in various types of houses. Later, when these have been computed, they will be crossed with house type and damage estimates to evaluate further the earthquake vulnerability of various housing forms.

Land and House Tenure Before and After the Earthquake

Data were collected during the household survey on both land tenure for the housing site on which both the pre- and post-earthquake houses were located and for ownership or tenure of the house itself. It is possible for a person to regard himself as owning the house he lives in without actually owning the land upon which the house is located. For example, a family may be squatting on a piece of land, having built a house there to assert their claim. They may also have borrowed or been loaned a piece of land and allowed to construct a dwelling on it. In addition to these two possibilities, they may rent or own both the house and the land.

Table 20 shows the tenure of house and land before and after the earthquake by region. In general, this table demonstrates that an increase in house and land ownership has occurred in every region since the earthquake. For example, in the Highlands 77 percent of all households studied claimed to have owned the house they lived in before the earthquake. Now 93.5 percent report that they own Structure I and 99.1 percent say they own Structure II. In the East, comparable figures exist.

The City, it will be recalled, was different in sampling procedure from both the East and the Highlands where the communities studied are more representative of other communities in those regions. In the city four post-earthquake housing areas were selected for study. All of their residents came from other locations either inside or outside the City where their pre-earthquake dwellings were located. The residents in these four City post-earthquake housing areas were drawn largely from the lower socio-economic group. This is reflected in the percentage of people who claimed to have owned their own houses prior to the

earthquake. Only 14.7 percent report ownership.

At present, two of the City housing areas, Carolingia and New Chinaulta, consist entirely of people who now own or are in the process of buying the houses they live in. The Fourth of February, a third City zone being studied, consists of persons who built "shacks" in a squatters settlement following the earthquake. They regard themselves as owning the house but not the land. In the fourth area, Asentamiento Roosevelt, families are living in structures built by the Guatemalan government and currently being rented to them.

Given these facts, it can be seen that now 82 percent of persons interviewed in the City claim to own Structure I,as compared to 14.7 percent who reported owning their pre-earthquake house. This does not mean of course that a similar increase in home ownership has occurred throughout the City, but merely that a much higher proportion of those people living in these four highly select housing areas now own their houses than before the earthquake.

All in all, Table 20 demonstrates that an increase in home ownership has occurred since the disaster. However, an evaluation of figures on land demonstrates that the increase in land ownership has been less than in the house itself.

Table 21 gives land and house tenure figures by ethnic group. It shows that prior to the earthquake 73.6 percent of the Indian respondents reported owning their houses as compared to 52.7 percent of the Ladinos. With respect to land, the figures are 65 percent for Indians and 48 percent for Ladinos. The low figure for Ladinos is accounted for partially by the fact that the City sample is heavily weighted with poorer individuals from this ethnic group.

Agency Housing

As discussed earlier, disaster relief and reconstruction agencies, both Guatemalan and foreign, engaged in various kinds of housing programs following

the earthquake. Broadly speaking, there were two types of housing efforts conducted by agencies. One type emphasized the distribution of building material such as lamina, wooden posts, nails, wire and tools which would enable earthquake victims to construct their own housing. In some cases these building materials were distributed free. In other cases they were sold at half price, largely through cooperatives.

The other kind of agency housing program constructed whole houses which were then distributed to earthquake victims. Such houses were built according to agency plans and under agency supervision. In most cases, however, local citizens contributed their labor to the actual construction process. Often a combination of several agencies cooperated in executing a single program in a community. In the following discussion we will look at agency houses, who received them, and how they differ from non-agency houses. An agency house is one which was built as a unit under agency supervision and according to agency plans. Houses built utilizing materials supplied by agencies but not under their supervision or according to their plans are not labeled "agency houses" in this discussion.

The distribution of agency houses by community and by region is shown in Table 22. This table reveals that of the 1077 households upon which data on agency houses is available, 530* received such a house. This amounts to 49 percent of all the households studied in this interview. It should be recalled, in interpreting this figure, that the City differs from the Highlands and the East in how representative the sample is of the geographic unit. In the City three out of the four housing areas were built by agency housing programs.

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*Ten other individuals live in houses built by an agency but they obtained them, not from agencies,but from individuals from whom they rented, bought or borrowed.

