Plan and Implementation Support for Commercialization of NW-1

Summary of 16th Pilot Movement

Kolkata to Patna

PepsiCo, Emami

22nd January 2019

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1 Introduction

During recent years, the National Government of India and the Inland Waterways Authority of India (IWAI) as the public authority in charge of the country's inland waterways have undertaken major efforts to enhance the navigability on the nation's inland waterways, develop necessary infrastructures and promote freight movements by inland waterway barge. The actions taken aim to increase the use of inland waterway transport (IWT) for the transport of freight shipments and make use of the potential benefits that this mode offers for the country's growing economy.

Due to high transport volumes, India's existing road and rail networks are overloaded in many places and transportation of freight and passengers often suffers from congestion as well as the presence of infrastructural bottlenecks. Moreover, environmental pollution and pursued sustainability goals require a coordinated approach to a comprehensive and integrated national transportation policy. Given the existing network of rivers, canals and backwaters and recognizing IWT's mode-specific advantages, the Indian Government thus intends to make transport by inland barge an integral part of the country's transport system.

Covering the Ganga-Bhagirathi-Hooghly river system, National Waterway-1 (NW-1) has the potential to open up large markets in the northeastern states of India for IWT. In order to ensure a sustainable and commercially viable development of IWT in these parts of the country, the public authorities have invited external expertise for the project on Plan and Implementation Support for the Commercialization of NW-1. The given project thereby aims to facilitate actual business development and foster the development of cargo movements on India's longest National Waterway from Haldia, West Bengal to Allahabad, Uttar Pradesh.

As the commissioned consultants, a Joint Venture of HPC Hamburg Port Consulting GmbH, UNICONSULT Universal Transport Consulting GmbH and its local Partner La Mer Maritime (P) Ltd. have put together a team of experts with comprehensive knowledge of the Indian inland waterway shipping sector and international IWT markets. Primarily aiming at the conduct of pilot movements and the closing of actual working contracts, the Consultants constantly engage into direct interaction with relevant market stakeholders, including potential shippers, barge operators as well as the competent public authorities.

This summary report of the 16th pilot movement conducted within the scope of the current project provides a documentation on the practical experiences made during the third trial transport of containerized cargo on NW-1. Building upon the insights gained from the given movement of food and healthcare products from Kolkata, West Bengal to Patna, Bihar as well as upon the findings from current field work and the Consultants' knowledge of the regional freight market, the given summary report provides implementation oriented guidance for the improvement of infrastructural conditions and operational processes on NW-1.

In the following, Chapter 2 provides an overview on the general background of the 16th pilot movement on the transport of containers from Kolkata, West Bengal to Patna, Bihar and the efforts undertaken to initiate it. Chapter 3 presents financial issues while Chapter 4 provides details on the operational aspects. Chapter 5 summarizes relevant findings and experiences made while Chapter 6 gives recommendations on further needs for action.

2 Preparation of Pilot Movement

Following the successful conduct of the first two transports of containerized cargo from Kolkata, West Bengal to Varanasi, Uttar Pradesh and in the return direction (see summary reports on the 14th and 15th pilot movements), the 16th pilot transport conducted within the scope of the curren project covered the barge transport of 16 twenty-foot equivilant unit (TEU) containers on the 815 kilometers stretch from Kolkata, West Bengal to Patna Gaighat Terminal, Bihar. Taking into account the specific advantages that containerization offers for the transports of smaller shipment sizes, the Consultants were able to arrange a consolidated transport with freight coming from two shippers, namely PepsiCo India and Emami.

Subsequent to the company's earlier involvement in the two preceeding and geneally successful pilot movements on the transport of containerized cargo on the Kolkata to Varanasi stretch, the snack, food and beverage company PepsiCo India expressed its intrest to participate in a third pilot transport featuring a different O-D pair. Following discussions between company managers and the Consultants' local team, PepsiCo India thus agreed to provide cargo for an IWT container movement from Kolkata, West Bengal to Patna, Bihar. With packing and unloading taking place at PepsiCo's respective warehouses, first and last mile transportation of the containers was conducted by truck transport.

