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THE AMAZON

The Amazon region of Brazil has experienced a marked increase in shipping activity in recent years on account of the exportation of products such as iron ore, bauxite and grains, especially soyabeans and corn.

As this region, with its complexities due to the sheer size and the peculiarities of its various ports and terminals, is still basically unknown, or at least a mystery to most, Williams Brothers has prepared this circular covering the major ports, and some aspects of the Amazon region, to provide useful, basic and clarifying information for those whose vessels will trade in these ports. This information may change without notice, not only because of the actions of local authorities, but primarily in view of the changing river conditions. Therefore all information should be considered as a general guideline only and must be confirmed with local agents before vessels arrive in these ports.

The map of the Amazon region below is our point of departure for this report:

ENTERING THE AMAZON

All vessels must enter the Amazon River through the North Bar (called Barra Norte in Portuguese) and proceed to the Fazendinha Pilot Station which is 174nm from the North Bar. The position of the Fazendinha pilot station is: Lat. 00 04´30”S and Long. 051.06´3”W.

Vessels are not obliged to use pilots from the North Bar to Fazendinha (as per present regulations) and if they have up to date Nautical Charts on board (200, 201, 202, 203, 204, 205, 206 e 210) they will not normally encounter any problems. Information is also provided by the Brazilian Navy regarding the last updated position of buoys for the entrance to the Amazon River (Canal Grande do Curuá – Great Channel of Curua). This channel is usually marked with pairs of lateral light buoys.

As per official information, the tidal current at the North Bar flows to the SW during the flood tide and to the NE during the ebb tide, at about 5.5 spring knots. About 5 hours after the high tide or low tide, the current flows in the NW and SE directions respectively.

Also in accordance with present regulations, pilotage is compulsory for navigating the entire river after Fazendinha where two river pilots board at the pilot station as they work in pairs to provide around the clock assistance to Masters.

The mouth of the Amazon River is approx. 320 kilometers wide and Marajo Island, stretching across the mouth, is larger than Switzerland (area of the island = 49,600 sq km), while the mouth of the Para River, giving access to the ports of Belem and Vila do Conde, is east of Marajo Island.

As per Brazilian Navy information, the maximum draft to cross the North Bar (normally when leaving the Amazon in laden condition) is 11.50 meters.

EXCHANGE OF BALLAST WATER AND BUNKERS

Vessels entering the Amazon must change ballast water twice as per local regulations. The first exchange must be made at least 200 nm from the Brazilian coast and on passing the North Bar channel all vessels must immediately start the second exchange until fully completing the exchange of salt water for fresh water.

On the Amazon, bunkering is only available at Belem or Manaus.

INSPECTION BY AUTHORITIES

Brazilian authorities inspect all vessels entering the Amazon at the Fazendinha pilot station. The authorities work commercial hours, that is from 08:00 to 12:00 hours LT and from 14:00 to 17:00 hours LT.

Those vessels that do not arrive within these working hours must anchor in the nearby Macapa anchorage until being inspected and cleared by authorities to proceed their voyage.

PORT OF SANTANA

The port of Santana is located about 6 nm from Fazendinha and shipments of iron ore in bulk were loaded 24/7 all year round from the Anglo American Terminal until two years ago, in 2014, when the river bank where the iron ore was stocked collapsed and most of the shiploader fell into the river, which resulted in the loss of 6 lives. The terminal has never been rebuilt and another company which continued shipping iron ore from the Santana commercial berth has since gone bankrupt.

Since late 2016 soyabeans and corn cargoes are being shipped from the public CDSA Terminal by shippers called Fiagril.

The maximum draft of this terminal is 11.50 meters.

PORT OF SANTAREM

The port of Santarem is located 474 nm from the North Bar at the confluence of the Tapajós and Amazon Rivers.

Besides general cargo, soyabeans, soyabean meal and corn are shipped by shippers Cargill Agricola from their private terminal which commenced operations in 2003. An average of 7 vessels load grain products at this terminal per month, where the maximum depth is 11.50m.

Forest products such as timber and wood chips are also shipped from Santarem.

PORT OF JURUTI

The port of Juruti is located on the right margin of the Amazon River 609 nm from the North Bar and is solely for the shipment of Metallurgical Grade Bauxite in Bulk

The port is owned and operated by Alcoa and consists of one berth which is 220 meters long equipped with mooring dolphins and fenders.

Vessels calling at Juruti must conform to the following port limitations to be always afloat:

- Maximum LOA of vessel: 242m
- Maximum beam of vessel: 32.2m
- Maximum draft: 11.58m
- Maximum DWT: 81,600 MT

No tugboats are available at this terminal to assist with berthing and unberthing operations and all such manoeuvres are only permitted in daylight. The terminal operates 24hrs SHINC and the final cargo loaded for the B/L is by draft survey.

