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UNITED STATES GENERAL ACCOUNTING OFFICE  
WASHINGTON, D.C. 20548

LOGISTICS AND COMMUNICATIONS  
DIVISION



B-156615

June 27, 1972

The Honorable  
The Secretary of Defense

Attention: Assistant Secretary of Defense  
(Comptroller)

Dear Mr. Secretary:

The General Accounting Office has made a survey of the relocatable family housing program of the Department of the Air Force to explore the feasibility of extending the program to meet family housing needs of other departments within the Department of Defense (DOD).

We found that relocatable housing not only can be moved and reused at less than the cost to construct conventionally-built housing, but also it compares favorably in features and livability. Therefore, wider use in the DOD family housing programs appears to have merit.

SCOPE OF SURVEY

The survey involved about 800 relocatable units at four Air Force installations. It covered relocatables originally erected at Glasgow Air Force Base (AFB), Montana, and moved in the period May to November 1969 to Mountain Home AFB, Idaho, and those erected and still located at Minot AFB and Grand Forks AFB, North Dakota.

We examined into the recent Air Force experience in relocating some of the homes and compared the principal advantages and disadvantages of relocatables with those of conventionally-built units. Cost records for construction and operation and maintenance for both relocatable and conventionally-built units at these installations were also examined.

We interviewed civil engineers and housing officials to obtain their opinions on the relative maintenance problems and livability of both types of units. We also interviewed a number of occupants of relocatable units for their views on how these units compared with military conventionally-built units and other quarters they had lived in.

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COMPARISON OF CONVENTIONALLY-BUILT  
AND RELOCATABLE HOUSES

Construction in "conventionally-built" housing is of the "stick-type" or "piece by piece method" and is performed on site. The time required to build in this manner is usually several months and construction delays can occur because of unfavorable weather. "Relocatable housing" is normally built in whole or in part in a factory and assembled and erected on the site in a relatively short period of time. This minimizes the weather factor, and the dwellings can be disassembled, moved to another location, and reassembled fairly quickly.

Principal factors considered in our comparison were: (1) features and initial cost, (2) operation and maintenance cost, (3) relocation cost, and (4) occupant reaction.

Features and initial cost

The comparison of these factors was limited to units located at Grand Forks and Minot Air Force bases since Glasgow, the only location we visited where both conventional and relocatable units were constructed, had been closed the last few years. Projects for both conventional and relocatable housing at these bases included roads, driveways, sidewalks, curbs and gutters, as well as electrical, water, sewage, and storm drainage systems.

Seven hundred conventionally-built family housing units were constructed at Grand Forks and Minot in 1964 and 1965, respectively, at an average unit cost of about \$15,890. These units are one and two story duplex buildings at Grand Forks and split-level duplexes at Minot. Each unit has from two to four bedrooms, a garage, and a basement.

The relocatable units at Grand Forks and Minot are one-story duplex units, each having three bedrooms and a garage, but no basements. The 600 units were built in 1966 and 1967 at an average unit cost of about \$14,360.

The above information shows conventionally-built units costing about \$1,530 more per unit than the relocatable ones without consideration of cost increases that may have occurred in the time interval between the two types of construction. However, the conventional units have a basement, while the relocatables do not, and the conventionally-built units are larger (1,260 square feet of living space versus 1,170). After adjusting for the basement and the difference in size, and considering that both types of units were built to about the same construction standards, it may be that neither type of unit has a distinct initial cost advantage over the other.

### Operation and Maintenance cost

We were unable to readily determine the operation and maintenance (O&M) costs attributable to the two separate categories of housing, since agency records are not designed to provide this type of information. Such data as we could obtain, however, indicated that relocatable O&M costs were somewhat lower than those for conventional units.

Air Force officials indicated, however, that since the relocatables were newer, they would normally have required less maintenance up to the time of our review. As the units age and become involved in one or more relocations, O&M costs can be expected to increase. Taken as a whole, we were unable to conclude that O&M costs would be much different for the two types of units.

### Relocation cost

The per unit cost to relocate 200 units from Glasgow to Mountain Home was about \$8,300. This covered dismantling, transporting, and reassembling the units at their new location, as well as preparing them for occupancy.

At the time these units were relocated 226 conventionally-built units were then being erected at Mountain Home, at an average unit cost of about \$19,260. Relocating 200 units from Glasgow eliminated the need for building an additional 200 new homes. The estimated initial savings was about \$10,960 per unit (\$19,260 less \$8,300 to relocate), or about \$2.2 million. The savings do not take into account the possible longer longevity of the conventionally-built houses.

### Occupant reaction

We interviewed the occupants of 36 relocatable units at Mountain Home, Grand Forks, and Minot for their views on the livability of such housing. Twenty-one of them previously lived in military conventionally-built housing.

Except for one case (a family of seven), the occupants stated that the space and features were adequate. Most were well pleased with the houses and 18 considered the unit's privacy or single-story features definite advantages over the conventionally-built units. Disadvantages mentioned were inadequate storage space at each location and poor maintenance at Minot. However, these deficiencies would seem to be readily correctible by construction of additional storage facilities and better control over maintenance activities.

