



FEASIBILITY ASSESSMENT OF RORO TRANSPORT SYSTEM IN THE PHILIPPINES FROM THE VIEW POINT OF INTER-REGIONAL COMMODITY FLOW

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Abstract: RoRo (Roll-on/Roll-off) transport system has been often mentioned among the transport society in the Philippines. So far, the advantage of RoRo transport system has been overemphasized only for the quick procedure at the terminals: the elimination of cargo handling, quick loading, and unloading and collection of charges. While passenger vehicles surely welcome simpler procedure at the terminals, the total transport cost is the major concern of the consignors. Depending on the type and transport distance, some commodities are the potential cargoes for RoRo shipping service, while others are most likely to remain as the cargoes of inter-island shipping: either conventional or container cargoes. The paper is intended to discuss the advantages of RoRo transport system and potential routes and commodities for RoRo transport service. The paper also highlights the outstanding issues to be focused for the promotion of RoRo services in the Philippines.

Key Words: Roll-on/Roll-off, inter-regional commodity flow, transport cost, maritime transport

1. Introduction

The development of Roll-on/Roll-off transport system has been one of major targets of the Department of Transportation and Communications (DOTC) of the government of the Philippines since 1980's. Many studies have been conducted by DOTC. The author was involved in "the Feasibility Study on the Development of RRTS for Mobility Enhancement, 2007 in the Philippines¹⁾", and this paper is prepared to report the background data analyses and some hypothesis the author tried to prove, which were not fully explained in the report of the said study.

2. Impact of the opening of Mindoro-Panay RoRo link on the passenger and cargo flow in Western and Central Visayas

RoRo ferry service was operational in 1970's between Batangas City and Calapan, Mindoro Island, which has been the food supplier to Metro Manila and rich in coastal resorts. The concept of RoRo ferry service as the part of highway was first introduced to Pan-Philippine Highway. In 1983, two RoRo ferry boats, i.e., Maharlika I and Maharlika II, started operation at two missing links of the Highway between Matnog (Sorsogon, Southern Luzon) and Allen (Northern Samar), and Liloan (Southern Leyte) and Lipata (Surigao del Norte). The RoRo ports were newly constructed for exclusive use of RoRo services. These two RoRo connections have been playing an important role as one of the north-south trunk corridor together with inter-island shipping routes. In recent years,



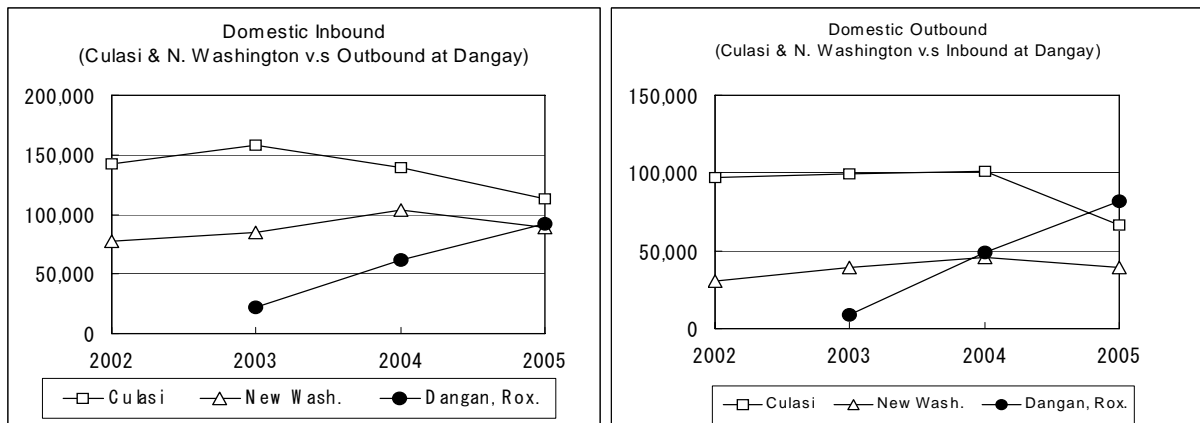
additional RoRo terminals were constructed at Northern Samar side by private sector.

In 2005, the annual traffic volume along Batangas-Calapan Route reached 2.5 million passengers and 250,000 vehicles, or 700,000 metric ton, while the annual traffic along South Luzon-Samar Route and Southern Leyte-Surigao Route along the Pan-Philippine Highway reached 1.59 million passengers and 1.77 million tons, and 445,000 passengers and 366,000 tons, respectively.

Now, RoRo ships are service in about 70 routes. Many of these routes are either within Visayas islands or Visayas and Mindanao Islands. Of the 70 routes, daily service is available only half of these. In 23 routes, service frequency is two or more. In 10 routes, including Pan-Philippine Highway links and Batangas-Calapan Route, the service frequency is four or more per day.

So far, except the Pan-Philippine Highway Route, the short-distance ferries have been serving basically for local traffic between two locations, which have not been covered by inter-island shipping routes. However, the role of RoRo ferry service has changed when RoRo ferry service started between Roxas, Mindoro Island and Caticlan, Panay Island. The Mindoro-Panay route had been proposed by the DOTC to establish western corridor between Mindanao and Luzon Regions via Visayas Region. Due to the long distance, the route had been a missing link over many years until the plan of DOTC finally came true in 2003.

RoRo ferry service between Mindoro and Panay Islands gave an impact on inter-island shipping and the mode of transportation. Figure 1 shows the annual cargo volumes from 2002 to 2005 at Culasi and New Washington, which, located on the north coast of Panay Island near Roxas City, have been the gateway ports for the inter-island shipping, and Roxas Port, Dangay, Mindoro Island, which is the counterpart RoRo port of Caticlan-Mindoro Ferry Link. The Figure on the left compares southbound cargo volumes at the three ports, while the figure on the right compares the northbound cargo volumes. It is obvious that, while the cargo volume at Roxas, which is correspond to the traffic at Caticlan Port, has been increasing, the cargo volumes at Culasi and New Washington Ports tend to decrease. This indicates that some of the cargoes transported between Panay and Luzon have been shifted from inter-island shipping to RoRo ferry.

