation of seeing post-disaster housing as:

- * The meeting point of numerous processes.
 - building as an activity.
 - administrative.
 - financial, etc.
- * As a built product
 - having an economic life
 - having a need for maintenance
 - adaptable to change and expansion
- * As a tangible realization of a house image.
 - of what is long known
 - of the newness tht is now aspired to i.e. resistant to earthquakes
- * As the modifier of human experience.
 - a base for family life
 - in the "wrong" place
 - just what is wanted and in the right place.

Even after the earthquake, when the emphasis on meeting fundamental human needs seems so obviously dominant. A house that is provided on sites far from employment, containing socially unacceptable materials and which fails to meet in plan some cultural requirement, may well be rejected.

b. Material Use

Building materials including adobe in most developing countries have been developed for use in everyday conditions. Only in a few countries have earthquakes been bath widespread and frequent enough (e.g. Turkey and Peru) to influence material selection and manner of use.

c. Structural Stability

This in most countries has been determined in relation to everyday use assuming dead loads of materials and live loads of people, furniture and weather factors such as rain, snow and sustained wind. It is essential in disaster prone areas that an understanding develop of the forces that lead to disasters, the reasons buildings fail and how economically they can be redesigned. This understanding is required of administrators, professionals and of the community at large. In each case this understanding will take a distinctive form in terms of detail and emphasis.

d. Permanency

Permanency can be related to the normal condition or to the withstanding the typical earthquake. Permanency of rural and middle income urban housing in most L.D.C.'s has usually been related to the normal everyday condition. This has led to a pattern of building forms and structural systems in many countries that are ill-suited to resist disaster forces. Changing these forms without social consultation may be perceived as an act of aggression.

e. Degree of Earthquake Risk

The adobe project preparation team will need to determine the nature of the disaster risk run in the selected development site and the extent to which material use, structural system, the notion of permanency and construction techniques can be changed (and afforded) to achieve a new specification of performance in face of earthquake, cyclone and flood. Appraisal of such risks is a task for technical expertise.

f. Conceptualized Knowledge of How Buildings May Be Made Resistant

This knowledge is still evolving worldwide. It is yet to be fully effective in relation to low income family housing that is owner-organized and which uses traditional forms of adobe construction.

Disaster resistant knowledge has evolved:

- * From analogy, based on an examination of what types of adobe dwellings fail and why.
- * From the application of structural design theory originally developed to obtain resistance to disaster forces in industrialized countries where the materials used and construction relate to different technical standards, construction and supervisory capabilities.

Joining these forms of knowledge to that of the customary building processes of the disaster-hit community had its difficulties. The local processes have evolved under different circumstances and are often held intuitively by craftsmen, in a sequential, mythical way. This way of knowing is severely disturbed by the attempt to intrude knowledge that is different in kind. Recognition of this difficulty is important to the successful construction management of contractor-built elements of a site

development project. It is highly significant to the success of the owner-managed stage of house completion of extension.

g. Continuity and Change in Construction Practices

A theme in adobe project preparation and design will be the focus upon providing initially what disaster victim households could not provide, or very readily provide, for themselves. In relation to dwellings, this usually means land, water supply, sanitation and the technical supervision of a earthquake-resistant, structurally-sound core or shell. Information-spreading and educational programs for key craftsmen and owners will be required as a component of any self-help program for the completion of adobe core houses if they are not to be structurally weakened by additions made later.

h. Completion and Extension Through Time

Because of the complexity, administrative and technical costs of trying to manage and inspect the self-help completion of core houses, it is probably best not attempted. Alternative routes of achieving the same end should be explored. These will include consideration of the establishment of a technical advice center on the development site, linked to a materials distribution point if possible; the use of roving building completion demonstrators; the use of models of completed houses (sometimes a failure in the past because of lack of local social/cultural knowledge by their designers); and use of training programs.

i. Innovations

The desire by project programmers to achieve rapid occupancy by victims has led in the past to consideration of innovative technical solutions. Experience shows that innovation in project administration, layout and phasing of occupancy of the site can contribute more to early settlement than attempts to innovate in construction. On the technical side, the introduction of earthquake resistant knowledge into traditional and conventional building processes is innovation enough.

