Mexican fortresses built in the 16th century. Morphology of maritime heritage and historic arsenals preserved

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Abstract

The history of the main Mexican villages is linked to the Spaniard Conquerors and their establishment. Morphology of the three main maritime fortresses in Mexico is related to several European medieval shapes of buildings. Even though the build of the main port *Veracruz* had a wall to protect the village, *San Juan de Ulúa* fortress had a star shaped. The birth of the cities of *Acapulco* and Campeche included star shaped fortresses too. These fortresses assumed the military role of European castles. Geometric regularity was based on the *Quattrocento* Renaissance, and found a perfect shape during the *Cinquecento*. The building of fortresses in Mexico allowed the civilians and authorities more secure places to settle down, and also the missioners started a cohesion work with native people, even though some churches were built with a fortified aspect – also some *haciendas* were built like this – several arsenals were placed along the main silver route, and in some other strategic situations. Although Spain conquered Mexico in 1521, the northern tribes named *Chichimecas* were still in war during the 16th century, and pacification was made slowly through the northern border of *Nueva Galicia* kingdom. So the Mexican arsenals, posts or *presidios* – places where they made or stored military weapons and explosives – were situated, in some cases, every 8 leagues, and helped secure mine production. It is through the conversion of these buildings to museums and interpretation centers that people, especially tourists and students, could comprehend better the national history, significance and the morphology of fortresses and forts. Also this paper could contribute to restoration projects of maritime heritage and historic arsenals.
Keywords: Mexican maritime fortresses, 16th century, morphology, historic forts.


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1 Introduction

Leading research universities in historic preservation in Mexico should focus on maritime heritage and forts too in order to improve new projects and interpretation centers. There are interesting buildings from the 16th century situated along the Mexican territory, especially religious buildings. But maritime fortresses and defensive buildings inside the country still require more historical and architectural analysis. Some of the fortresses are abandoned now and some others are still undiscovered. This paper mentions *San Juan de Ulúa* as the most important maritime heritage of Mexico, because Hernán Cortés the Spaniard Conqueror decided to build in 1519 a fortified place to defend the port of the *Vera Cruz*. The main entrance to Mexico from the Caribbean and from Europe was *Veracruz*. Also the communication roads to the *Aztec Empire* situated in the centre of Mexico started in *Veracruz* and ended in *Tenochtitlan*. Today this communication still remains. The silver belt came from the northern mines, passing through *El Bajío*, the Valley of Mexico and ended in *Veracruz*. Also the fortresses of *San Diego* and *San Felipe de Bacalar* are evaluated in this paper. The morphology of maritime fortresses in Mexico demonstrates that the three fortresses keep a pentagonal shape. But *San Diego* fortress has a regular shape, and 5 bastions surrounding the building, using military engineering principles in the original design. The Spaniards decided to build forts and arsenals in dry land to establish control of the new lands and mines. In the 16th century the northern boundaries of Mexico were in the plain named *El Bajío*, and after the *Chichimeca* War the mines were discovered and new settlements – including forts – colonized the northern territories of Mexico. Several forts and arsenals were set by the side of the main Royal Road which interconnected *Zacatecas* with Mexico City and *Veracruz*, forming a silver belt, fig. 8. *Veracruz* and *San Juan de Ulúa* used to be the main way out of the Mexican silver to Europe – through the Atlantic Ocean. Nowadays we can find several forts and arsenals from the 16th century preserved. But most of the forts have been torn down. This research shall contribute to identify and catalogue historic arsenals and forts that are meaningful to a preservation culture in Mexico.

2 Maritime fortresses in Mexico

In this paper – in chronological order and significance – are mentioned the following maritime fortresses: *San Juan de Ulúa*, *San Diego* and *San Felipe de Bacalar*. The three of these buildings keep a star shape. Spaniard builders brought building design ideas from Spain and Italy. The renaissance of arts influenced on Mexican architecture during the conquest. But also engineers from the Madrid Academy of Mathematics managed the design of *San Juan de Ulúa* fortress.