In order to ensure an optimal utilization of vessel capacity, the Consultants' local team moreover managed to reach an agreement with the Emami Group on the company's participation in the pilot movement. For this purpose, the Indian healthcare and agrotech producer agreed to provide edible oil cargo for transportation from Haldia, West Bengal via Kolkata GR Jetty, West Bengal to Patna, Bihar. Following the packing of cargo at Emami's Haldia warehouse, the containers filled with oil canisters were trucked to Kolkata GR Jetty for consolidation with the PepsiCo shipment and loading onto the inland waterway barge. In total, the freight provided by both companies amounted to a quantity of approximately 190 metric tons.

As to the freight rate, PepsiCo India and Emami agreed to pay lump-sum rates of INR 160,000 (PepsiCo India), respectively INR 204,000 (Emami) for barge transport from Kolkata, West Bengal to Patna, Bihar. Costs for first and last mile transportation to and from the IWT handling sites were thereby calculated separately and borne by the Consultants with charges to be met by IWAI. Handling cost for loading and unloading at Kolkata GR Jetty and Patna Gaighat were borne by IWAI.

Following a rather late approval by the competent authorities, the pilot movement was initialized and the final preparatory actions were taken, including the distribution of the containers to the two loading sites. Having also conducted the preceeding 15th pilot movement, inland waterway vessel MV Rabindra Nath Tagore was available at Kolkata, West Bengal without the need for reallocation. Loading of the containers took place on the afternoon of 06th December 2018 and the vessel departed Kolkata GR Jetty for Patna Gaighat on the morning of the following day.

3 Financial Aspects

Under the coordination of the Consultants' local experts, PepsiCo India and the Emami Group as cargo owners and IWAI as the barge operator reached and agreement on the conduct of a third container pilot movement including the transport of 16 TEU on NW-1's 815 kilometers long stretch from from Kolkata, West Bengal to Patna, Bihar.

The two companies and IWAI thereby agreed upon a total lump-sum rate of INR 364,000 for barge transport of a total of 16 TEU containers from Kolkata, West Bengal to Patna, Bihar. Of the total freight costs, INR 160,000 are to be paid by PepsiCo India whereas the share of Emami's cargo accounts for INR 204,000. Loading at Kolkata GR Jetty and unloading at Patna Gaighat Terminal was arranged and paid for by IWAI. Initially loading charges at Kolkata GR Jetty were paid by the Consultants but all charges (i.e. first mile, last mile, loading, unloading and statutory charges) are to be met by IWAI.

First mile transportation of the containers from the warehouses in Kolkata, West Bengal (PepsiCo India) and Haldia, West Bengal (Emami) to the loading site at Kolkata GR Jetty as well as last mile transportation from the unloading site at Patna Gaighat Terminal, Bihar to the shipments' final destinations was organized by the Consultants. All costs for first and last mile transport were borne and managed by the Consultants and paid directly to the truck and trailer operators. However, charges are to be met by IWAI.

As to the financial viability of the agreed freight rates it must be noted that IWAI acted as barge operator. However from the shippers' perspectives, it can be assumed that the given lump-sum freight rates of INR 160,000 (PepsiCo India), respectively INR 204,000 (Emami) excluding additional costs for first and last mile transport constitute economically efficient alternatives to road and rail transportation.

Table 1 below shows the major cost items of the 16th pilot movement.

Table 1: Freight and Transport Charges

Position (Cost Item)	Charges (excl. Service Tax)
First mile transport to Kolkata GR Jetty, West Bengal	PepsiCo: INR 64,000 Emami: INR 96,000
Loading at Kolkata GR Jetty, West Bengal	INR 103,840
Vessel transport freight charges	PepsiCo: INR 160,000 Emami: INR 204,000
Discharging at Patna Gaighat Terminal, Bihar	NA (IWAI crane)
Last mile transport from Patna Gaighat Terminal, Bihar	INR 176,000 (lump sum)

Source: The Consultants 2019

4 Operational Aspects

The given pilot movement covered the barge transport of a total of 16 TEU containers loaded with FMCG products (PepsiCo India) as well as edible oil canisters (Emami) on the 815 kilometers stretch from Kolkata GR Jetty, West Bengal to Patna Gaighat Terminal, Bihar. The movement constitutes the third container transport and the second movement of consolidated freight from different shippers conducted within the scope of the current project on Commericalization of NW-1. Moreover it is the first pilot movement on the transport of containerized cargo handled at Patna Gaighat Termial, Bihar.

