Trade / Rail Facilitations at International Ports

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Presented by –
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Agenda:

- Global & Indian Maritime Transport
- Indian Govt. Plans – Sagarmala Project
- Port Operations
- Interface with Railways
- Issues with Railways

Global Logistics through Maritime Transport

Seaports continue to be a crucial link for access to the global marketplace.

The volume[1] of cargo shipped by water is projected to dramatically increase over the coming decades.

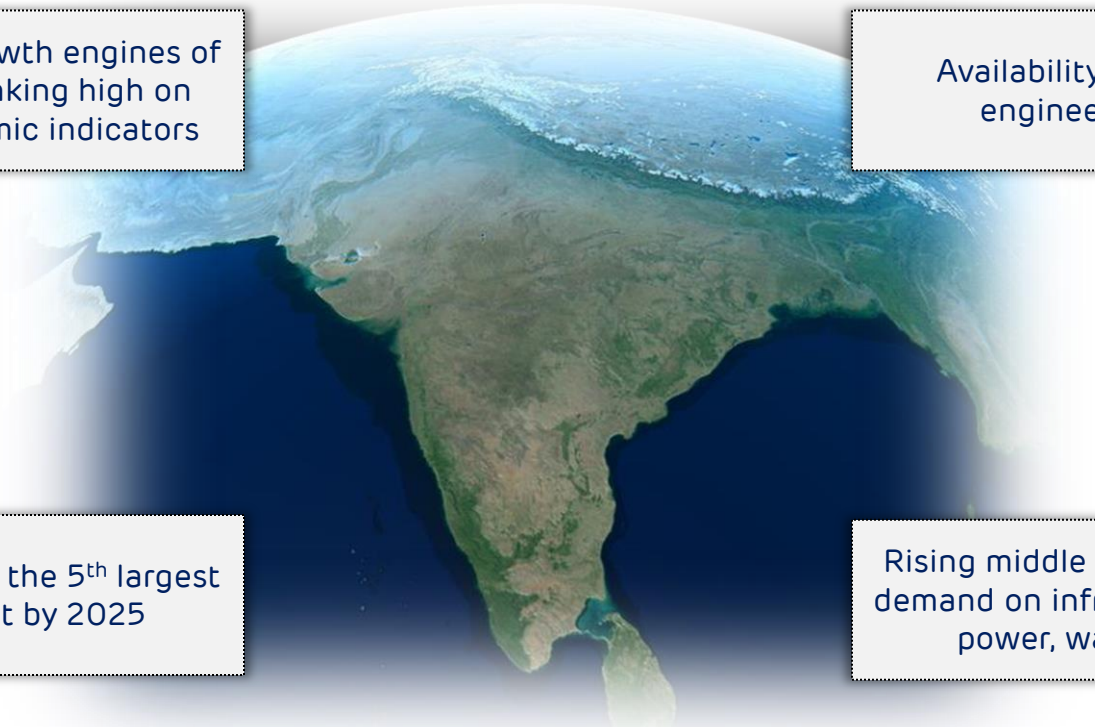
Adani group is strengthening its presence all around the coast to meet future demands.
Current Capacity : 358 MMT
Proposed Capacity : 598 MMT

[1] http://www.investindia.gov.in/ports-sector/

India: A Paradigm Shifter in Global Economy

One of the global growth engines of the 21st century, ranking high on many macro-economic indicators

Availability of cost effective engineering resources



Estimated to become the 5th largest consumer market by 2025

Rising middle class puts increasing demand on infrastructure needs like power, water, road & land

