
BEYOND THE TRAILER: RETHINKING AFFORDABLE MANUFACTURED HOUSING IN THE U.S.

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INTRODUCTION

There are possibilities in low-income housing that the manufactured housing industry has not considered or sufficiently explored. Residential low-income areas on the periphery of some American cities show an elaborate spatial complexity, building creativity, and growing ingenuity in the way housing is built and completed through time. One of the most important characteristics that makes housing in these areas interesting is its incremental character. In these residential environments, decisions on housing investment are gauged by carefully balancing the household's housing needs and available resources. Housing is then built in two or more stages in an incremental process of continuous improvement. Some of these residential environments show great potential to consolidate into good urban habitats and become incorporated into cities as healthy neighborhoods.

Prefabricated housing and the manufactured housing industry has a modest but relevant presence in this context. However, manufactured housing has the potential of a bigger share of this housing stock because its capacity to preserve its value, relatively good tradability, and higher fabrication standards. Taking into consideration the characteristics of incremental housing as well as the way and type of investments that are made by these low-income households would give the manufactured industry access to an untapped group that would benefit from the advantages that manufactured housing has over other available options.

This paper is based on a study on the long term changes operated in low-income housing located in the peri-urban areas of Texas. The study identified the characteristics and types of investments made by households in their housing including spatial priorities, housing typologies and technologies, and type of investments made in housing in time.

The paper explores avenues for the manufactured housing industry to expand its offer of affordable housing by developing new products that integrate many of the notions operating in low-income housing environments observed in this study and in many places across America. The paper also proposes concrete examples on how this could be done.

BACKGROUND

The study used in this paper is part of a larger research on how low-income housing has been built in the low-income peri-urban subdivisions of South Texas known as *colonias*. Colonias are settlements located in the urban periphery of cities of the four southern states of the US border. These settlements were developed out of the jurisdiction of cities in what was originally rural unserved land subdivided and sold by land speculators to low-income people searching for affordable housing.¹

For many years this process of selling land without services went on until the consequences of lacking minimal sanitary conditions



Figure 1. Housing incremental construction in colonias (Webb Appraisal Office 1992/1995/2002/2005)

		0	1	2	3	4	5	6	7+ years
1 st Stage	55% Permanent St.	20%	22%	4.5%	2%	--	4.5%	2%	
	31% Trailer/Manuf.	29%	2%						
	11% Temporary St.	9%	1%	1%					
2 nd Stage	42% Attached Add.	2%	16%	5%	2.5%	2.5%	3.5%	3.5%	7%
	17% Permanent St.	7%	3%	2%	2%	--	--	1%	2%
	11% Detached Add.	6%	1%	2%	--	--	1%	1%	
3 rd Stage	45% Attached Add.	7%	13%	11%	4%	3%	3%	--	4%
	19% Detached Add.	3%	4%	4%	2%	1%	2%	1%	2%
	9% Dividing Covered Space	5%	1%	2%	--	--	--	--	1%
4 th Stage	44% Attached Add.	7%	12%	10%	2%	2%	1%	1%	9%
	15% Detached Add.	6%	2%	3.5%	--	--	--	--	3.5%
	9% Trailer/Manuf.	5%	1%	--	--	--	1%	--	2%
5 th Stage	39% Attached Add.	4%	13%	9%	4%	--	4%	4%	1%
	18% Detached Add.	6%	7%	--	--	3%	2%		
6 th Stage	50% Attached Add.	12%	15%	5%	12%	--	3%	3%	
	15% Detached Add.	6%	6%	--	--	--	3%		
	10% Trailer/Manuf.	--	--	--	--	7%	--	3%	
	10% Dividing Covered Space	--	3%	--	3%	2%	2%		
7 th Stage	50% Attached Add.	--	6%	11%	17%	6%	--	--	10%
	16% Detached Add.	6%	--	5%	--	--	--	5%	
	11% Trailer/Manuf.	--	6%	--	--	--	5%		
8 th Stage	50% Attached Add.	--	--	17%	17%	--	--	--	16%
	33% Trailer/Manuf.	--	16.5%	16.5%					
9 th Stage	66% Attached Add.	--	--	33%	33%				
10 th Stage	50% Attached Add.	50%							
	50% Dividing Covered Space	50%							