The bauxite cargo shipped from Juruti is stocked an open, unpaved stockyard at the port and part of this cargo is not washed and may contain a larger quantity of clay, which retains more water, leading to higher TML.

According to the Cargo Declarations issued by shippers Alcoa World Alumina Brasil Ltda., the bauxite shipped from this port is a Group A cargo as per the IMSBC Code. The shippers state TML varying from 14.27% to 15.22% and moisture content from 12.50% to 13.51% in recent cases. The stowage factor is between 0.6–0.7 cubic meter per ton. The angle of repose non applicable.

The cargo is loaded by means of a conveyor belt system to an automatic shiploader.

Surveyors are allowed to enter the stockyard to visually inspect the stockpiles prior to loading operations, however they are not allowed to dig into the piles of cargo to collect samples for safety reasons. Samples may be collected from the automatic sampler on the shiploader during the loading operation.

There is no equipment available to unload bauxite cargo already loaded on board, so that Masters and Owners should be very attentive to the condition of the cargo arriving on board, especially as this region is prone to frequent heavy rains. In recent cases, loading has been interrupted due to the very wet visual condition of this cargo and unsatisfactory can tests, although samples tested for MC in the local Alcoa ovens indicated the MC was below TML.

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If Owners or the Club should require further analysis of cargo samples for TML at an independent laboratory, the samples must be transported to the only independent qualified laboratory in the region at Santana by boat. This takes an average of three days, plus the time for analysis.

There are no local surveyors in Juruti, and surveyors must arrange transport by plane to Santarem and then continue by motor launch for 5 hours. The motor launch leaves for Juruti once a day at 5 AM.

A few illustrative photos of the port of Juruti and the bauxite cargo follow below:

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Berth and shiploader at Juruti</td><td>Shiploader</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Bauxite stocked in open unpaved stockyard</td><td>Condition of the stockyard</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Close up of the bauxite cargo</td><td>Close up of the bauxite cargo</td></tr>
</table>

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PORTO TROMBETAS

Porto Trombetas is situated on the right bank of the Trombetas River, which is a tributary on the left bank of the Amazon River. This terminal is located 606 nm from the North Bar and 60 nm from the confluence.

There is only one berth at Trombetas and operations are uninterrupted. While one vessel is loading, the next vessel is authorized to come up the river and anchor off the port. The bauxite is loaded by shiploader.

The maximum allowable LOA of vessels loading at Trombetas is normally 245 m and breadth 40m.

The maximum sailing draft from Trombetas is also 11.58m.

The only cargo loaded at Trombetas is bulk bauxite cargo, which the shippers and owners of the port (MRN-Mineração Rio Norte) separate into “wet” and “dry” bauxite.

The bauxite arrives at the port in train cars and the cargo is previously processed (crushed and washed) at the mines far back in the jungle, to remove dirt and other foreign materials. The wet bauxite is stocked in piles in the open and exposed to the elements. This cargo is usually destined to Brazilian and Chinese ports.

The dry cargo is dried mechanically and stocked in enclosed warehouses in the port and this drier cargo is normally destined to ports in the USA, Canada and Europe. The dried cargo is also eventually used to improve the condition of the "wet" bauxite by loading the drier cargo on top of wetter cargo in stow when the MC is above allowable limits.

MRN normally state that the maximum MC of the bauxite loaded is 10%, with FML of 12% and TML of 11%, however the laboratory of shippers MRN is not certified by the competent authority (in this case the Brazilian Navy) to issue either MC or TML certificates for their cargo. In a recent case, the shippers had to reissue the cargo certificates when it was observed that they had classified their cargo as Group “C”, but that as per the IMSBC Code, it was actually a Group “A” cargo.

There are no local surveyors at Porto Trombetas. Surveyors must have prior authorization to travel to the town of Trombetas by plane, as well as to enter the port area, as MRN owns the port and town of Trombetas and all those arriving by plane or boat must have previous written permission from MRN. Without this authorization, the visitor must return to Belem immediately on the same plane, which arrives and leaves Trombetas once a day.

Surveyors are allowed to enter the stockyard to visually inspect the stockpiles prior to loading operations, however they are not allowed to dig into the piles of cargo to collect samples for safety reasons. Samples may be collected from the automatic sampler on the shiploader during the loading operation.

The only independent laboratory certified by the competent authority for analysis of samples, if necessary, is located at Santana and involves transporting samples by plane and boat.