Amongst the top ten economies of the world

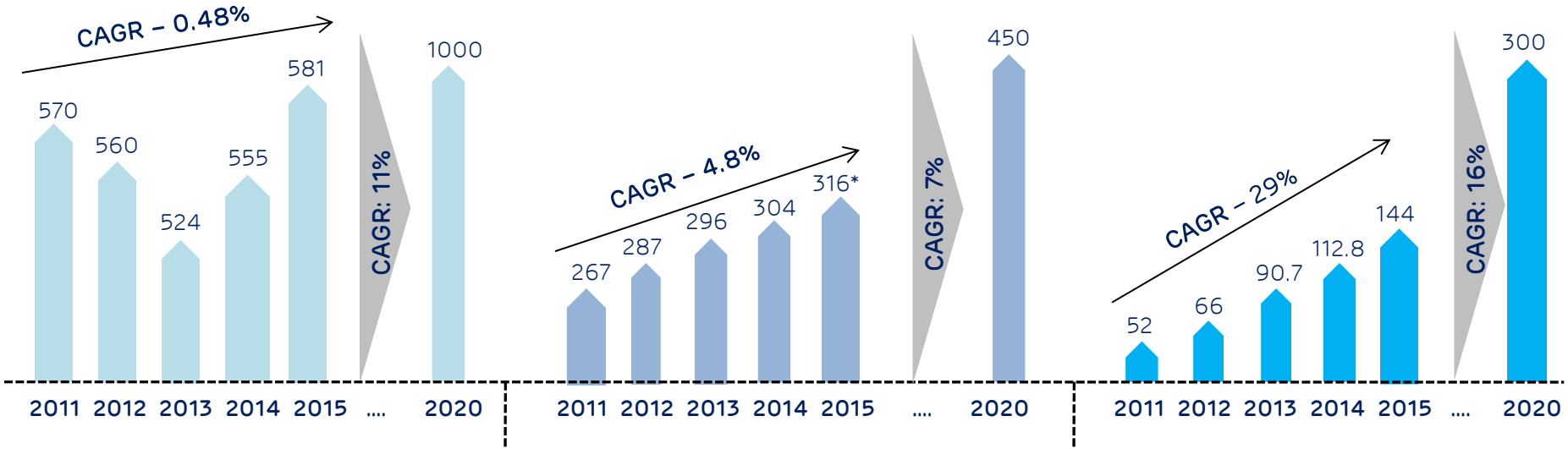
Ports in India: Overview

90% of the country's trade by volume and 70% by value is moved through maritime transport.

Cargo Handled

6x growth compared to other non major ports

All figures in MMT



Major Ports
(Operated by Govt. of India)

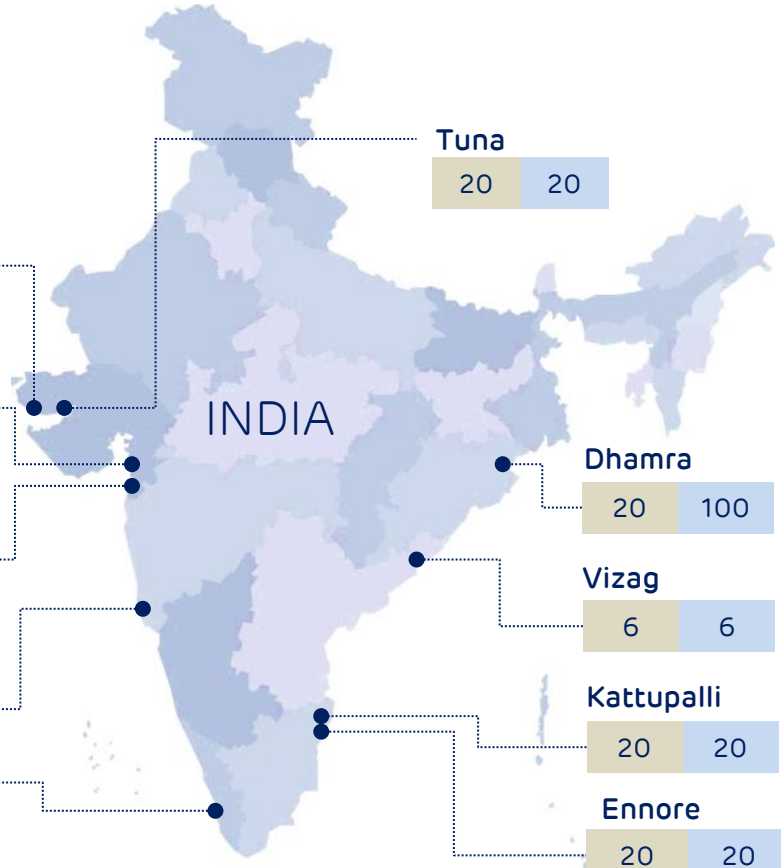
Non Major Ports
(Private ports excluding Adani Ports)

Adani Ports
(Domestic operations only)

MMT: Million Metric Tons; CAGR: Compounded Annual Growth Rate: *Estimated

Adani Port Presence: India

Coverage access: >90% of India's hinterland through 10 strategically located Ports & Terminals



Mundra
210 | 315

Tuna
20 | 20

Dahej
20 | 25

Hazira
35 | 85

Mormugao
7 | 7

Vizhinjam
(Project Pipeline)

Dhamra
20 | 100

Vizag
6 | 6

Kattupalli
20 | 20

Ennore
20 | 20

Largest Port Operator in India

358	598

All Units in MMTPA

Current Capacity	Proposed Capacity

Indian Government Plans:

Indian ports and coastal regions are set to witness a sea change, thanks to the ambitious Sagarmala project mooted by the Centre. There is already enough wind under its sail — the National Perspective Plan for the scheme was released in April and a start has been made with three rail port connectivity projects worth ₹38 crore awarded.

Total of 173 projects have been initially identified under four projects archetypes of Sagarmala in National Perspective Plan, April 2016. The Project archetype and the number of projects identified are given below:

Sr. No.	Project Archetype	Number of Projects
1	Port Modernisation	53
2	Port Connectivity	83
3	Port Led Industrialisation	29
4	Coastal Community development	8

Indian Government Plans: Sagarmala Project

- The Sagarmala is a series of projects to leverage the country's coastline and inland waterways to drive industrial development.

