



Plan and Implementation Support for Commercialization of NW-1

Summary of 3rd Pilot Movement Kolaghat to Bhagalpur / DALMIA



29th May 2017

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Commercialization of NW-1**

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Kolaghat to Bhagalpur / DALMIA**

This report has been prepared by:

HPC
Hamburg Port Consulting GmbH
Am Ballinkai 1
21129 Hamburg,
Germany

UNICONSULT
Universal Transport Consulting GmbH
Burchardkai 1
21129 Hamburg
Germany

JV HPC-UC
c/o UNICONSULT Universal Transport Consulting GmbH

Phone: +49-40-74008 108

Fax: +49-40-322764

E-mail: f.busse@uniconsult-hamburg.de

Web: www.uniconsult-hamburg.de

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1 Introduction

In India with its large network of rivers, canals and backwaters, the National Government intends to increase the use of IWT and to exploit the potential that this mode of transport offers for the country's growing economy. During recent years, the Indian Government and the Inland Waterways Authority of India (IWAI) as the statutory authority in charge of inland waterways have therefore undertaken major efforts to enhance the navigability and boost freight movements on India's inland waterways.

Given the country's recent economic growth, India's road and rail networks are overloaded in many places and transportation of cargo and passengers suffers from heavy congestion and the presence of physical bottlenecks. Moreover increasing pollution and environmental goals require a comprehensive and coordinated approach to a national transportation policy. Recognizing its mode specific advantages, the Indian Government intends to make IWT an integral part of the country's future transport system.

In order to foster a sustainable and commercially viable future development of the sector, the competent authorities have invited external expertise for a project on Plan and Implementation Support for the Commercialization of National Waterway-1 (NW-1).

Considering the practical experiences and also building upon the interim findings of the current project's ongoing field work as well as the Consultant's profound knowledge of the Indian IWT market, this Summary of Pilot Movement provides implementation-oriented recommendations for creating the necessary conditions for a sustainable development of IWT transports on NW-1.

In the following, Chapter 2 gives an overview of the general background of this specific Pilot Movement and efforts done to initiate it. Chapter 3 presents the financial issues and chapter 4 the operational aspects. Based on the findings, crucial success factors and relevant requirements for commercially viable transport flows and their technical feasibility are discussed and recommendations on urgent need for action are derived.

The current project on Plan and Implementation Support for Commercialization of NW-1 aims to stimulate the further development of freight movements on India's longest National Waterway from Allahabad to Sagar Island. In order to improve utilization of the waterway infrastructure, facilitate actual business development and to ensure the future development of IWT in North Eastern India, the project fosters one to one interaction with relevant stakeholders, aiming at the closing of actual working contracts.

Having been awarded the contract to conduct the assignment, a Joint Venture of HPC Hamburg Port Consulting GmbH and UNICONSULT Universal Transport Consulting GmbH and its local Partner La Mer Maritime Ltd. have put together a team of experts with comprehensive and long-standing knowledge of both, international IWT markets in general and the Indian inland waterway shipping sector in particular. The group of international consultants is thereby supported by local experts under the roof of La Mer Maritime Limited with headquarters in Gurgaon/Haryana.

2 Preparation of Pilot Movement

Dalmia Baharat Cement Ltd. (Dalmia) has been the shipper for the very first Pilot Movement from Haldia via Bhagalpur to Patna. Thus, contact between JV team and Dalmia exists since very beginning of the project. In several discussions at Dalmia office in 12th Floor, Hansalaya Building 15, Barakhamba Road, New Delhi, Delhi 110001, by phone or with regional representatives at different places it has become clearer and clearer that Dalmia is looking for multiple Pilot Movements in order to generate a good basis for long-term development decision regarding regular utilization of IWT for their supply chain. For the specific connection from Kolaghat, West Bengal to Bhagalpur, Bihar Dalmia has been interested in transporting up to 1,000 mt bagged cement.

