

The Influence of French Colonial Rule on Architecture with a Focus on Nano effects in interior of Residential Buildings

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ABSTRACT: During the French colonial period in Lao PDR (from 1893-1953), France integrated its architectural elements into traditional Lao architecture and modified them to suit the climate. The French colonial style continues to make a modest impact in most major towns and cities. The harmonious combination of traditional Lao architecture and French colonial influences shows the true values and wealth of a city's characteristics. These unique architectural styles and motifs are valuable to the area's heritage; many of these styles are still conserved today, especially in Luang Prabang, which was designated as a World Heritage city in 1995. Some historical buildings have been adapted according to social and economic factors. However, as elsewhere in Indochinese countries, the provincial French design was modified to suit the hot and humid tropical climate. The design of colonial villas, in turn, began to influence subtle changes in the design of Lao urban dwellings. This paper discusses the development of traditional Lao architectural styles and the effect of Nano technology in this style, that have been experienced in Lao PDR, analyzes the process of change, emphasizes the importance of compatibility between traditional house form and the French colonial house, and studies of the factors like Nano materials influencing the transformations of traditional housing.

Keywords: *Heritage, Influence, Integrated architecture, Nano technology architectural design, Science of Nanotechnology, Traditional architecture, Values of Nano materials.*

INTRODUCTION

Traditional Lao architecture encompasses an idea that features the characteristics of the lifestyle, art, and culture of the Lao people. Lao PDR has a hot, humid climate all year round. Previous generations of Lao have acknowledged their rich environment and took the opportunity to reduce the temperature and humidity in their homes by creating living places and a lifestyle that matched their surroundings. Lao culture, social standards, and lifestyle developed a vital, religious,

and unique architectural character. Their major beliefs influenced their architectural design and affected many aspects of their buildings. Traditional Lao architecture can be separated into two types of buildings:

Residential Buildings and Religious Buildings.

Traditional Lao houses are built on stilts and have a rich cultural legacy that reflects the challenges of living comfortably in such a hot, humid climate. These houses exhibit a sense of community and the Buddhist religious beliefs of the Lao people. They also devel-

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oped significant regional variations in both vernacular and religious buildings. One of the universal aspects of traditional Lao architecture is the "Lao house on stilts" construction. The area beneath the house is used for storage, crafts, lounging during the daytime, and sometimes for housing livestock. The houses are raised as a result of heavy flooding during certain parts of the year, and, in more ancient times, to avoid predators. Many other considerations, such as utilizing locally available materials, the climate, and agriculture, heavily influenced the style. Traditional Lao houses are made from a variety of woods and are often constructed in a single day. They can be constructed with prefabricated wood panels including Nano technology for saving the resistance aspects that are assembled ahead of time and put together on-site by a master builder. Many houses are also built with bamboo: a material that is easily constructed.

From 1893-1953 Laos was colonized by France. At the same time, in Europe, modern architecture was growing rapidly and spreading its influence around the world. During the French colonial era, French architectural elements were integrated into traditional Lao architecture and modified to suit the climate (hot and humid). The French colonial style and cities including both Vientiane and Luang Prabang (the current and old capitals, respectively). The harmonious combination of traditional Lao architecture and French colonial influences joined to yield a wealth of value to many Lao cities, which have been conserved to this day. This period represents the most significant evolution Lao's architectural history. This paper will study the importance of understanding the modern development of Lao architecture, impact of Nano materials on architectural design and the main forces of changes that occurred as these structures evolved from traditional Lao houses into those influenced by colonial modernity.

French Colonial Architecture (1893-1953)

During the 19th century, many parts of the third World were colonized (i.e., taken over by European nations who were laying claim large swathes of the planet.) Laos was colonized by France during this period and remained a colony from 1893 to 1953. During the French colonial era, France made a modest impact on the architecture of several major towns and cities in-

