

# PROJECT MEXICO: COLONIA ROMA

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## Introduction

Focusing on political, urban and housing issues, this essay examines the early results and objectives of a building research project being conducted in Reynosa, Mexico. The essay concentrates on the current housing developments and urban planning problems within impoverished neighborhoods that have developed along the United States-Mexico border due to economic conditions exacerbated by the North American Free Trade Agreement (NAFTA). The rapid growth of unregulated settlements in the peripheries of developing cities is becoming a global economic, political and environmental problem.

Because governments are ill-equipped to manage the current situation, improvements in habitation must be citizen-directed and involve small scale collaborations within communities. Government corruption is a major problem that hinders progress coming directly from government agencies, therefore, improvements need to come from a network of individuals and organizations willing to conduct collaborative projects with those most in need. In *Optimism and Overpopulation*, Virginia Abernethy states that foreign aid has been largely unsuccessful in improving the current living conditions of developing countries, but "certain kinds of aid remain appropriate." Abernethy states, "micro loans that foster grassroots enterprise, where success is substantially related to effort," are more apt to succeed.<sup>1</sup>

In order for our profession to be relevant to current society, we must expand the profession's narrow focus and develop ways to confront this pressing global dilemma. The long term goal for the project in Reynosa, Mexico is to improve the quality of life in squatter settlements through community empowerment. Our proposal is to introduce new, low-cost construction and community planning ideas and technology that may better serve the squatter communities. We plan to conduct workshops that will demonstrate new ways of building houses and planning communities as well as cover issues such as sanitation technology, water supply and crime prevention. We expect to eventually empower communities to conduct their own workshops. In close collaboration with the people of Reynosa, we hope the project will develop into a community based process rather than a universal solution. Our expectation is that once an effective process of implementation is developed, it can be effectively modified for other communities worldwide.

## The Global Situation of Rapid Urbanization

The rapid growth of unregulated settlements in the peripheries of developing cities is becoming a serious global issue. Asia, Africa, and Latin America all share this unprecedented urban growth around developing cities. In 1900 only one in 40 people lived in urban areas. In the last 30 years, the earth's population has almost tripled and half of all people now live in cities. Estimates on future population growth and urbanization are staggering.

Poverty is abundant in developing countries, and the strain on the limited resources to sustain an ever increasing population has fostered an extremely low standard of living for many communities. This increase in population, combined with excessive poverty, inevitably results in increased exploitation of resources and environmental degradation. The World Bank states that urban poverty could become one of the most explosive political problems of the 21st century.<sup>2</sup> In *The Urban Explosion in the Third World*, Nicole Massignon states that:

Poverty, once more prevalent in rural areas, is now becoming a primarily urban problem. The number of people living in shanty towns on the outskirts of Third-World cities is growing much faster than the population housed in modern residential areas. In the 1980s, in cities like Bombay and Cairo, between 60 and 80 percent of the population were reported to live in slums and informal settlements.<sup>3</sup>

The problems associated with urbanization are balanced against the economic and social development intrinsic to the growth of cities. The allure of greater opportunity and better living conditions often associated with urban environments will ensure the continuation of this problem. The rapid increase in population will add to this as well. The population shift and industrialization of developing countries is vital to their participation in a growing global economy. The return to the development of a rural society to solve the problems of urbanization would be unrealistic and environmentally catastrophic. Since there are no viable solutions to curb the rapid growth of urban areas, any strategy for urban development must accept the situation and work within it.

In considering solutions to this global problem, one must act locally, considering the unique characteristics of the particular environment. Because building traditions vary from place to place, universal solutions will probably prove ineffective. A design/planning model that would

work for one region may not necessarily work for another.

## NAFTA

NAFTA has provided many incentives for American and other foreign companies to relocate in Mexico, where there is increased trade potential, an abundance of cheap labor, and less stringent environmental regulations. NAFTA has helped make the Texas-Mexico border region the fastest growing region in both the United States and in Mexico. To facilitate economic development, local governments make concessions to industry so they will locate plants nearby. As thousands of Mexicans migrate north in search of work in the *maquiladoras* (foreign-owned factories) and across the U.S. border, the rapid growth of squatter settlements in the peripheries of border cities continues unregulated. The enormous urban growth along the border is due mostly to immigration from other parts of Mexico but also partly due to high birthrates resulting from the desire to have large families. An unofficial estimate denotes an influx of 500,000 new inhabitants to Reynosa in the last eight years.