There are also no means of unloading cargo already stowed aboard in this port, so that crews must give very close attention to the condition of the cargo arriving in the holds to ensure that only sound cargo is loaded. Frequent heavy rains are common, especially in the rainy season from May to September.

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The photos below depict the port and loading equipment at Trombetas, the open stockpiles and photos from a case involving very wet bauxite cargo with clear liquefaction.

Porto Trombetas bauxite loading berth

Sampling tower on shiploader

Bauxite in open stockpiles

Bauxite cargo with signs of liquefaction

Free water in corner of cargo hold

	
Can test with cargo in liquefaction	MRN laboratory

PORT OF ITACOATIARA

The Hermasa Terminal operated by shippers Amaggi is located in Itacoatiara which is about 270 km from Manaus by road and is 108 nm downriver from Manaus. This port is 924 nm from the North Bar.

The cargoes shipped from this terminal are soyabean products, including soyabeans, soyameals/pellets and soyaoil, and corn.

Loading is around the clock SHINC.

The depth of the terminal can reach up to 42 meters during flooding and Panamax vessels can berth alongside, however to cross the North Bar on leaving the Amazon, the maximum draft is 11.50m.

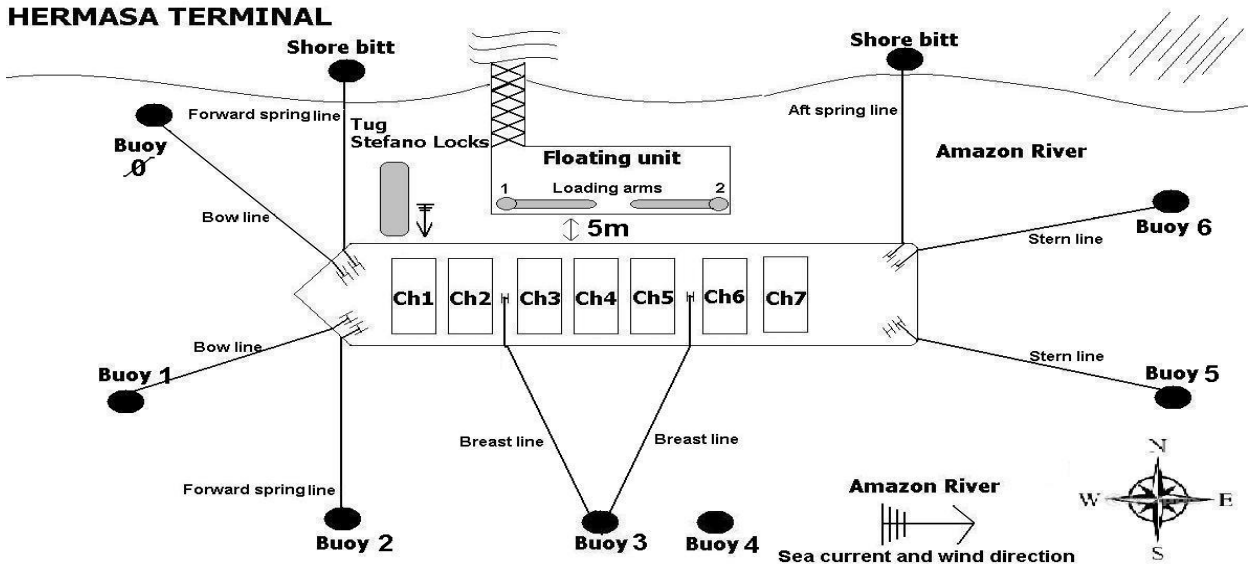
In this terminal, the cargo is loaded aboard either from river barges or from warehouses ashore by two fixed shiploaders and a conveyor system. The barges berth under the shiploader structure of the terminal and the cargo is then transferred to the vessel by the conveyor belt system of the shiploader. From the warehouses, the cargo is transferred by conveyor belts to the floating pier, which measures 32m x 90m, where the fixed shiploader is mounted.

Considering the huge variation in the level of the Amazon River (30m to 50m depending on the rainy/dry seasons), the shiploader was built on top of a floating unit which is kept steady by six anchors and is linked to shore by a bridge.

The shiploader has two arm arms, one has an outreach of 25m (No.1) and the second has an outreach of 28m (No.2). Both can move 30º up/down and swivel 180 degrees on the base. The maximum loading rate is 1,500 MT/hour. In the case, all of the cargo was loaded from barges.

To comply with the cargo plan, vessels may need to shift forward and aft by the mooring ropes during the operation. During the rain/flooding season from November to June, river currents are recorded to be an average of 3 knots, although they may peak at 4-5 knots in the area of the terminals.

