

# Naval professional qualification in the Amazon state

Formación profesional naval en el estado amazónico

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## Abstract

This article aims to report the efforts that have been made in the Amazon State for Naval professional qualification from 2004 up to now. And it is justified by the position of the Amazon State as one of largest Naval Brazilian Poles, so it is necessary to qualify professionals to meet the demands of construction, repair and maintenance of fluvial vessels in the shipyards. Partnerships with government institutes for education qualified shipbuilding technicians; and partnerships with private universities and other nongovernmental organizations sought to provide a new way of thinking for engineers and architects who were unaware of the naval market. The standards applied in the trainings and their respective focuses will be presented here, and the results will show the synergies created with other universities, the market, the shipyards and the professionals who were qualified.

**Key words:** Amazon, Professional Qualification.

## Resumen

Este artículo tiene como objetivo presentar los esfuerzos que se están haciendo en el Estado de Amazonas para la formación profesional naval, desde 2004 hasta la actualidad. Teniendo en cuenta la situación de que el Amazonas está ubicado entre los más grandes polos navales de Brasil, se hace entonces necesario formar al personal para las demandas de construcción, reparación y mantenimiento de las embarcaciones fluviales en los astilleros. Las alianzas con institutos de educación profesional del gobierno, formaron técnicos en construcción naval y las alianzas con instituciones de enseñanza superior privadas y otras organizaciones no gubernamentales, buscaron formar nuevas visiones para los ingenieros y arquitectos que desconocían el mercado naval. Se presentarán en el artículo los modelos de cursos aplicados y sus respectivos focos, y los resultados de las sinergias con otras instituciones de enseñanza superior, con el mercado, con los astilleros y con los profesionales formados.

**Palabras claves:** Amazonas, formación profesional.

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## Introduction

### A Brief History of the Naval Sector in Brazil

Sivar Hoepner Ferreira, from the Paulistana Academy of History, in the work "Note on Naval Construction in Brazil in the XVII and XVIII Centuries", describes that, at the time of the great navigations, Brazil was contemplated with the installation of shipyards for repair and maintenance of wood vessels in its coastal, due to its strategic geographical location in relation to the "Route to India" and also for having wood in abundance to be used as input for the shipyards.

In 1549, Tomé de Souza, a Portuguese military and politician, came to Brazil and brought in a group of qualified professionals to work in the shipyards, such as: construction masters, naval carpenters, calligraphers, blacksmiths and other ones able to teach the Portuguese workers and "mestizos" who already lived in the country.

In the end of 1500th year, in Bahia, by that time the capital of Brazil, the first shipyard called Ribeira das Naus was settled to repair and maintain the Portuguese's vessels.

In 1663, the capital of Brazil was transferred to Rio de Janeiro and it was created the Navy Arsenal of Rio de Janeiro.

In 1767, the first ship built in Brazil, named "São Sebastião", at the Navy Arsenal of Rio de Janeiro was launched.

In 1770, the Ribeira das Naus Shipyard, located in Salvador, was renamed for the Navy Arsenal, and was extinguished in 1899. A plant dating from the 18th Century indicated an imposing set of buildings of approximately 300,000m<sup>2</sup> in size, including paths of raw logs, workshops, warehouses, barracks and boilers (closed basin).

In 1874, according to information from the Santa-Anna Nery Baron the first European vessel, with Danish flag, arrived in Manaus from Hamburg. It was a sailing boat weighing 263 tons.

In 1937, the São João Shipyard was settled in Manaus, Capital of the Amazonas State, it is considered the oldest shipyard in operation in Brazil.

In 1945, after the II World War, the West began to use more iron and steel vessels, thus opening up new demand for shipyards that had previously worked almost exclusively with wood.

Since 1970 many shipyards have been opened in Manaus, which began not only to manufacture wooden vessels, but also iron and steel vessels; the ferries, tugs and pushers are not only the most manufactured ones, but also the most suitable ones for the transportation of cargoes to the inland navigation.

In 1996, a new option of transport was created, aiming to serve the country side of the Amazon. It is exclusive for passengers and hand luggage, it is made of aluminum hull and it's called "Expresso", as its speed is well above the regional boats, thus reducing travel time.