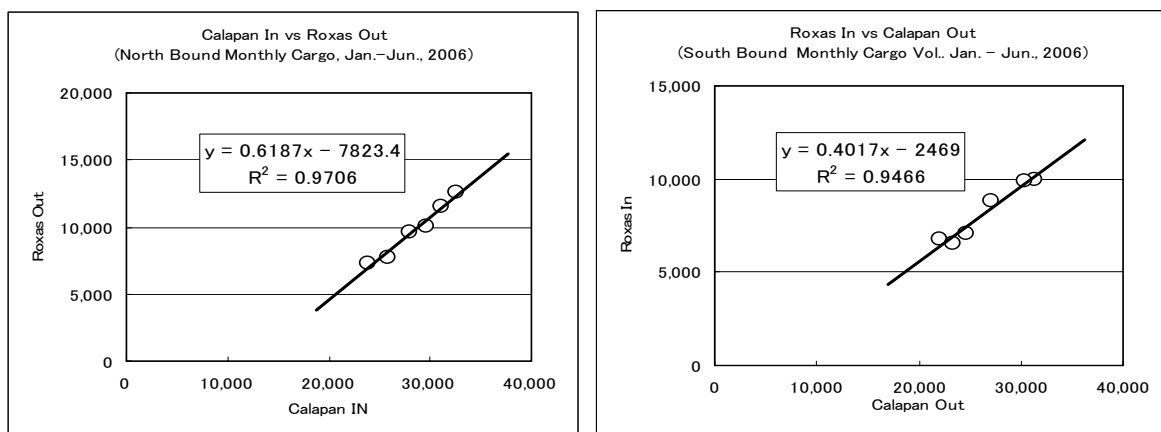


Source: PPA

Figure 1 Changes in cargo volumes at conventional ports and RoRo port



The ferry service between Mindoro and Panay Island is no longer merely a local connection, but it gave great impact on the transport network between Luzon and Visayas Regions. There are cargo flow between Luzon and Panay Islands via Mindoro Island. Figure 2 is drawn to compare the number of southbound and north bound vehicles at Calapan, the north gate of Mindoro Island, and Roxas Port, the south gate of the Island in each month over the first six months in 2006. The figure on the left shows the correlation between the number of southbound vehicles at Calapan and Roxas Port, while the figure on the right is drawn for northbound vehicles. It is seen in the figure that the correlations between the vehicle numbers at the two ports for both directions are quite high. This indicates that, of the vehicles taking Batangas-Calapan RoRo ferry, about 30 % of vehicles are taking Roxas-Caticlan RoRo ferry. Thus, it can be said that Batangas-Calapan and Roxas-Caticlan RoRo ferry link has established its position as an inter-modal transport route between Luzon and Panay Islands. Along the inter-modal route, it was proved by the interviews to the drivers at Calapan Port that many truck drivers are regularly plying between Panay and Luzon. As of 2007, 20 daily long-distance bus services were available between Manila and several destinations in Panay Island.



Source: PPA Calapan Office

Figure 2 Correlation between the vehicle traffic between Batangas-Calapan (Luzon-Mindoro) and Roxas-Caticlan (Mindoro-Panay) RoRo ferries

The establishment of the Panay-Luzon Inter-modal route is further confirmed by the interviews to the passengers and truck drivers at RoRo ports. Table 1 is the results of the interviews conducted in October, 2006. The destination of all the passengers and drivers interviewed at Caticlan Port, Panay Island, intended to travel to Luzon Island via Mindoro Island at Iloilo Port, about 20% of passengers at the RoRo ferry terminal were traveling to Luzon via Mindoro Island.

Regarding other RoRo terminals than Roxas and Caticlan, Table 1 shows that, in general, while about a half of the passengers and trucks were going to neighbor islands, 30 to 40% of RoRo terminal in Iloilo Port were going to Luzon via Mindoro Island, Cebu or Mindanao via Negros Island. Thus, substantial traffic volume is moving through two RoRo links. Table 1 further indicates that there are passengers who were taking three or more RoRo links: Mindanao to Luzon or Leyte, Panay to Bohol, though the number is very few. In Table 1, it is also observed that the extent of the trips of cargo trucks is basically limited



Source: Domestic Shipping Development Plan²⁾

Source: Development of RRTS¹⁾

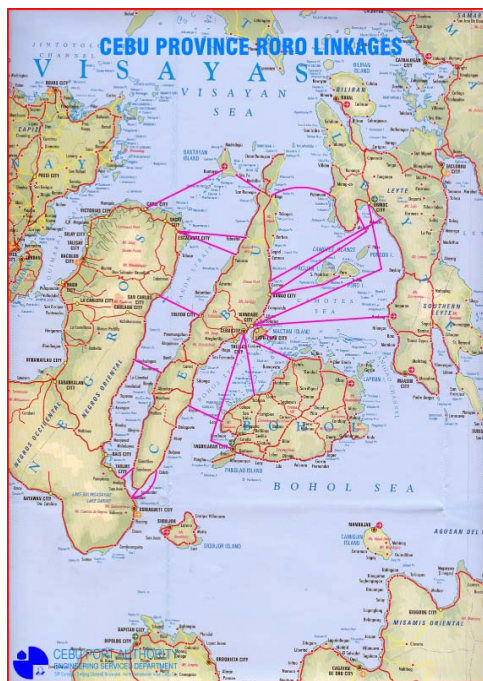
Figure 3 Hub & Spoke links by
 Inter-island Shipping

Figure 4 Access to and from
 Panay Island

3. Situation of RoRo service in Central and Eastern Visayas Regions

(1) RoRo links of Cebu Island

Cebu Island also has many RoRo links with adjacent islands. Figure 5, shows the existing short distance RoRo service routes of Cebu Island As seen in the Figure, RoRo services are available almost everywhere of Cebu Island connecting the nearest locations of adjacent islands, i.e., Negros, Bohol and Leyte Islands. Along these routes the RoRo service frequencies are twice or more per day.



Source: Cebu Port Authority

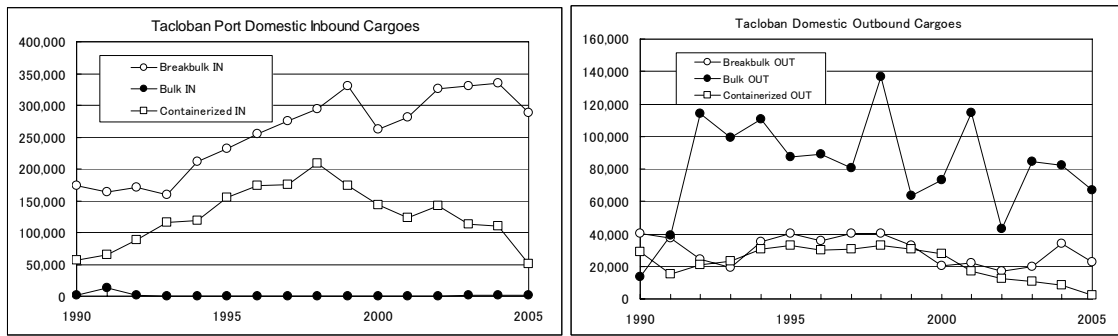
Figure 5 Cebu based Short-distance
 RoRo ferry routes

In addition, the RoRo connection between Cebu and Mindanao via Negros Island, i.e., Santander (Cebu)-Dumaguete (Negros)-Dapitan (Mindanao) seems to have attracted passengers and cargoes. The interview showed that about one third of the passengers and trucks at Dipolog were going to Cebu Island (see Table 1)..