While vessels are loading, they do not actually berth alongside the floating unit but rather they moor starboard side to about 5-10 meters away from the floating unit to a system of seven buoys and two bitts ashore. A tugboat stands by full time with a line passed to the vessel's bow, as per the sketch below:



Vessels berthed at the Hermasa Terminal

Amaggi also operates a floating loading berth in the river to provide a second berth and to increase capacity, which is called Maquira Terminal II, which is located west of the Hermasa Terminal, as per the photo below. The barges come alongside and the cargo is transferred to the ship by the crane on the floating berth equipped with a grab. The vessel must shift alongside during the operation to reach all holds.

Surveyors attend from their base in Manaus which is about 5-6 hours by car from Itacoatiara.

PORTS OF BELEM / VILA DO CONDE/BARCARENA

Access to the above three ports is through the Pará River channel where the minimum depth during low tide is 10.5m. The Espardarte pilot station is located at the mouth of the Pará River and all tanker vessels are required to pick up a pilot at this pilot station to proceed to Belem, Vila do Conde/Barcarena. All other vessels, unless restricted by draft, may proceed on their own towards the Mosqueiro pilot station farther down the Pará River channel where they are also required to pick up the pilot to continue onto the mentioned ports.

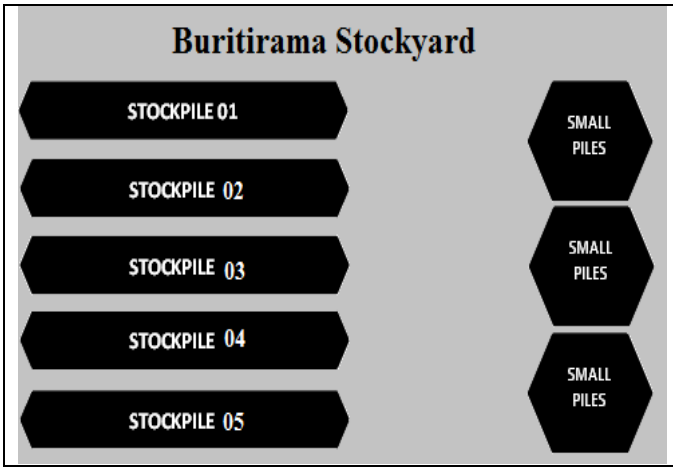
The port of Belem is located 120km from the Atlantic Ocean and vessels calling at this port normally operate general cargoes and containers.

The port of Vila do Conde is located in the town of Barcarena, about 2 hours by car from Belem. There are seven berths distributed in three piers with internal and external berths. Pier 1 (berths 101 and 102) operates general cargo. Bauxite cargo loaded at the port of Trombetas for receivers Alunorte is discharged at external berth 101 while alumina is shipped from internal berth 102. Pier 2 (berths 201 and 202) also operate general cargo. Pier 3 includes berths 301 and 302. External berth 301 is the preferential berth for containers and is also used to load Manganese cargo from shippers Buritirama. Internal berth 302 is destined to smaller vessels, especially livestock carriers, however in October 2015, a livestock carrier called the HAIDAR sank alongside berth 302 with 5,000 head of cattle on board and to this time the wreck has still not been removed after it was abandoned by its owners so that this berth is still interdicted.

Separate from the port of Vila do Conde are three grain terminals located in Barcarena: TGPM, Bunge and Hidrovias Terminals. Each has one berth and operates soy products and corn.

Of interest to this circular is the Manganese Ore Fines cargo shipped by Buritirama. The cargo is declared to be Manganese Ore, packing in bulk size 0.15mm to 8.00mm, a Group A cargo with TML of 16.87% and MC of 16.19%.

The Buritirama stockyard is paved and open with various stockpiles covered with plastic canvas as depicted below.



Shipper's Stockyard and CDP dock

The cargo is transferred from the shipper's stockpiles in buckets on flatbed trucks to alongside vessel. The distance between the stockyard and quay is approx. 1.5 km. The buckets are loaded by excavator at the stockyard and then covered with plastic canvas.

It has been observed that the visual condition and moisture content of the cargo in the stockpiles varies as the top level generally is drier and in good condition and the bottom level is sometimes apparently wet, with water around the base.

Stockpiles mostly covered with plastic

Water around base

	
Darker cargo in stockpile indicating high MC	Buckets alongside for loading

Once again Masters and crews should be attentive to the cargo arriving on board in order to require the shippers to shift to a drier area of a pile or to a different pile to ensure only sound cargo, below TML, is loaded for a safe sea voyage, as frequent heavy rains are common to all of the Amazon region,