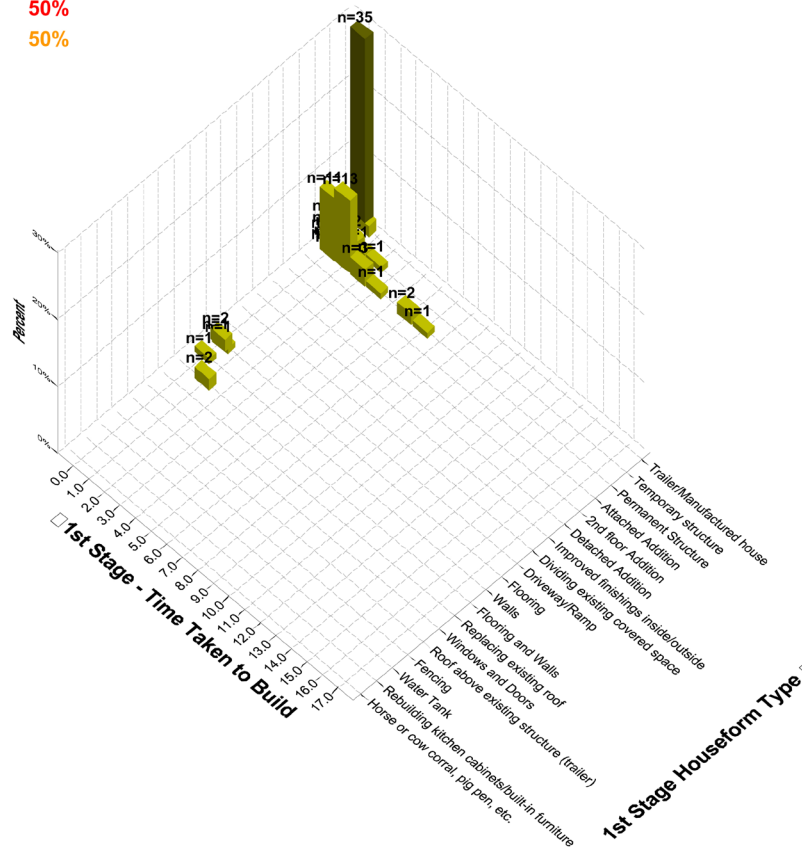


Figure 2. House structure change vs. time to build / stage (detailed 1st stage showing area vs. structure type).

BEYOND THE TRAILOR

became a serious problem and a matter of public health. By then, only in Texas, colonias housed almost half million people.² These and other similar issues related with the informal character of colonias drew a lot of public attention and federal funding during the 80s and 90s until federal and state legislature were passed to clear colonias' legal status. Many programs and initiatives were put to work to regularize colonias' infrastructure, service and housing conditions with a relatively positive outcome.

Although colonias were better known in the literature by the problems and issues created by their "extra-legal" condition, low-income households found in colonias affordable means to obtain access to housing, equity, and home ownership in ways that were not available to them in conventionally developed housing.³ For years, the inhabitants of colonias have built and improved their housing initial conditions by enlarging, consolidating, and servicing their homes as their economic status and stability has also been raised.⁴ Today, many colonias stand as respectable neighborhoods that have been incorporated into cities and provided with facilities, infrastructure, and services.

INCREMENTAL HOUSING IN COLONIAS

The research sought to identify the specific characteristics of the process by which housing was incrementally built up to what could be considered conventional urban standards.⁵ The study included a group of 10 colonias in Webb County, Texas. Data sources included periodic aerial images spanning a period of 28 years, census information at the block level, a field survey, and a semi-structured interview made to a random sample of 123 households. The information collected included household characteristics and detailed accounts on how houses were completed, from the initial structures built or set on the lots, up to their current house forms.