San Juan de Ulúa recently was considered as one of the 100-world heritage in danger list as well as disappearing site, because of seawater corrosion and wind erosion. This fortress was built to protect the city of *Veracruz* and its treasures from the constant attacks and pirate assaults. Even though *San Juan de Ulúa* was

built in the 16th century, final changes to the main building continued until 1712. *San Juan de Ulúa* was not only a fortress; it became a hospital and also a prison, fig. 1. The Caribbean was a very turbulent sea and *San Juan de Ulúa* played an important role on defending *Veracruz* and Mexico. It is convenient to mention that the main silver routes in México ended in Veracruz, and from that port the silver and other minerals were transported to Europe, mainly to the Bay of Cadiz, so there were a lot of interests of pirates and buccaneers on the Gulf of Mexico and the Caribbean Sea. Also a wall surrounding *Veracruz* was built to help protect the city. Walls have always been used by people to make places a better place to live with a sensation on some kind of protection. Also a wall was built in *Campeche* and there were plans to build a wall to surround Mexico City in the days of the empires in Mexico.

Cortés decided to set up *San Juan de Ulúa*. But later on it was built by Escalante y Gomedel in 1552; basically there were: a tower and a wall with wall rings. In 1570 a design was made based on a defensive castle improving the first building. Cristobal de Erasmo designed at first a complementary tower, but Bautista Antonelli included bastions and battery areas in 1590, fig. 2. *San Juan de Ulúa* became so important that Pedro de Aragón named it: 'the key of the Kingdom'.

Figure 1: Tower, bridges and cells inside *San Juan de Ulúa* (photos Guillén, 2013).

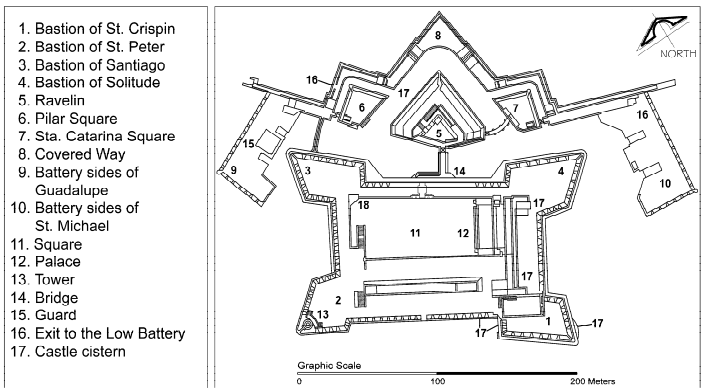


Figure 2: *San Juan de Ulúa* became the main maritime fortress in Mexico. The building design was complemented with new spaces during the 16th century (drawing: Acosta and Guillén, 2014).

The conquest of *Yucatán* was completed in 1546. But the colonization process wasn´t that easy. Some of the most difficult places to conquer were: *Uaymil*, *Ekab* and *Chctemal*. But *Bacalar* was the most important human settlement in the Mayan Riviera. *San Felipe de Bacalar* fortress was built in 1726 to help pacify the Indian tribes in the Peninsula of *Yucatán*. In *San Felipe de Bacalar* the bastions are solids with no room inside. The building is surrounded with a fossa. There were 60 soldiers, a captain and a sergeant at the beginning. In the middle of the 19th century in the War of '*Castas*' the fortress had a lot of defensive activity. Then the building was abandoned, becoming a ghost fortress.

San Diego fortress was built originally in the 16th century. But there was an earthquake in 1776 and the old building was torn down. So in 1778 was built a new fortress to protect the city of *Acapulco*. Final complements of the building were finished in 1783. The Manila Galleons used to arrive to *Acapulco* in those days, making possible a commercial route from Manila – in the Spanish East Indies – to Mexico trough the Pacific Ocean. This route lasted from 1565 to 1815. The Manila Galleons carried largely Chinese goods. Engineer Miguel Constanzo designed a restoration project to make the bastions more regular, according to the newest fortification criteria in the 18th century.