In 2000, forced by the difficulty in obtaining the wood from legal origin for the construction of the hulls in the state of Amazonas, the shipyards began to renew the fleet of mixed vessels (transport people and cargo) to the iron and steel hull.

And from 2010 on, due to the demand of agribusiness, called "Arco Norte", in the country side of Brazil, the vessels needed to be modernized again to bring the grains in their rafts and pushers through the Amazonian rivers.

### The range of the Naval sector

The naval sector has three major divisions that strongly complement each other: the transport of cargo and people, the terminals and ports, and shipbuilding. As this article is about professional qualification in the naval sector, we will focus specifically on this topic. Following:

- The transportation of cargo and people in waterway or waterway modal is carried out in boats. In the Amazon there is the mixed transportation, that is, in the same boat loads

- and people can be transported. In addition, there is the cargo transport that carries both general loads and bulk. The crew that works on the vessels is qualified in the Instruction Centers of the Brazilian Navy; there is one these in Manaus and another one in Belém in Pará;
- Terminals and ports are the places where vessels dock to leave people, luggage and cargo. In Manaus there is a Public Port that serves mixed vessels and cruises. And there are 2 private terminals that serve the vessels that do cabotage or long haul, bringing cargoes. There is a Port Labor Management Organization (OGMO) that develops the professionals who work both in the warehouse and in the wharfage. However, the Private Terminals began to promote internal training, thus bringing more productivity to the port activities;
  - Shipbuilding occurs in shipyards that offer the services of manufacturing, maintenance and repair of vessels. Thus, it requires Professional, supervisors, engineers, architects, etc., who need to be experts in the building vessels that are certified and classified according to Brazilian Navy standards in order to be approved for sailing.

In this article we are going to talk about the Naval Construction Professional.

### Navigation in the Amazon

In the Amazon State most of the existing highways are non-transitable, besides BR 174 that goes from the Amazon to Venezuela, thus the waterway is the most used modal of transportation. The Amazonas is the best river known but there are several other tributaries that also need to be navigated.

In this way in the Amazonas states several modals of navigation, such as: long haul, cabotage, inland and crossing navigation:

- a) The cabotage and long-distance vessels usually transport unitized cargo to the Industrial Pole of Manaus (PIM);
- b) The vessels that do inland navigation come from the States and Countries surrounding the Amazon State, and they perform mixed transport (load and people). There are also the ones that are exclusive to bulk transport from the center of Brazil to the ports of the North, performing the inland navigation;
- c) In the inland navigation, there are also those that only transport passengers; those travel in a very high speed, as a result the duration of the trips between the cities in lower;
- d) There are boats that do crossing navigation. Those are propelled boats that transport cars and people from one shore of the river to another, thus facilitating road trips; and
- e) Finally, there boats used for sports and leisure, they are minority, but they make small inland routes on the weekends and holidays.

### Demand for the Naval Sector

According to the ANTAQ (National Agency for Water Transport) there has been a significant increase in what we call “Arco Norte”, that is, transportation of grains (soy and corn), which passes through the private port of Hermasa, in the city of Itacoatiara, 269 km of road from Manaus, according to Fig. 1.