They were selected for study deliberately as examples of such programs. This is why 65 percent of all respondents in the City report having received an agency house. In the Highlands and the East fewer people reported receiving agency houses, with 43 percent in the Highlands and 42 percent in the East. The community with the highest percentage of people receiving agency houses is Santa Maria Cauque, where nearly 88 percent of all families now live in a dwelling unit built by an agency. In this community the houses consist of units with half concrete block walls, with wood filling in the upper half, covered with a lamina roof. These houses are heavily reinforced with large treated timbers fastened together with substantial steel bolts.

The community with the next highest proportion of agency houses is El Progreso, with approximately 85 percent. In this community the agency houses were built as relatively short-range shelter to last for four or five years while a permanent solution to the housing problem was being sought. They consist of prefabricated wooden structures with lamina roofs, set directly on the ground without a prepared foundation. Similarly, the houses found in Espiritu Santo, where 64 percent of the citizens received agency houses, and those found in Chimaltenango, where only 31 percent received such houses, were built under the same program. Patzun and Sanarate are communities in which the houses built by agencies were constructed using cement block for walls, reinforced by steel bars and with lamina or duralita for the roof. The other communities in the table had mixed housing programs with a few houses being built by several different agencies in the same community.

The case of Pacoc and San Marcos is different from all the rest. San Marcos is a new settlement consisting of wooden houses with lamina roofs built by a foreign agency to which refugees from Pacoc originally moved. Since the settlement was opened some of the original residents have moved back to Pacoc, the community from which they came, and people from other communities, even

from Guatemala City, have moved in to occupy the dwellings. The sample of households studied in this case consists of fifteen families from San Marcos and ten from Pacoc. The ten from Pacoc received no agency houses since they are the individuals who remained behind in the heavily damaged original community from which the residents of San Marcos were drawn.

The largest community studied outside of Guatemala City is Chimaltenango. It was also among the most heavily damaged towns in Guatemala. Despite a massive housing effort by outside agencies, only 31 percent of the residents of Chimaltenango interviewed received an agency house. It can be seen in this table that the smaller places, the aldeas lying in remote areas, for the most part, received fewer agency houses than the department capitols or municipios. These smaller places include Las Lomas, Pacoc, Santo Domingo, Conacaste, Espiritu Santo and San Juan. Santa Maria Cauque is also an aldea but is situated directly on the Pan American Highway within easy reach of Guatemala City. Espiritu Santo, an aldea far to the east of Guatemala City, is an exception to the rule that most aldeas in the East received relatively few agency houses.

Comparison of Housing Characteristics of Agency and Non-Agency Houses

An examination of characteristics of agency and non-agency houses is useful in determining what people did on their own with respect to housing as compared to what was done for them. Table 23 gives a comparison of wall types between houses constructed by individuals and houses constructed by agencies. It can be seen from this table that agency wall types fall very heavily in two categories - wood and cement block. Over 90 percent of all agency houses employed these types of walls. Only six individuals report having received an agency house which had adobe walls. These houses consist of what is called adobe canto, a type of wall suggested by one agency. They are made of adobe blocks set on their sides to form a thin wall and held in place by wire bracing which is stretched between posts set into the ground. The remainder of the

cases of agency houses is scattered among other wall types with half-block being the only substantial category.

In the case of houses built by individuals, the type of wall material used varies considerably, with no single category constituting more than 20 percent of the wall types. Of special interest is the category "adobe walls." Only 13.7 percent of the houses constructed or repaired by individuals have adobe walls. This compares to 78.4 percent of the houses which had walls of this type prior to the earthquake. The use of wood and of block is greater in post-earthquake houses constructed by individuals than was true of the pre-earthquake houses. Before the earthquake only 4.9 percent of all houses employed block walls as compared to 13.9 percent at present. Wooden walls were found in 5.2 percent of the pre-earthquake houses, while such walls constitute 18.5 percent of those in houses constructed or repaired by individuals after the earthquake. It is apparent, when the data in Table 23 is compared to that in Table 2, that individuals as well as agencies have shifted away from the use of adobe and towards the use of more aseismic wall materials. It is likewise apparent that individuals have shifted in the direction of using more "industrialized" materials. Agencies almost entirely depended on such materials in housing construction.

Table 24 shows the types of roofs used on agency and non-agency houses built after the earthquake. Here again it can be seen that agency roof types fall heavily into two categories. Lamina roofs were found on 80.8 percent of all agency houses and duralita on 17.7 percent of them. Of interest is the fact that six agency houses had thatch or palm roofs and one had a tile roof. One small agency program built houses with block walls and thatched roofs, accounting for the former. The tile roof probably represents a change made by the house owner himself.