- The project is mammoth with 150 initiatives with a total outlay of ₹4 lakh crore, spread across four broad areas -
    1. modernise port infrastructure, add up to six new ports and enhance capacity.
    2. improve port connectivity through rail corridors, freight-friendly expressways and inland waterways.
    3. create 14 coastal economic zones or CEZs and a special economic zone at Jawaharlal Nehru Port Trust in Mumbai with manufacturing clusters to enable port-led industrialisation.
    4. develop skills of fishermen and other coastal and island communities.

Transport costs are high in India – 18 per cent of GDP, compared to less than 10 per cent in China.

Indian Government Plans: Sagarmala Project

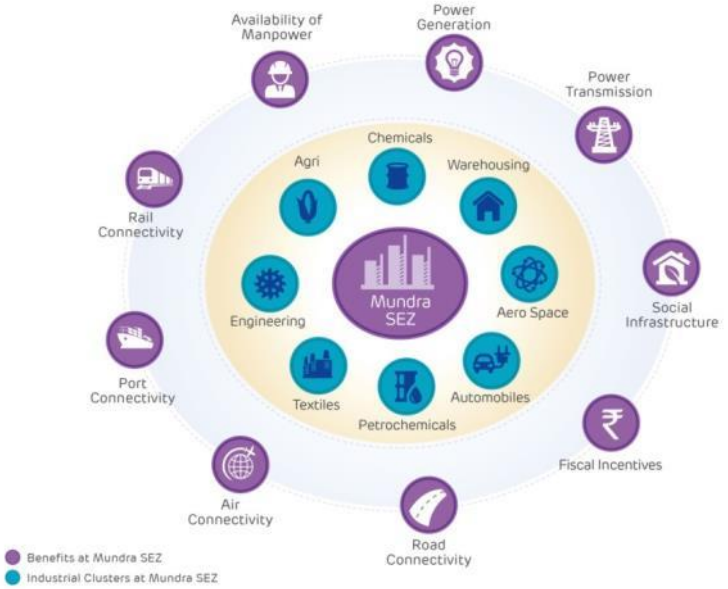
Boost development through ports and shipping-

- Develop three to four new mega ports
- Develop a world-class transshipment port with a capacity of more than 10 million TEU
- Create additional capacity of 1,200–1,500 MMTPA by strengthening existing ports
- Develop maritime and manufacturing clusters around the ports
- Develop 2–3 port-based smart cities and Coastal Economic Zones

The Mundra template for port based manufacturing center

Integrated Infrastructure

- Offering land in SEZ, DTA and FTWZ with cluster based zoning
- Excellent integrated utilities such as power, water, CETP
- Quality social infrastructure facilities - housing, education, healthcare and recreation
- Multi-modal connectivity with sea, air, rail and road linkages



Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Cargo Throughput (In MMT)	54.53	67.40	81.69	100.87	110.53	108.70
Cargo Handled by Rail (In MMT)	13.88	17.55	18.03	20.77	24.62	20.79
No. of Rakes Handled	6341	7948	9476	10211	11520	10307

The Mundra template for port based manufacturing center

Integrated Logistic Solutions

Inland Container Depots

- Multiuser Inland Container Depots at Patli (Gurgaon) and Kishangarh (Rajasthan)
- Additional ICDs planned at strategic locations across the Country

Railways

- Licensed container rake operator with own rakes
- 230 kms privately laid track length
- Handles loaded python rakes-first location in western region to dispatch a loaded rake with 114 wagons

Port Operations

Disclaimer – Photography is restricted item as per the ISPS regulation. We are using Hazira port site photos for better understanding.

Adani Hazira Port – The Making.....