2. Environment and Activity

a. Climate

Climate is of interest of the adobe house designer at four levels:

- * Regional - the annual pattern plus the hazard region of rains and floods plus the expentancy of recurrent cyclonic storms.
- * Local - the intetaction of physical setting, land forms and settlement with climate.
- * The climate close to the ground buildings (i.e. induced breezes, shading through trees).

- * Climate within buildings - influence of roof and wall thickness, position of openings, etc. on human comfort conditions.

The more the designer can exploit knowledge of the first two to modify the third so the more one can finally reduce the design effort and costs.

b. Place

Place of site location is of interest to the adobe house designer at four levels also:

- * Regional - located on a gentle slope, in a flood plain, at the foot of mountains, near the sea. Every location will say something about safety relative to other regions in the face of rains, floods and earthquakes and land slides.
- * Local - the density, spatial and visual pattern that existing buildings make will influence people's expectations of what new building work should be like.
- * Ground conditions, faults soil bearing capacity, site drainage will influence use of the site.
- * The layout and building placed on the site will change it from what it was before either positively extending its previous qualities or undermining them (i.e. either more or less pleasant to be on, more less safe from the point of view of the earthquake hazard, than previously).

The more the designer can exploit knowledge of the first three, in order to act sensitively in the fourth, the more effective and more economical the result.

c. Activity

Residential activity, together with the activities that it supports and support it, is of interest to the housing designer at four levels:

- * Beyond the neighbourhood of development site (i.e. work, marketing, cultural sites, transport).
- * Within the neighbourhood of development site (i.e. work, marketing, transport, water sanitation.)
- * Between households in localized areas. groupings of lots and buildings, use of local communal open space.
- * Within households of lots, clustering of buildings on lot, use of outdoor space, methods of cooking, place for sleeping, journeys for and storage of water, sanitation and culture.

Site development planning poses the incorporation of these factors into a total design in the context of climate and environment. While these are all

prime factors, local political, legal and administrative mores and standards will have a secondary but still significant influence on design decisions.

3. Social and Cultural

Activities can be seen and even measured, but the social and cultural environment, taken as a whole provides the designer with an atmosphere more difficult to appraise than that of the physical atmosphere. The reasons why people behave the way they do, react to disaster the way they do will be deep in the corporate mind of a people. This shared attitude, which is likely to underpin many personal and family variants, will also mold a people's view of change.

From the interaction of long-made appraisal of region, available materials, social patterns and beliefs have sprung such manifestations as:

- * The grouping or clustering of rooms around a yard to form a home
- * Single isolated dwellings widely spread.
- * Row houses alongside narrow paths up mountainsides.

These patterns also reflect long held systems of land tenure and tenancy. Appraisal of such formative influences leads one to expect that house forms and dispositions are signs and symbols as well as artifacts. Appreciation of this assists in understanding the reluctance of disaster victims to accept new forms unless they were moving towards their acceptance prior to disaster; as is sometimes the case with rural people newly settled in peri-urban areas.

D. REGIONAL CHARACTERISTICS

Regional "building character is recognizable. It stems from building processes, settlement patterns and social and cultural mores interacting in a similar way throughout one large living space. It will change in parts of a region or throughout a region as change is embraced in any of the region's formative forces.

Traditional buildings and layouts of certain regions exhibit recognizable forms which offer clues to satisfactory solutions for day-to-day living. They may mislead as to their relevance to disaster situations, however. Where the period of recurrence of earthquakes is long, then its threat may not be seen as something to build against. It may even be categorized as "the will of the Gods". Regional traditional design may therefore not be suited to disaster resistance without changes in disposition of dwellings one to another or in structural design and architectural detailing.

The normal habitat and settlement patterns of most of the people is not a much studied subject in any country. The designer's need is not for prime sources but for secondary and for distilled knowledge. Most countries have one or two academics or professionals who have privately assembled data, drawings and sketches of traditional buildings and/or methods of strengthening them or developing a new design approach in the face of newly perceived regional needs. Such rare individuals can be tracked down through telephone calls to University Department of Architecture, Social Studies, Geography and to national professional institutes of architects or engineers.

Government executive departments in rural development may offer useful contacts or leads to the name of a particular field officer with an understanding beyond the confines of his daily job. Government departments of housing and urban development ought to be able to offer leads, although the education of their administrative officers and technical staff overseas (or under the influence of overseas programs) has frequently cut such people off from the local formative roots of the building process.

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