While RoRo ferry services between Cebu and neighboring islands have been developed taking advantage of the geographical proximity between the islands, the RoRo connection between Cebu Island and Mindanao or Bicol Regions is still underdeveloped due to the long distance between the islands: the RoRo service between Cebu City and Cagayan de Oro City is just once a day and between Cebu City and Masbate City is only three times per week. Thus, for the Cebu Island, the inter-island shipping is still the major transportation route to and from Luzon and Mindanao Regions.

(2) Impact of RoRo service to inter-island shipping

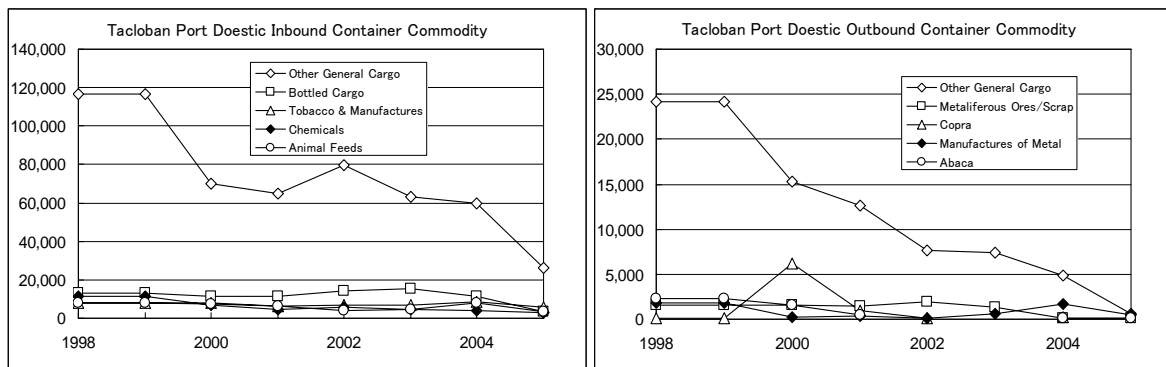
Tacloban Port has been the principal port in Leyte Island. As seen in Figure 6, the both inbound and outbound cargoes at Tacloban port keep decreasing since 1998. This is because the inbound and outbound volumes of Other General Cargoes that include industrial products and other high value products, which is the major commodity of the container cargoes, have been decreased drastically (see Figure 7).



Source: PPA annual statistical report³⁾

Figure 6 Inbound and Outbound cargoes of Tacloban Port

This implies that Other General Cargoes, which used to be transported in containers most probably from Manila via inter-island shipping, are transported by either overland via Pan-Philippine Highway or RoRo ferries in these years, since Other General Cargoes includes industrial products and it is unrealistic to the consumption or production of general cargoes have been decreased.

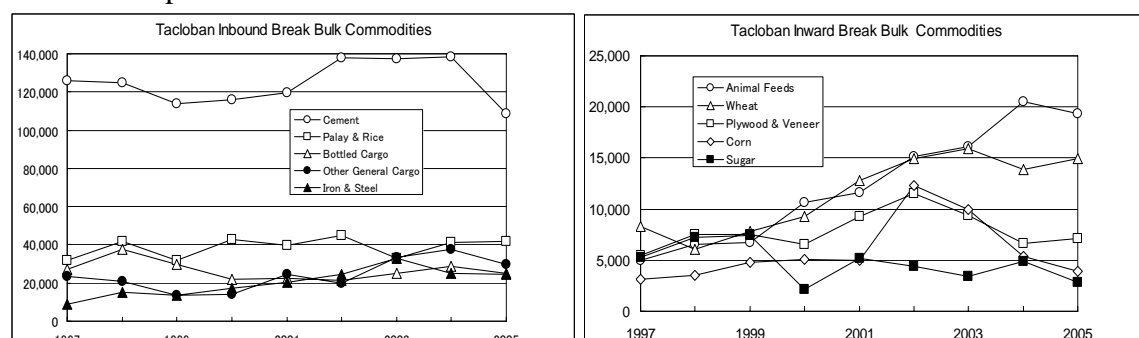


Source: PPA annual statistical report

Figure 7 Commodities of container cargoes at Tacloban Port

The volume of the inbound break bulk at Tacloban port remains at the level of 120,000 to 140,000 tons (see Figure 8). The major commodities of the break bulk cargoes are Cement, Rice, Bottled Cargoes, Other General Cargoes, Iron & Steel, Animal feed, Wheat, Plywood, Corn, Sugar.

While the volumes of most of these commodities remain almost the same, since 1998 the volumes of Animal Feeds and Wheat have been increasing. In the light of the major origins of the two commodities, i.e., Animal Feeds from Cagayan de Oro and Wheat from Manila, these two commodities should be transported by inter-island shipping. Thus some commodities have preference of transport modes. Bulky and low price commodities that are transported over a long distance prefer inter-island shipping, while high value commodities prefer RoRo ferries.