Site as in May 2010

Site as on June 2016

Adani Hazira Port – Site Photo

Adani Hazira Port – Dredger approaching the Bund

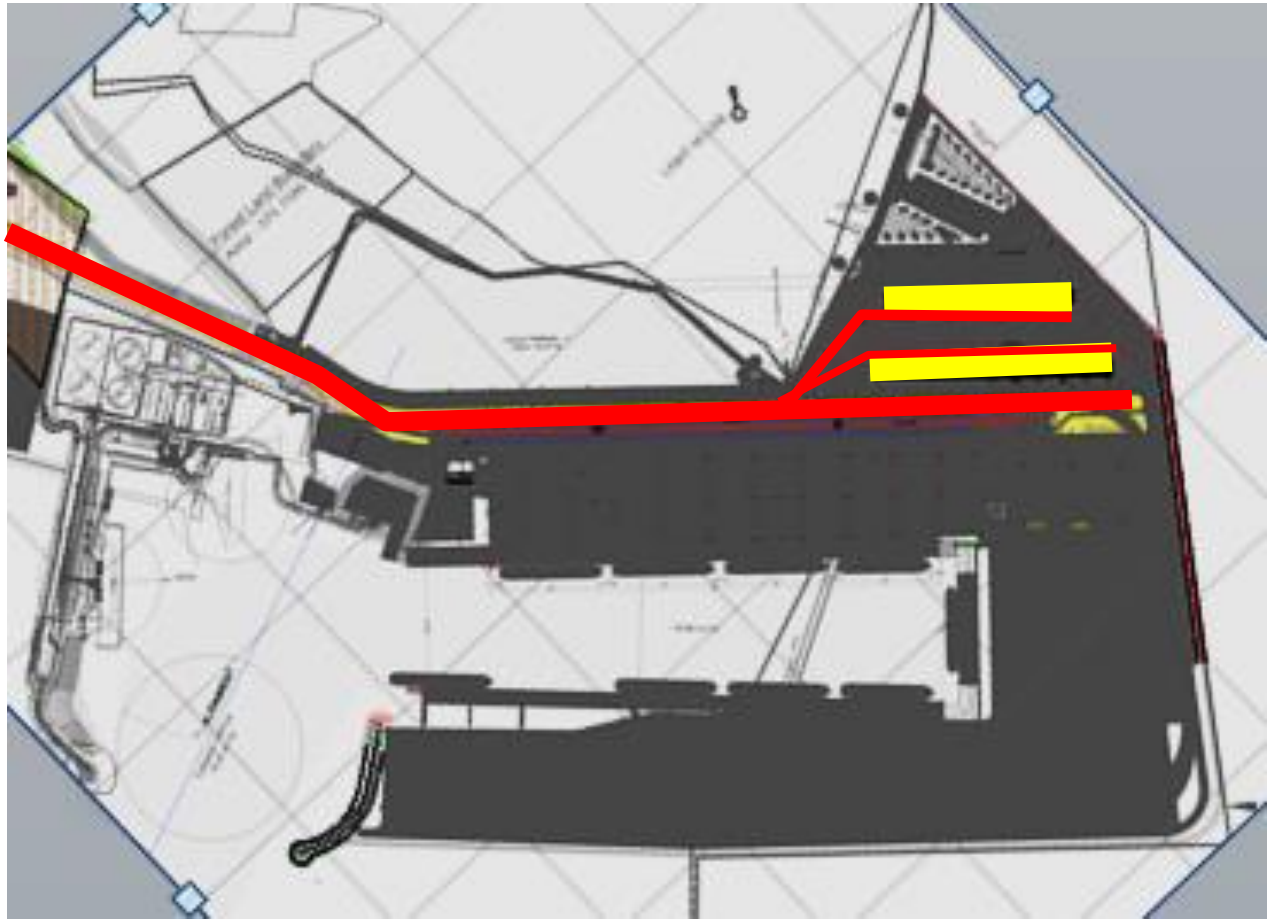
Adani Hazira Port – MPO1 completion