The well documented urban problems that Mexico City currently faces are also occurring in Reynosa and other border cities. The rapidly expanding urban populations overwhelm insufficient sanitation and water resources, resulting in increased pollution and disease. Thus far the Mexican government has been ineffective at modernizing these settlements. Lack of resources and capital limit the government's ability to provide and maintain adequate infrastructure. Much of the building and planning is done by the inhabitants of these communities in a process that evolves over many years. As conditions exist now, the increase in urbanization far exceeds the economic development of capital, making progress difficult.

## The Colonia

Residential patterns in Mexican border cities differ from cities in North America in that they are "much more mixed socially, spatially, and architecturally."<sup>4</sup> Residential neighborhoods usually appear fairly distinct and fragmented on maps and in aerial photography. This also describes the settlement of the city peripheries. The basic unit of these unregulated city peripheries is the *colonia* (neighborhood). *Colonias* often include a church, *tiendas* (small groceries), *tortillerias* (where tortillas are sold), and occasionally medical and dental services. Schools are usually located nearby, as well as bus lines and other services allowing the *colonia* to connect with the city. The center of the *colonia* retains much of the activity and business just as in traditional Spanish towns. The local church will often act as the social center.

The *colonias* are created entirely by citizens and eventually become enfranchised by the government. Once the *colonia* population is sizeable, the *colonia* creates its own pseudo-governmental body that operates like a neighborhood association with a president, treasurer and other officers. This neighborhood governmental body then approaches the Mexican government for assistance. The first phase of assistance is the subdivision of land into probate parcels and public right-of-way. The

Mexican government then allows families to buy parcels and gives them six months to begin constructing a house, if they have not already built there, or risk losing the property. The second phase of government assistance is the implementation of infrastructure. Electricity, water, street lights, sewer lines and sidewalks are then added one by one, usually over a period of many years. The improvement costs are shared equally between the government and the *colonias*.

*Colonia Roma* occupies approximately 11 acres of land (8.5 acres of private parcels and 2.5 acres of public right of way). Laid out on an east-west axis, Roma is approximately 1,300 feet long by 370 feet wide. The family unit is typically comprised of three to six members with some houses occupied by two or more families. Roma is currently about 90 percent occupied with a total capacity of approximately 2,000 people or 230 people per acre. Lot sizes average 32 feet by 65 feet creating a density of about 175 square feet per person.

The economic conditions and the small catalog of building materials readily available in Reynosa greatly limit the possibilities of a diverse building vocabulary. Traditional building techniques seem to have been exhausted. Home builders rely on mass produced building material of wood studs, plywood, concrete, corrugated metal and a large inventory of salvaged materials. Sixty-four percent of the houses in Roma are constructed with manufactured wood products and 34 percent are constructed with concrete block and concrete. What is perhaps ironic is that the *colonia* inhabitants are almost exclusively homeowners and not renters. Ownership has a significant impact on *colonia* residents' willingness to invest in their community.

The formal character most housing takes is simple, yet many retain some trace of their colonial roots. One characteristic similar in both high-end and squatter housing is the desire to separate the private yard from the street and neighbors with some sort of enclosure. Usually this enclosure is a fence, but occasionally one finds a wall that encloses a simple front court. This is a direct descendent of Spanish colonial architecture. Another aspect of *colonia* housing is the desire to personalize one's house, especially the street facade. Many houses are brightly painted and have ornamentation that creates a unique dwelling that reflects the inhabitants personality.

## SHELTER FOR ALL

The Second United Nations Conference on Human Settlements (Habitat II) focused on two main themes: 1. Shelter for All, and 2. Sustainable Human Settlements: Development in an Urbanizing World. The most interesting of the issues outlined in the conference was a program to encourage the adoption of appropriate policies, strategies, frameworks, and measures to provide "adequate shelter for all by the year 2000." "Adequate shelter" in this context was defined as "shelter with adequate privacy, security, space, lighting, ventilation, basic infrastructure and location with regard to work and facilities — all at reasonable cost."<sup>5</sup> We chose this theme as a programmatic manifesto in which to further develop the project.

The primary issues of building within *Colonia Roma* focus on costs and materials of construction, ease and efficiency of construction, and the expandability over time of individual houses. A house in the periphery is always in a state of becoming. A typical house within the *colonia* usually begins as a small one-room structure and is expanded as extra money becomes available. The process of start and stop building, rebuilding, and repairing seems to proceed indefinitely.