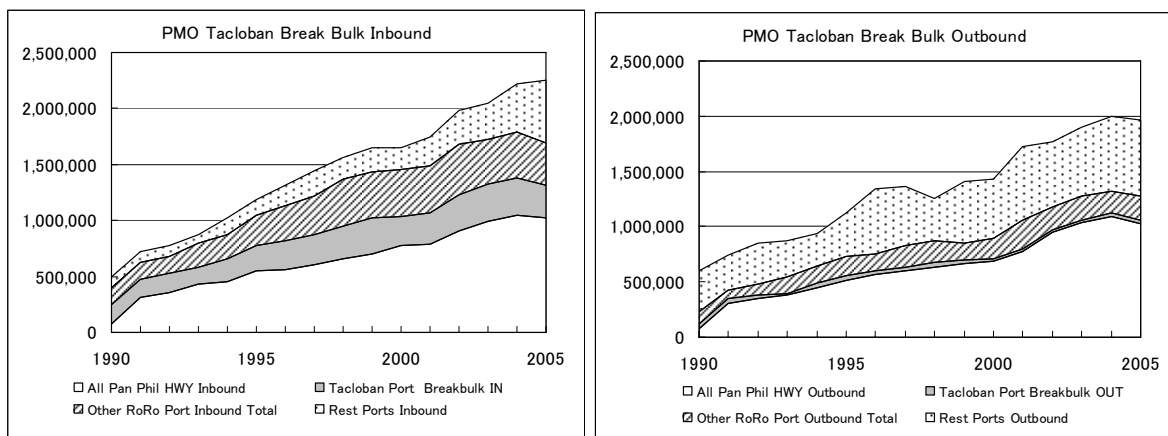


Source: PPA annual statistical report

Figure 8 Major inbound commodities at Tacloban Port

The shift of the transport mode from inter-island shipping to other modes is more clearly seen in the total inflow and our flow of the cargoes of Leyte and Samal Islands. Samal and Leyte Island are interconnected by a bridge and commodities are transportation overland between the two islands. The commodities to and from these two islands are transported via either Pan-Philippine Highway ferry terminal or sea ports. Figure 9 shows the share of the break bulk among (1) Pan-Philippine highway, (2) Tacloban Port and (3) RoRo ports (other than Tacloban Port) and (4) Rest of the ports, which include private ports that handle specific commodities such as fertilizer and iron ore. In general, the volume of the Pan-Philippine Highway cargoes indicates the trade volume of Eastern Visayas, i.e., Samar and Leyte Islands, with Mindanao and Luzon Islands, Tacloban Port cargo volume indicates the trade volume with Metro Manila, and RoRo port cargo indicates the trade volume with Central Visayas, especially Cebu Island, while cargoes handled at Rest of the Ports are rather special cargoes of private enterprises. The RoRo ports in Leyte Island are Naval, Palompon, Isabel and Ormoc in northern coast of Leyte Island and Hilongos, Baybay, Bato and Maasin in the southern cost of the Island

It is observed in Figure 9, that, except for the Rest of the Port, the share of the Pan-Philippine Highway cargoes is the largest, and RoRo ports and Tacloban Port are the second and the third, respectively. This implies that, even with many RoRo links with Central Visayas, the Eastern Visayas has closer economic tie with Mindanao and Luzon than Central Visayas. It should be noted that the reason why Pan-Philippine Highway takes large share is that RoRo passenger and cargoes must have been further transported to Luzon via Pan-Philippine Highway.



Source: PPA annual statistical report

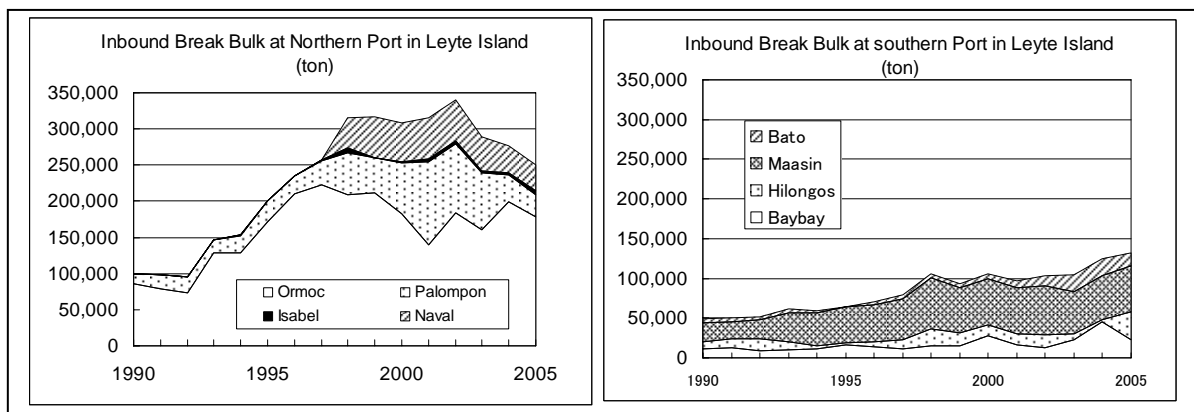
Figure 9 Share of break bulk cargoes among Pan-Philippine
Highway, Tacloban Port and RoRo Ports

(3) Competition among the RoRo routes between Cebu and Leyte Islands



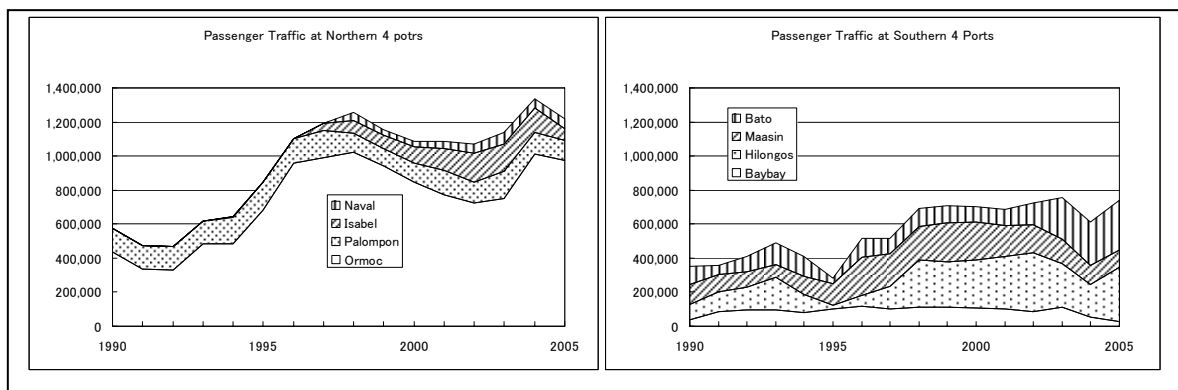
The cargo traffic between Cebu and Leyte is shown in Figure 10, which is drawn for the northern four RoRo ports and the southern four RoRo ports. It is observed that, while the total cargo volume of the northern four ports tends to decrease, that of the southern ports tends to increase. This implies that the RoRo service in the southern Leyte has been improved. It is also observed that the four RoRo ports in northern Leyte are alternate ports, and are competing to each other. When the cargo volume at Ormoc Port decreased, the cargo volume at Palompon increased. The four ports in southern Leyte are also competing to each other. While the cargo volume at Maasin port tends to decrease, Bato port tends to handle more cargo volumes.

Passenger traffic at the northern and the southern ports are shown in Figure 11. The total numbers of passenger at the northern and the southern ports remain almost the same level since 1998. The shares of the northern and the southern ports remain 60% and 40 %, respectively, since 1998. The rate is almost the same as the ratio of the population of north and the south Leyte. It seems that the RoRo ports in the northern Leyte are competing to each other, while the four ports in the south also competing to each other.