3 Morphology of fortresses in Mexico

The fortresses of *San Felipe de Bacalar* and *San Juan de Ulúa* have clear ravelins and very similar shapes. But *San Diego* Fortress includes five bastions surrounding the building, fig. 3. The three fortresses still keep a pentagonal shape. But *San Diego* fortress has a regular shape. The 5-sided polygon is symmetric. Even though I refer to a convex pentagon the bastions make angles pointing inwards, making a perfect place to install attacking points from the fortress to any point outside, fig. 4.

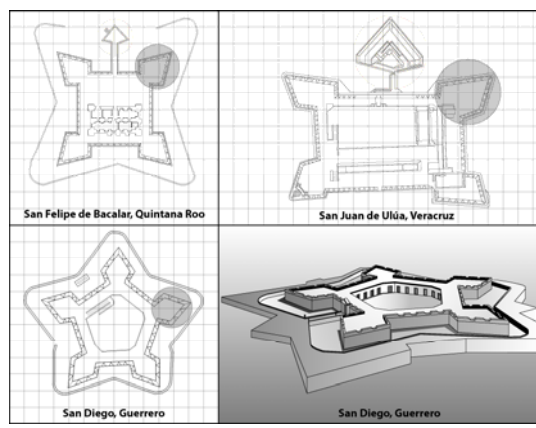
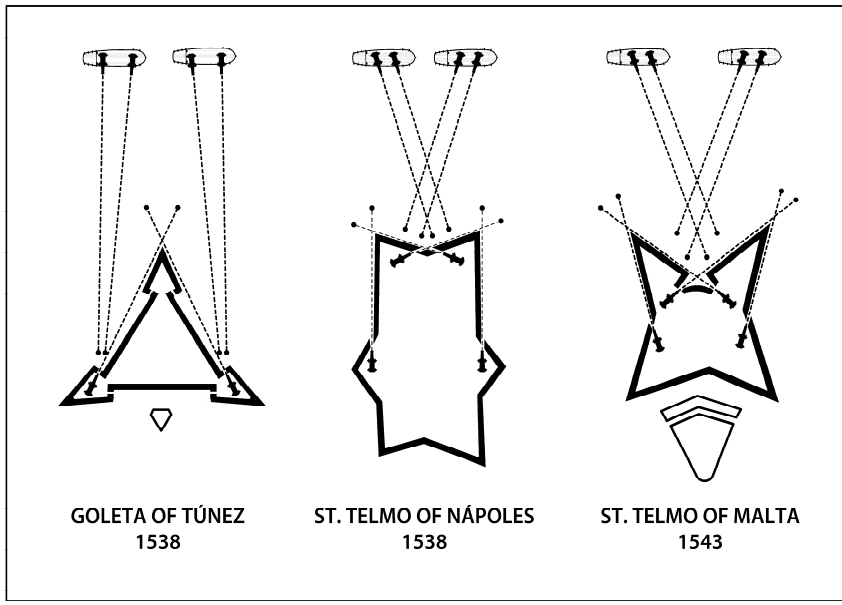


Figure 3: The fortresses of *San Felipe de Bacalar* and *San Juan de Ulúa* have clear ravelins and very similar shapes. But San Diego Fortress includes five bastions surrounding the building (drawings: Acosta, Andrade and Guillén, 2014).



(a) (b) (c)

Figure 4: Discussions of the defence of the coastal forts: Comparative layouts with the arcs of defensive and attacking fire according to the deliberations of Escriva's treatise of 1538. (a) The initial design for la Goleta, Tunis (1538). (b) St. Elmo, Naples, 1538. (c) St. Elmo, Malta, 1543. They focus on the batteries whose position offers the greatest threat, on the isthmus, the ridge and the peninsula respectively. Drawing reinterpreted by Acosta, based on Chías and Abad [1].

