Aspects and impacts in the trade of alcohol and oil derivatives transportation on the Tietê-Paraná Waterway

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Abstracts

The objective of this present article is showing the peculiarities of oil derivatives fluvial transport on Tietê-Paraná Waterway, one of the most important waterways in South America, under the security shelter on the using and transport of these dangerous products, carrying out an adapted internalization of the expected and normalized appliance thru the IMO and Brazilian Marine Authority (Autoridade Marítima Brasileira) – Administration of Ports and Costs (Diretoria de Portos e Costas – DOC) Consonant Law 156 of the marine commandant, already applied in Brazilian Jurisdictional Waters (AJB - Águas Jurisdicionais Brasileiras), in the offshore segment, and what mainly affects the formation, training, duty and Certificate Expedition, remodeling the fluvial scenery consubstantiate by NORMAM 13/DPC-05 e NORMAM 02/DPC-05.

What is searched, with this methodology and this new approach, is the quality improvement on the formation and waterway capacitating labor, which would have basic notions of security and health at work, first aid, safety and conflagration, with theoretical and practical classes, on a patterned way, complementing the initial formation. Therefore, the labor quality general formation would improve, uniformed with the principles established by the international conventions such as SOLAS74, MARPOL 73/78, STCW 78/95, IMDF and IMO “models courses” for navigation in open sea and in other activities off-shore, that would allow that the indices of accidents conditions could be mitigated, and the lost of lives, natural resources, propriety damages and others in general, could become less frequent.

In this analysis, it will be used the cause and effect matrix technique already consolidated in the Naval Industry and Offshore and in use.

In addition, it may be seen the necessity of improving the inspection quantity, both from marine authority and classifications societies on the boat in the inland trade, especially in the oil, alcohol and their derivatives transportation.
Keywords: safety in waterways, dangerous products, NORMAM 13, IMDG, GIEN

1- PRESENTATION

The fluvial navigation in Brazil, compared with others means of transportation, is positioned secondly, being the transportation with less participation in the merchandise transport in the country. This fact occurs because of the geographic factors (elevated plain rivers) and the distance which it has from the economic centers.

The Tietê-Paraná Waterway system has, almost 2400 km of navigable routes in Piracicaba and Conchas (both in São Paulo state), until Goiás and Minas Gerais (at north) and Mato Grosso do Sul, Paraná and Paraguai (at south), connecting five of the biggest soybean producers states in the country, being considerate Mercosul Waterway.

In São Paulo state, Tietê-Paraná Waterway has almost 800 km of navigable routes, 10 reservoirs, 10 barrages, 23 bridges, 19 shipyards, and 30 intermodal terminals of load. Its infrastructure, which administration belongs to the São Paulo’s Waterway Department, transformed modal on an economic alternative to the loads transport, besides propitiating the matrix reordination to the transports of the state’s central-west area and on the regional development of cities such as Barra Bonita and Pederneiras.

This waterway is the main agent who caused the industrialization and development of tourism in São Paulo’s countryside and the reordering of matrix transports in the central-west area. Tietê-Paraná Waterway has its commercial operations working at the same time as the mainly multiple improvement rivers projects are being concluded.

The navigation has began in 1973, with the opening of Barra Bonita Lock (figure 1), which has developed the regional tourisms; followed, in 1981, by the sugar cane, construction material and calcareous rock regional transport, using Bariri Lock, which has more than 300 km.

![Figure 1 – Barra Bonita Plant and Lock – Tietê River – Source: São Paulo State Government](image)
In 1986, with Ibitinga and Promissão Locks, the Alcohol Waterway has been concluded. In the year of 1991, the enlargement of Três Irmãos Barrage, the opening of Nova Avanhandaca Locks and Pereira Barreto Artificial Canal, made possible the distant trade transport, thru all Tietê River and Paraná River’s Tramo Norte, creating the possibility to reach Goiás’s south state and Minas Gerais’s west state, totaling 1,100 km of waterways.

Concomitantly, in Paraná River, it starts operate provisory Porto Primavera Lock. In 1995, Três Irmãos Lock was opened; followed, in 1998, by Jupiá Lock (figure 2) and, in 2000, by definitive Porto Primavera Lock, reaching, then, the integration between Tietê River and Paraná River’s Tramo Sul, obtaining, then, Itaipu’s hydroelectric navigation improvement.

![Figure 2 – Jupiá Plant and Lock – Paraná River – Source: São Paulo State Government](image)

In Paraná River, there are more than 750 km of principal waterways and 550 km of secondary ones, which reaches, specially, Mato Grosso do Sul state. That way, it was possible to Tietê-Paraná Waterway getting into a total of 2,400 km of primary and secondary navigable routs.