Source: PPA Annual Statistics Report³⁾

Figure 10 Cargo volumes at the northern and the southern RoRo ports of Leyte Island



Source: PPA Annual Statistics Report³⁾

Figure 11 Passenger traffic at the northern and the southern RoRo ports of Leyte Island

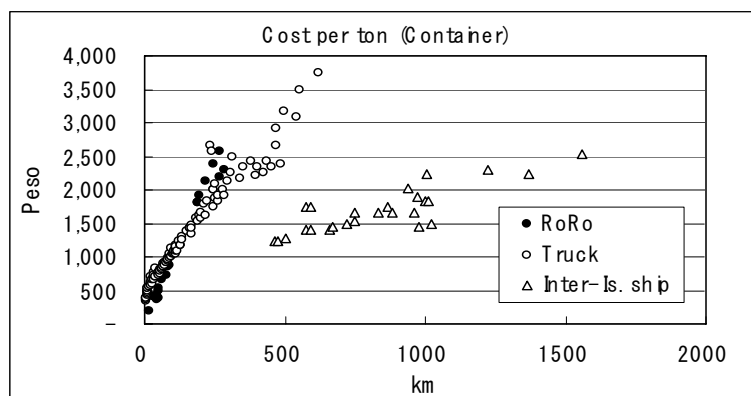
4. Freight rate of truck, RoRo ferry and inter-island shipping



The Roxas-Caticlan RoRo link was first proposed to complete North-South Inter-modal transport corridor, it is named the Strong Republic Nautical Highway (SRNH), which was expected to be an alternative transport route to the existing inter-island shipping between Luzon and Mindanao. However, even after three years of operation, the traffic that moves over the entire length of the SRNH is very few. One of the reasons why the route is not yet fully utilized for the transportation between Mindanao and Luzon may be the transportation cost.

The freight rates of land, RoRo ferry and inter-island shipping are compared in Figure 12. The freight rates per ton for truck and inter-island shipping are calculated from the rates applied to 20-foot container, while the freight rate for RoRo ferry is calculated from the rate applied to 11-m truck. As observed in Figure 13, ferry and truck are serving up to 500 km, while inter-island shipping service covers rather long distance transport beyond 500 km. The freight rates of trucks and RoRo ferry are almost proportional to the distance.

Even though the freight rate of inter-island shipping is not available from shipping lines for the distance shorter than 500 km, by extrapolating the freight rate of inter-island shipping, it is estimated that the freight of RoRo ferry and trucks would exceed the freight rate of the inter-island shipping for the travel distance longer than 100 km.



Source: Confederation of Truckers Association of the Philippines Nov., 2005,
WG & A Feb, 2002, Negros Navigation May, 2007

Figure 12 Comparison of the freight rates of truck, RoRo ferry and inter-island shipping

Thus, the inter-island shipping seems to be much more economical mode of transportation when a cargo is transported over 100 km. However, for the comparison between the freight rates of truck and inter-island shipping under the same condition, the freight rate of inter-island shipping should be added by the cost of hauling from the origin of the cargo to the loading port and from unloading port to the final destination as well as the cargo handling charges at the ports.

Figure 13 shows the comparison between the per-ton freight charges of inter-island shipping and Truck & RoRo ferry. The freight charge is shown per ton based on the freight rate given for 20-foot containers. The freight charge of inter-island shipping includes the hauling charge from the origin to the loading port and the unloading port to the destination as well as the handling charges at the two ports.

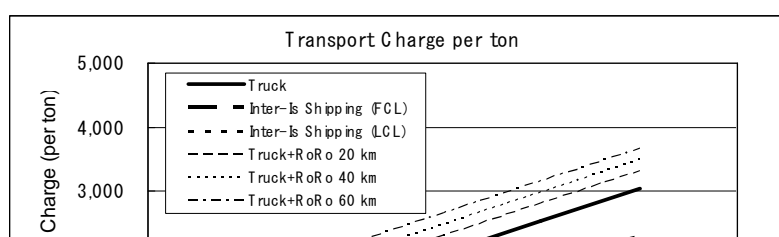




Figure 13 Comparison of door-to-door transportation cost among different modes

The freight charges for truck and RoRo ferry varies depending on the charges of RoRo ferry, i.e., the distance of the RoRo link. The freight charge of Truck & RoRo is calculated for different RoRo ferry links: 0, 20, 40 and 60 km. when the travel distance is 300 km, freight charges of truck are almost the same as that of inter-island shipping. However, if the truck uses RoRo ferry of 40 km long link, the competitive range is less than 200 km. The freight for the inter-island shipping is calculated for Full Container Load (FCL), which is a container contains cargoes of only one consignee, and Least Container Load (LCL), which contains cargoes of several consignees. The freight charge of LCL is higher than FCL because an additional cost is required for LCL containers to fill up one container.

The freight charge of Truck & RoRo does not include the RoRo ferry charges of return trip. Thus, the simple comparison of the freight charges leads to the conclusion that RoRo transport system is competitive to inter-island shipping only when the travel distance is short and the distance of RoRo ferry link is also short. However, as seen in the actual traffic between Batangas and Panay Island, even though the travel distance is longer than 300 km, substantial volume of cargoes has been shifted from inter-island shipping to the inter-modal route. This implies that RoRo transport system provides other benefit for the users to pay for higher freight cost.

5. Inter-regional commodity flow & identify potential routes of RoRo shipping & Potential commodity

PPA publishes its Annual Statistics Report. The port statistics covers all the commercial ports under PPA Port System, which includes national ports under PPA, municipal ports and private ports except those ports under Cebu Port Authority (CPA) or Subic Bay Metropolitan Authority (SBMA). The report summarizes the cargo, passenger and commodity statistics in accordance with the by PPA Port management Offices (PMOs). Basically, a PMO covers all the commercial ports of each Region, i.e. political boundary.

The total volumes of the inbound and the outbound commodities by PMO seem to indicate the inflow and the outflow of the commodities to and from the Region, respectively. Table 2 shows the net inflow and outflow of major commodities by PMO. For some commodities, the supply regions are clearly distinguished. For example, the supply region of cement is only Cagayan de Oro and Iligan area, corn is supplied by the regions of General Santos,



Cagayan de Oro and Davao areas, palay is supplied by Panay Island and sugar is supplied by Negros Island.