In Roma three stages define the development of homes and housing stock. *Stage One* housing is the most basic and refers to housing that is quickly erected with mostly salvaged materials and minimum means when a family first moves to a community. *Stage Two* housing is built primarily with mass produced materials and a minimum of salvaged materials. It is generally developed when money becomes available to invest in more substantial materials. It is usually constructed while the family lives in their stage one house. Upon completion of a *Stage Two* house, the *Stage One* house will be abandoned, substantially modified or integrated into the new *Stage Two* house. *Stage Three* housing consists of a level of completion with finished materials, plumbing and electricity.

The Hernandez family lives in a typical *Stage One* house in Roma. It consists of one room approximately 90 square feet in area. Two adults and four children share this single space. The adults sleep on a raised platform with a mattress and the young children sleep on the floor. The house was built seven years ago and sits on a typical lot measuring 32 feet by 65 feet. There is an outhouse in the back yard that is not connected to Roma's new sewer system. The home is constructed of wood and found materials. It has a door facing the street and one small window opening on the east side of the structure. The home has no electrical service even though Roma has had electrical infrastructure for two years. The family cooks its meals over a wood fire in the front yard because propane is too costly for them. Most houses in Roma have a propane tank that is filled periodically for cooking purposes. There is often standing water on the dirt floor due to a roof that leaks and occasional high water. *Colonia Roma* was built in a low lying area that floods in the rainy season. Families who have the means build their homes on piers or build up the ground on which the house sits.

The Ferretera La Blanquita (a building supply store) is only two blocks from *Colonia Roma*. Although lumber is not stocked in standard dimensions, residents can purchase many of the materials available in the United States, and at similar prices. Considering the fortunate person employed at a *maquiladoras* will earn approximately U.S. \$45 a month, shopping at La Blanquita is out of reach for many Roma residents. Down the street, vendors sell reclaimed building materials for about half the cost. The vendors generally have a very limited selection of materials that vary in size and quality. Most residents sift through urban refuse and salvage usable materials. The salvaged materials currently used in the construction of homes include wood pallets (discarded by the *maquiladoras*), bottle tops (used to seal the nail hole in the tin roofs) and old tires (used as planters or

fences). Few people own tools, however, we interviewed a local builder who owned several essential hand tools, such as a builders' square, level, hammer, masonry trowel, hand saw, and hand drill. Although we saw power tools at La Blanquita there was no evidence of their use in Roma.

## The Studio Project

*Project Mexico: Colonia Roma* was first introduced to students in the fall of 1996 by David Baird and Eirik Heintz in a construction elective, and also by Andrew Baque in an urban design seminar. The two classes collaborated on the first phase of the project, which consisted primarily of research, data collection, and a small amount of design work and cost estimating. Students compiled program information, which included the study of current events in Mexico (specifically U.S.-Mexico border towns), climatic and topographical information, and social, cultural and economic profiles. At mid-semester we made arrangements with an American missionary organization, Vineyard Border Outreach, to visit Reynosa. The primary purpose of the trip was to meet community leaders and identify a viable student project, catalog available materials and their costs, catalog the construction tools available, gather community data, and interview several residents.

After our return, our first objective in the construction course was to develop a viable *Stage Two* house design. The average construction costs of a typical house in Roma is about U.S. \$300 so this figure was used as a preliminary budget. Other concerns included improving the quality and efficiency of the housing design; solar orientation; use of prevailing winds; use of exterior space; security; and health and safety. These were necessary aspects in the creation of a design that would meet the demands of the users and relate to the particular region. The project required students to produce design drawings, scaled models and a preliminary budget.

Student design solutions included a roof system that is tied down at the ends, eliminating the need to breach the roof membrane above the living area. Another student designed a double roof to reduce heat gain in the summer and to use the interstitial space as a sleeping loft. All the designs incorporated porches, allowing some household activities to occur under a covered outdoor space. The desire was to create greater potentials for comfort and livability at a minimum cost. All solutions used modified balloon-frame construction with standardized materials (i.e. wood studs, plywood, and corrugated metal). Unfortunately, the cost of these designs exceeded our estimated budget of U.S. \$300. However, this pointed the project toward the next generation of designs, which reconsidered the building systems and relied more heavily on salvaged/recycled materials.