Morphology of fortification models depended on the designer and the geographic situations. Chías and Abad [1] mentions that the strategy applied consisted of fortifying and controlling the access to all the major ports of the Western Mediterranean with castles, in effect often garrisons with enemy territory on all sides, whose role was not so much protection on of the port for the use of the Spanish fleet, as denying access to any other fleet. This is the case of the fortresses of el *Peñón of Algiers*, *la Goleta* at Tunis, or of those of the *Stato dei Presidi* on the Tuscan coast. With home ports the key location was the point of the bar on the inlet, with fortifications specifically designed for the position. The 1538 treatise of Escrivá had outlined a system of pincer fortification without bastions which could be adapted without loss of effectiveness as much for the waterline on coastal points as for the mountainside overlook inlets, as at the *San Telmo* project in Naples or in the castle of *Mers-el Kebir* at *Oran*, fig. 4.

The fortresses designers always considered the parabolic shots and the study of ballistic methods. These concerns included the study of the situations where

the defences were going to be built, in order to improve castles resistant to piracy to the greatest degree possible those days.

Gutiérrez [2] mentions that the idea of configuring a scientific base on building fortresses first appeared in the book of Tartaglia in 1546, articulating the shape of buildings with the capacity of heavy artillery – moved on wheels. Tartaglia visualized that progress of armament would continue through the time, producing important changes in the way fortified cities controlled adjacent lands. This idea was developed by the French Sébastien Le Prestre de Vauban after one century. Another Italian treatise was Francesco De Marchi, whose paper: *Della architettura militare* was sent to Felipe II. The document is still preserved in the National Library of Madrid. During the empire of Carlos V some Italian engineers worked building fortresses in several countries of Europe. So we could find engineers like II Castriotto built in France, Francesco Pacciotto in the Netherlands, Lorini in Flanders, and Floriani in Germany and Austria. In Spain the Italian Tiburcio Spanoqui and the Antonelli family had a decisive role in military architecture in the Iberian Peninsula and in America. So the *Cinquecento* principles had great influence in fortresses of Europe and America.

The three study cases of maritime fortresses in this research were designed as medieval star shaped forts using military engineering principles. The star fortress design – with no dead zones – made fortresses more efficient in attacking and defending surrounding areas, fig. 5.

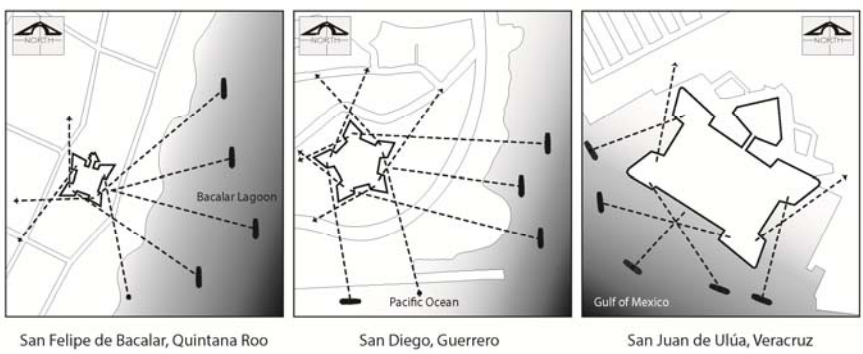


Figure 5: Star fortresses in Mexico keep a defensive morphology. The fortresses were built depending on geography and in strategic situations (drawings: Acosta, Andrade and Guillén, 2014).

There were three fortresses built – named castles – in the United States of America that used the star design and they looked alike in shape: the castle of *San Felipe del Morro* and the castle of *San Cristobal* in *San Juan de Puerto Rico*, and the castle of *San Marcos* in St. Augustine, Florida. The fortifications of *San Marcos*, Florida and *San Felipe de Bacalar*, Quintana Roo in Mexico are very similar in shape.

4 Forts and arsenals in dry land

The first Spanish settlements in Mexico are related to forts that helped pacify the conquered places. Evolution of guns helped to make the new settlements more secure. At the beginning of the conquest of Mexico it was focused basically in the Valley of Mexico – situated in the centre of the New Spain – just where the leader tribes like the *Aztecs* lived. The conquest continued in the north of Mexico against the *Chichimeca* tribes during the 16th century. The Spaniards decided to build forts and arsenals in dry land to establish control of the new lands and mines. Also they found that in *El Bajío* plains agriculture was a very productive activity because of conditions of soil and climate. It became necessary to build forts in the central plains of Mexico to protect agricultural areas, fig. 6.