Adani Hazira Port – Container Berths

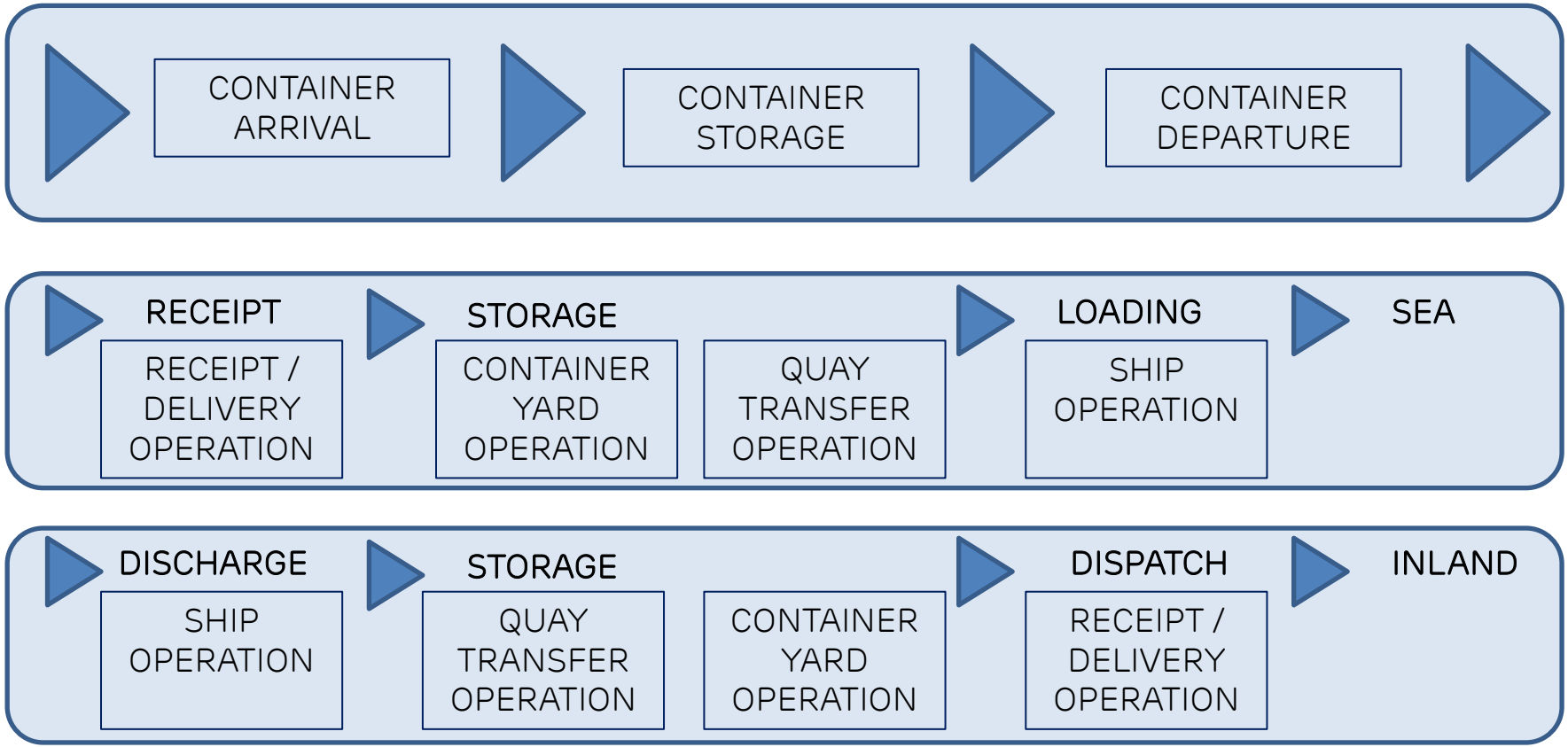
Adani Hazira Port – Berths

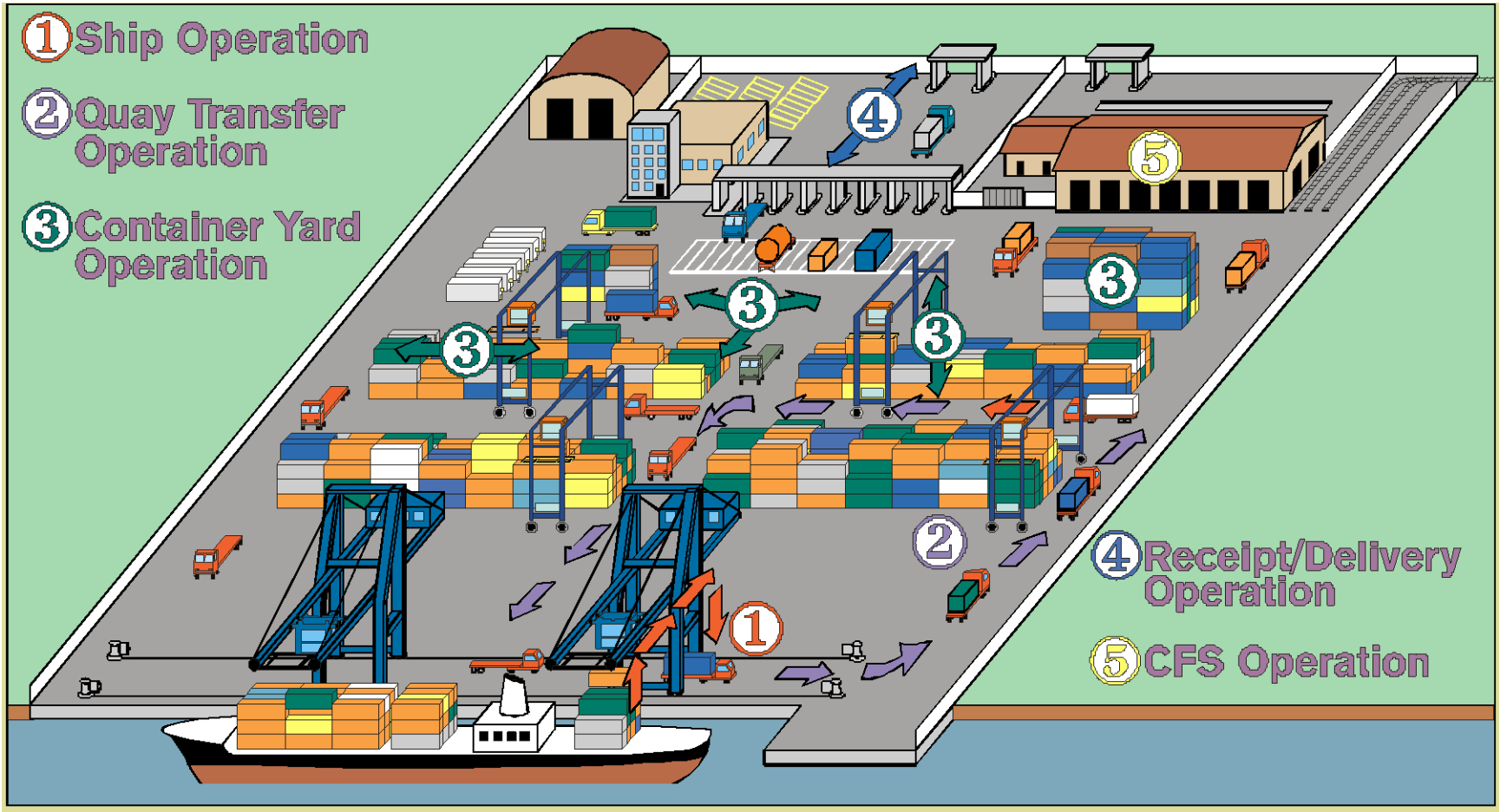
Adani Hazira Port – Overview of Facilities