Non-agency houses vary considerably more in the type of roof employed. However, three-fourths of them have lamina roofs. This is a reflection of the

lamina distribution programs carried on by various agencies as well as the sale of lamina through normal market channels. Before the earthquake, only 48 percent of all houses had lamina roofs as compared to the 75 percent at present on non-agency houses and 81 percent on agency houses. Tile has declined as a roof material on structures built by individuals as well as those built by agencies. About 15 percent of present non-agency houses have tile roofs. Before the earthquake approximately 43 percent had such roofs. This table also indicates that individuals, when responsible for building their own houses, have moved away from the use of tile and towards the use of lamina and duralita just as was the case with agencies. The movement in this direction, however, is slightly less pronounced.

In interpreting both the use of tile and adobe as building materials it should be realized that a few houses having these features survived the earthquake and are still occupied by respondents. This fact inflates the current use of tile and adobe on non-agency houses and makes it appear that individuals chose to use these materials in rebuilding more frequently than they actually did.

Other Housing Features on Agency and Non-Agency Houses

In Table 25 other housing features employed in agency and non-agency houses are summarized. The two features most important to earthquake resistance -- the presence of columns and of cross-bracing -- show that agency houses utilize these features slightly more frequently than non-agency houses, but the difference is small. This table also shows that the percentage of agency houses with a porch is considerably lower than those built by individuals. Similarly, houses built by individuals are more likely to have a kitchen inside than when they are built by agencies.

Agency and Non-Agency House Types

When houses are classified into combinations of roof and wall types, a house typology results. Table 26 gives a tabulation of the number of houses in each type which were built by agencies as contrasted to those built by individuals.

This table demonstrates, as noted earlier, that 90 percent of all agency houses are one of two types, wood walls with lamina roof or block walls with either a lamina or duralita roof. This table also shows that when individuals built their own houses there is considerably more variation in the patterns followed. The four types which stand out as the most prevalent self-built houses, are (1) wood and lamina, (2) patchwork and any roof, (3) half-and-half and lamina, and (4) block and lamina. The patchwork houses reflect the use of salvaged materials to build shelters that have not been replaced by more permanent dwellings since the earthquake. These houses are found primarily in the Fourth of February urban squatter settlement but a few are found scattered around other communities throughout the study area. This table also shows that the number of houses with adobe walls and with tile or lamina roofs has been substantially decreased even when individuals furnished their own housing. This tabulation will be used later in the report to estimate the improvement made in aseismic qualities by agencies and by individuals as they rebuilt houses following the earthquake.

Use of Agency Houses

Those persons who received a house from an agency were asked what use the agency house was being put to at the time of the interview which occurred between January and November, 1978, about two years after the earthquake. Table 27 shows the distribution of responses to this question. Ninety-two percent of all agency houses are still being used as residences. The remainder are being employed for various other purposes; a few as businesses and as storehouses or for materials with which to build other structures. In this table twenty cases occur in which the agency house is being put to "other uses."

This table is most instructive when compared to the data on house types which show that a large number of agency houses (most cases) were wood and lamina

structures intended for short-term use only. These houses were still in use as dwelling units at the time of this study.

Additions to the Agency Structure

It was anticipated by most agencies that recipients of agency houses would add additional features to suit their own purposes. This feature might include attaching a porch or an extra room, or putting up partitions, or otherwise expanding or altering the original structure. The interview schedule asked respondents whether they had made additions to agency houses but did not ask what additions had been made. Table 28 shows that 39 percent of the agency houses have been altered in some way by their residents. This tendency to make additions or alterations in the structure is slightly more pronounced in the City than in the two rural areas. In subsequent interview schedules the exact nature of the additions will be explored.

Who Received Agency Houses

The question arises, "Were agency houses supplied to people who had suffered heavy damage and therefore needed assistance or were they supplied to persons who really did not need housing assistance as a result of the earthquake?" It should be noted that there was a severe housing shortage in Guatemala before the earthquake occurred. Persons in the lower socio-economic category were especially in need of housing assistance. The earthquake exacerbated this already difficult situation.