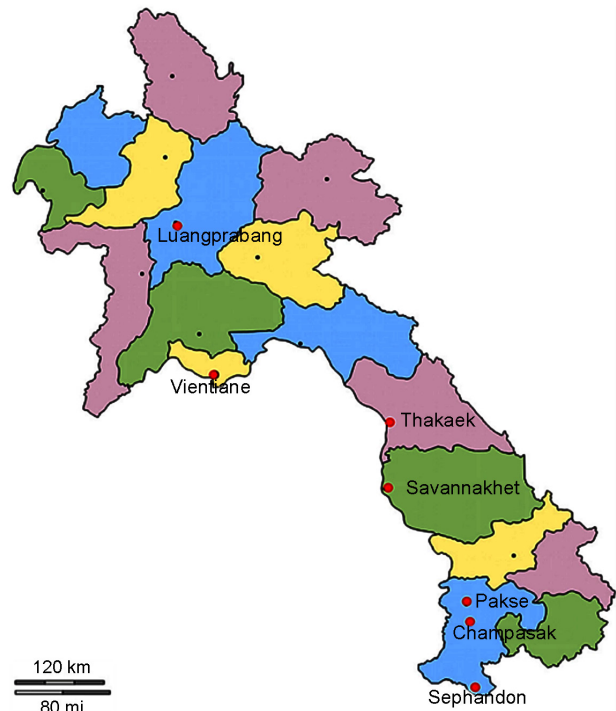


Fig. 1. French Colonial Cities During the Colonial Era (1893-1953) in Lao PDR [6].

cluding Vientiane, Luang Prabang, Thakack, Savannakhet, Salavan, Pakse, Champasak, and Siphandon (Fig. 1). Prior to the arrival of the French, Vientiane was comprised of ramshackle collections of mainly wooden or bamboo stilted houses with thatched roofs, grouped around the overgrown ruins of former temples and palaces. The first major French building to be constructed in the city was the Residence Superior (1900), strategically sited within the former royal palace compound.

During the last 30 years of French rule, a number of large-scale construction projects were implemented. These included the Bureau de la Residence (1915, now the offices of the Ministry of Information and Culture), the Lycee Auguste Pavie (1920, now part of the School of Medicine), the Hotel du Commissariat (1925, now the Lao National Museum), and the Eglise de Sacre-coeur (1930). In addition to government buildings, the French also built two-story brick and stucco villas with pitched tile roofs and wooden shuttered Windows in every major population center in order to accommodate colonial administrators and their families. However, as elsewhere in Indochinese colonies, provincial French design was modified to suit the hot and humid tropical climate through the addition



Fig. 2. Royal Palace, Built by the French for King Sisavangvong between 1904 and 1909, In 1975, the Palace was Converted into a National Museum (Source: Author).

of balconies, verandahs, and internal corridors. Construction was entrusted mainly to migrant Vietnamese laborers, who also built their own two-story shop houses in designated areas.

The design of colonial villas, in turn, began to influence subtle changes in the design of Lao urban dwellings. From the 1930s onwards, in major population centers, the traditional Lao twin gabled wooden stilted house increasingly gave way to inventive architectural hybrids such as European-Style villas on stilts or stilted wooden houses with their lower levels enclosed by masonry walls. Many excellent examples may still be seen today throughout the country, particularly in Luang Prabang. Perhaps the most memorable piece of colonial-era architecture in Luang Prabang is the Royal Palace (Fig. 2). built by the French for King Sisaavangvong between 1904 and 1909 to replace the former royal palace; today, this building houses the Luang Prabang National Museum. The building was intended to cement Franco-Lao relations and features a blend of traditional Lao design, topped at its center by a gilded spire. Above the main entrance, approached via a flight of Italian marble steps, is the royal three-headed elephant crest, which symbolizes the three kingdoms of Laos. French fleur-de-lis emblems also adorn the pillars on either side. The interior decor also features an intriguing mix of European and Asian design elements.

