

RESEARCH ARTICLE

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## Feasibility Study on River Bus Systems in Ho Chi Minh City

Vo Trong Cang<sup>1,2</sup>, Nguyen Anh Tuan<sup>2,3</sup>, Vo Minh Phuc<sup>4</sup>

<sup>1</sup> (Digital Control & System Engineering National Key-Lab, Ho Chi Minh City University of Technology, VNU-HCM, Vietnam)

<sup>2</sup> (Faculty of Transportation Engineering, Ho Chi Minh City University of Technology, VNU-HCM, Vietnam)

<sup>3</sup> (Department of Science Technology & Environment of HCM city)

<sup>4</sup> (Faculty of Urban Studies, HCM city University of Social Science & Humanities. VNU-HCM, Vietnam)

### ABSTRACT

One of the solutions to reduce traffic congestion in the Ho Chi Minh City (HCMC) is the use of the waterway transport. There have been several proposals for Saigon River Bus systems, but no results have been approved to be feasible due to many technical-economic reasons and investment solutions.

The paper analyzes the factors affecting the implementation of the Saigon River Bus systems. Next, introduce some orienting solution in the research proposed with HCMC administration. There are the feasibility studies of: planning for selection of routes and terminals location; design and manufacture of the river bus boat; construction technique for river bus stations; organizing and exploitation of river bus boat transport. Some of the solutions incentives for investment in public transport in the model of "socialization" were also introduced at the end of the paper.

**Keywords:** River bus, ship design, inland ferry pier, waterway transportation, Ho Chi Minh city

### I. INTRODUCTION

The river bus system is one of valuable solutions for minimizing the traffic jam of Ho Chi Minh City. According to decision [1] on approving the adjustment of transportation development planning of Ho Chi Minh city by 2020 with a vision after 2020, the public transportation system of Ho Chi Minh city must undertake 20%-25% per total of passengers. Otherwise, the inland waterway passenger transportation has not still played the essential role as equal as system scale with 574.1 km natural waterway system [2]. The city will be invested VND 2,752 billion for inland waterway transportation development in 2013-2015 .

In another aspect, Ho Chi Minh city has also built the tourism development strategy by 2020 [3]. The city will invest new landing stages for tourism development and passenger transportation.

These factors lead the good conditions to research and develop the water bus system in Ho Chi Minh city, the paper concentrate on analyzing the river bus system characteristics, system management and engineering issues of designing water bus and terminals.

### II. THE RIVER BUS SYSTEM CHARACTERISTICS

To explore the river bus system characteristics, the paper will analyze the unbalanced issue in passenger transportation, besides the demand and psychology of passengers.

#### 2.1 The unbalanced issue in the waterway transportation

The unbalanced issue in the waterway transportation plays the essential role affects the fleet management method, and also the passenger service system. On the unbalanced issue in the waterway route, the density of passenger will decrease from the center terminal to the end terminal that is called "the unbalanced area". The unbalanced area depends on below factors as follows:

- The density of departure and arrival routes;
- The distribution of rural and urban area;
- The schedule of other public transportation systems;
- Work time of office area, industrial park;
- The schedule and capacity of fleet at rush hour.



Figure 1. Rush hour in Ho Chi Minh city  
(<http://vnexpress.net/>)

To optimizing the fleet transportation capacity, the fleet administrative department has to comprehend the unbalanced issue in fleet operation schedule that is contingent upon significant difference between vacations of the year, days of week and hours in day. That is called “the unbalanced schedule” will be described clearly as follows:

- Between vacations in year: Ho Chi Minh City attracts various immigrants from neighboring provinces. Consequently they will come back their hometown on vacations.
- Between days of week: At the weekend, almost all people don't have to go to work, hence amount of passengers can be low. However, many people will go to the neighboring areas on Saturday, and then they come back to Ho Chi Minh City to work on Monday.
- Hours in day: The fleet will be overloaded in the rush hour in the morning and in the afternoon when a lot of people come back home after work. The fleet operation center should arrange the schedule is appropriate for work time of factories, building offices, schools around the terminals.

Next, the paper will research demand and psychology of passenger using the waterway transportation [5].

### 2.2 Demand and psychology of passengers

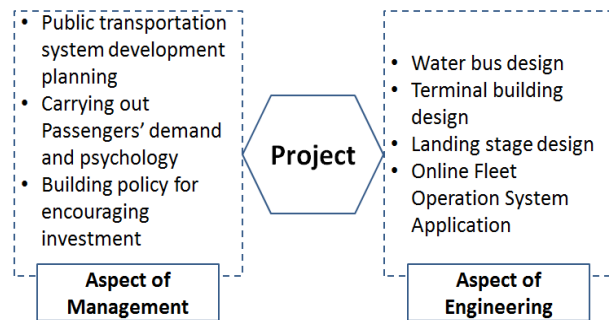
In rush hour in the morning and the afternoon, almost all passengers are officials, and students using the water bus. At the remaining time, demand of passengers is often to go shopping, make a tour discovering Saigon river, and usual activities of citizens. Consequently, the psychology of passengers is expressed aspects as follows:

- Stability: Reason of waterway bus development in urban area is to serve citizens' demand such as go to school and go to work, in other that the demand is stable in all aspects including time, kind of boat, hand-luggage, length of route;
- The fleet schedule and the convenient route, and the onboard convenience are the urban citizens' care.

All of these are essential factors in order to build water bus system in Ho Chi Minh City.

### III. THE RIVER BUS SYSTEM DESIGN

In other to build the river bus system, the city has to consider two essential aspects including management and engineering (see Fig. 2).



**Figure 2.** Aspects of project for building river bus system

The aspect of management will include the public transportation system development planning, carrying out the survey of citizen's transportation demand, analyzing psychology of passenger, and policy for investment encouragement.

