
TYOLOGY OF 20TH CENTURY VERNACULAR ARCHITECTURE IN NORTHEAST SIERRA MADRE OCCIDENTAL

Yuko Kita

yuko.kita@uacj.mx

Angélica Nohemí Chávez Martínez

angelica.arquitectura@gmail.com

Adriana Edith Suárez García

al190445@alumnos.uacj.mx

Departamento de Arquitectura, Instituto de Arquitectura, Diseño y Arte (IADA)
Universidad Autónoma de Ciudad Juárez (UACJ), Ciudad Juárez, México

Abstract

Vernacular architecture in the communities of the northeast Sierra Madre Occidental (Casas Grandes, Chihuahua) share some formal, functional, and constructive characteristics of the buildings. Most of them were built with local materials such as earth and timber. Recently the integrity of built landscape has been changing gradually due to the introduction of industrialized materials and construction techniques, and addition of new constructions designed without considering the cultural and natural context of the place. The identification of typology allows the understanding of multiple dynamics of transformation and adaptation to natural and cultural contexts, which will contribute to the quality of new constructions in the communities. The buildings were classified by their formal, functional, and constructive characteristics. Interviews with communities were carried out to recognize cultural and historic contexts.

Keywords: porch, gable, adobe block, timber, wood shingle, metal roofing

Figure 1. Location map of Ejido Ignacio Zaragoza (El Willy), made with QGIS

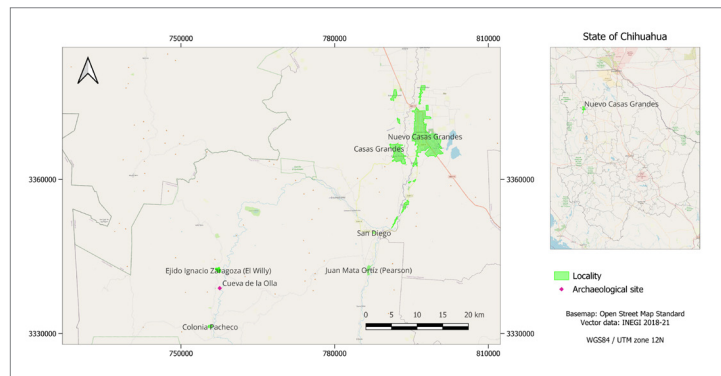


Figure 2. The new (left) and the old (right) community health center of El Willy (2021)

1 Introduction

Ejido Ignacio Zaragoza, known better as “El Willy”, is one of the villages established in the northeast Sierra Madre Occidental after Mexican Revolution by revolutionaries who came from central and southern Mexico.

The buildings of El Willy have some common formal, functional, and constructive characteristics, such as adobe masonry wall, porch, roof slope, chimney and wooden barn. The paved road completed between Nuevo Casas Grandes y El Willy in 2018 reduced the travel time from four hours to one hour and a half. There are more people traveling between the city and the village. Gradual population mobility to the city has been observed and there are more weekend or vacation houses in El Willy. The paved road also has taken tourists to the village, because of tourist attractions near El Willy, such as Cueva de la Olla (archaeological site) and Piedras Verdes River (camp site). The landscape of the village has changed with the construction of temporary residences such as log houses. Besides, the local people started using some industrial construction materials such as concrete blocks and cement. The old community health center of the village and the new one demonstrate the gap of architectural characteristics between vernacular architecture and recent government building style (Figure 2). The new medical center of El Willy is an example of those constructions with a notable disconnection with their context. The understanding of cultural context is essential to propose appropriate solutions and innovations for any urban-architectural intervention nowadays. Therefore, this study aims to clarify the cultural context of El Willy, identifying the typology of 20th century vernacular architecture.



Figure 3. Field survey in El Willy in 2021

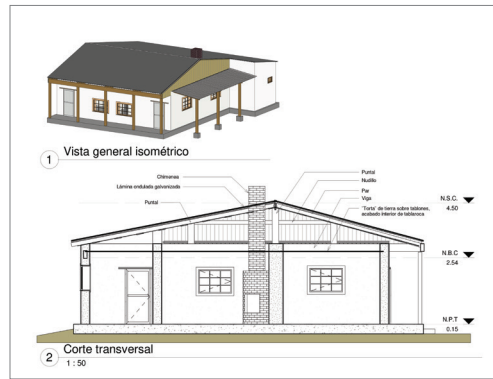


Figure 4. BIM of an old house in El Willy

2 Methods

First, it is necessary to recognize building characteristics in a field work. In the first field work, the recognition of some formal, functional, and constructive characteristics of the buildings was carried out with their photographic records. Prior to the second field work for making inventory, building list and location map should be prepared; then an inventory format with recognized characteristics, to facilitate the process of making database of all buildings in the second field work. An architectural survey may also be performed to document construction details. Using this database created in the second field work, statistical analyses may be applied to classify buildings according to their characteristics in an objective way.