The overall duration of the pilot movement including first and last mile transportation and time for loading and unloading amounted to 20 days. The pilot movement was closely monitored by the Consultants' local team at all times in order to ensure early detection of potential hurdles and bottlenecks and to prevent major organizational or operational delays.

Following the packing of the cargo at PepsiCo's Kolkata warehouse and Emami's Haldia branch, the full containers were trucked to Kolkata GR Jetty for loading onto IWT barge MV Rabindra Nath Tagore. Approximate first mile distances amounted to 35 kilometers (PepsiCo India) and 150 kilometers (Emami Group). All containers arrived at Kolkata GR Jetty by 13:00 hours on 06th December 2018.

Official documentation issued for the pilot movement included a cargo manifest that had been signed by the master as evidence for the cargo quantity on board. Moreover, loading supervision was conducted.

Table 2 below presents a summary of information on the movement.

Table 2: Pilot Movement at a Glance

Route	Kolkata GR Jetty – Patna Gaighat
Shipper	PepsiCo India, Emami
Vessel Operator	IWAI
Vessel Name	MV Rabindra Nath Tagore
Commodity	Containerized cargo (FMCG, edible oil)
Cargo Quantity	16 TEU (approx. 190 metric tons)
Distance on NW-1	815 km
Loading at GR Jetty, West Bengal	06|12|2018 – 06|12|2018
Departure at GR Jetty, West Bengal	07|12|2018
Arrival at Patna Gaighat Terminal, Bihar	14|12|2018
Unloading at Patna Gaighat Terminal, Bihar	14|12|2018 – 16|12|2018

Source: The Consultants 2019

4.1 Loading Procedure

Following first mile transportation by truck from the containers' packing sites at Kolkata, West Bengal and Haldia, West Bengal, loading operations at Kolkata GR Jetty took place on the afternoon of 06th December 2018. Starting at 14:00 hours, loading of the containers by means of a privately owned on-shore mobile crane was completed by 18:00 hours. Given the unavailability of spreader equipment, steel cables had to be used to attach the containers to the crane. On board of MV Rabindra Nath Tagore, the 16 containers were stacked in two layers of eight containers each.