POTENTIAL USEFULNESS OF  
RELOCATABLE HOUSING

We offer the following observations on the advantages and disadvantages of relocatable housing and the availability of manufacturers to produce the quantities DOD may require.

Advantages

The primary advantage of relocatable housing is that it can be moved from one location to another when the need for housing changes. As shown in the case of Mountain Home, an estimated savings of about \$2.2 million was achieved by moving 200 houses there from Glasgow instead of building 200 new units. In addition, houses can be relocated in less time than new ones can be built conventionally. This can reduce the length of time that payments of allowances for quarters are made to eligible personnel because adequate Government quarters are not available at their duty stations.

Another advantage is that relocatable housing need not remain vacant for extended periods, with the resultant loss of "rental income," when a base is closed or its activities otherwise significantly curtailed. As discussed above, they can be moved to a base requiring additional housing at substantially lower cost than new construction. By contrast, of the 1,227 conventionally-built units remaining at Glasgow, about 1,000 were vacant at the time of our review.

As a result of base closures a few years ago, about 23,400 adequate conventionally-built family housing units became surplus. About 18,500 were disposed of through sale to private owners, local communities, etc., at considerable loss. The disposal of the remaining 4,900 units may be protracted because of such things as delays in finding suitable buyers or planned deferred disposals to lessen community impact.

Disadvantages

One disadvantage of relocatable housing concerns longevity. Air Force housing officials believe that the lightweight materials used to facilitate transportation may result in higher upkeep costs and reduced life span.

Another disadvantage suggested by some DOD housing representatives was that a relocatable housing unit may cost more than conventionally-built units of similar size. This view is consistent with one presented by Defense housing officials in hearings before the Subcommittee on Military Construction, House Committee on Appropriations, early in 1971.

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They felt that, normally, it would be necessary to pay a premium for the relocatable feature of housing. Their views were based upon discussions with relocatable housing manufacturers and their own general knowledge. One DOD representative told us that, in his opinion, the increased cost for relocatability might not exceed five percent.

Relocatable houses tend to lack the individuality in design and the flexibility of size possible with conventionally-built housing. To a large extent this is because conformity to design and size restrictions simplifies their manufacture and transportation. However, builders of industrialized housing are aware of these problems, and it seems likely that innovations in design and a liberalization of size restrictions will come about in the foreseeable future.

#### Availability of manufacturers

According to information provided by Defense housing officials in the above hearings, industry has clearly demonstrated that it can provide DOD with acceptable relocatable housing when the need arises.

In addition, DOD housing officials told us that manufacturers of industrialized or prefabricated units are located throughout the United States. According to one official, each time a turn-key housing project is put out for bid a manufacturer of prefabricated units of one kind or another can be expected to submit a bid. He further stated that a large manufacturer of prefabricated units had indicated that a unit an hour could be produced, if necessary.

#### VIEWS AND POLICIES OF DEPARTMENT OF DEFENSE

In the hearings mentioned above, Defense officials strongly endorsed relocatable housing, and their views generally parallel our findings concerning the advantages and disadvantages of the two types of housing.

They also provided their criteria for determining when relocatable housing should be used. Use is generally to be restricted to installations where housing needs are "terminal" or where operation of the base beyond 5 years is unpredictable. A terminal need for housing is defined as one where on-base housing--existing and approved for construction--plus available adequate housing in the community exceeds 80 percent of the gross housing needs. Adherence to these criteria promotes use of relocatable housing as a supplement to conventional housing, rather than as an alternative to such housing.

We learned, however, that DOD recently waived the above criteria and permitted the Air Force to procure about 2,900 units of relocatable housing, which were authorized in the Air Force's military construction program for fiscal year 1972. This housing is planned for installation on permanent Air Force bases. According to an Air Force housing official, nine firms have submitted acceptable proposals and on May 2, 1972, were asked to submit price proposals.

CONCLUSIONS AND RECOMMENDATIONS

Relocatable housing has sufficient potential advantages, in our opinion, to justify using it more extensively as an alternative to conventionally-built housing. We believe, however, that DOD's stated criteria for use of relocatables are too narrow to encourage the maximum use of such housing to meet its "regular" requirements.

We believe that these criteria are unduly restrictive. Greater use of relocatable housing can help avoid the creation of surplus housing, brought about by base closures or reduced personnel strengths, with its attendant loss in both investment and rental income. More importantly, however, it permits the relatively rapid transfer of needed housing to locations where critical shortages exist and at less cost than building new houses.

DOD's action in waiving its criteria to permit use of relocatables at permanent Air Force bases to meet regular requirements is a step in the right direction. We recommend that the criteria be reexamined with the objective of broadening it in a manner to encourage all the services to make greater use of this type structure as an alternative to conventionally-built housing. To make it more acceptable, we further recommend that additional efforts be made to improve the design, size, and features of such housing so as to make it more attractive to occupants and less costly to operate and maintain over its expected useful life.

Copies of this report are being sent to the Secretaries of the Army, Navy, and Air Force.

Sincerely yours,



Deputy Director

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