Regardless of the general need for housing, the question is, "Were those persons who received agency houses victims of the earthquake in the sense that they lost their pre-earthquake dwelling units as a result of it?" Table 29 shows a tabulation of those people who received or did not receive an agency house, cross-classified by the damage to the roof and walls of their pre-earthquake house. This table shows that 383 out of the 530 persons who received an

agency house had heavy damage to both the roof and walls of their previous house. This amounts to 56 percent of those who were supplied agency housing. In contrast, 297 (approximately 44%) of the 538 people who did not receive agency houses, suffered heavy damage. There was therefore a tendency for more persons with heavy damage to receive agency assistance than not to receive it. However, looking at the low damage category demonstrates that 34 percent of those with low damage to wall and roof also received an agency house. This compares to 66 percent in the low damage category who did not. This table also demonstrates that persons with heavy damage to the wall and low damage to the roof were more apt to receive aid than those with heavy damage to the roof and low damage to the wall. This is perhaps a result of the fact that many other agency programs supplied roofing material as the primary method of assistance with housing. It also reflects the fact that heavy wall damage makes a house unsafe even for roof repairs and therefore demands replacement in most cases.

While this table demonstrates a tendency for persons with heavy damage to be more likely to receive an agency house, it also demonstrates that a substantial number of persons with low damage managed to receive houses as a result of the earthquake. At the same time a large number of people with heavy damage did not receive such assistance. If those houses given or sold to people with low damage had been supplied to people with heavy damage, a better job of housing assistance would have been done.

Opinions of the Agency House

Respondents were asked several questions requesting them to compare the agency house they had received with their pre-earthquake dwelling unit. First, they were asked how the agency house compared in size with the house they lived in before the earthquake. Table 30 gives the responses to these questions by region. It can be seen that 47 percent of the respondents regard the agency house as

smaller than their pre-earthquake dwelling and only 33 percent regard it as being larger. This should be interpreted against the fact that most agency houses lacked porches and therefore additional living area found in many pre-earthquake dwellings.

Respondents were also asked whether they thought the agency house was more or less safe in an earthquake than the house they lived in previously. Table 31 shows the responses to these questions. Although there were 530 families with agency houses, responses were obtained from only 506. In other words, there are 24 cases of missing data in this table. Of those who answered the question, 77.5 regarded the agency house as safer than their previous dwelling and only 12.6 percent regarded it as not as safe. In the Highlands and City where the largest number of agency houses were constructed out of concrete block, the opinion of agency house safety is highest. In the East where most agency structures were made of wood with lamina roofs, the lowest proportion of persons think the agency house is safer than their pre-earthquake dwelling.

Respondents were asked why they think the agency house is either more or less safe than their previous dwelling. Responses to these questions are in Tables 32 and 33. Table 32 shows reasons the respondents said their agency house was safer. One fact stands out above all others in this tabulation. The response, "The house is not made of adobe," constitutes 26 percent of all responses. The second most frequent response (24%) was that "The material for the walls is better." These two responses probably amount to the same thing. The house is made of some other material than adobe. The only other relatively frequent responses are that the material for columns and beams in the house is better and that the house is well-built. These two answers seem to indicate that structurally the house is regarded as being sounder than the pre-earthquake dwelling. All other responses scatter among a wide variety of categories.

Table 33 shows reasons people gave for thinking the house is less safe. Only 80 responses, all together, were given to this question. No single category stands out as more important than the others, unless it is the answer "bad construction." When one compares the 504 reasons given for why the house is safer with 80 responses to why it is not safe, it appears, as indicated by the direct question on house safety, that respondents think the agency house is more earthquake resistant than their previous dwelling.

Respondents were also asked the reasons they liked the agency house more or less than their previous dwelling. The results of these questions are shown in Table 34. Each respondent was allowed to give up to three responses. Table 34 shows that 537 responses were obtained to the question, "Why do you like it more?" as compared to 202 to "Why do you like it less?" The most frequent positive response given to this question was "general appearance." About 24 percent of all respondents said they liked the house more for this reason as compared to 2.3 percent who said they liked it less for the same reason. The second most frequent positive response was "construction material used." Eighteen percent reported liking the house more for this reason as compared to 2. percent who liked it less for the same reason. The third most frequent reason for liking the house more, the size in general, also was a frequent reason for liking it less. Fourteen percent reported liking the house more because of size but nearly 11 percent reported liking it less for the same reason. The only other response given by more than 6 percent of the respondents for liking the house more was its weather resistance. About 9 percent gave this reason. In other words, the most frequent answers given for liking the agency house more than the previous house were: (1) general appearance, (2) construction material, (3) size, and (4) weather resistance. The most frequent reasons given for not liking the house, although many fewer such reasons were given, were (1) size, (2) internal temperature,

(3) construction material used, and (4) weather resistance.