3 Architectural surveys

3.1 Making building database - inventory

We created building list and map with data of The National Institute of Statistics and Geography (INEGI) and National Agrarian Registry (RAN) of Mexican government, also Google satellite images. The National Housing Inventory (INEGI, 2010) indicates the existence of 81 dwellings and the 28 blocks that make up the village.

During the field survey in 2021 (Figure 3), a total of 228 properties were registered, including dwellings, barns, stables, open-air roof structures, outdoor toilets and other facilities used for educational services at preschool, elementary, secondary and high school levels, including an ejidal assembly hall, a Christian church and a Catholic church, and community health centers.

3.2 Architectural survey

Conventional hand survey and photogrammetric survey has been applied to document 10 buildings (8 dwellings and 2 facilities) (Figure 4).

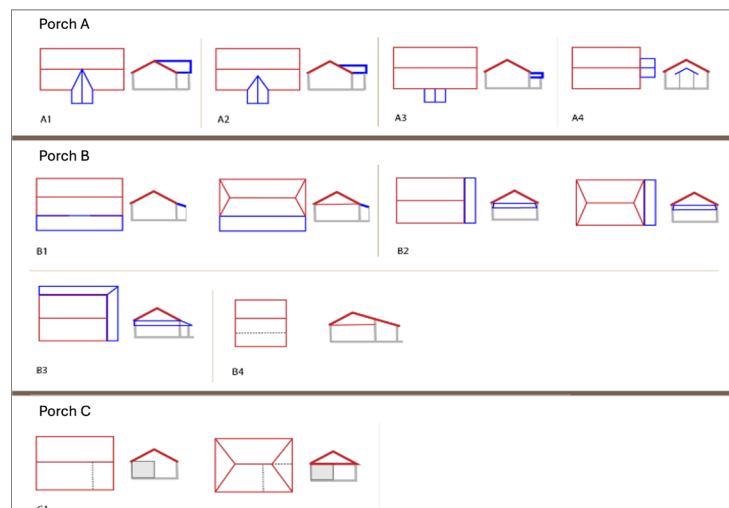


Figure 5. Graphical variation of the porch types

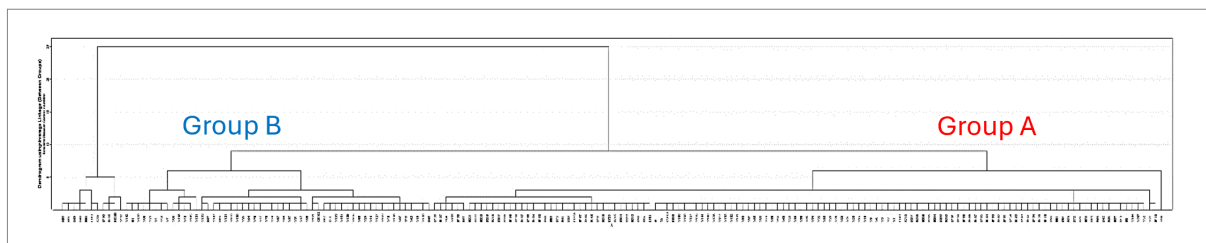


Figure 6. Dendrogram created by IBM® SPSS® Statistics

4 Defining typologies

4.1 Variable

We identified i) formal characteristics such as stem wall style, porch style (Figure 5), and gable style; ii) structural characteristics as stem wall construction system, wall construction system, and roof structure; and iii) material characteristic as render material, roof material and chimney material.

4.2 Statistical analyses

According to the results of the Pearson's correlation analysis, some variables such as the shape of the secondary porch, the shape of the main gable and roof materials, were discarded in the classification process to avoid noise or errors. As a result of the cluster analysis, two main groups were identified that segregate the properties with typological integrity (Group A) from those that do not have sufficient characteristics to be grouped into a "pure" typology (Group B) (Figure 6).