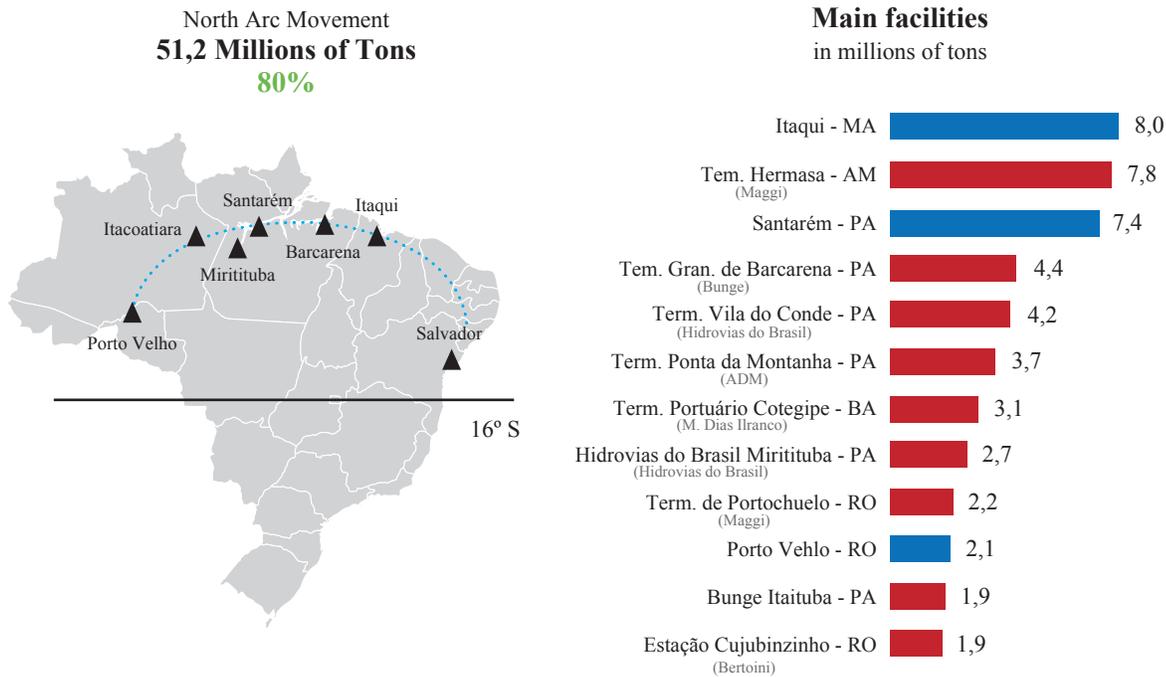
Data from 2017 show that Brazil handled 64% of in bulk solid cargo. Iron ore, soybeans, containers and corn were the four main goods exported to China, the Netherlands and Japan.

The data show that from 2010 to 2017 the “Arco Norte” went up from 23% to 41%; That is, all the indicators show that this demand is notorious and it has to be covered meaning that manufacture, maintenance and repair of vessels must be supported.

In order to drain the grains the rafts and the pushers need new technologies and maintenance.

As per what was seen above, there is demand for the naval sector, mainly coming from the

Fig. 1. North Arc Movement in 2017.



Source: ANTAQ.

transportation of grains (soy and corn), better known as “Arco Norte”.

## Material and Methods

The material for this work is the technical qualification courses of the naval sector that have started in 2004 with qualification courses in Naval Construction technology, then the technical qualification courses, the undergraduate course and the extension courses. All of them run in partnerships with educational institutions. Some of them are still in place in the institutions.

The method used was ethnography, which is based on observation and hypothesis analysis, where observers sought to describe what is happening in the context (naval sector) with the subject researched (professional qualification).

Due to lack of information, quantitative data were not available; therefore, the analyzes and results were qualitative.

The SWOT Analysis tool will be used to identify the characteristics of each variable (naval sector training course). This technique was founded by Kenneth Andrews and Roland Christensen and was intended to aid and improve business strategic planning in the 1960s and 1970s. The term "SWOT" stands for strengths, weaknesses, opportunities, and threats. It is a management tool which main purpose is to evaluate the internal and external environments of the business.