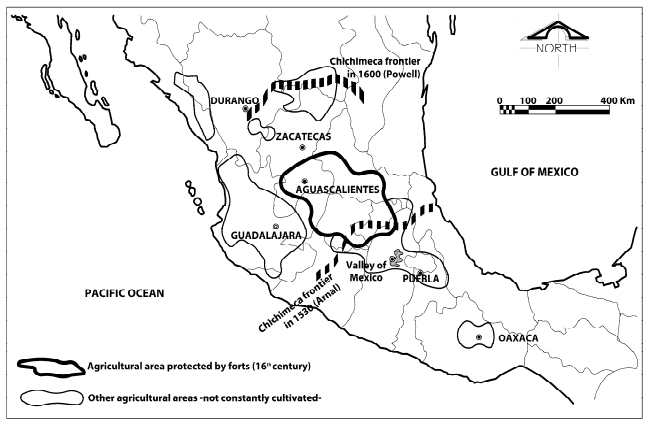


Figure 6: The Chichimeca War occurred between the two frontiers indicated in the map. Drawing reinterpretation: Acosta and Andrade, 2014, based on: Arnal [3] and Powell [4].

According to Arnal [3] the *Chichimeca* frontier was situated in the northern of the Valley of Mexico, fig. 6. But Powell [4] assures the frontier in the middle of the 16th century was in the northern of Zacatecas, fig. 6. In fact the *Chichimeca* War occurred basically between these two frontiers.

The conquest of Mexico was made from *Veracruz* to the Valley of Mexico and then to the northern side and the southern side of the Valley of Mexico. But the most difficult lands to be conquered were in the north. So it became necessary to settle people in strategic places with the help of forts and arsenals. This contributed to pacify the *Chichimeca* tribes and set '*Intendencias*' along the territory from the 16th century to the 18th century.

In the 16th century the northern boundaries of Mexico were in the plain named *El Bajío*, and after the *Chichimeca* War the mines were discovered and new settlements – including forts – colonized the northern territories of Mexico. After the Independence of Mexico the northern border was California. Also in the constitution of 1824 the geographic boundaries of the states were defined, fig. 7.

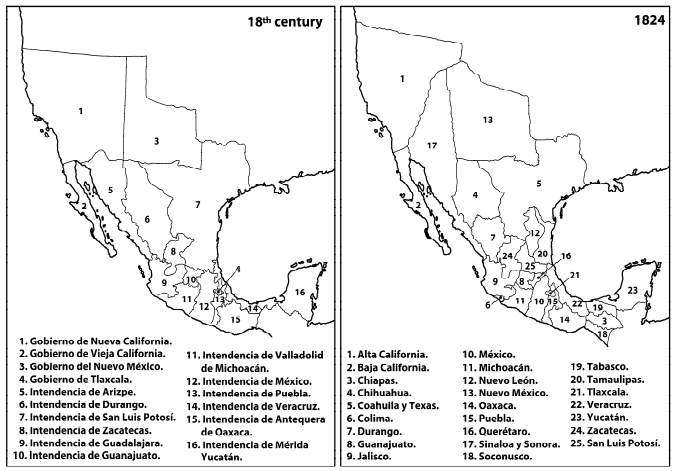


Figure 7: Governments and 'Intendencias' were set in Mexico after de 'Chichimeca' War in the 18th century. But in the constitution of 1824 states' geographic boundaries were defined in Mexico. Drawing reinterpretation by Acosta, 2014 based on Goldin [5] and Salvat [6].

The Spaniards focused their efforts to find silver mines in Mexico in the 16th century, and pacification of the conquered territories was important. Several forts and arsenals were set by the side of the main Royal Road – or Silver Road – which communicated *Zacatecas* with Mexico City and *Veracruz*, forming a main silver belt, fig. 8. *Veracruz* and *San Juan de Ulúa* used to be the main way out of the Mexican silver to Europe – through the Atlantic Ocean.