Since 1995, São Paulo state government, together with the Union (União) and private enterprise, had invested, in correct values, R$562 millions on Tietê-Paraná Waterway.

Data from the National Agency of Waterways Transportations (Agência Nacional de Transportes Aquaviários ANTAQ) (2002), mentions that thru their routs, they transport, annually, about 2 millions tones of loads, produced and distributed thru the states of São Paulo, Minas Gerais, Goiás, Mato Grosso do Sul and Paraná, beside Mercosul countries.

Besides the soybean and bran, the system was used to the transport of corn, wheat, manioc, carve, sugar cane, manure, sand and gravel. The mainly products flowed off were sugar cane and bran, with a growing of 13% and 64% in the loads volume, respectively.

The progressive increase of Tietê-Paraná Waterway’s efficiency - reduction on the time waste traveling and on the operational costs – is directly connect to the investments carried out by the security on the navigations, on the capacity of transporting boat and on the creation of new roots. In the end of 2004, for example, the wheat produced in Paraguay whose destination was Goiás and Minas Gerais’ mills, was transported thru the new Itaipu-São Simão root, Mercosul’s south-north shaft. The same trip has been
already done in the opposite direction, on a load with ten thousand tons of fertilizers. Nowadays, with the possibility of carrying this operation out on both directions, it is possible optimizing costs and lowering freight values.

According with the statements of the federal government, until the end of 2006, Tietê-Paraná Waterway would gain investments of R$15 millions that would be invested, mainly, on the protections of pillars and amplification of road and railroad bridges’ centre spans. Those initiatives objective increase the capacity and operational security. It’s important to mention that the acceptance of alcohol, used as a fuel in many countries in the world, creates unique opportunities to increase the local production and, therefore, creates the necessity of improving the system, and, consequently, having systems with more control and hardness over the operational conditions of security and environment.

2- WATERWAYS SYSTEMS ADVANTAGES

The waterway transport, the cheapest in the world, has some particularities, both advantageous and competitive, beginning with the river that transforms itself on a truly natural road, dismissing the opening and covering with a new layer of asphalt the new roads (expensive operations that doesn’t last much, with necessary interventions on a short period of time), consuming of tires and vehicles fleet, and, beyond everything, with the smaller price by load km, all around 50% of the cost, if it is compared with the road transportation. To keep with these advantages, it’s necessary to observe the safety rules, in order to guarantee the security of the environment and the workers who belongs to this area.

The oil derivatives transport such as diesel oil and gas must have additional safety requests that will only be observed in the open sea navigation, but should be internalized to the inland trade – NI. It must be really clear that this waterway passes thru Brazilian states that depend on the quality of the water to keep their economy stable, sectors such as agribusiness, as well as the secondary transformation areas which demands enormous quantities of water.

The minimum requisites from (SMS), from the offshore segment must be internalized, having this objective: “SAFETY AND CLEAN RIVERS AND SEAS”, being compromised with the Brazilian Jurisdictional Waters (Águas Jurisdicionais Brasileiras - AJB). It’s possible optimizing this trade with the human resources investment, improvement on the fluvial formations, nautical signalizations, reduction on the Brazil-cost, and generation of wealthy around Tietê-Paraná Waterway, making possible, until 2010, the alcohol and it is derivatives transportation with safety, social and environmental responsibility as it is predicted in E&P area from the offshore sector, corresponding inclusively to all the national effective legislation.
Tietê-Paraná Fluvial Captainship’s (CfTP – Capitania Fluvia Tietê Paraná) actuation, could it be like the execution organ – oe – with the “10” (education) inside the CFTB’s organogram, interacting with the navigation terminals and companies and also the education centers.

Therefore, it is possible acting on the referent courses according to the fluvial formation to alcohol transport as it is said in NORMAM 13/DPC-05 and NORMAM 02/DPC-05 thru Maritime Professional Teaching’s Program (PREPOM – Programa do Ensino Profissional Marítimo) courses, established by the Administration of Ports and Costs (Diretoria de Portos e Costas), attending on what is said on the CP/DL/AG in AIB on what is necessary, eliminating with this the substandard “Filipinos ” population as well as it happens on the salt region (Brazilian’s northwest) and in some trades of distant trade - LC, with low salaries, unprepared crews and substandard boat, having the black or gray flag from IMO or any other similar classification.

Managing security is consolidated having a specific politics training with the crew, in order to the necessary information and qualification, answering to the basics demands of work. Besides, it is necessary having at least 2 members of the crew or professionals when the boat has no crew (the ones responsible for the loading and unloading operations), having to possess the safety training on the loading and unloading operations of oil, its derivatives and other products, being responsible, during all moment, for the operation, having knowledge on how to proceed in case of problems and flaws that may happen, compromising the environment as well as the crew and the boat.