## Results

The Naval Sector qualification training in the Amazon Chronology

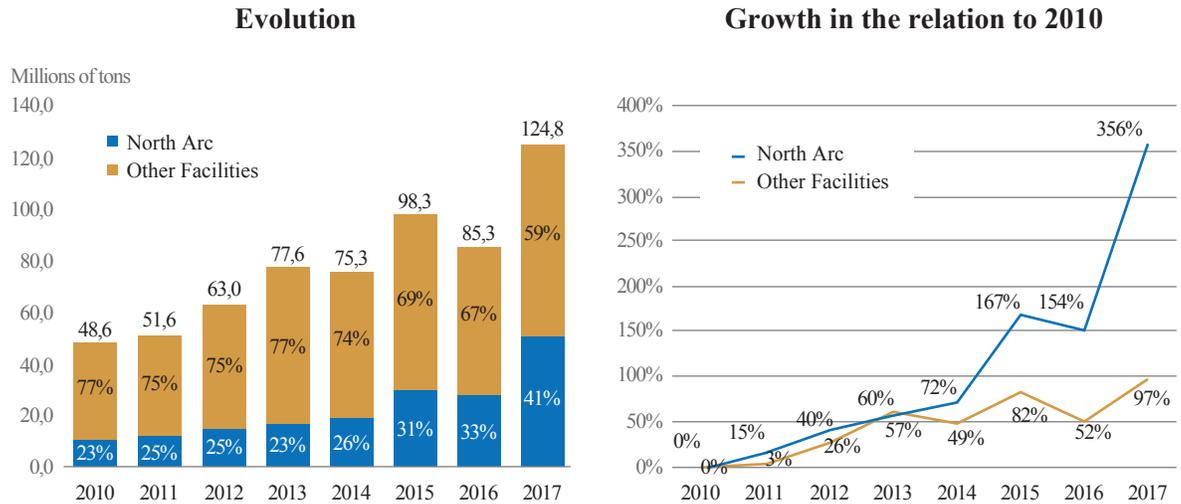
### 2004

**ULBRA** (Lutheran University of Brazil) launched the first course in **Naval Construction Technology**, in Manaus.

*Duration:* 3 years.

*Strength:* pioneer in training professionals to work

Fig. 2. Evolution of the Northern Arc.



Source: ANTAQ.

in the shipyards in Manaus.

*Weakness:* difficulty in getting teachers; It was a paid course.

*Threat:* value of benefits, little interest, profession not valued; for this reason, it was terminated in the 3<sup>rd</sup> Class.

*Opportunity:* could have partnered with shipyards or other institutions.

### 2007

**UEA** (University of the Amazonas State) in partnership with **Hermosa Navegação da Amazônia**, a company of cargo transportation through the Amazonian rivers, aiming to train their own labor for the maintenance of their rafts and pushers, launched the Naval Construction Technician qualification course in Itacoatiara, a city 270 km distant from Manaus.

*Duration:* 3 years.

*Strength:* Pioneer in the technical training courses of naval construction and in the formation of employees for the sector.

*Weakness:* the teachers were the staff themselves, however, due to the inability to deliver the classes, they had to hire teachers.

*Threat:* the distance from Manaus made it difficult for the teachers to teach the courses in the city. As a result, the course was delayed and completed only in 2012.

*Opportunity:* They could have done more classes to qualify more employees of the company.

### 2008

**UEA** (State University of the Amazonas State), in partnership with the Secretariat of Planning of the Amazonas State (SEPLAN), aiming to attend the fishing production chain, launched the Naval Construction Technology training course in Novo Airão, a city located 194km from Manaus.

*Duration:* 3 years.

*Strength:* First course of Naval Construction Technology in the inland.

*Weakness:* difficulties to have teachers travelling all the distance to teach.

*Threat:* as it was a project, the training course was unique to these students.

*Opportunity:* courses were later opened in Tefé (522 km distant from Manaus) and Itacoatiara (270 km distant from Manaus).

### 2013

**CETAM** launched, (Technological Education Center of Amazonas) in partnership with the Brazilian Navy (**MB**), aiming to train technicians to work on shipyards in the construction, repairs and maintenance of vessels in the region, at the same time the **Naval Construction Technician training course** in Manaus and Tabatinga

(1,106km distant from Manaus).

*Duration:* 2 years.

*Strength:* First Naval Technician course in the Capital and states country side.

*Weakness:* difficulties to teachers to go to teach classes, both in Manaus and in the country side.

*Threat:* The target audience has low level of education, as at least a high school degree is required and those who had interest often had no such educational level.

*Opportunity:* Classes were offered in Manaus from 2013 to 2017, up to now 4 classes have graduated.

### 2013

**UEA** (State University of the Amazonas State) launched the **graduate course in Naval Engineering in Manaus**, in order to meet the needy naval engineers demand in the State. The first class of naval engineers graduated in 2017.

*Duration:* 5 years.

*Strength:* Manaus had less than 10 naval engineers registered in the Regional Engineering Council and needed to train these professionals.

*Weakness:* difficulty to find teachers qualified on the area demands.

*Threat:* student avoidance for other engineering courses.

*Opportunity:* creation of specialization courses in Naval Engineering.

### 2014

**CETAM** (Technological Education Center of Amazonas) aiming to train technicians to work in ports and waterway terminals launched a 2-year Technical Course in **Freight Transportation in Manaus**.