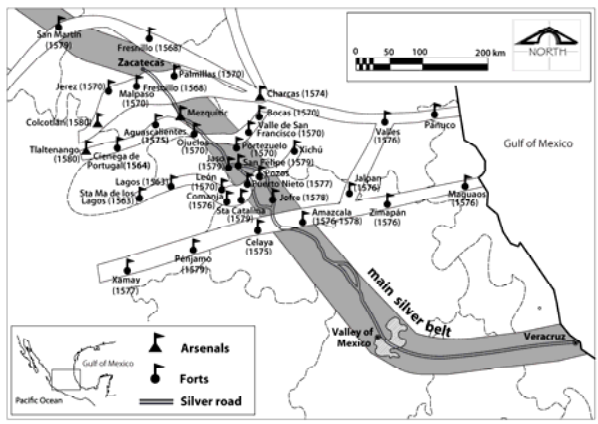


Figure 8: Forts and arsenals were set by the side of the main Royal Road that communicated Zacatecas with Mexico City and Veracruz, forming a main silver belt. Drawing reinterpreted by Acosta and Andrade, 2014, based on Arnal [3].

5 Conclusions

The results of this research demonstrate the importance of fortresses like *San Juan de Ulúa, San Felipe de Bacalar*, and *San Diego*, among other fortified places in Mexico. *San Juan de Ulúa* was the main fortress in Mexico. Nowadays a lot of containers and cranes surrounding the fortress complicate preservation activities. Also at *San Diego*, people started to build new buildings very close to the old fortress.

Cejudo mentions in: González [7]: The declaratory of *San Juan de Ulúa*, fig. 9, Cartagena of the Indies, Portobelo, and Old Panama, as UNESCO World Heritage Sites recognize the old character and historic value of military architecture, and also the job of military engineers, like Juan Bautista Antonelli, Bautista Antonelli, Juan Bautista and Cristobal of Roda, the treatise writers and the people who defended the fortresses.

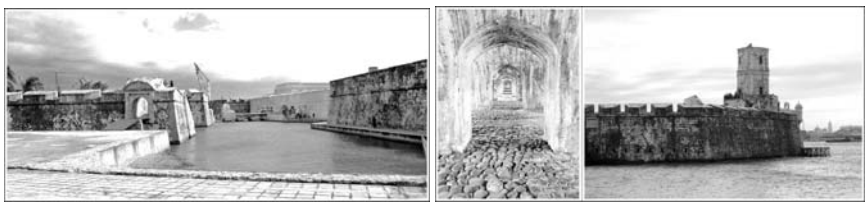


Figure 9: *San Juan de Ulúa* was recently recognized as UNESCO World Heritage Site (photos Guillén, 2013).

In fortresses like *San Juan de Ulúa* a reinterpretation area is necessary to demonstrate concepts of the place and its architecture, especially if the fortress was built in the 16th century. The study of history and archaeology could contribute to obtain better results in restoration works – and not only make the place look like a brand new building, fig. 10. Leus and Arckens [8] mention: interpretation exceeds mere description of what was found and offers the visitor the possibility to have an emotional interest in the archaeological heritage: interpretation and presentation provide the visitor with an emotional experience.

Figure 10: *San Juan de Ulúa* recent restoration and the masonry – with hard coral substances in the walls (photos Guillén, 2013).

The museums should encourage the preservation of defence sites heritage by documenting their significance. The recent renovations should include archaeological research in order to justify new appearances of restored architecture.

The comparative studies in this paper allowed concluding that a basic morphology of fortresses was brought from abroad – basically from Spain and Italy. But the Spaniards made the *genius loci* an important principle to design defence buildings in local geographies. Also the fortresses reflect defensive ideas from the *Cinquecento*. The star shaped building was used in the main fortresses of Mexico. The main maritime fortresses in Mexico made the country a more secure and prosperous place.

Fortresses and military posts in Mexico helped protect the gold and silver produced from mines in the New Spain. Also they were used to show power, to house historical events – like the beginning of the second empire, and also contributed to the development of *Mexican haciendas*. There were found 35 forts and arsenals in this research.