The study found that housing in these settlements was built in successive differentiable *stages* over time in a process that lead to the consolidation of initial and even precarious structures into sound and lasting houses. A stage was a change made to the existing house structure using household resources, following a preconceived plan, and executed within a certain timeframe. Stages were usually separated by periods of low or no construction activity (see Figure 1). The study showed that structures built or set initially on the site were followed by up to 10 differentiable stages that improved quantitatively and/or qualitatively the house. Quantitative improvements usually involved increasing the amount of roofed or enclosed area. Qualitative improvements involved the addition of floor or wall finishings, partitioning spaces, renewing deteriorated parts of the house, and other similar changes. Overall, it was interesting finding out that only 19% of the households built houses in two stages or less. However, most of them (68%) went through three to six stages to reach the present house form. A small group (13%) went through seven stages or more to reach their final condition. The dominant trend was that residents took between 3 to 5 stages to build their houses. (see Figure 2).

The time taken for each household to complete all the stages was also variable. A minority of households built or set up a structure before or immediately after moving into the lot and a similar minority of households took more than 25 years to complete the current houses. However, most households took between a few months and up to 5 years (24%), and between 10 to 15 years (25%) to complete the current housing structures. A second cluster of households took between 5 and 10 years (16%) and 15 to 20 years (17%) to build their current structure. Only a small group of about 10% of households took between 20 to 25 years for their house structures to reach their present stage.



Figure 3. Manufactured mobile houses in low-income colonias

Even though most of the housing stock in colonias was made of structures built on site, manufactured housing was still a relevant part of the housing seen in these settlements. This paper concentrates in the use of manufactured housing in the process described.

MANUFACTURED HOUSING IN COLONIAS

Manufactured mobile homes, usually known among colonia inhabitants as *trailers*, were a common sight in colonias. Mobile homes instantly provided a structure with differentiated spaces that could be moved onto and away from the lot at any point in time (see Figure 3). An active market of used trailers facilitated the acquisition and resale of these structures. Second hand mobile homes could be seen for sale on the roads and highways of Webb county entering the city of Laredo. Small shops that repaired or updated used mobile homes were also frequent in colonias. Households of colonias saw in a mobile home an investment that could be used as needed and easily sold if replaced by other house structure of a more permanent character. But mobile homes took other forms as well. They were often improved as part of a permanent house structure, sometimes by adding areas to their front, side or rear, sometimes even covered by or placed on top of a structure built to expand the house vertically onto a second floor in novel and original ways (see Figure 4).

Manufactured houses made 31% of the original structures set on lots (see Figure 2), although they represented 43% of the total covered area initially built in these colonias. Larger area was the main reason manufactured houses were used as a first housing structure besides providing shelter with basic differentiated spaces ready to be inhabited. In contrast, permanent structures built on site made 55% of the initial housing stock, but they made 52% of the total covered area. Additionally, permanent structures took up to two

years to be built while people inhabited their unfinished structures or lived somewhere else before they could move into their house.

Households that used manufactured housing spent in average a little less than \$17,500 for the land and the structure they moved in, as compared with \$19,000 for the average price of all other initial structures. In addition, the average area for manufactured initial structures was 770sqf which was larger than the average area for all initial structures (550sqf). After the initial stage, manufactured houses were part of successive additions made to the existing structures until the 8th stage, although in much less proportion than permanent structures, which suited better the smaller progressive additions and amounts of investment made in incremental construction. Yet, the study showed that, after 28 years of construction, manufactured housing represented approximately 23% of the total covered area built in these colonias, which was nonetheless quite relevant.

In the stages following the initial structure, manufactured houses were also brought into the lot mostly to improve the living conditions of the existing household or to accommodate a growing household due to a marrying son or daughter or a close relative who moved in.

INCREMENTAL HOUSING AND THE MANUFACTURED INDUSTRY

Despite the unquestionable presence of the manufactured housing industry in these low-income settlements, there are deep reflections worth considering from this study's outcome. Manufactured housing provided instant benefits that on site construction struggled to satisfy. However, a majority of households chose building on site by themselves rather than the seemingly better alternative of more area at a lower price offered by manufactured housing. There were several reasons for this.