Vientiane Capital City

Vientiane's most notable memorial to its French influence is its architecture. There are numerous small residences, in addition to some mansions, built in the

style of the former colonial power. Many of these may be found in the older parts of town, along the riverside, appropriately designated Quai Fa Ngum. Here, as by the shaded boulevards in the vicinity of That Dam and along Lane Xang Avenue (the "Champs Elysées" of Vientiane), one can find fine examples of colonial French architecture, complete with shutters and red-tiled roofs, which would not be out of place in a French provincial city like Dijon. There is also Patuxai, a near-replica of the Arc de Triomphe in Paris. Many of the former private residences are in stages of advanced decay, and some are clearly beyond saving. Others, however, have been painstakingly restored. Restoration has become increasingly common and authorities have come to realize the potential tourism value of this unique architectural legacy. Preservation according to Nano technology materials, rather than demolition, is becoming the order of the day of the administrators and their families. However, as elsewhere in Indochinese colonies, provincial French design was modified to suit the hot and humid tropical climate through the addition of balconies, verandahs, and internal corridors. Construction was entrusted mainly to migrant Vietnamese laborers, who also built their own two-story rather than demolition.

Luang Prabang (Old Capital City)

New secular building styles were introduced to Luang Prabang as the French gradually assumed administrative control of Laos. There are many colonial buildings in the old town area of the city. Luang Prabang was designated as a World Heritage city in 1995. Many colonial buildings have also registered with the UNESCO heritage list for conservation. Some colonial buildings have been renovated to change the function of the building (for business purposes such as guesthouses, hotels, restaurants, and massage parlors, according to context of the area. The French colonial style still maintains an influence on local architects. Today, you can see many new buildings in the French colonial style. The French also indirectly introduced some elements of Chinese architecture and urbanism. To execute French public works, skilled Vietnamese laborers were imported. These laborers settled near the foot of the peninsula and built their own commercial quarters made from brick. These consisted of

Chinese-style shop houses in rows that faced directly onto the street with living accommodations on the upper floors. All of these architectural styles can still be seen today in Luang Prabang.

Thakaek District

During the French colonial period, Thakaek was an important city, both for trade along the Mekong as well as a defensive outpost on the front lines with the Siamese. As a result of the strong French presence, there are many French colonial style buildings around town from the late nineteenth and early twentieth centuries. The old city was entered on board median plaza that stretched away from the river for couple of blocks. Most of the interesting buildings in Thakaek are within five or six blocks of the plaza in either direction.

Savannakhet District

Legacies of the French colonial period can be found all over Laos, including great tasting baguettes, cheese, good wine, Catholicism, and the mark of all colonial Powers: architecture. The city of Savannakhet in Southern Laos is full of fine, if crumbling, examples of French colonial architecture. Most of these buildings have deteriorated over the years due to neglect, war, and poverty: however, they still retain a sense of romance and history. The most popular and well-known examples of French architecture in Savannakhet include St. Theresa's Catholic Church and numerous colonial shop houses.

Pakse District Located

Located at the confluence of the Mekong and Se Don rivers, Pakse derives its name from the Lao language Pakse "mouth of the river". Pakse offers some fine examples of colonial era architecture such as the pink Franco-Chinese style Chinese society building. Once serving as a French administrative outpost, Pakse is still characterized by a variety of colonial buildings, some of which now function as guesthouses and shops.

Champasak District

This used to be the seat of the Champasak Kingdom. Now, the town is peacefully quiet, and the only reminders of its previous splendor are the fountain traf-

fic circle in the main street and the French colonial style royal residences of Chao Boun Oum na Champasak and Chao Ratsadanai. The town itself is dotted with stunning colonial buildings. Of these, Champasak's hereditary Prince Boun Oun (the former leader of the right wing opposition who fled the country in 1975 after the Communist takeover), is quite possibly the most magnificent colonial building in Laos.

Si Pan Don District

In colonial times, the French attempted to create a cargo route through Si Pan Don, otherwise known as the 4,000 islands, by building a narrow gauge railway across two of the islands. Goods were hoisted from boats sailing up through Cambodia from Vietnam and then reloaded onto new boats above the falls on the Laos side. For this reason, the islands also have some French Colonial influences in their architecture. It is quite intriguing to observe these luscious Asian islands replete with French architecture, such as the Don Khon District Museum (built in 1898) or the now deteriorating colonial building in Don Khon.

The Characteristics of Residential Architecture

Two main types of residential architecture existed during the French colonial period: the traditional Lao style and the French colonial style.