The explanation for why some people report liking a house because of a feature and others report not liking it because of that same feature lies in the fact that agency houses differed in their construction. Some agency houses provide excellent internal temperature qualities -- those made of concrete block, for example, while others, those made of wood with lamina roofs, are very hot when located in the eastern area and relatively cool when located in the Highlands. What is interesting about Table 34 is the comparatively few times that features related to earthquake resistance are mentioned as reasons for liking the house. Such reasons as the type of foundation and the kind of frame are very infrequently given.

Distribution of Lamina

A number of large agencies concentrated on the distribution of lamina for use in house construction as the central feature of their housing programs. The idea was that lamina is a versatile material which can be used for roofing or for siding, is relatively light weight and durable, and can be salvaged and re-used easily. Lamina was given away by some agencies in large quantities. Other agencies distributed lamina at a subsidized price through cooperatives in local communities. Table 35 gives a tabulation showing the various ways in which people obtained lamina by communities and regions. It shows that about 22 percent of all respondents reported receiving free lamina from some source and almost 24 percent reported purchasing it at a discount price. Taken together, this means that over 45 percent of the respondents received lamina from a source associated with an agency program.

There is, however, considerable regional variation in the way in which lamina was obtained. For example, 46 percent of people in the East report

receiving free lamina as compared to 16 percent in the Highlands and 7 percent in the City. In contrast, 38 percent of the people in the Highlands report buying lamina at a discount price as compared to 7 percent in the East and about 24 percent in the City. This is not surprising since the programs which featured subsidized sale of lamina were largely concentrated in the Highland region and those which gave lamina away were comparatively more concentrated in the East, although there was overlap in these programs in both regions.

Despite the large agency programs distributing lamina, the most common source of this material was by purchase at market value. Thirty-five percent of all respondents report buying lamina on the open market. This source, however, was greatest in the City. Another interesting fact revealed by Table 35 is the observation that lamina was salvaged for reuse far more frequently in the Highlands than in other areas of the country. There, 29 percent reported salvaging lamina and reusing it as compared to 3 percent in the East and 4 percent in the City. This is, in part, a reflection of the fact that lamina was more commonly used in the Highlands and the City as a building material prior to the earthquake than in the East.

Table 35 computes percentages using the total number of interviewees in each community as the base. For this reason, when one examines the column "Total of all sources," percentages exceed 100 percent since respondents could have received lamina from several sources. In the Highlands the total percentage is 123. In other words, each person averaged 1.23 sources for obtaining lamina. In the East the comparable figure is 85, or each person utilized .85 sources. The City figure is 112 percent. These figures confirm the fact that the distribution of lamina as a solution to the housing problem was widespread after the earthquake. It also demonstrates that respondents desired this material. How else can we account for the fact that 35 percent purchased lamina at market value and an additional 25 percent purchased it at a discount price?

Use of Temporary Shelter

Right after the earthquake individuals whose houses had been destroyed or heavily damaged sought shelter of various types. Table 36 shows the type of shelter in which people stayed, classified by the region of the country in which they lived. These data demonstrate that by far the largest number of people created make-shift shelters out of available material left over from the earthquake. About 65 percent stayed in make-shift shelters whose roofs were patched together out of various materials. Makeshift shelters which used roofs made of lamina or wood were used by 22 percent of the respondents.

Although various agencies sent tents for use in various communities, in those studied only 3.8 percent of the people stayed in a manufactured tent. These data seem to indicate that in a country such as Guatemala where individuals are accustomed to building houses and sheds out of available material and where the climate is relatively mild, tents and manufactured temporary shelters may not be essential. The people seem to be able to supply themselves with temporary shelter without outside assistance.

Table 37 shows the length of time that respondents remained in temporary shelters after the earthquake. This table shows that 58 percent of the individuals remained in a temporary shelter for less than two months following the earthquake. Thirty-eight percent were in temporary shelters for less than a month. However, about 19 percent of all families remained in a temporary shelter for more than four months and 2 percent say they were still living in a temporary shelter over a year after the earthquake. By and large the agency housing programs which were instituted in Guatemala to assist people with their housing problems got underway five or six months after the earthquake had occurred. This appears to mean that about half of the people had succeeded in solving their housing problem in some way which they did not consider to be a temporary

shelter prior to the time that housing programs were in full operation.