Adani Hazira Port – Master Plan



CONTAINER TERMINAL ACTIVITIES AND OPERATIONS:

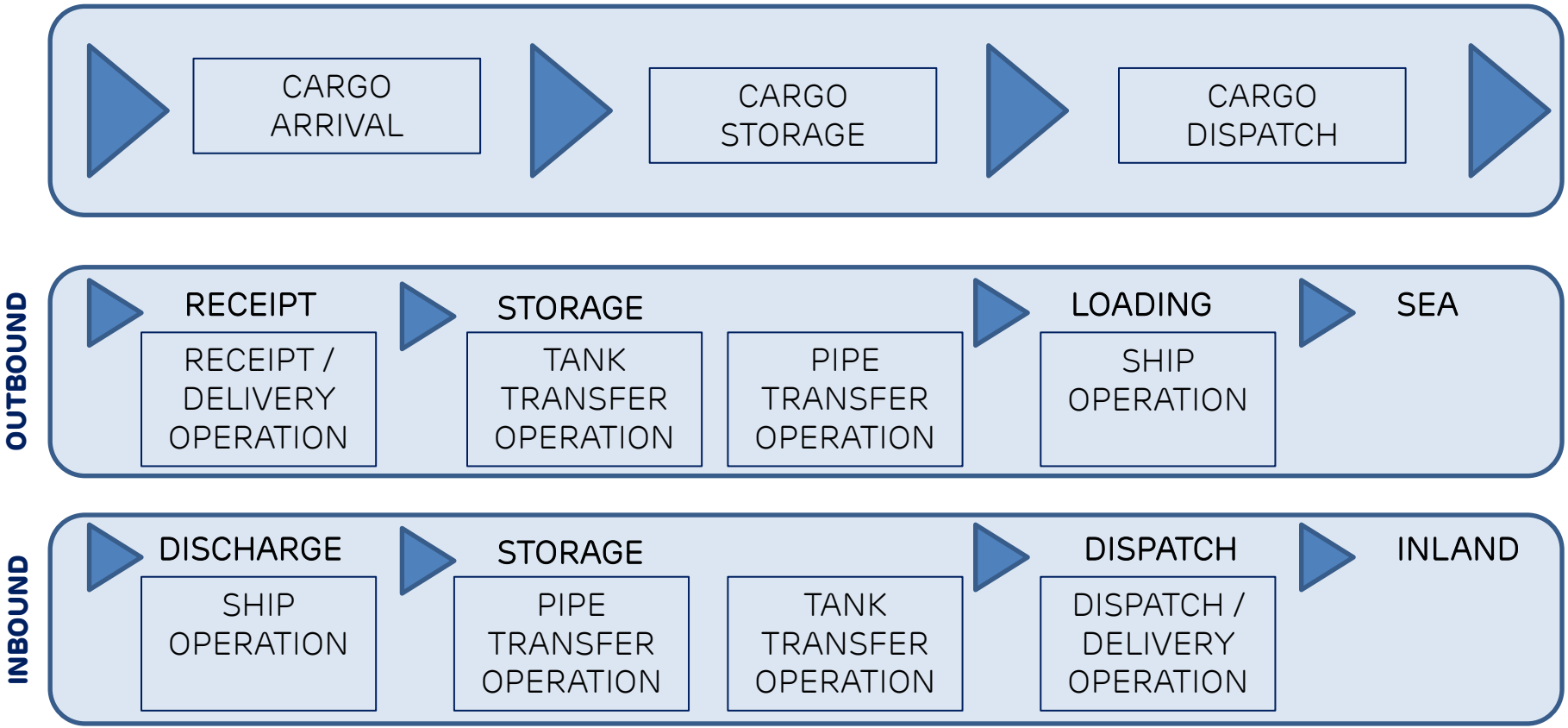



1 Ship Operation
2 Quay Transfer Operation
3 Container Yard Operation
4 Receipt/Delivery Operation
5 CFS Operation

Adani Hazira Port – Container Terminal

Adani Hazira Port – Container Yard

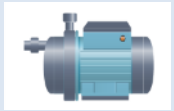
LIQUID TERMINAL ACTIVITIES AND OPERATIONS:



OUTBOUND :