In the spring semester of 1997, Baird and Heintz introduced the second Roma project to the sophomore design studio. The goal of the four-week project was to consider alternative enclosure systems and explore the use of reclaimed materials in the construction of a house. The Baird studio concentrated on the design of a full-scale prototypical outhouse that would be adapted to housing

design and construction. Students were divided into teams and given two materials lists. List A contained materials that were readily available to purchase and List B contained a list of common salvaged materials, such as car tires/parts, soda cans and bottles, cardboard, and wooden pallets. Groups were encouraged to spend as little as possible and were not allowed to exceed U.S. \$50. One of the most provocative designs to result from the studio work is a tilt-up concrete panel system produced by students David Boira and Daniel Velazquez. Wall panels, measuring 3 feet by 7 feet, 9 inches by 1.5 inches thick, were cast in simple forms and can be lifted into place by two people. The panels are joined together with bolts and simple steel plates. The foundation and floor components were also cast in concrete. The roof structure is wood and clad with corrugated metal. The material costs of a single solid wall panel is less than U.S. \$8. This system is less expensive than modified balloon frame construction and is more durable. This system works well with the fundamental building customs of the *colonias* because it is extremely flexible and could easily accommodate an addition or alteration.

The final result of the Heintz studio was a 64 square foot full-scale construction of a *Stage One* house that tested the integration of the individual systems of construction. The resulting structure relied heavily on wood pallets and visqueen to explore possible configurations of *Stage One* housing. The cost estimate of the *Stage One* house is U.S. \$180, which is U.S. \$2.80 per square foot. Throughout the project, both studios collaborated and participated in group lectures and reviews.

### Recycled Material

Material recycling became a fundamental issue in the project. We found material recycling as not only a means of global responsibility, but also an economic necessity. By using recycled material, the costs of individual houses will decrease. Our main concern with using recycled material is insuring a reliable and consistent supply. We intend to contact factories in Reynosa and determine the materials that are discarded and estimate their availability. For example, wood pallets are commonly used in construction of *Stage One* and *Stage Two* housing. If we can calculate the number of "pallet houses" that can be constructed per month we can compare it with the estimated need for housing and determine the role this material should play in the construction of homes.

When an effective system is devised that uses discarded material, those materials could become valuable and sold rather than given away. This would effectively take building materials out of the hands of *Stage One* home builders and put them in the hands of *Stage Two* builders. It is our intention that many different building systems be developed simultaneously to maintain balance in material demand.

### Conclusion

The next step in this project will be to finalize and refine the concrete tilt-up system and to travel to Reynosa with a group of students to construct a house for a family

in need. The construction project will double as a workshop to train several community members in the building technique. Drawing, diagrams and essential materials will be left with each person trained at the workshop.

We also plan to revisit the communities over an extended period to document the impact the workshop had on the *colonias*. A post-occupancy evaluation of the homes will also be completed. The long-term relationship with each *colonia* will help determine the effectiveness of the effort and allow us to identify refinements and changes that need to be made to the system and/or the workshop. Once the workshop process is perfected other topics, such as *Stage One* housing construction, community planning, sanitation technology, and crime prevention, will be included.

The role of the architect and urban designer is but a small part of a greater collaboration. The task is enormous. Success rests on the ability of a diverse group of professionals to provide technical and management assistance. The implementation of innovative solutions must occur with the participation of the community. Massignon states, "experience has shown that allowing people to participate directly in urban-development projects makes for more efficiency and may even determine success."<sup>6</sup>

### NOTES

- <sup>1</sup> Virginia Abernethy, "Optimism and Overpopulation," *The Atlantic Monthly*, (December 1994), p. 91.
- <sup>2</sup> Nicole Massignon, "The Urban Explosion in the Third World," *The OECD Observer* (June/July 1993), p. 21.
- <sup>3</sup> Ibid.
- <sup>4</sup> Daniel D. Arreola and James R. Curtis, *The Mexican Border Cities*. (The University of Arizona Press, 1993), p. 154.
- <sup>5</sup> D.C.I. Okpala, "Viewpoint: The Second United Nations conference on Human Settlements (Habitat II)." *Third World Planning Review*, (Liverpool University Press, May 1996), p. vi.
- <sup>6</sup> Nicole Massignon, "The Urban Explosion in the Third World," *The OECD Observer* (June/July 1993), p. 22.

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