Dalmia Bahart Cement is the cement branch of the Dalmia Group. It manufactures cement since 1939. The group has cement manufacturing plants in southern states of Tamil Nadu (Dalmiapuram & Ariyalur) and Andhra Pradesh (Kadapa), with a capacity of 9,000,000 mt annually. Company also holds stakes of 74 % in OCL India Ltd., a large cement producer in the Eastern Indian Region. The brands Adhunik Cement & Calcom Cement in North East have also been acquired. In total the group controls an expandable capacity of up to 25,000,000 mt annually.

On Wednesday 12th April 2017 the JV team discussed all vital aspects of the upcoming Pilot Movement with representatives of IWAI. These were the name of the barge to be deployed and the both roles of IWAI to act as barge operator and charterer as well as the acceptable rates for barge transport, loading and unloading operations. In this discussion also the involvement of the relevant local offices of IWAI has been defined. The JV team has been asked to cover the complete coordination work between shipper, barge operator, charter and local representatives as well as IWAI Noida.

As IWAI is barge operator and charter in one no formal Gap Funding Request Sheet has been submitted although negotiated rates (see following chapter) are not covering the actual costs. IWAI is balancing all occurring costs as an indirect funding.

It has been agreed that the IWAI Kolkata office will take care about provision and payment of work forces for loading of the barge. Information about the loading locations at Kolaghat identified and suggested by JV team have been forward to regional office on 16th May 2017 in order to be approved or substituted by an alternative location by IWAI.

For the unloading operations and location at Bhagalpur the regional Patna office of IWAI has been involved. During the meeting at IWAI headquarter in Noida on 12th April it has been also agreed that regional office will be in charge for provision and payment of unloading staff.

Subsequently to meetings with IWAI the MV ViVi Giri (300 mt capacity) has been nominated as the barge to be deployed for this Pilot Movement.

All the agreements and decisions have been documented and sent to all participants in writing in form of short minutes of meeting on Thursday 13th April 2017. On Friday 14th April the JV team started to involve the relevant regional representatives of IWAI.

On Friday 14th April all discussed and agreed issues has been formally agreed by IWAI via e-mail.

Although the first contact was very much supported by the existence of the first Pilot Movement the discussions with the shippers – when it all comes down to prices/cost, service quality, speed and reliability – requested many meetings and conversations. The preparation of the described Pilot Movement has been mentioned in the tenth Weekly Status Report (covering activities in calendar week no 15).