*Strength:* First Technical Course of Freight Transportation in Manaus.

*Weakness:* Difficulties with qualified teachers in the area.

*Threat:* The target audience has low level of education, as at least a high school degree is required and those who had interest often had no such educational level.

*Opportunity:* Partnerships with port and terminal companies could have been made. Only one class graduated.

### 2016

**UNIAMAZONIA** (Free University of the

Amazon) aiming to present the naval architecture to the engineering and architecture courses academics and professionals who work or wish to work in the naval sector, launched the Extension Course in Naval Architecture in Manaus.

*Duration:* 32 hours.

*Strength:* First extension course in naval architecture in Manaus.

*Weakness:* short course load.

*Threat:* lack of incentive for institutions to promote extension courses.

*Opportunity:* to do other extension courses exploring all areas of the naval sector.

### 2018

**FACULDADES LA SALLE** aiming to present the naval architecture to academics of the engineering and architecture courses and professionals who work or wish to work in the naval sector, launched the **Extension Course in Yachts, in Manaus**.

*Duration:* 32 hours.

*Strength:* Second extension course in naval architecture in Manaus.

*Weakness:* short course load.

*Threat:* lack of incentive for institutions to promote extension courses.

*Opportunity:* to do other extension courses exploring all areas of the naval sector.

### 2019

**UEA** (State University of the Amazonas State) will launch a specialization course in Naval Engineering in Manaus. Up to the moment there is no detail of the course.

### OTHERS

In 2017 the Naval Institute of the Amazon ministered the course of Maritime Transport and Port Logistics in Manaus.

*Duration:* 8 hours

Over the years there has always been qualification courses offered by some shipping companies that train and advertise their product (*Caterpillar and Cummins*). The quantitative results can be seen in Table 1, which presents the number of vacancies offered by courses since 2004, that is, 15 years. Showing that 692 positions were offered in all categories. The technician's category was most attended one.

Table 1. Number of vacancies offered by courses since 2004.

Institutions	Technical	Technology	Engineering	Extension
ULBRA		150		
UEA/HERMASA	40			
UEA		120		
CETAM/MB	80			
UEA			60	
CETAM	200			
UNIAMAZONIA				15
INSTITUTO NAVAL DA AMAZONIA				12
FACULDADE LA SALLE				15
<b>TOTAL</b>	<b>320</b>	<b>270</b>	<b>60</b>	<b>42</b>
<b>PERCENTAGE BY CATEGORY</b>	<b>46%</b>	<b>39%</b>	<b>9%</b>	<b>6%</b>

## Conclusions

Since 2004, the Amazon has been active in order to train professionals for the naval sector, however, the results achieved still not promptly meeting the needs of the existing shipyards in Manaus.

The negative aspects are numerous, but the ones that most stand out are:

- a) The lack of specialist teachers in the naval sector, it is noteworthy that we had help from FATEC-JAHÚ technologists who lived in Manaus and contributed considerably as teachers in the courses;
- b) The target audience, students, with low level of educational degree. The Technical level requires that you have at least a high school degree;
- c) The low investment of educational institutions in this branch. Colleges do not open courses for the naval sector;
- d) The Shipbuilding Union of Amazonas does not undertake to participate in this initiative; and
- e) The informality of the shipyards makes them accept unqualified professionals and certifications, promoting themselves training for the employee's adequacy to the work.

The good aspects are:

- a) The formation of several levels of professionals, from the technician through the technologist to the naval engineer with quantitative limitation, but that already have awakened another look for the professional that chooses this branch of the naval sector. Whereas, in the last century, workers were not even valued as professionals;
- b) At the Bertolini Construção Naval Shipyard, considered one of the best in the northern region, several professionals, technicians and engineers were hired; and
- c) Students who have already completed the technical courses continued studying, graduating in engineering and related areas.

We have verified that the opportunity we have to be in the region where the “Arco Norte”, which transports grain from the country side of Brazil to the outside, can be the door to open more courses in our region to meet the construction of vessels, but mainly maintenance and repairs on the sailing vessels.

But for this to happen, it will require a partnership between academia and the market so that professionals can be trained here in the state of Amazonas.

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