Table 2 Net commodity inflow and outflow by Region by domestic shipping in 2004 (1,000 ton)

PMO and Region covered 2004	Cement	Corn	Palay & Rice	Sugar	Ferti- lizer	Animal Feed	Bottled Cargo	Gen. Cargo	Wheat	Fish & Prod.	Live Animal	Fruit & Vegita.
Limay(Reg III)	0	0	0	0	0	556	0	-3	572	0	0	0
North Harbor (Manila)	-43	-10	10	-159	-10	-12	25	544	1	-28	-20	-49
South Harbor (Manila)	6	-32	-9	-144	-32	40	41	393	-591	-17	-1	-14
Batangas(CALABARZON)	-55	-3	-25	-72	-29	-17	113	-107	42	0	-1	-44
Calapan(Mindoro)	-33	0	77	-1	-14	-1	-3	-1	0	0	1	2
Puerto Princesa(Palawan)	-83	3	14	-12	-12	-5	-61	-72	-3	32	5	-2
Legaspi(Bicol)	-148	-5	8	-78	-50	-7	-89	32	-8	1	0	0
Iloilo(Panay)	-504	-50	174	93	-71	3	-328	-316	39	-12	8	-5
Pulpandan(Negros Occ)	-284	-34	-93	531	-80	-71	81	-472	-31	-3	1	-20
Dumaguete(Negros Or.)	-154	-43	-35	161	-23	-45	-37	-90	-11	-8	3	-1
Tgbiliran(Bohol)	-109	-10	-13	-15	-24	-65	-28	-127	-9	-3	5	-8
Tacloban(Leyte, Samar)	-378	-13	-103	-19	543	-105	-75	-168	-40	-1	0	-9
Ozamiz (Misamis Occ.)	-59	4	-9	-10	-24	-18	-44	-138	-11	8	1	18
Iligan (Lanao del Norte)	312	24	-6	-3	1	115	11	-29	122	0	2	10
Cagayan de Oro North Mindanao	483	228	-8	63	-94	11	35	-166	12	1	36	129
Nasipit(Agusan del norte)	-1	10	0	-3	-1	-5	-81	-143	-10	0	0	150
Surigao(Surigao del Norte, Sur)	65	0	-9	-5	-1	-11	-5	-43	-4	0	4	10
Davao (South Mindanao)	-17	94	-6	-2	-102	-11	-30	-616	0	-13	5	301
General Santos (South Mindanao)	-2	184	0	1	-50	21	-24	-230	-6	40	54	113
Zamboanga (West Mindanao, Sulu)	-140	-8	-1	-17	-9	-10	-45	-133	-4	83	0	-7

Note: "-" (negative value)" denotes net inbound volume while positive value denotes net outbound volume in domestic shipping

Source: PPA Annual Statistics Report Volume B, 2004⁴⁾

No information of origin destination is given in PPA statistics. However, in the light of the existing shipping service routes, the flow patterns can be drawn for some commodities.

Figure 14 shows the flow of corn and sugar. There is practically no import or export of corn in the Philippines, and the production and the consumption of Corn are well balanced. Therefore Cagayan de Oro and General Santos supply corn all other regions. Corn is transported in the form of either bulk or bagged cargo, which is classified as general cargo. It is most likely that, except for local and short-distance deliveries, large volume of corn first transported to Manila via inter-island shipping and then distributed to all the consumption area in the form of bags via various modes of transport, truck, RoRo ferry or inter-island shipping.

Sugar is produced in many provinces, and some provinces self supply their consumption. The largest consumption area is National Capital Region (NCR) area. It is likely that, while greater volume of sugar transported to Manila by inter-island shipping, sugar is also transported via RoRo ferry links in Visayas Region, especially to Cebu and Bohol Islands.

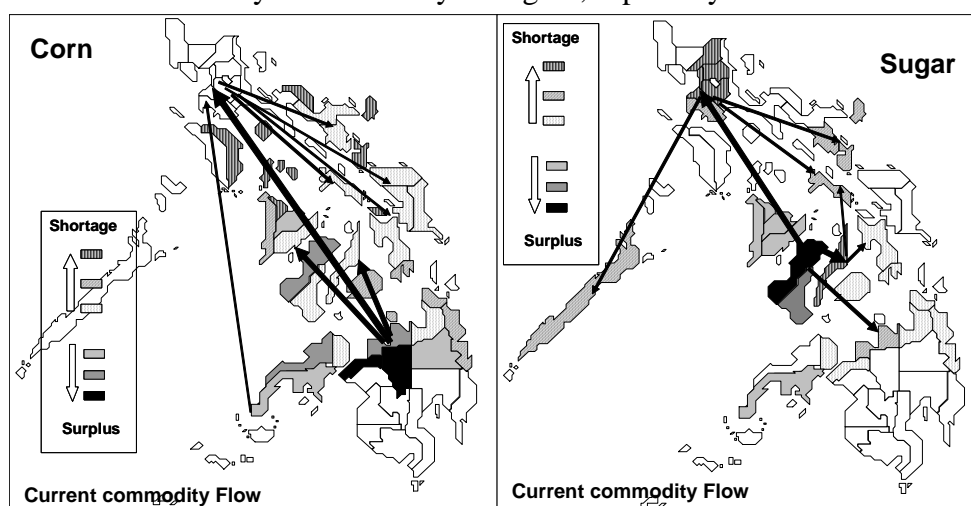


Figure 14 Flows of Corn and Sugar

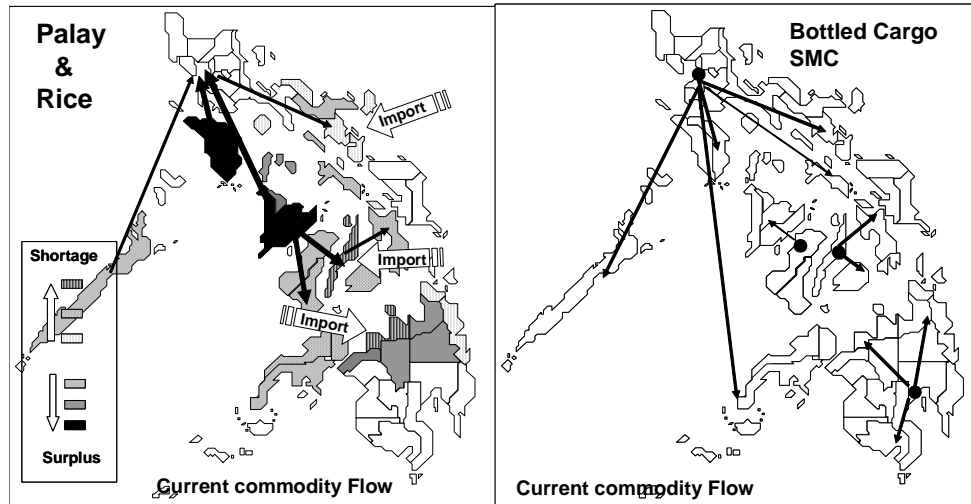


Figure 15 Flow of Palay and Bottled cargoes

Figure 15 is drawn to exhibit the flow of Palay & Rice and Bottled Cargoes. Since the Philippines is short of rice, rice is imported at several ports such as Legaspi, Cebu and Cagayan de Oro for local consumption. Since Panay Island has fully developed RoRo ferry links, substantial amount of Palay must be transported to Central and north coast of Mindanao. For the case of Bottled Cargoes, the San Miguel Corporation (SMC) has its own transport network. So far, its products have been delivered by tramp ships, non liner service, from the factory to its own ports near its regional logistic centers. However, it is reported that due to the establishment of Batangas-Panay inter-modal route, the SMC reduced the number of its logistic centers, because the coverage of a distribution center has been expanded with RoRo ferry service.