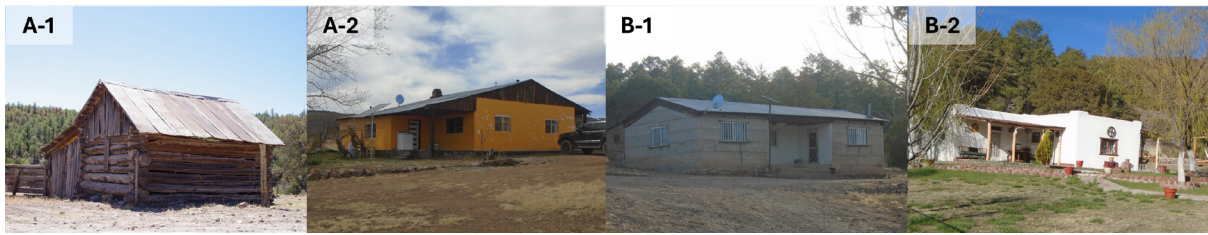


Figure 7. Typologies of building of El Willy

5 Discussion

Two subgroups were found in both Group A and B (Figure 7).

A-1. Traditional service building

Traditional barns and stables are distinguished by their simple one-story volume, with a steeply pitched roof with one or two slopes. They also stand out for the apparent wood walls and the use of galvanized sheeting on the roof. Some buildings use only wood, including their roofs.

A-2. Traditional residential building

This typology consists of mixed-use buildings, mainly private houses. The number of roof slopes is usually two or four. These buildings have simple facades with a porch, walls of adobe, and roofs with timber truss and galvanized metal sheet, and usually with a brick chimney.

B-1. Interpretated traditional buildings constructed with industrial materials

Properties with mixed uses, predominantly services such as barns, garages and outdoor restrooms. These buildings have concrete foundation, brick masonry walls, roofs with one or two slopes with timber or steel truss and galvanized metal sheet. Walls can be finished with cement-based render or without any render (apparent walls). This typology presents formal solutions referencing traditional buildings but employing industrialized construction materials.

B-2. Building without context

The disconnection from the context and the disparity of the construction systems and appearance among themselves are the characteristics of this typology. These buildings usually have roofs with a slight slope. They employ formal elements out of the context, for example, Pueblo Revival Style. Their construction materials are usually industrial ones, such as concrete blocks, cement panels, bricks, and reinforced concrete slabs and walls.

6 Conclusion

In El Willy there is a specific cultural and natural context materially expressed through its typologies. Through this research, we recognized that the greater the degree of interventions without prior appreciation or continuity of the contextual elements and constructive traditions, the more the landscape loses its integrity. The research on distribution and adaptation of housing space is currently in process, which will allow a greater understanding of the changes and consistency in relation to the uses and customs.

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References

Google Earth. (2007). Satellite Images. Google.

INEGI. (2010). *Censo de Población y Vivienda 2010*. <https://www.inegi.org.mx/programas/ccpv/2010/>

Registro Agrario Nacional. (2019). *PHINA. Padrón e Historial de Núcleos Agrarios*. Recuperado de <https://www.gob.mx/ran>

Yuko Kita, Dr., is a Professor at Universidad Autónoma de Ciudad Juárez, where she teaches research seminars and courses on architecture. She received her Ph.D. from the Graduate School of Comprehensive Human Sciences at Tsukuba University. She has developed research on earthen construction materials, especially on pre-Columbian architecture in Casas Grandes region.

Angélica Nohemí Chávez Martínez, is an architect graduated from Department of Architecture at Universidad Autónoma de Ciudad Juárez. She has developed her thesis titled “Identificación de tipologías arquitectónicas en el Ejido Ignacio Zaragoza, Casas Grandes, Chihuahua” under Dr. Kita’s supervision, which is now under review for publication as journal article. She is now applying for various graduate schools to pursue additional education in the heritage conservation field.

Adriana Edith Suárez García, is an undergraduate student of Department of Architecture at Universidad Autónoma de Ciudad Juárez. She is receiving a scholarship from the Consejo Nacional de Humanidades, Ciencias y Tecnologías (CONAHCYT), doing research for her thesis related to the project “Ciencias de Frontera 2023 (CF-2023-G-584)” on valorization of earthen architecture.