Figure 1: Weekly Status Report

Status Report - Commercialization of NW-1 *							
Report No 10	Week: 10.04. - 14.04.2017 (calender week 15)			Submission Date: 14th April 2017			
1. Pilot Movement in progress		Total Accomplished: 1					
S.NO	Shipper	Barge operators	Vessel Name	Loading	Unloading	Remarks	
1.1	Dalmia cement	IWAI	MV Zakir Hussain	Haldia	30.01.-02.02.17 Patna	27.03.17	First Pilot Movement completed
1.2	Ultratech	IWAI	MV Zakir Hussain	Patna	04.05.2017	Bhagalpur	Loading completed, waiting for approval letter for Opening of Pontoon bridge.
1.3	IFFCO			Kolaghat			Waiting for approval from IWAI
1.4	Dalmia cement	IWAI	MV VIVIGiri	Kolaghat		Bhagalpur	Get approval from IWAI for this movement
2. Contacted Shippers		Total Signed LOI: 6 by shipper & barge operator					
S.NO	Shipper's name	Discussion / Meeting	Letter of Intent / B2B Meeting / Contract		Remarks		
2.1	Dalmia Cement	Done with B2B meeting	Letter of Intent received from Dalmia		B2B meeting with Ocean Sparkle has been completed on 21.03.2017 and interested to provide lon term contract		
2.2	Ultratech Cement	Done with Waiting 17th March	Letter Of Intent format Sent		Interested to Provide LOI after their first movement of bagged cement.		
2.3	IFFCO	Meeting 02/03. 03.2017	Drafting IFFCO tender process		PWC sent tender docs to us.		
2.4	Kalyanpur Cement	Done with Meeting 14.02.17	LOI Received		Done with meeting , need to finalised tentative date for movement		
2.5	Lafarge India Pvt. Limited	Done with meeting 17.03.17	Waiting for LOI		Working on their cost analysis		
2.7	Ruchi Soya Industries	Done with meeting 17.03.17	waiting for LOI		Interest for transportation cargoes by NW-1, but need to finalise quotes and others.		
2.8	Shree Cement	Done with meeting 17.03.17	Waiting for LOI		Will sent OD pairs and quantity for transportation of their cargoes		
2.9	Prism Logistics	Done with meeting 17.03.17	Waiting for LOI		Will sent OD pairs and quantity for transportation of their cargoes		
2.10	Sharda plywood industries Ltd.	Discussion On			Sent questionnaire, introductory slide, will revert via email		
2.11	Birla Corporation pvt.limited	Discussion on			Called again but concerned person is on leave.		
2.12	Baba Ispat Pvt.limited	Discussion on			Draft of LOI, Shipper's questionnaire has been sent, waiting for revert		
2.13	Birla Sugar Mills	Discussion on			Draft of LOI, Shipper's questionnaire has been sent, waiting for revert		
2.14	Ashtech India Pvt. Ltd	Discussion on			Draft of LOI, Shipper's questionnaire has been sent, waiting for revert		
2.15	Dalmia Sugar Mills	Discussion on			Draft of LOI, Shipper's questionnaire has been sent, waiting for revert		
2.16	Pioneer Agro & Experts Ltd	Discussion on			Draft of LOI, Shipper's questionnaire has been sent , waiting for revert.		
3. Contacted Barge Operators		Total Signed Agreements: 0					
S.No	Operator's Name	Discussion / Meeting	Letter of Intent / B2B Meeting / Contract		Remarks		
3.1	Ocean Sparkle	Done with B2B meeting	LOI Received		Interseted to provide their fleet on time charter to Dalmia Cement		
3.2	Mercator Ltd.	Discussion	LOI Received				
3.3	Alphard Maritime Pvt. Ltd	Discussion	LOI Received				
3.4	M.Palloni & Co. Pvt. Ltd	Discussion	LOI Received				
3.5	Shri Maharshi Shipping	Done with Meeting 16th March	Waiting for LOI		Sent an offer of INR 16Lakh per month for Time charter.		
3.6	Sohom Shipping	Done with Meeting 16th March	Waiting for LOI		Sent an offer of INR 1 Lacs + 5T for a day		
3.7	B.ghose & Co.pvt. Ltd	Done with Meeting 16th March	Waiting for LOI		Will revert via email		
3.8	Era Shipping	Discussion					
3.9	TCI Seaways	Discussion			They want to sale-purchase / charter , but they want to know about exact subsidies by IWAI.		
3.10	Polestar	Discussion			Discussing with GSHI		
3.11	Shipping Corporation of India	Discussion					

Source: Consultants 2017

A Regulatory Request Sheet has been submitted on 19th April 2017 by the JV team to IWAI. Due to minor availability of water depth the relevant river section only facilitated the transport of 240mt (metric tons) of bagged cement. As the parameters defined for a valid Pilot Movement request at least 300mt per movement it has to be clarified if this movement will be accepted as a valid Pilot Movement. A positive feedback has been given for this during a regular operational meeting on 20th April 2017 from IWAI to JV.