6. How we can maximize the use of the RoRo service

Reviewing the flow of some major commodities, we can recognize two flow types:

(1) Type I - Centralized delivery

This type of flow utilizes the Hub-and Spoke transport network composed of the inter-island shipping. Rice, Sugar and corn are firstly delivered from production area to NCR in bulk, then redistributed to the consumption area at various locations

(2) Type II - Direct delivery

This type of flow is seen for those products of large scale enterprises such as bottled cargoes, cement and fertilizer. Instead of inter-island shipping, i.e., liner service, tramp ships are employed for the delivery from the production area to everywhere of the country.

RoRo ferry service is advantageous for short distance transportation. This advantage is



fully utilized when a RoRo route provides a transverse service route that complement national hub-and-spoke network formed by the inter-island shipping. With the RoRo ferry service in Visayas Region, especially between Central and Eastern Visayas, the distance of transportation is shortened by direct delivery from production zone to consumption zone without the double handling at NCR. This is well illustrated in Figure 16. In western Visayas, while a regional hub at Panay Island seems to have been established, another hub in Cebu Island seems to remain without efficient RoRo accesses especially to Bicol and Mindanao.

Another advantage of RoRo is speed of the transportation. Since the RoRo system eliminates the handling between ship and truck at the ports, duration of the transportation can be drastically reduced. This means a truck can cover wide area in other islands (see Figure 17), and this encourages the suppliers to reduce the number of warehouses. This has been already achieved for bottles cargoes. Cement is the principal commodity of general cargoes in domestic shipping. Many ports practically handle cement only. With RoRo ferry service, cement suppliers can reduce the warehouses and then the volumes of stocks.

The RoRo ferry service itself does not achieve the reduction of transportation cost. The real benefit of is raised through the structural change of logistics system: from large volume & few frequency delivery to small volume & frequent delivery and point-to-point delivery to point-to-area delivery. To this end, the RoRo ferry service should make it possible that a truck deliver goods to other island in a day or two. Thus, the frequency of RoRo ferry service at a route should be no less than two round trips, for the convenience of the users, three round trips are desirable, which make it possible for a truck to deliver goods over other islands in a day.

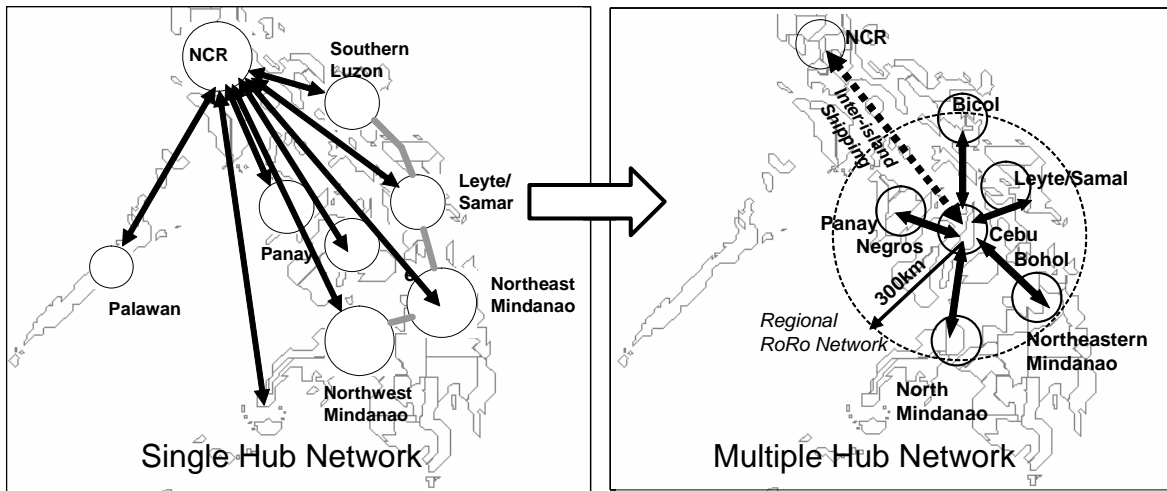


Figure 16 Single Hub Network and Multiple Hub Network

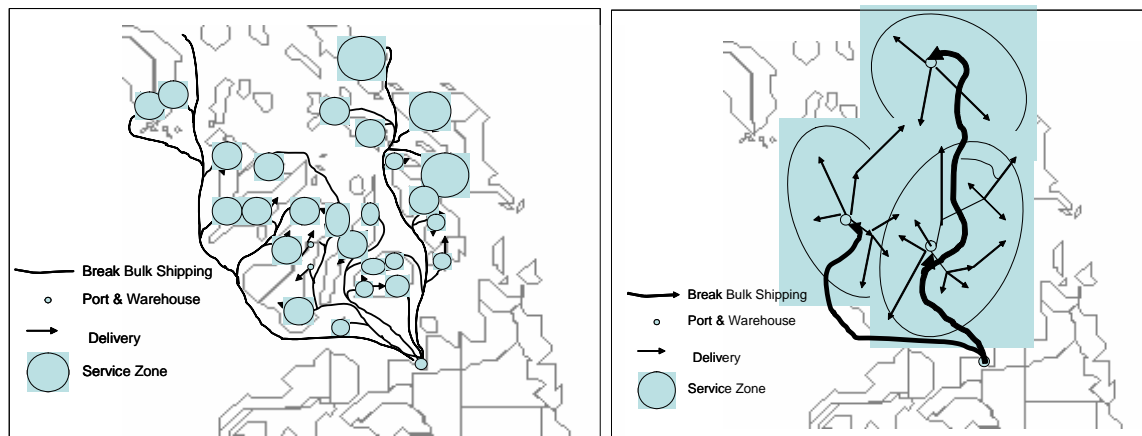


Figure 17 Possible changes in cement delivery

7. Regulatory and administrative aspects for the promotion of RoRo service in the Philippines

For the realization of the effective RoRo transport network, it is most important to ensure the profitability of RoRo operators to sustain its operation with appropriate service level from the view point of regularity, safety and comfortableness. Though the cost of shipping includes various items and is difficult to estimate, the average revenue of RoRo ships can be calculated from the port statistics. In 2005, in Batangas-Calapan link, 9,556 round trips were made by 12 RoRo ships having GT ranging from 258 to 2,925 GT. Most of the RoRo ships were about 500 GT having the lane-meter capacity of 120. The average revenue per round trip is estimates to be P75,414 (see Table 3), which is supposed to be profitable revenue per round trip for a 500 GT RoRo ship when it serve along 24 mile long RoRo link.