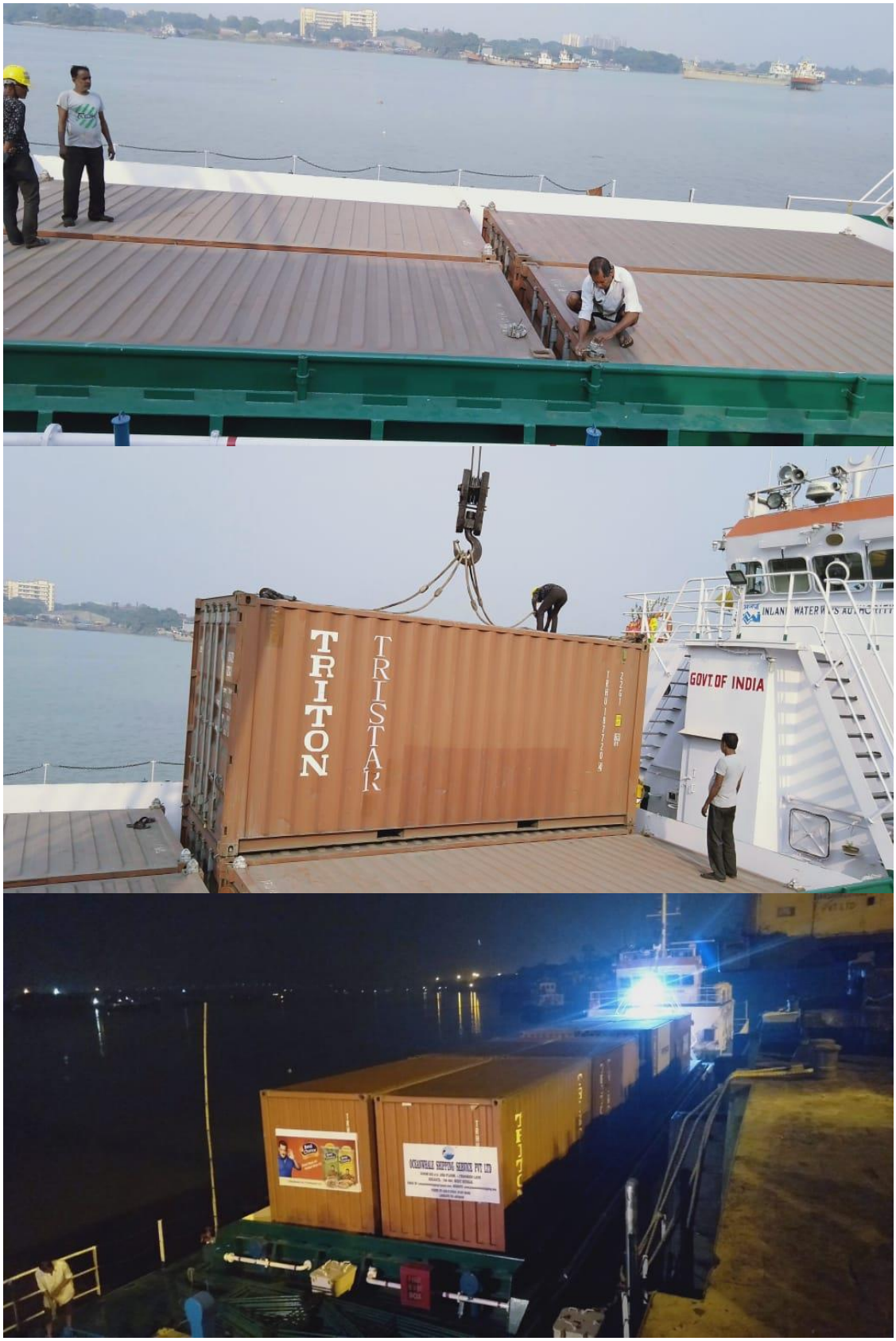
Figure 1 below shows the site of the loading location at the Kolkata GR Jetty, West Bengal.

Figure 1: Loading Location

Source: The Consultants 2019, based on Google Earth

Figure 2 below provides illustrations of inland vessel MV Rabindra Nath Tagore during loading operatiuons at Kolkata GR Jetty, West Bengal.