In aspect of engineering, the water bus system must be operated logically, requiring applying the online fleet operation system to optimize the number of passengers, reducing the cost of operation and maintenance. On the other hand, the design of the water bus, landing stages, especially waterway terminals should be designed carefully in accordance with around existing buildings and citizens' culture in this stage.

The project must be obeyed Government's policies as follows:

- General planning of Vietnam inland waterway transportation development by 2020 (Decision No. 16/2000/QD-TTg);
- Approving the adjustment of Transportation development planning of Ho Chi Minh City by 2020 with a vision after 2020 (Decision No. 568/QD-TTg);
- Planning the network of inland waterways, ports, landing stages of Ho Chi Minh City through 2020 (Decision 66/2009/QD-UBND);
- The strategy for developing inland waterway tourism of Ho Chi Minh City for the period 2013-2015 and intention up to 2020;
- Project of General planning of transportation of Ho Chi Minh City (Houtrants 2003).

The project must carry out the survey in order to comprehend Ho Chi Minh City residents' demand. After surveying, the report will answer issues as follows:

- What are 2 suitable routes for the first period 2013-2015?
- What is the mission for design water bus series, terminals, landing stages?
- What is the plan for next periods?

Besides that, the survey will show the factors affect citizens' choice with inland waterway public transportation [6].

Next, the paper will represent some models from developed nations as USA, Russia, and the Netherlands.

#### IV. SOME MODELS FROM THE DEVELOPMENT COUNTRIES

##### 4.1 New York Water Taxi (USA)

Water bus taxi of New York City has been begun since early 2002 with 5 black white checked vessels. Up to now, New York water taxi (NYWT) is used not only for passenger transportation, but also for tourism, charter, and event organization. NYWT is operated by the Port Authority of New York and New Jersey.

The length of the route is 90 minutes. With the Hop-on/Hop-off system, passengers can buy daily ticket to visit 5 tourist spots along the route. Nowadays, the fleet has 12 vessels including 4 catamarans designed with high stability and others. These catamarans also have the fly-bridge for passengers to go on a sightseeing tour of New York City in good climate.

The series 16.2 m length with capacity of 74 passengers, velocity of 24 knot, were built in 2002-2003 such as Curt Berger, John Keith, Michael Mann, Mickey Murphy and Schuyler Meyer Jr.

The series 20.5 m length with capacity of 149 passengers, velocity of 26 knot, were built in 2005-2008 such as Seymour B.Durst, Ed Rogowshy, Gene Flatow, Marian S Heiskell and Sam Holmes (Fig. 3.)



Figure 3. Durst Class catamaran of New York Water Taxi (<http://www.nywatertaxi.com/boats/>)

##### 4.2 St Petersburg Aquabus (Russia)

The water bus system in St Peterburg has 4 route including Primorskaya, Niepskaya, Tsentralnaya, and Kurortnaya. The water buses are operated daily from 8 a.m. to 8 p.m. Almost the vessels are small including Hitek 85C (12 passengers, 80 Km/h, 8.58 m length, 2.65 m width, Fig. 4), Strela-7 (12 passengers, 60 km/h). Excepting the Kurortnaya route, it uses the catamaran with capacity of 70 passengers, velocity of 45km/h and has the special schedule for go sightseeing.



Figure 4. Hitek 85C (ST Petersburg Aquabus)

##### 4.3 Water Bus Dordrecht-Rotterdam (The Netherlands)

Water bus system of Dordrecht-Rotterdam is catamaran "Fast ferry" carrying 132 passengers with displacement of 18 tons, 31m length, 2x540 HP engine (Fig. 5).



Figure 5. Fast Ferries 132 pax of Dordrecht-Rotterdam

#### V. CONCLUSION

Back to Vietnam, after researching the practical operation of some routes for passenger transportation exist in Ho Chi Minh City [4] besides analysis of citizen's demand and water bus system characteristics, the criteria is proposed to design water bus taxi system.

The project will suggest 3 series of water bus in accordance with capacity and propulsion [7]. Hence, the fleet has to be designed to satisfy the criteria including:

- Reducing the wave-making resistance;
- Mobility and stability with logical velocity;
- Saving power and restricting environment pollution;
- Building fleet with eco-friendly material and technology;
- Easy and convenient maintenance.

To registering the fleet with Vietnam Register and optimize the operation cost, the design of fleet must be following the existing regulations of

Vietnam and the life-cycle of fleet should be operated in 20-30 years.

Terminal construction should be designed in accordance with architecture of around existing buildings. The design of the landing stage must have space for wheelchair, and even passengers can go with bicycles as below concept (Fig. 6.)

Finally, the river bus / taxi system will bring the new choice for Ho Chi Minh City residents to reduce the traffic jam for road transport and also the new service attracting the tourist comes to Ho Chi Minh city.

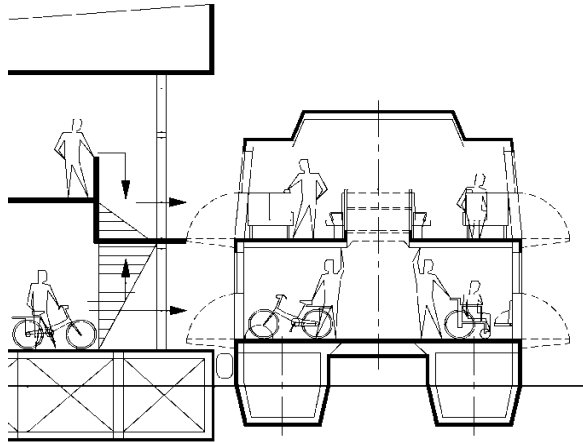


Figure 6. Concept of river bus and landing stage at terminal [7]

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