Figure 2: Regulatory Request Sheet

HPC		Uniconsult Universal Transport Consulting GmbH	
REGULATORY Request Sheet from JV HPC UNICONSULT to IWAI			
		Submitted on: 19/04/2017	
		Request No.: #004	
		Reply from IWAI requested until: 20/04/2017	
Subject of this request: Provision of Regulatory Support			
(like certificates, authorizations, pilotage, etc.)	Confirmation of a 240t-transport as a valid pilot transport		Place of action Kolaghat, West Bengal
			Period of action 17/04/2017-17/05/2017
Transport scenario:			
Commodity	Cement	Volume	240 t
Origin of cargo	Bengal Cement Works – Dalmia Cement Bharat Ltd, Salboni West Medinipur	Entry point NW1	Kolaghat
		Exit point NW1	Bhagalpur
		Destination of Cargo	OCL INDIA LTD - BHAGALPUR
Involved shipper	Dalmia Bharat Cement		
Involved barge operator	IWAI		
ETD	20/04/2017		
Rationale of request:			
(reason, alternative, background etc.)	According to the Service Contract between IWAI and JV an IWT transport will only be counted as one pilot movement if it covers a volume of at least 300 t and a distance of at least 20 km. In this particular case only 240 t can be transported at once due to not sufficient water depth mainly at Bhagalpur region for secure barge operations. Although the shipper provides 1,000 t to be transport by barge from Kolaghat to Bhagalpur.		
Further details:			
(Exact information/data needed for regulatory action, etc.)	Loading of 240 mt bagged cement has completed 19th April, awaiting master instructions for sailing from loading point. Due to low tide the river draft is less than 1 meter, so the vessel is waiting for high tide for departure.		
Responsible Consultant:			
Name	Avinash Kumar		
Phone	91 -124 - 4313 407		
Email	projects@la-mermaritime.com		

Source: Consultants 2017

After three accomplished Pilot Movements since beginning of the project it has been experienced that the preparation of a Pilot Movement takes at least one month for negotiation, convincing and agreements.

3 Financial Aspects

Dalmia, IWA and JV team agreed after focused negotiations from 29th March 2017 to 13th April 2017 on a freight rate for barge transport of INR 600 per mt including loading and unloading charges. The cost of loading and facilities at Kolaghat, West Bengal has been negotiated with labor contractor at INR 175 per mt and INR 120 per mt for unloading at Bhagalpur. The costs of loading/unloading have been invoiced directly to director of respective IWA regional office. This has been confirmed by IWA via e-mail on 14th April 2017. The following table shows the major cost items investigated during preparation of this Pilot Movement.

Table 1: Freight and Transport Charges

Position (Cost Item)	Charges (excl. Service Tax)
First mile truck transport	INR 385 per ton
Loading of vessel at Kolaghat, West Bengal	INR 175 per ton
Vessel transport freight charges	INR 600 per ton
Unloading at Bhagalpur, Bihar	INR 120 per ton
Alternative truck rate to Bhagalpur	INR 1,120 per ton
Alternative rail rate Bhagalpur	INR 797 per ton

Source: Consultants 2017

During the physical loading operations it turned out that finally representatives of Dalmia paid unloading charges at Kolaghat to the staff. Afterwards Dalmia submitted an invoice to IWA Kolkata to get the loading costs funded by IWA.


IWT freight charges for the main leg transport of the cement shipment transported during this Pilot Movement summed up to a total of INR 1,44,000 for 240mt or INR 600 per mt. It can be assumed that this equals slightly more than half the cost of a corresponding transport by truck, thus proving the potential cost effectiveness of transport by inland waterway vessel.

In addition to the charges directly associated to the vessel transport, a number of other expenditures occurred for pre- and onward transport as well as cargo handling. In total, these additional costs summed up to approximately INR 680 per mt (excl. Service Tax). In this particular case the first and last mile transport has been organized and financially covered by the shipper Dalmia.

For this Pilot Movement vessel transport freight charges mentioned above have been paid by Dalmia to charterer, whereas the rest of cost items have been paid by the charterer to respective concerned parties.

The quotation for loading procedures at Kolaghat requested from Waterman Ltd. by JV team has been provided to IWA on Friday 14th April 2017. It is shown in the following figure.