Figure 2: Loading operations



Source: The Consultants 2019

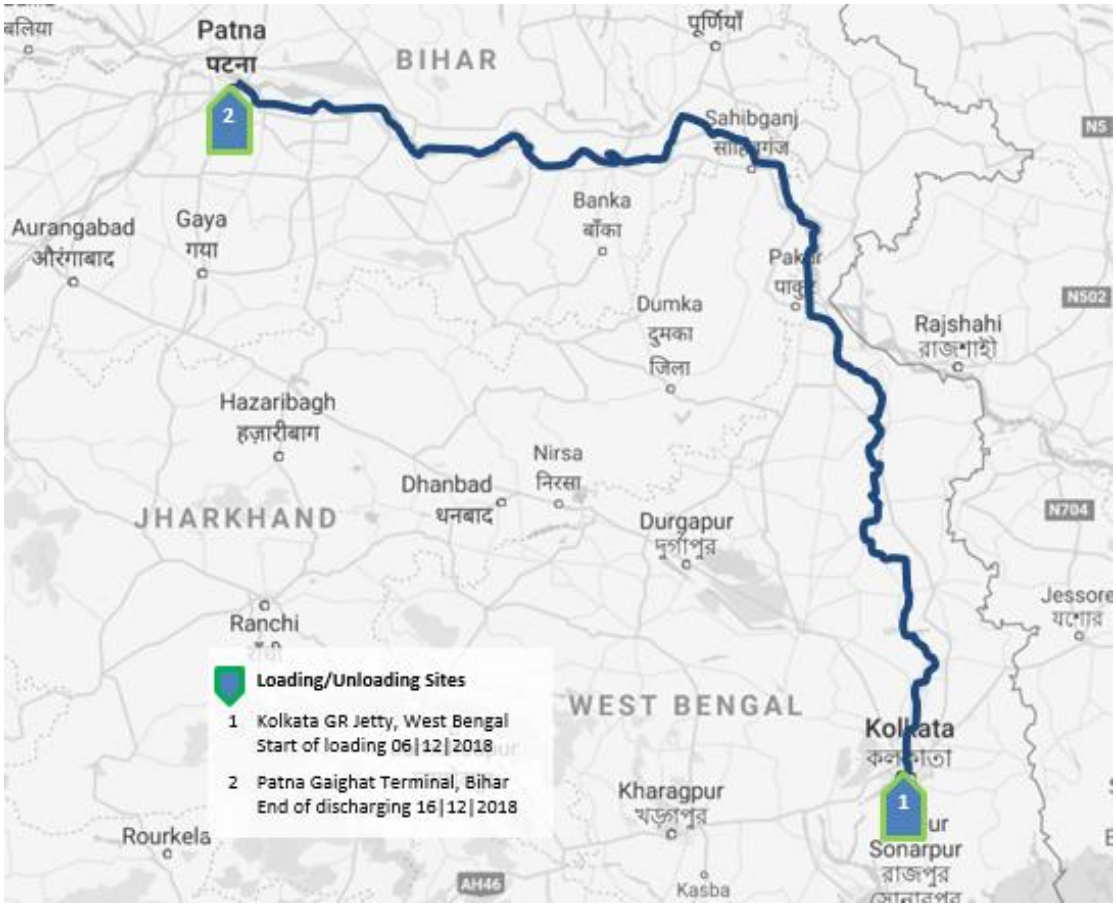
4.2 In-transit Procedure

Following the loading of 16 TEU containers with cargo from PepsiCo India and Emami, the IWAI inland waterway vessel MV Rabindra Nath Tagore departed Kolkata GR Jetty, West Bengal for Patna, Bihar on the morning of 07th December 2018 at 06:30 hours.

Due to good navigational conditions and sufficient water levels on all relevant sectors of NW-1, the pilot movement was able to operate without significant restictions and maintain an average speed of more than seven knots. After passing Farraka Lock, MV Rabindra Nath Tagore left the Hooghly River system and continued its journey on the Ganga River until reaching the destination at Patna Gaighat Terminal, Bihar. Throughout the journey no en route groundings occurred. However, delays that occurred during crossing of two pontoon brigdes on the Ganga River resulted in a late arrival of the vessel at Patna, Bihar. Due to missing night navigation infrastructure, barge operations were restricted to day light hours only. Upon arrival at Patna Gaighat Terminal on 14th December 2018 at 22:10 hours, unloading was delayed due to temporary unavailability of trailers for last mile transport.

Figure 3 below provides a map of the IWT movement plan covered by this pilot transport.

Figure 3: Movement Plan



Source: The Consultants 2019, based on Google Maps

Figure 4 below shows MV Rabindra Nath Tagore while en route from Kolkata GR Jetty, West Bengal to Patna Gaighat Terminal, Bihar.

Figure 4: En route operations

Source: The Consultants 2019

4.3 Unloading Procedure

Following MV Rabindra Nath Tagore's arrival at Patna Gaighat Terminal, Bihar on 14th December 2018 at 22:10 hours, unloading operations started at 22:45 hours but were thereafter temporarily delayed due to unavailability of trailers for last mile onward transport. Unloading and interim handling of the 16 containers at Gaighat Terminal was completed by 03:00 hours on 16th October 2018.

Similar to loading operations at Kolkata GR Jetty, unloading at Patna Gaighat Terminal included the use of a shore mounted mobile crane. With no spreader equipment available, steel cables had to be used to attach the containers to the mobile crane. Once unloaded, the containers were loaded onto trailers for last mile transport to PepsiCo and Emami warehouses in the Patna, Bihar area. Last mile distances for both shipments thereby amounted to approximately 40 kilometers each.