This managing security system must has the requests from OHSAS 18001, voluntary certification on the Safety and Operational Health (SSO - Segurança e Saúde Operacional) management, being consonant on what is said on the PETROBRAS’s System of Security, Environment and Health Management (Gestão de Segurança, Meio Ambiente e Saúde - SMS), coadunate with the 3 ISM CODE (Chapter IX from Safety of life at Sea, de mandatory character in open sea) rules: BS 8800 (SSO, indicative character), OHSAS 18001 (SSO, indicative character) and ISO 14001 (environmental, indicative character), inside the 18 directress preconized from SMS.

Attending to the minimum requests, the following aspects must have objective evidence, according to what System of Integrated Management (Sistemas de Gestão Integrada – SGI) says.

- Boat operational proceedings;
- Security and environment politics and training;
- Alcohol and drugs politics (internalized by STWC 78/95, part B);
- Procedures to smoke on board;
- Procedures of risk and emergency;
- Procedures to enter in confined places, or to work in hot places;
- Emergency procedures for conflagration, grounding, pooping, collision, overflow, bad weather, net disruption or load suction haze, lost of tow and/or act of pushing (if it is appropriated) and others;
- The Managing Security System must have a Security Manual, which must stay on board and be known for all the crew.

3- CAUSE AND EFFECT MATRIX

This presented technique is a document in the metric form which abbreviates all of the acting combinations from the instruments and subsystems states having the necessary actions to avoid the installation of undesired effects. This matrix is the result from the unit production of safety and operation philosophy and it may be used as a subsidy for the implementation from the safety interconnection system in its respective subsystems: electric, control, fire & gas/HVAC, among others.

The matrices should represent all the interconnection and controls on-off type, existents in the unit. However, some elements and activities should not be at the matrix, such as:

I – Pure alarm: those that don’t have any other function besides alarming;
II – Indications registers and condition signalizations, also not associated with logics of interconnection or ON-OFF controls;
III – Alarms associated with the interconnection techniques and ON-OFF controls must be show on the simplified matrix in one column (the same first column);

The boat modification and repair management and interface MMI – Man Machine together with the classificatory society mitigating onus to the Shipowner and Incident and Accidents (Armador e Incidentes e Acidentes), characterized by the human element, Software and Factor Material (Software e Fator Material), together with an internalization of Integrated Management of Naval Engineering (Gerenciamento Integrado de Engenharia Naval-GIEN), where the shipowner envies to the Specialized Entity or Classificatory Society, the Impact Paper to the Certification (Folha de Impacto à Certificação – FIC), avoiding, like this, the lack of possibility of tracking, as built, management of changes that might be the master piece in the Aspects and Impacts Survey and its respective frequency valorization and severity, who may increase the Risk (R) function and signaling it, according to the answer from this FCI (if it causes impact in the Unit) to the Project of Study Solicitation.
4 – FINAL CONSIDERATIONS

In face of the optimized reality and the safety culture from the offshore sector, it’s important telling that the “simple internalization” from SMS, in every situation, to the alcohol and oil derivatives transport in the waterways will be totally viable and will contribute completely with the generation of new offers of job, in the improvement of life quality and income around the waterway and the marginal price reduction of some products face the reduction of losses, service’s quality e work conditions improvement. The present article wants to signalize which obligatory rules, procedures and voluntary certifications adopted by the oil industry may be use as a base and model to be adopted for the success in this mean of transportation, attending to the rules and social and environmental responsibility, which is differential in the mission that every serious company who works in the E&P area has, developing new technologies, methodologies and processes, optimizing and discovering other products connected to this commodity transportation in focus. To the alcohol and other inflammable elements transportation, the ISM code shows objectives evidences perfectly feasible to this focus trade, where the emission of the statement compliance will be adjudicated by the Tietê-Paraná Fluvial Captaincy (Capitania Fluvial do Tietê-Paraná-
CFTP), with the sending of professionals legally able and qualified, such as naval adjusters and inspectors, formed by the Administration of Ports and Costs (Diretoria de Portos e Costas – DPC) and keepers of the appropriated knowledge and competence certificate emitted by the FLAG consonant the praised in the Resolution IMO A 787 (19), will be the sailing sentinels on the final point system, the perfectioning exercising its delegation of competence established by Security Law of the Waterway Traffic (LESTA – Lei de Segurança do Tráfego Aquaviário), with the keeping power of the boats that do not response to the minimum safety requests, and even if being able to keep an Enhanced Survey Programmer – ESP (a program of intensified inspection) by semester or ASD-A to be determined mitigating the punctual or random faults that may happen.

5- BIBLIOGRAPHY

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