In Aguascalientes the main fort was situated beside the Cathedral in the main square of the historic centre, fig. 11. But there is still standing only a bastion from a corner. Also there is only one drawing of a fort made in the 16th century, fig. 12, Arnal [3] mentions that the sketch was probably drawn by Luis Carvajal.

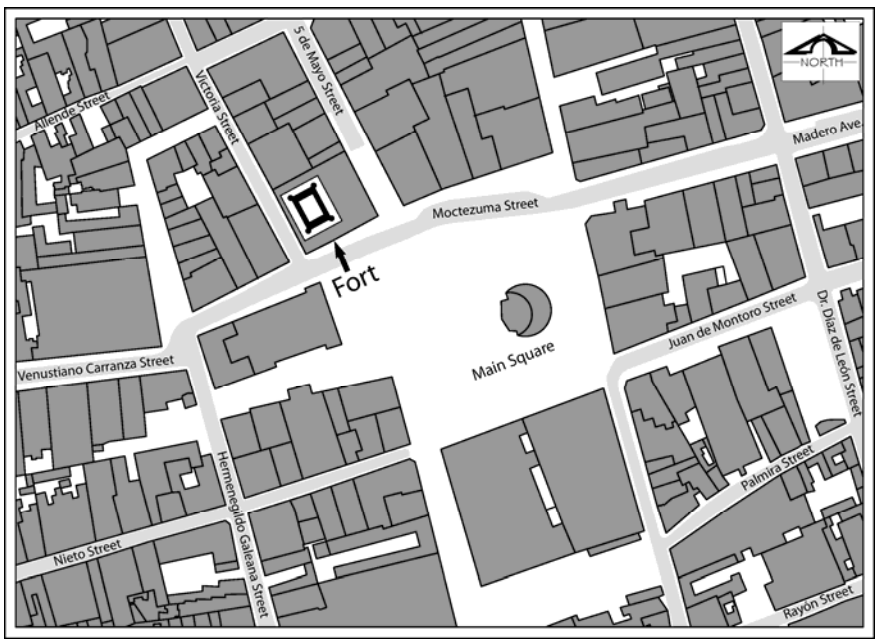


Figure 11: In *Aguascalientes* the main fort was situated beside the Cathedral in the main square of the historic centre. (Drawing: Acosta, Andrade and Guillén, 2014).

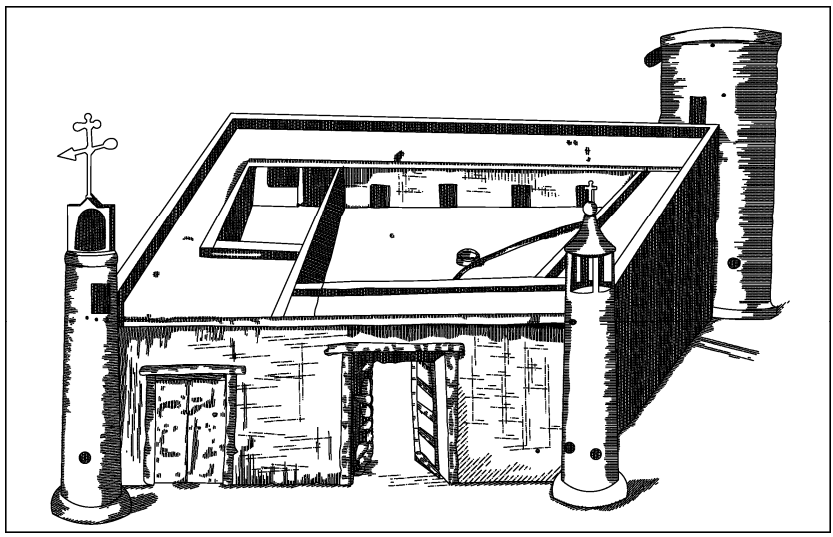


Figure 12: Replica of an original drawing of a fort – made in the 16th century – (drawing: Acosta, Andrade and Guillén, 2014).

It is convenient to recognize nowadays the cultural value of historical maritime fortresses in Mexico. Also there are still historic forts and arsenals from the 16th century in dry land to be preserved.

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