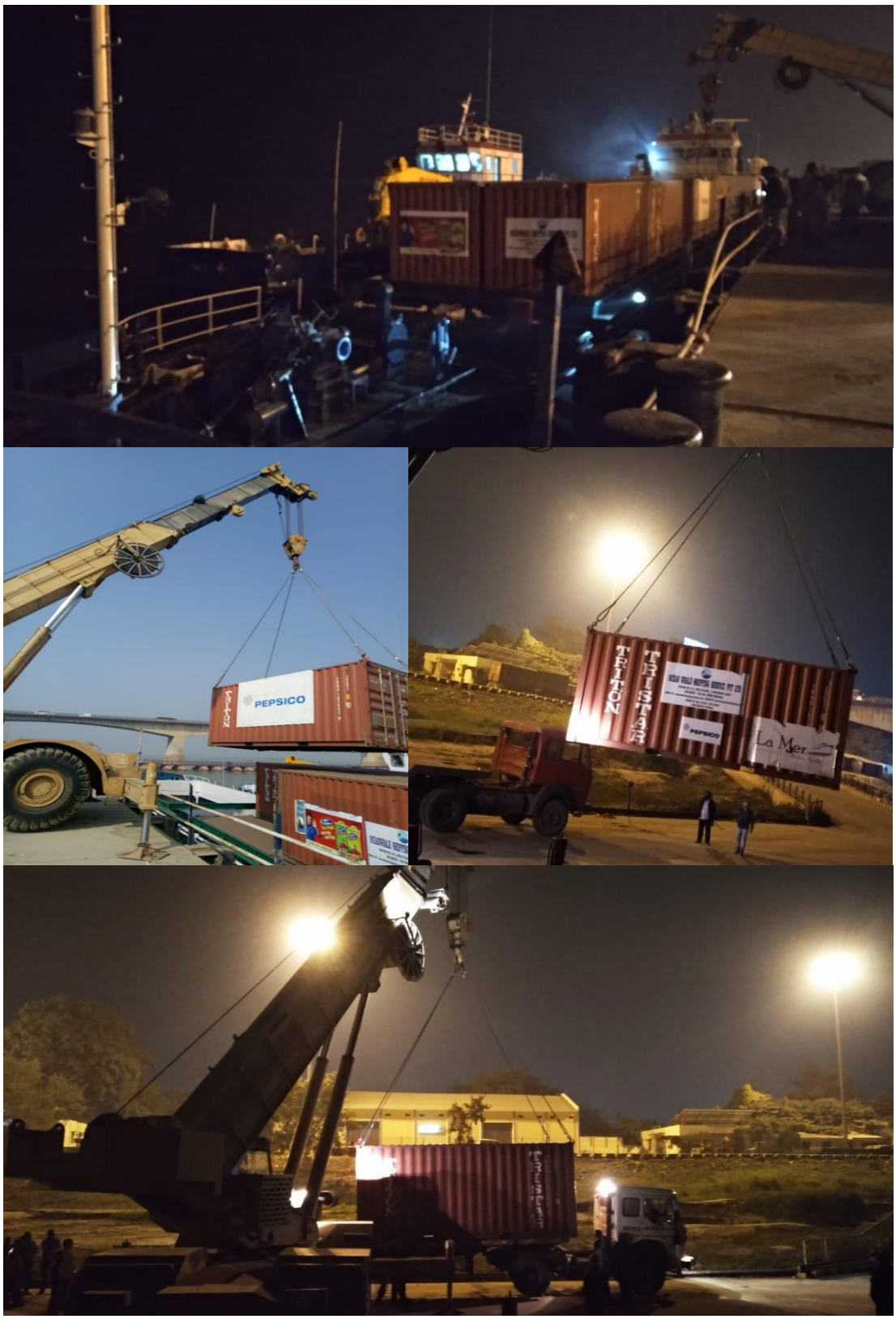
Figure 5 below shows the unloading site of the 16th pilot movement at Patna Gaighat Terminal, Bihar.

Figure 5: Unloading Location

Source: The Consultants 2019, based on Google Earth

Figure 6 below provides illustrations of the unlaoading of the containers at Patna Gaighat Terminal, Bihar.