Traditional House Characteristics

A traditional Lao house is a finely-carved wooden house, built high off the ground with hardwood stilts embedded either into the ground or on stones. One must climb steps or a ladder to get inside (Fig. 3). Wooden planks are used for flooring. Wood boards or bamboo are used for siding and either grass or shingles can be used for roofing. The roof is sometimes made of thatch: a thick covering of leaves layered over a roof frame. A thatch roof is much cooler than a tin roof, which seems to turn the house into an oven when the sun beams down on it. The ground floor is much cooler during the middle of the day, making it a more comfortable place to be. (Figs. 4 and 5). Lao villages are often built near rivers and streams that sometimes flood in the rainy season. Building the house on stilts protects against mud and flooding. There is usually a front porch and a clear space inside under the roof that

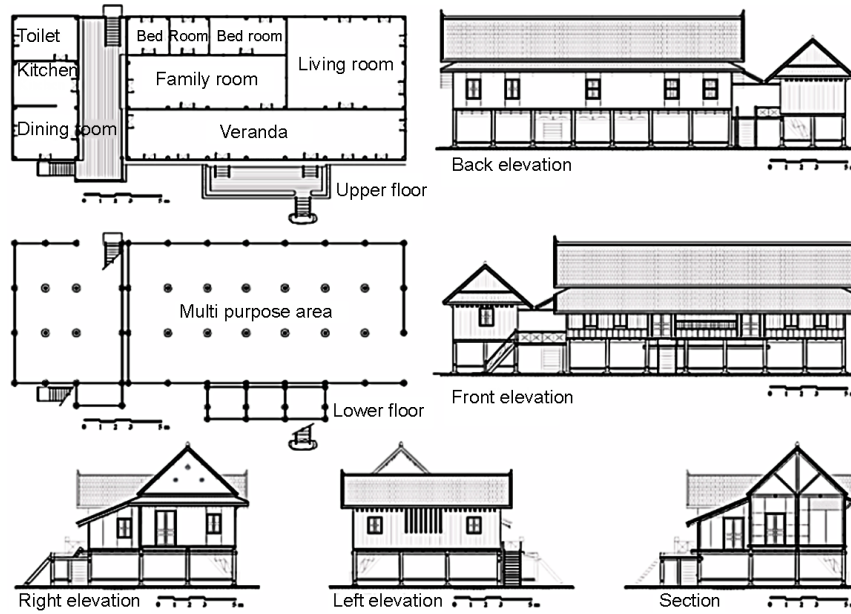


Fig. 3. The Characteristics of a Traditional Lao House, Representative of a Traditional Lao House in Luang Prabang (Source: Author, 2012) [5].

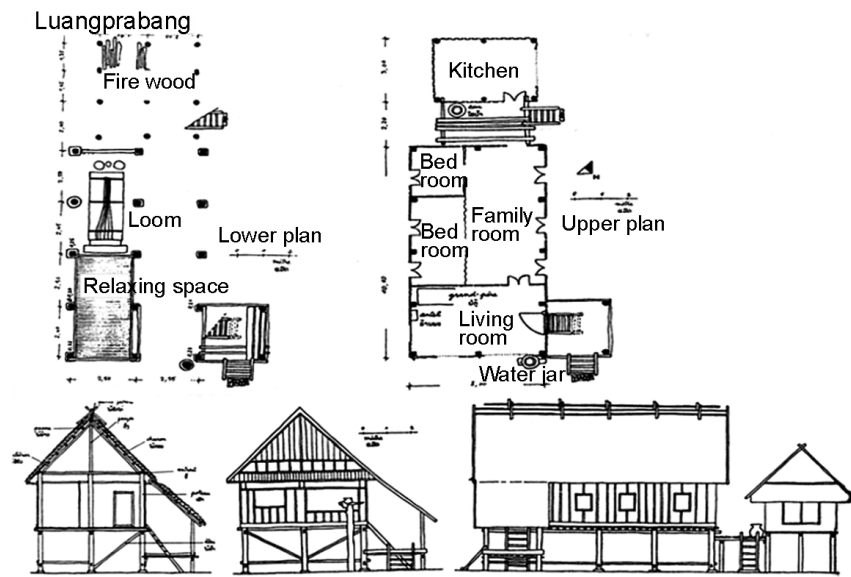


Fig. 4. Traditional Lao House Style in Luang Prabang (Source: Sophie Clement-Charpentier, 1989) [2].