Figure 3: Quotation for Loading Costs at Kolaghat

WATERMAN CO. LAUNCH OWNER, BARGE AND BOAT LAUNCH CONTRACTOR & SUPPLIER, MARINE TRANSPORTING		Office :- 53 Sri Ram Dhang Road P.O. - Saikia Howrah Pin - 711106 Phone- 033 - 26556880	Head Office :- Vill & P.O. - JAMITYA Via - KOLAGHAT PURBAMEDINIPUR Mob. : 9830188012
Ref. No.		Mail ID : company.waterman@gmail.com Date : 11/01/17	
To LAMER MARITIME PVT. LTD. KOLKATA			
Quotation			
1. Rate Rs. 175 per/ton (The rate including barge loading, local expenses & dock hire charges.)			
2. The rate will be apply within 50 meter distance of the barge.			
Thanking you, Yours faithfully  WATERMAN CO. Proprietor			

Source: Consultants 2017

4 Operational Aspects

The arranged Pilot Movement covered a cargo volume of 240 mt of bagged cement from Kolaghat at NW-86 Rupnarayan River in West Bengal to Khoti Ghat at Bhagalpur in Bihar. On Friday, 14th April the barge MV VIVI GIRI has already reached loading site in Kolaghat which has been identified by JV team. Loading procedures started on 17th April and have been accomplished on 19th April 2017. Due to low tide conditions the barge M.V. VIVI GIRI did not departure directly after completion of loading but on 23rd April. After its travel of the 715 km upstream to Khoti Ghat at Bhagalpur the barge reached unloading location on 30th April. Unloading has been completed on 03rd May. The summary of this basic information are shown in the following table.

Table 2: Pilot Movement at a Glance

Route	Kolaghat – Bhagalpur
Shipper	DALMIA BAHART Cement Ltd.
Vessel Operator	IWAI
Vessel Name	M.V. Vivi Giri
Commodity	Cement (bagged)
Cargo quantity	240 metric tonnes
Distance on NW-1	715 km
Start of loading at Patna	17 04 2017
Date of Departure	23 04 2017
Date of Arrival at Bhagalpur	30 04 2017
End of Unloading	03 05 2017

Source: Consultants 2017

The origin of the cargo has been the Orissa Cement plant at Medinipur/West Bengal which belongs to the Dalmia Group and is around 70 km away from Kolaghat by road. For last mile transport the cargo has to be transported around 10 km by road to the recipient in Bhagalpur area.

4.1 Loading Procedure

The loading procedure has been supervised by JV team members Mr Malik and Mr Kumar. A partly paved loading location next to the national highway no 16 at Kolaghat has been chosen (see figure below). Due to lack of loading equipment the bagged cement has been carried manually on board of the barge. But as the trucks were able to reach the barge directly no long distance has to be covered between truck and barge. After completion of loading the shipper asked for a “Material Issuance Letter” which has to be provided by the charterer. As this has been a new request for all involved parties the issuing of this letter took until completion of total Pilot Movement. The Material issuance Letter confirms mainly the loaded number of cement bags and if they are damaged or not.