Figure 6: Unloading Operations



Source: The Consultants 2019

5 Experiences and Findings

During the 16th pilot movement on the transport of containers from Kolkata, West Bengal to Patna, Bihar several issues have been documented. These include in particular:

- Empty containers were distributed to PepsiCo warehouse in Kolkata, West Bengal and Emami warehouse in Haldia, West Bengal for packing of cargo.
- Stuffing of cargo done while containers remained on trailers.
- Stuffed containers were then moved from PepsiCo warehouse in Kolkata, West Bengal and Emami warehouse in Haldia, West Bengal to Kolkata GR Jetty for loading onto IWAI vessel MV Rabindra Nath Tagore.
- Containers were directly loaded from trailers onto inland vessel using a mobile crane hired from a private crane operator.
- Vessel sailed from Kolkata GR Jetty to Patna Gaighat Terminal. At Patna Gaighat containers were unloaded from vessel onto trailers. Trailers then moved to PepsiCo and Emami warehouses in Patna, Bihar for de-stuffing of cargo.
- Vessel arrival at Patna delayed due to two pontoon bridge crossings.
- Unloading operations were delayed due to temporary unavailability of trailers at Patna Gaighat Terminal, Bihar.
- Night navigation was not possible throughout channel from Kolkata, West Bengal to Patna, Bihar on NW-1.
- Vessel maintained an average speed of more than 7 knots and was safe throughout channel on NW-1 (i.e. no groundings).
- No gap funding required for this containerized pilot movement.
- Suitable crane and loading arrangement required at Kolkata GR Jetty for safe, smooth and fast container handling (e.g. including spreader equipment – the latter was also unavailable at Patna Gaighat Terminal).
- Due to delayed commencement of the pilot movement demurrage costs/delay charges for trailers occured.

6 Recommendations

Based on the findings of the 16th pilot movement on the transport of FMCG and edible oil products in containerized form from Kolkata, West Bengal to Patna, Bihar the following actions are recommended:

- Take measures to improve handling of containers at Kolkata GR Jetty, West Bengal and Patna Gaighat Terminal, Bihar.
    - Suggestion: Ensure permanent availability of adequate cranes including spreader equipment for fast, safe and efficient container handling.

- Ensure technical and operational feasibility of night time navigation on NW-1.
    - Suggestion: Improve navigational aid infrastructure (inter alia navigation lights) on all stretches of NW-1.

- Take measures to better coordinate and facilitate crossing of pontoon bridges on NW-1.
    - Suggestion: Improve organizational process and coordination for opening of pontoon bridges on NW-1's Ganga River stretch downstream from Patna, Bihar.

7 Conclusion

Following the successful conduct of the two earlier pilot movements on the transport of containerized cargo from Kolkata, West Bengal to Varanasi, Bihar and in the return direction, a third trial run on the transport of containers on NW-1 was conducted on the relation between Kolkata, West Bengal and Patna, Bihar. As a consolidated transport, the 16th pilot movement involved containerized cargo from two different shippers, namely PepsiCo India and Emami. Consolidating both shippers' containers into one vessel departure ensured a high load factor and optimal utilization of the vessel capacity.

The good environmental conditions prevailing at the time of the transport ensured a generally fast and unproblematic IWT operation on NW-1. While insufficient water levels on the Ganga River and en route groudings were a common issues during earlier pilot movements on the transport of bagged or bulk cargo, no such problems were encountered during the given movement nor during the two previous container transports conducted in October and November 2018. Despite showing a generally unproblematic and fairly fast operation, the given 16th pilot transport nevertheless highlights some fields of action.

As demonstrated by the three recent pilot movements, the transport of containerized freight offers some operational advantages over bagged or bulk cargo that inter alia result in notably faster loading and unloading operations at the IWT terminals. In order to improve both the safety and efficiency of container handling and promote the transport of containerized cargo by IWT, it appears necessary that adequate cranes including spreader equipment become available on short notice at all major IWT terminals along NW-1, including Kolkata GR Jetty and Patna Gaighat Terminal.

Pontoon bridges on the Ganga River downstream from Patna, Bihar consitite a physical bottleneck for IWT operations that can result in operational delays. Improving organizational processes and coordination between the relevant authorities involved in the opening of these bridges would likely help to reduce waiting times and improve the operational reliability of barge operations on NW-1. Likewise, the provision of adequate night navigation aid infrastructures on all sectors of NW-1 would help to decrease transport durations and support the overall competitiveness of IWT.

In the case of the given pilot transport, the commencement of the movement got delayed. Hence, resulting in the incurrance of demurrage costs and delay charges for hired trailer equipment. In order to avoid corresponding costs, ensure a high planning security and warrant the on-time conduct of IWT freight shipments, it would thus be desirable to ensure a fast processing of respecitive proposals and to provide shippers and service providers with frequent updates on the status of corresponding requests.