is open to the street. Sometimes there is a room or two walled off at either the back or side of the house. Because the weather is hot, an open house that permits sufficient air flow is desired. Animals can be kept in pens under the house. All the materials are including Nano technology. There may be a bamboo bed under the house as well, for use during the heat of the day. Often there is also a loom for weaving cloth. Usually there is no furniture in the house. The open area serves

as the living room, dining room, and bedroom. People sit and sleep on the floor. A woven reed mat might be put down for company to use. A reed mat or thin fold-up mattress might be used for sleeping and can be put away during the day. The kitchen is usually in the back of the house. People cook over wood or charcoal. They may use charcoal in a clay bucket, like a hibachi, or have a wood fire over a thick bed of sand in box. They might also make a wood fire on the ground in

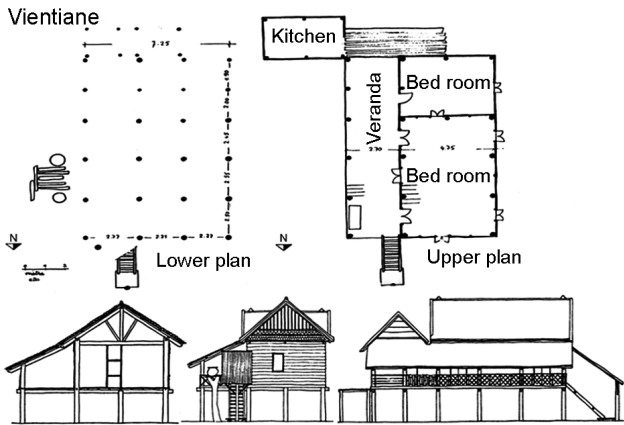


Fig. 5. Traditional Lao House Style in (Source: Sophie Clement-Charpentier, 1989) [3].

the middle of some Stones that are used to balance a cooking pot. The houses are built close together with no real yard. Lao people appreciate company. They can sit on their porches and visit with their neighbors or with people walking by. They prefer living together in a close community and walking to their fields outside of the village as opposed to each family having a house by itself near its fields.

The typology of the traditional house is classified into four distinctive categories according to the building forms such as single roof house, single roof with veranda house, double roof house, and house with kitchen. The main construction materials of the tradition house are bamboo and wood (see Fig. 6).

Colonial Buildings

There were only two types of French colonial buildings constructed during the colonial era: office buildings and houses. The French colonial architectural legacy consists of two-story brick and stucco villas with pitched tile roofs, wooden shuttered windows, and some art deco decoration. The thick-walled structures were modified with balconies and verandahs. The styles were modified according to the traditional art, cultural, and tropical climate of Laos.

In constructing administrative buildings and houses, the French introduced European construction techniques and materials. For instance, the restriction on the use of bricks, which were previously used only

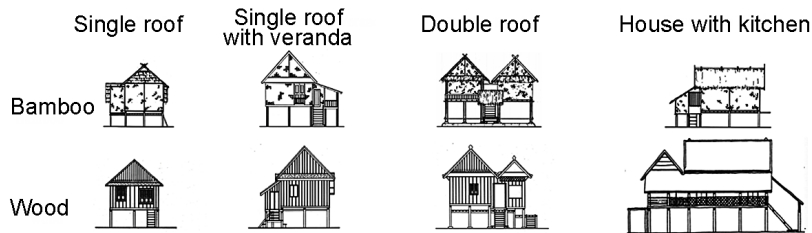


Fig. 6. Traditional Lao House Style (Source: La Maison du Patrimoine, 2001) [1].