While some RoRo ferry links have much vehicle traffic and few passengers, other links have many passengers and few vehicles. In order to get rough idea of traffic volume that makes a 500 GT RoRo ship operation profitable, the annual traffic volumes that ensure



P75,414 are calculated for various ratios of passenger and vehicle under the condition that the RoRo ship makes three round trips per day and the composition of the four vehicle types of 3%, 34%, 31%, 32%, which is observed in Batangas-Calapan Link. Figure 18 shows the results of the calculation. Assuming that the average load factor is 60%, which is observed in Batangas-Calapan link, the annual cargo traffic is 80,000 ton (see right figure), annual passenger should be more than 150,000 (see Figure in the middle) to make the RoRo ferry operation profitable. If the Load Factor, the annual average, is 40%, which is 50,000 tons per year, the number of passenger should be more than 250,000 per year (see left figure).

Table 3 Average revenue of RoRo ship per round trip at Batangas-Calapan Link

Batangas - Calapan, 2005					
Ship Employed	12	Distance	24 Nautical Miles		
Ship calls	9,556	2005 Actual			
Trip per ship	796	2.5 per day			
Cargo	690,795	2005 Actual	72.3 t per trip		
Vehicle Type	I	II	III	IV	Total
Vehicle number	6,426	92,014	106,216	48,919	253,575
Vehicle Per Trip	0.7	9.6	11.1	5.1	26.5
Unit Lane-Meter	1.5	4	6	9	
Total L-M	1.0	38.5	66.7	46.1	152.3
Charge (Peso/Unit)	250	1,300	2,250	3,100	
Revenue/trip PhP	168	12,518	25,009	15,869	53,564
Passenger	1,305,000		2005 Actual		Total revenue per trip (Pesos)
Pax Per Trip	137	Pax/Trip	160	peso/Pax	21,850
					75,414

Source: The Feasibility Study on the Development of RRTS for Mobility Enhancement, 2007¹⁾

Figure 18 is a sort of a criterion to assess whether a RoRo service with 500 GT ship is possible or not. If the vehicle and passenger traffic volume do not fulfill the minimum volumes, 500 GT ship is too large for the link.

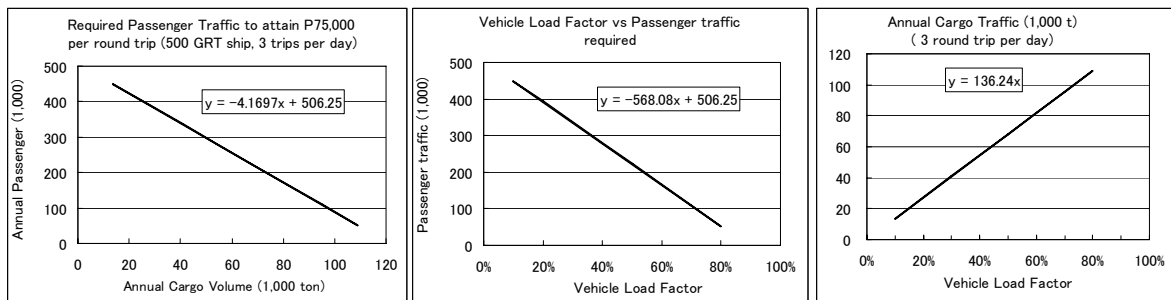


Figure 18 Annual passenger and vehicle traffic to make RoRo operation profitable

For the RoRo ferry links that formulate an inter-regional transport network, a certain standard should be fulfilled to ensure regularity of service. Since these links are complementing inter-island shipping, the RoRo ships should have enough capacity to carry full size trailers and buses. Thus, it seems to be realistic to assume that 500 GT is the minimum size to fulfill the requirements for the inter-regional RoRo service. To make the operation of 500GT or larger size ships financially feasible, the RoRo links should be carefully chosen so that the link attracts enough traffic volume and that the RoRo operation is profitable for the operators.



While Batangas-Mindoro-Iloilo route has been established as the inter-regional transport routes, most of the RoRo links of Cebu seem to be still local links. The increase in number of RoRo links between two islands does not formulate the regional network. On the contrary, all the links are most likely to encounter the difficulty to achieve profitability. It seems to be unlikely that all the existing RoRo service routes will survive without intervention of the government to regulate the operation and to improve the highways so that the traffic along the routes grow beyond the level that make the RoRo operation profitable.

8. Conclusions

Summing up the discussions above, the following are the conclusions:

(1) Extent of Inter-modal transport

The inter-modal transport in the Philippines is competitive to inter-island shipping within a distance 300 km with one or two RoRo links.

(2) Advantage of RoRo ferry service

For the full utilization of the advantage of RoRo ferry service, Cebu Island should play a role of the regional economic center. To this end, Cebu Island should have full access to all the adjacent islands. To make the RoRo ferry routes of Cebu Island competitive to the conventional shipping, the highway system should be improved to shorten the distance of RoRo links so that the travel time of a RoRo link is less than three hours.

(3) Commodity flow

The transport network of the Philippines has been hub-and-spoke type, and NCR is still plays a role as the sole logistics hub for many of the major commodities of domestic shipping. Some commodities such as cement and fertilizer are distributed by tramp ships directly from the port at the production area to everywhere of the country. With the full access to all the adjacent islands, Iloilo City has been established as the logistic hub of cement distribution. The real advantage of RoRo ferry service is not the cost reduction of the transport itself, but the cost reduction of the structural change of the commodity flow. With the regional hub, the suppliers can reduce the number of distribution centers and this further leads to the reduction of the cost of distribution by reducing the number of warehouses and volume of stock.

(4) Administrative intervention

For the promotion of RoRo transport system, it is most important to generate enough traffic volume to ensure the profit of RoRo ferry operators. The government should be very careful to issue the franchise of RoRo ferry operation and to regulate the number of ships in a RoRo route.

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