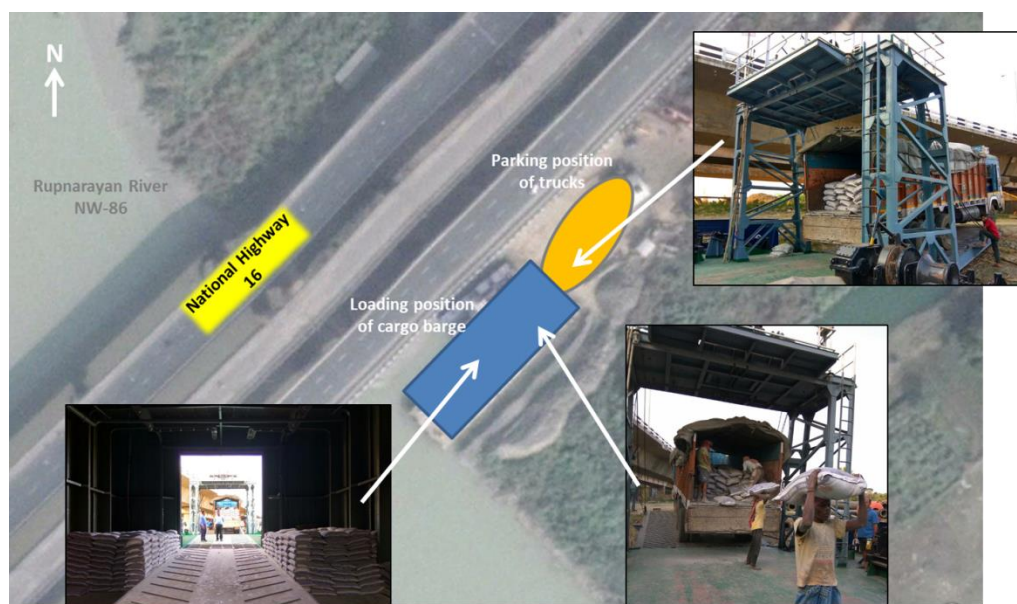
Figure 4: Loading Location



Source: Google Maps, Consultants 2017

The manual loading procedures that have been conducted are shown in the following figure.

Figure 5: Loading Location Details



Source: Google Maps, Consultants 2017

Tidal variations of water depth have been recorded during berthing of the barge at Kolaghat. There is a distinct difference between the daily recorded water depths which is shown in the following table.

Table 3: Tidal Variations at Kolaghat

Date	Available water depth
15/04/17	1.9 m
16/04/17	1.5 m
17/04/17	1.1 m
18/04/17	1.1 m
19/04/17	0.7 m

On 20th April ghat owner at Kolaghat requested an acknowledgment receipt of material loaded in MV VV Giri on IWA letter head for 240 mt of material loaded. Additionally 500 bags have been shifted on the barge during cargo operations which also had to be confirmed.

A loading receipt has been also necessary for utilizing the e-suvidha procedure. e-suvidha is an electronic tool / platform as basis for commercial transactions between private business and governmental departments India. During this Pilot Movement e-suvidha has been used to get permission for IWT from state of government responsible for the unloading location – which is Bihar in this particular case. Shipper had to pay taxes on cargo for shipments and also had to present a 'way bill' containing all of cargo details for evidence to government authorities.

4.2 In-transit Procedure

Due to tidal issues the barge was not able to leave the loading location right after loading on the 20th April 2017. Thus, the barge waited until 23rd April 2017 and then started its voyage to Bhagalpur. On 24th April the barge stopped at Kolkata, Garden Route Jetty, in order to fix

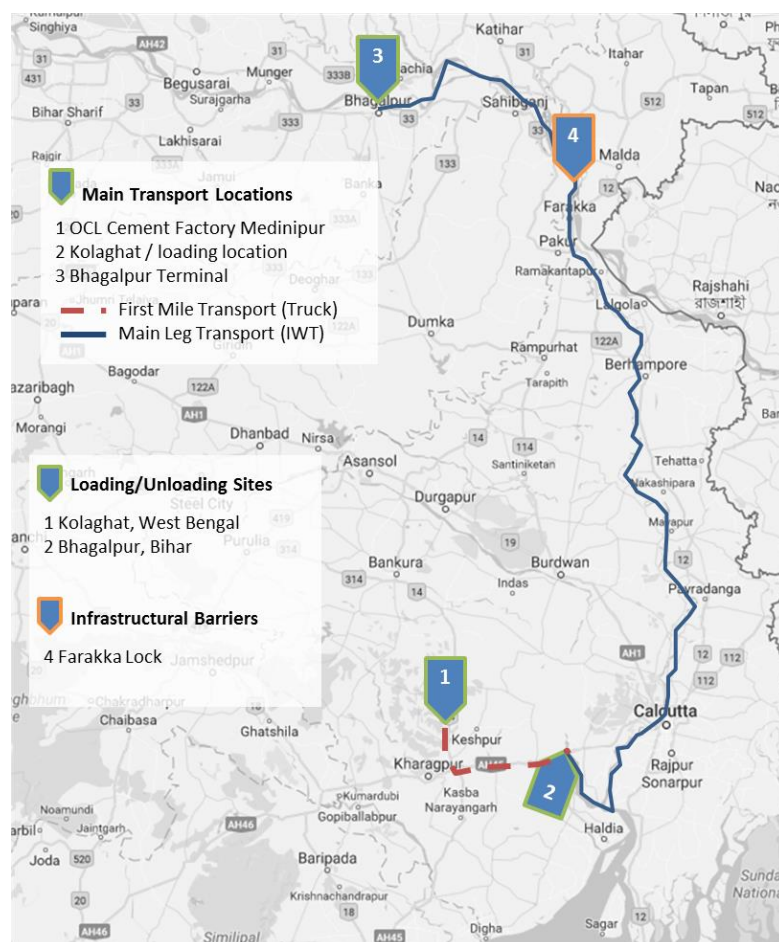
some technical issues. On 25th April barge passed Balagarh, on 26th Patuli and on 27th Hazarduari approx. 115 km South of Farakka Lock. It passed the Farakka Lock on 28th and Sahibganj on 29th.