Figure 4. Manufactured mobile houses modified to enlarge or improve the house structure

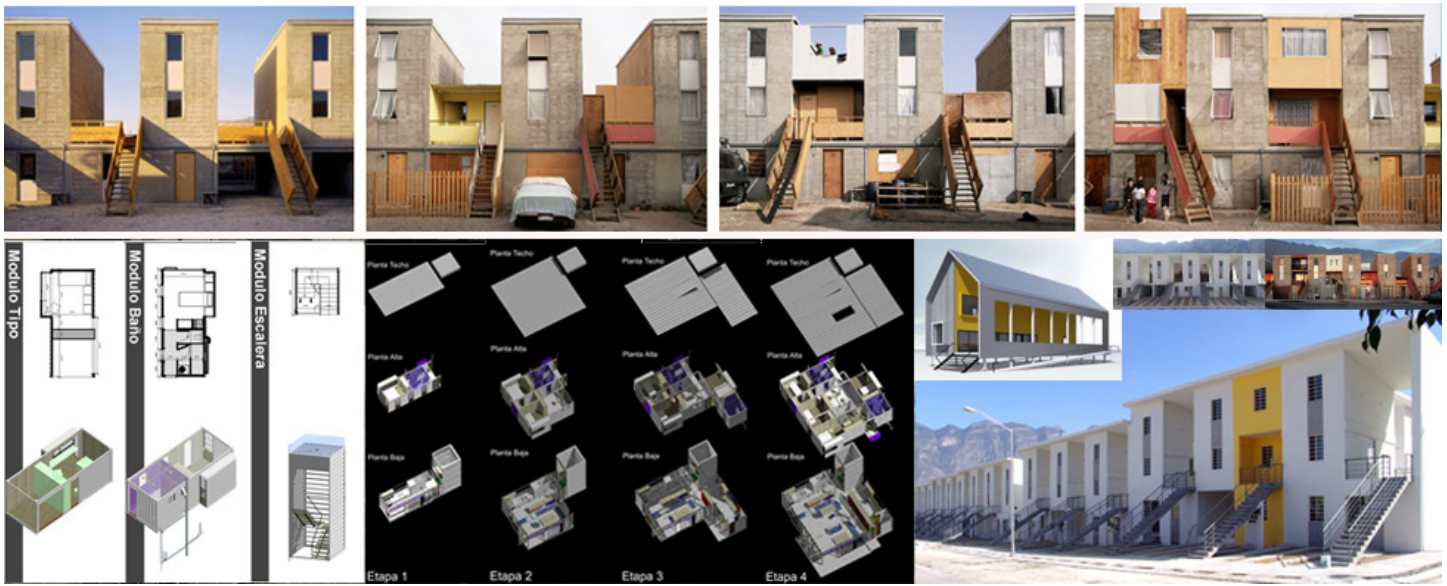


Figure 5. Incremental Housing examples: Aravena, A. Elemental Chile - Elemental Monterrey - Make it Right New Orleans (www.elementalchile.cl), Armengol, J. Container Housing Caracas.

To begin with, on site construction reflected better the needs, intentions, and even the identity of the household. If the diversity of forms that households gave to their houses is compared to the uniform look of mobile homes, there is no surprise that the first was preferred. There is no doubt that initial structures followed by attached and detached additions built as needed, sized to the available resources, and tailored to very specific needs were a much closer match and more affordable fit to the particularities of households. Unfortunately, manufactured housing was designed with too narrow objectives of standardization looking for the ‘average’ household with the ‘average’ needs. There was certain diversity offered, but this was far from the wide range of household characteristics found in colonias.

Individual circumstances of cultural heritage, personal preference, and particulars of site, while not consistent, are always present and will always work against any impulse toward a common, repetitive appearance and substance for all production.⁶

Consequently, manufactured housing was chosen to satisfy very specific needs in very specific times of the household. That is why mobile homes were seen more often as initial structures and as later additions for extended families. Manufactured housing was seldom seen as simpler attached and detached additions to accommodate growing households and/or to add living area as more resources became available. However, these non-manufactured additions represented 77% of the total covered area built in colonias.