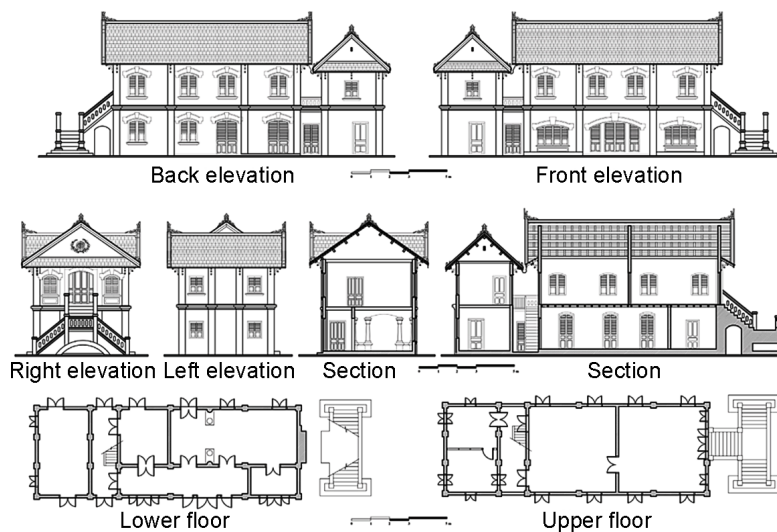


Fig. 7. Residential Building Representative of the Foreign Influence on Lao Architecture (Source: Author, 2012) [5].

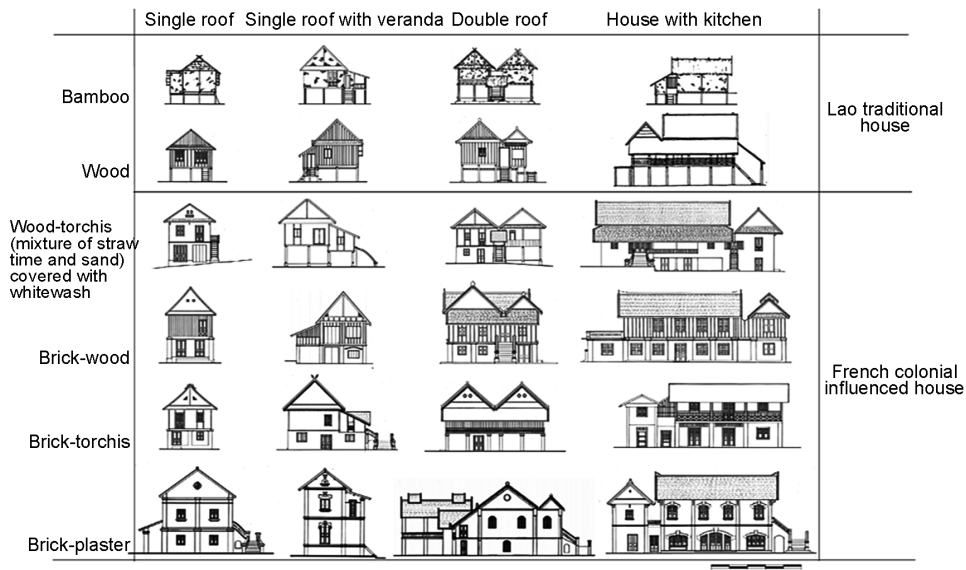


Fig. 8. The Evolution of the Traditional Lao House into the Colonial House (Drawing Source : La Maison du Patrimoine, 2001) [1].

for temples, was lifted. The French, however, did not merely transplant European styles into Laos. Instead, they employed styles developed in Vietnam and produced designs inspired by vernacular temple architecture and secular wooden structures that were better-suited to the warm and humid climate. As a result, a new Lao architectural style emerged. This was based on the indigenous architecture, but freely incorporated French and Vietnamese design elements along with European and Chinese technical innovations. The Laotian royalty and aristocracy, who had previously lived in wooden houses, had new masonry residences constructed in this style.

Analytical Comparison between Lao Traditional Architecture and the Influence of Foreign Architecture Table 2 shows a comparison between a representative traditional Lao house and a French colonial house. The comparison considers the function of the building, form and facade, roof shape, structural system, building composition, and decoration. It shows the characteristics of the styles, materials, structural system, and construction methodology.