During the complete journey the echo sounder was not working properly due a breakdown of this equipment. Although echo sounder has not been available no grounding incidents have been recorded by the barge's crew.

Due to unavailability of bunkering facilities at any place of the journey the two fuel tanks with capacity of 2,000 tons each tank. They have been completely filled by using a direct pumping from truck carrying fuel oil for bunker. The barge travelled with around 10 KM/hr in upstream directions. The fuel consumption was recorded being around 65-70 litres per engine operating hour.

There has been a crew of 7 members on board. No support by pilot has been neither required nor requested for this voyage. The master did not need any certificate or license for this single voyage operation. But the barge itself needed to get approval of condition certificate from state government for continuous operation.

Figure 6: Movement Plan



Source: The Consultants, Based on Google Maps

The route of the loaded barge is shown in the figure above. Due to insufficient navigational aid facilities the barge did not move during night time and anchored from 6 p.m. to 6 a.m.

Figure 7: Stowage Pattern inside the Barge



Source: Consultants 2017

The stowage pattern has to take into account the stability issues of the cargo barge. A permanent supervision of operations has been provided.

4.3 Unloading Procedure

On 30th April the cargo barge arrives at Khoti Ghat at Bhagalpur. The unpaved loading location is located next to an existing pontoon jetty facility has been chosen as the jetty facility has been unsuitable for RORO barge operations.

Since 2nd May a total of 2,875 bags of cement have been unloaded from the barge. 1,450 bags out of that have been unloaded on 2nd May only. Some delays occurred during unloading as availability of personnel has been low. Further 1,925 bags have been unloaded on 3rd May.

Approx. 7-10 bags got damaged at Bhagalpur. Since damaged quantity was less than 2 % of total quantity these losses have not been regarded for accounting procedures. No discrepancy between loading and discharging tally has been documented. After unloading a cargo receipt signed by barge master has been given to the shipper.

Figure 8: Unloading Location



Source: Google Maps, Consultants 2017

As the location has been known to the JV team a tractor has been organized for last mile movement. The team expected that a tractor could reach the barge across the sandy beach much better than a truck – which has been tried without success during previous Pilot Movement. But due to quite rainy weather during the days before arrival the sandy beach area became kind of swampy. Thus, even the tractor was not able to reach the barge. This resulted in distance of 65 m which has to be cover for each bag of cement (see figure below).

Figure 9: Unloading Location Details



Source: Google Maps, Consultants 2017

Manual unloading procedures have been conducted as due to unavailability of unloading gear and soft ground and/or unpaved access road.

Figure 10: Unloading Procedures



Source: Consultants 2017

An unloading supervisor has been provided by the shipper at Bhagalpur. The construction of a paved access road at Bhagalpur Khoti Ghat has been initiated but not been finished beginning of May 2017. Preparations for temporary road construction are shown on the figure shown above.