In a future analysis of the data available from this project an attempt will be made to determine when exactly families moved from temporary shelters into their present post-earthquake housing unit. Unfortunately this cannot be done in time to become a part of this report.

Predicted Future Earthquake Damage

It is possible on the basis of information concerning damage that occurred to various house types in the 1976 earthquake, and information concerning the number of houses in each type at present, to predict the amount of damage likely to occur in a similar future earthquake. This can be done by assuming that the average amount of damage which occurred to a given house type, such as adobe and tile, would occur to the same house type under the same circumstances in the future. By taking the average damage to each housing type and multiplying it by the number of houses of that type and then accumulating the scores and dividing them by the number of houses, it is possible to estimate the total level of future damage based on these assumptions. One of the difficulties with this procedure lies in the fact that some of the mean damage estimates for housing categories are based on only a few cases. For example, there were only eight half-block or adobe and lamina structures before the earthquake. Table 17 shows that the average damage to these structures was 1.56, or about half-way between "slight" and "heavy." This mean is based on a small sample compared to that obtained for adobe and tile where there were 426 pre-earthquake houses which averaged 2.30 on the damage scale.

It would be desirable therefore in creating a figure predicting future damage to give more weight to those estimates in which we have the greatest confidence. One way of doing this is to weight the means in terms of their

standard deviation. The best way to do this is to give more weight to those mean damage estimates that have the lowest standard deviation and less weight to those with higher standard deviations. This can be done by using the reciprocal of the standard deviation as a way of weighting the mean. Table 38 presents four damage estimates for the total set of houses studied. First, it gives the total actual damage which occurred to pre-earthquake houses in the earthquake of 1976. Next, it gives an average predicted damage to all post-earthquake houses whether built by agencies or by individuals. Then it breaks down post-earthquake houses into those produced by individuals without direct agency assistance and those produced by agencies according to their own plans.*

Table 38 shows that on an average, all house types taken together had a weighted mean damage score of 2.08,** or a score slightly greater than heavy damage. When these houses which were built before the earthquake are compared with those which have been built since and in which people are now living, the weighted average predicted damage is 1.076, or slightly greater than "light" damage. This finding indicates that substantial improvement has occurred in the earthquake resistance of houses in the communities studied.

When all post-earthquake houses are divided into those produced by agencies and those produced by individual households it can be seen that agency houses have

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* The procedure is to multiply the frequency of each house type by the average damage estimate x 1/the standard deviation and then to accumulate the sum of these weighted scores and to divide by the sum of 1/the standard deviation x the number of houses in each category. The formular given is as follows:

$$\text{Average damage} = \frac{f_1\bar{X}_1/s_1 + f_2\bar{X}_2/s_2 + \cdots\cdots f_n\bar{X}_n/s_n}{f_1/s_1 + f_2/s_2 + \cdots\cdots f_n/s_n}$$

Where $\bar{X}_1$ = mean damage to House Type 1 and S_1 = the standard deviation of that mean and f_1 = the number of houses in that house type.

** This score has also been weighted by the above procedure. The total score given earlier in this report is unweighted.

a predicted weighted mean of .798 which places them on the damage estimate scale between "no damage" and "slight damage." In other words, agency houses,compared to those that existed before the earthquake,seem to be considerably more earthquake resistant. It must be remembered,however, that a substantial number of these houses, 233 in fact, out of the total of 540 agency houses on which a record is available are made of wood and lamina and were intended for only temporary use to last perhaps five years. When they are replaced by self-built houses it is reasonable to predict that they will be similar to those which fall into the non-agency post-earthquake houses where the damage estimate is 1.320, or between "slight" and "heavy."

This figure for houses built by persons after the earthquake according to their own plans rather than according to agency plans, also shows a considerable improvement in aseismic qualities. These self-built houses fall on the damage prediction scale slightly higher than "light damage." In other words, individuals, when left on their own with agency assistance being restricted to the distribution of lamina, avoid the use of house forms which suffered heavy damage in the earthquake of 1976. This was accomplished very largely by the avoidance of adobe and tile as building materials and the substitution of lamina, concrete block and wooden siding for adobe and tile.

It must be realized that this sort of predicted damage is based on the assumption that the materials used in walls and roofs, in combination with each other, are heavily associated with the amount of damage suffered. A more accurate and better prediction would be one based on more extensive knowledge of how the house is actually put together. This information is not available in the current data being analyzed for this report.