The evolution of traditional Lao House into the Colonial House

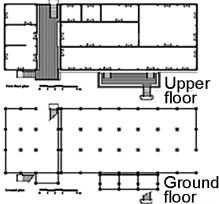
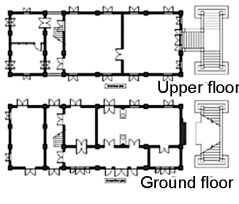
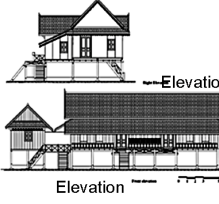
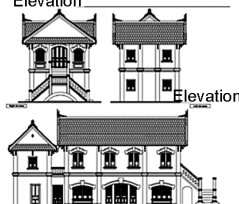
Originally, traditional Lao houses were built high off the ground with stilts embedded either into the ground or on stones. The typology of the traditional house was classified into four distinctive categories according

to the building forms such as: the single roof house, single roof house with a verandah, double roof house, and house with a kitchen. From 1893-1953, under the rule of French colonization, France introduced many kinds of building innovations to Lao architecture, especially to the traditional Lao house. In this era, the traditional Lao underwent a significant transformation. This evolution was made in terms of factors such as the materials, structural system, and some western-decoration styles. Fig. 8 shows the transformation of the traditional Lao house from a structure constructed of wood and bamboo into houses made with wood and torchis (torchis is a mixture of straw, lime, and sand, which covered with whitewash), houses made with brick and wood, houses made with brick and torchis, and finally houses made with brick and plaster including Nano technology specialities.

The influencing Factors that Impact on Traditional Architecture

The transformation of the French colonial era impacted traditional Lao architecture by the introduction of modern materials and technology. Table 1. A comparison between the Lao traditional house and French colonial house, shows the difference and similarity of house function, form, facade, structure, building components and materials, and summarizes the way in which French colonial influence factors impacted on Lao architecture and residential culture including

Table 1. Comparison of the Building Components between a Traditional Lao Building and a French Colonial Building.

Parameter	Traditional architecture		Colonial architecture		Remarks
	Styles	Characteristics	Styles	Characteristics	
Building function		<ul style="list-style-type: none"> - The ground floor is an open space for multiple functions. - The upper floor is a semipublic and private space. 		<ul style="list-style-type: none"> - The ground floor is a semiprivate space - The upper floor is a private space. 	The same shape but different in terms of some functions
Building form and facade		<ul style="list-style-type: none"> - Two buildings - Built high off the ground - Wood building 		<ul style="list-style-type: none"> - Two buildings - Two stories - Brick building 	The same form but different materials and patterns

the reason for transformation in each category. While the French colonial era had an impact on modernization, the advent of colonial government meanwhile changed some traditional aspects of life and culture of the people. Therefore, Lao traditional architecture has been overridden by modern technology and materials. Nevertheless, Western trends, politics, economic, Lao art culture, the local environment and social virtue have all impacted on traditional architecture, thus changing its forms. Such transformation resulted from a combination of traditional building and modern construction techniques in accordance with the new life styles and domestic conditions. The transformed houses have become compact dwellings, modified to the climatic context, with the harmonious combination of Lao traditional architecture and French colonial influences showing the true values and wealth of the city's characteristics.

CONCLUSIONS

This paper aims to present the integration of Lao and European architecture. There was a significant degree of interaction and exchange between traditional Lao and French styles and new Nano technology materials. This study indicates the significant role of national culture, tradition, Nano technology effects in architecture and customary practices on the creation and configuration of the colonial architecture. Lao architecture of foreign influence or French colonial architecture based on traditional Lao architecture was

Lao early modern architecture. Because this influence applied characteristics based on the integration of Lao and French styles, which were modified to embrace the traditional art, culture, Buddhist religion, lifestyle, and tropical climate of Lao, under the impact of Western trends, politics, economics, Lao art culture and the environment, the foreign influences on Lao architecture were very harmonious in form, function, and building composition. Therefore, these buildings were very suitable for the Lao lifestyle, environment, and climate. The foreign-influenced architectural presence transformed the traditional Lao architectural style without eliminating it. Moreover, this only represented the initial step of Lao architectural development. The influences of French architecture, in terms of the construction methodology, structural system, and the introduction of new materials and decorative elements, are illustrated. The successful fusion of traditional architecture and foreign influences, with respect to the native values, characteristics, and motifs, demonstrates the values of heritage and exhibits an important Exchange of human values. These developments in architecture and technology led to what is known today as the Lao early modern architectural style.

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