5 Experiences and Findings

During conduct of 3rd Pilot Movement several issues have been documented by the consulting team. These are mainly:

- IWAI has covered both stakeholder roles of barge operator and charterer.
- Thus, no submission of Request Sheet has been necessary.
- But three different IWAI offices have been involved. Coordination of all information with all involved offices has quite time consuming.
- Loading location provides a small kind of basin the vessel can berth in. This reduced the impact of tidal issues on the berth itself.
- Loading location is impacted by tidal procedures.
- Local road conditions at loading point at Kolaghat did allow the trucks to reach the cargo barge directly.
- Lack of navigation aid lights led to partly reduced velocity and to interruption of travel during the night time. Barge did not move between 6 pm and 6 am.
- Actual in-transit time (excluding loading + unloading) has been 8 days.
- With a suitable night navigation aid system this travel time can be reduced to 4 days.
- Insufficient LAD (least available draft) of 1.5 to 1.7 m especially on the stretch between Farakka and Bhagalpur led to underutilization of cargo barge (240 mt although capacity for 300 mt available).
- Local jetty facility conditions at Bhagalpur have been unsuitable for RORO barges. Thus, unpaved river bank stretches have been used for mooring/berthing.
- No grounding incidents have been reported during this pilot movement.
- Insufficient labour availability at Kolaghat and Khoti Ghat Bhagalpur led to extended loading/unloading time.
- An acknowledge receipt of material for preparation of Bihar e-suvidha permit and transit insurance of 240 mt has been required and requested.
- Local road conditions at unloading location did not allow the trucks to reach the cargo barge directly.
- But a temporary access road is under construction at Bhagalpur.
- After 3rd Pilot Movement has been accomplished Ministry of Shipping published a press release (see following figure).

Figure 11: Press release about Pilot Movement

Government starts multiple waterways transportation

BY PTI | UPDATED: MAY 06, 2017, 10:20 PM IST

NEW DELHI: The government today said it has started integrated cargo transportation along multiple waterways, with a cement consignment from the banks of Rupnarayan in West Bengal to Bhagalpur, Bihar.

"MV VV Giri, a vessel of the Inland Waterways Authority of India (IWAI) began a landmark pilot movement on April 23 2017 from Kolaghat in East Midnapore district of West Bengal to Bhagalpur in Bihar with a cement consignment of 240 tonnes," Ministry of Shipping said in a statement today.

The vessel's journey commenced from Kolaghat on Rupnarayan river (National Waterway- 86) to reach Bhagalpur via river Ganga (NW-1).

The vessel's journey commenced from Kolaghat on Rupnarayan river (National Waterway- 86) to reach Bhagalpur via river Ganga (NW-1).

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6 Recommendations and Conclusions

In order to mitigate the negative impacts of specifically mentioned obstacles, circumstances and conditions the following measures are recommended:

- Implement measures to speed-up processing of release of Material Issuance Letter
 - Target: response within 6 hours after completion of loading operations
- Finalize improvement of access road condition at Khoti Ghat, Bhagalpur
 - Suggestion: Pave an access road at Khoti Ghat, Bhagalpur (3m x 65m = 195m² to be paved)
- Provide sufficient and suitable navigation aid facilities
 - Target: Enable continuously travelling of barges day and night all along the NW-1.
- Identify locally available suitable work forces for loading and unloading operations
 - Suggestion: Implementation of local work force pools of approx. 25 workers each
- Inform local authorities about loading and unloading procedures to avoid interruption or disturbance by public.
 - Suggestion: Announce commencement of operations locally at least 3 days in advance

7 Conclusion

Organizational and/or processual measures requesting low investment and could tap the potential to improve the competitiveness of IWT distinctly.

The major delay causing aspect during this specific Pilot Movement has been the unavailability of sufficient night navigation aid facilities. With the facilitation of 24 hour barge operations the travel time could have been cut down from 8 days to 4 days.

The issue „work force“ has to be developed as currently less availability and local (authority) interest had an negative impact on duration of conduct of this specific movement.

Construction of most flexible jetty infrastructure and/or river bank reinforcement will increase the utilization of these facilities at Patna and Bhagalpur and reduce loading and unloading costs.

The involved shipper DALMIA has conducted its second Pilot Movement.

Shipper is – despite all negative incidents – still interested in conducting further transport of bagged cement and fly ash on several stretches of NW-1.

Publishing press releases supports the increase of awareness towards ITW distinctly.