Unfortunately, manufactured housing has overlooked one of the biggest advantages of standardization which is its potential to reach for diversity. That is, instead of emphasizing mass production, stressing the potential of mass customization.⁷ In the specific case of colonias, this research provided clear figures of the advantages of incremental

building over conventional housing to satisfy this need for diversity. Information on the number of stages in which housing was built, size and purpose of each of these stages, and the approximate amount invested by households on each of them is essential to understand the way low-income households prefer to build their housing. Ignoring this information is accepting a limited participation in the share that colonias has traditionally given to manufactured housing. Considering this information represents opening the opportunities to a bigger market and a better housing alternative for colonias. After all, manufactured housing already offers a better value, tradability, and higher standards than other available options.

CONCLUSIONS AND IMPLICATIONS FOR PLANNING AND DESIGN

This study found out that low-income housing in colonias was rarely built at once. Affordability relied on a close match between available resources and household needs. Economic resources played a part in this equation, but there were other factors equally relevant such as the lower cost of labor, the household's management of the process, the low cost of materials, etc.

The manufactured housing industry has a lot to learn from this experience. There is room to participate in this process well beyond the market of second hand trailers that is currently available to colonia inhabitants. Designers and engineers of the manufacturing housing industry have a role proposing feasible alternatives to participate in this process. For instance, the manufactured housing industry can use the characteristics and notions of the incremental construction process observed in colonias to design and supply innovative housing systems that follow flexible patterns of staged or phased construction.

An open scheme of house parts that reflect some of the relevant stages identified by this study could be produced off-site and purchased when needed to be incorporated to the house structure as desired. Prefabricated house sections or pods that could be integrated to the existing house form in one or more ways by small crews of workers could have a high impact in the positive development of colonias and in maintaining its diversity.

All these innovations in design strategies for the manufactured housing industry could find base in the work that began in the 1970s with Habraken's SAR in housing (1972) and that has more recently evolved into newer concepts adapted to contemporary problems (Habraken, J. 1998; Kendall, S. 2000). Some of these ideas that consider incremental housing are already being experimented in other latitudes and countries (see Figure 5). There is today a renewed interest in incremental housing strategies that is giving a new breath to low-income housing. The manufactured housing industry can be an active actor in this great opportunity.

ENDNOTES

1. Martinez, Zixta, Kamasaki, Charles and Dabir, Surabhi 1999 *The Border Colonias: A Framework for Change in Housing in Rural America* edited by Joseph Belden and Robert Wiener, Sage Pub. Inc. California.
2. The Texas Office of the Secretary of State defines colonias as "unincorporated settlement[s] along the Texas-Mexico border that may lack basic water and sewer systems, electricity, paved roads, and safe and sanitary housing."
3. Eaton, David and Jorge Chapa (1997) *Colonia Housing and Infrastructure* LBJ School of Public Affairs, University of Texas at Austin. Austin, Texas.
4. Reimers-Arias, Carlos (2009) *Housing Diversity and Consolidation of Low Income Colonias: Patterns of House Form and Household Arrangements in Colonias of the US-Mexico Border*. Texas A&M University, College Station, TX.
5. Graham, Charles and Jana Pereau (1992) *Intermediate Technology: An Acceptable Standard for Self-Assisted Housing in the USA in Making Environments: Technology and Design* edited by Adele Naude Santos and M. Susan Ubbelohde, Association of Collegiate Schools of Architecture, pp. 138-144. Washington, DC. Davies, C. S., and Holz, R. (1992) *Settlement evolution of 'colonias' along the US-Mexico border: The case of the Lower Rio Grande Valley of Texas* Habitat International, 16(4), pp 119-142. Elsevier.
6. Kieran Stephen and James Timberlake (2004) *Refabricating Architecture*. McGraw Hill, NY.
7. Kieran Stephen and James Timberlake (2004) "Mass customization is rapidly replacing mass production. Mass production was all about the economy of making things in quantity, but mass customization does not depend in quantity to be cost effective, Mass customization is about cultural production as opposed to the industrial output of mass production. In other words, rather than decide among options produced by industry, the customer determines what the options will be by participating in the flow of the design process from the very start."