RECEIPT TULF → TANK STORAGE → PUMP HOUSE → PIPE TRANSFER → SHIP

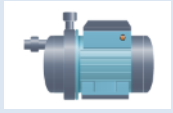




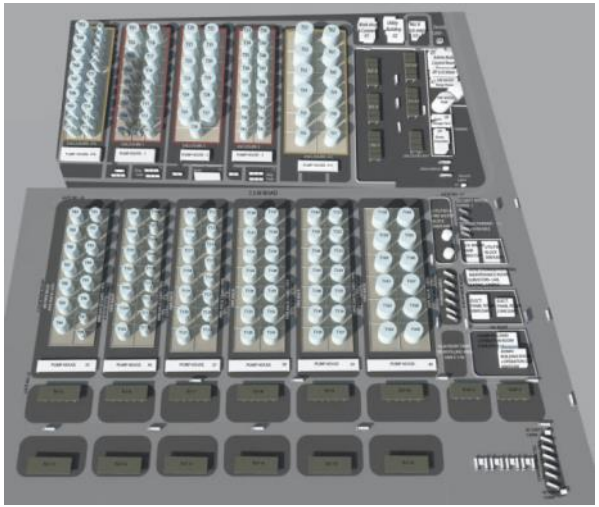
INBOUND :

SHIP → PIPE TRANSFER → PUMP HOUSE → TANK STORAGE → DISPATCH TLF





Adani Hazira Port – Liquid Terminal



Total Tanks: 169 nos
Storage Capacity:
4.25 Lacs KL

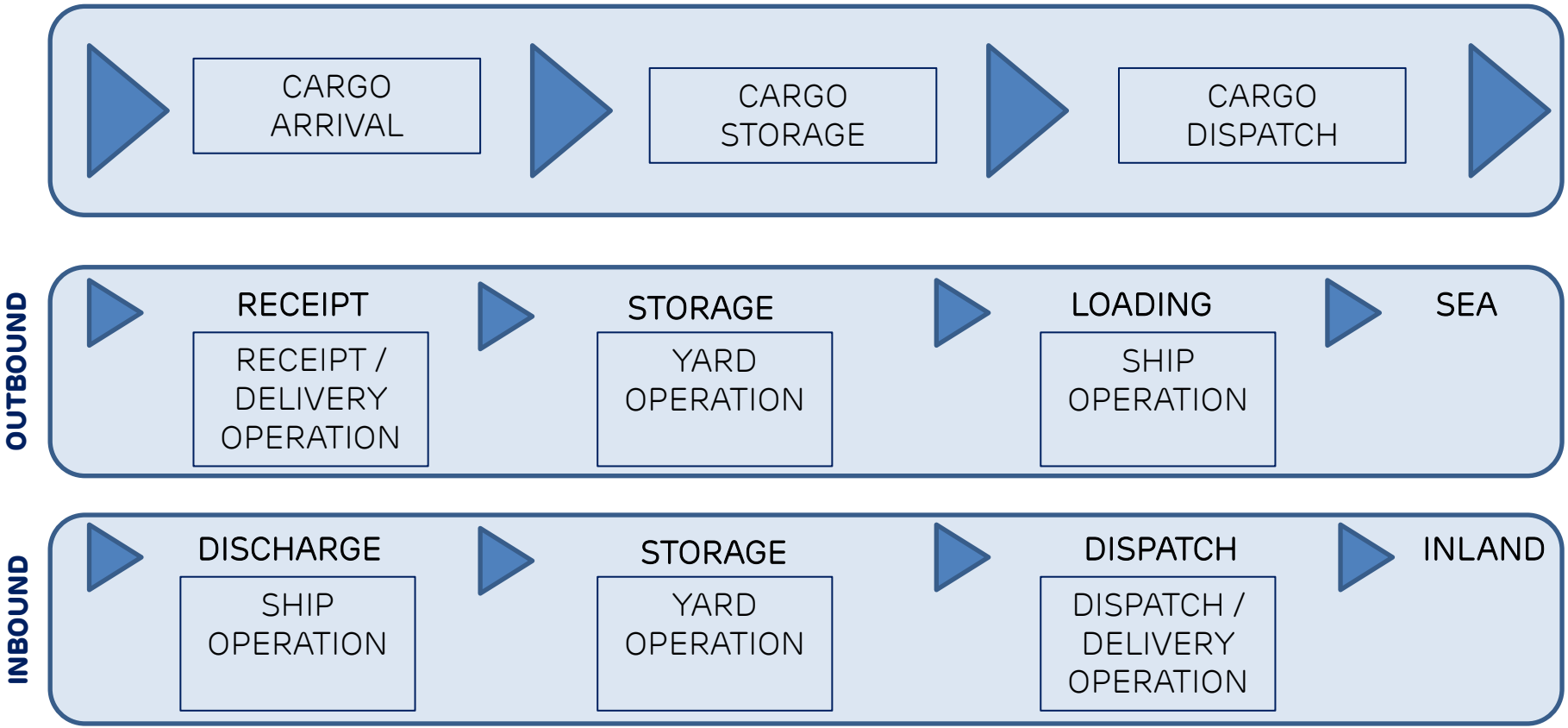
Adani Hazira Port – Liquid Pump House

Adani Hazira Port – Liquid TLF / TULF

Adani Hazira Port – Liquid TLF / TULF

Adani Mundra Port – Single Point Mooring

DRY TERMINAL ACTIVITIES AND OPERATIONS:



OUTBOUND :

RECEIPT OPERATION

WAREHOUSE / OPEN YARD STORAGE

SHIP – LOADING OPERATION

INBOUND :

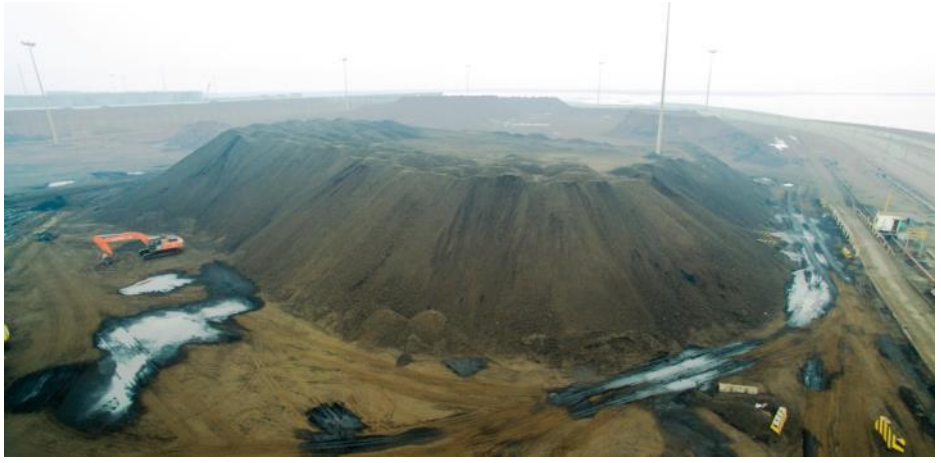
SHIP - UNLOADING OPERATION

WAREHOUSE / OPEN YARD STORAGE

DISPATCH OPERATION

Adani Hazira Port – Warehouse / closed storage yard

Adani Hazira Port – Open storage yard



Interface with Railways

Container movement through rail:

Liquid movement through rail:

Dry Bulk movement through Rail:

Rapid Wagon Loading System

Indian Railways: Facts & Figures

- Indian Railways network spans more than 66030 kms. making it the world's third largest rail network.

- **Fourth largest** rail freight carrier in the world.

- Both passenger and freight traffic volumes have increased steadily in the past five years. While passenger traffic witnessed a CAGR of 2.6% during 2010-2015, freight traffic has registered **CAGR of 4.3%** during the same period.

- Indian Railways runs more than 9202 freight trains, carrying about **3 million tonnes** of freight every day.

Indian Railways: Last Mile Connectivity

- **26 Port rail connectivity projects** were identified under NPP, of which 2 have been completed and 18 are under implementation by Ministry of Railways. Most of these projects will be **completed by 2019-20**.

- To strengthen rail connectivity with various ports, Indian Railways has floated SPVs under the PPP mode. Pipavav Rail Corporation Ltd., **Bharuch-Dahej Railway Company Ltd., Kutch Railway Company Ltd.,** Hassan-Mangalore Rail Development Company, Obullavaripalle-Krishnapatnam Railway Company Ltd., and Anugul-Sukinda Railway Company Ltd. have been established.

- Three rail connectivity projects namely **Gevra Road-Pendra Road new line, Raigarh-Bhupdeopur new line and Jaigarh Port connectivity** projects are being implemented through the joint venture route.

Indian Railways: Last Mile Connectivity

- The long-term strategic plan of the Ministry of Railways is to construct **six high-capacity, high-speed dedicated freight corridors** along the Golden Quadrilateral and its diagonals.

- To develop a network of **freight terminals**, the Policy of Private Freight Terminals on the PPP model is being further refined.

- Railways will facilitate connectivity to new and upcoming ports through private participation. So far, in principle, approval has been granted for building rail connectivity to the ports of **Jaigarh, Dighi, Rewas, Hazira, Tuna, Dholera, Astranga, Chara and Nargol** under the Participative Model Policy of the Indian Railways, amounting to INR 40 Billion

Issues with Railway

Indian Railways: Issues

- In the competitive environment freight cost is a very important factor. On one hand shipping freight is down on the other hand railway freight has become un-viable. Railways have reduced port congestion charges but the damage has already been done. ICD rail traffic is down to 18% from the earlier 27%.

- New policies to attract port connectivity by rail eg. Participative Models e.g. Non-Government Railway (NGR) taken up by Adani at Dhamra, Tuna and Mundra were not implemented in the spirit of the policy. Example - apportionment of freight policies diluted resulting in under payment to the developer.

Indian Railways: Issues

- Extracting arrears by the Railways in retrospect but all payment to the developer without considering retrospectively. All this resulting in trust deficit issues between the Railways and Developer.

- No support by the railways in land acquisition for the connectivity from port to the main line.

- Applying old railway rules in port area when it comes to either development or upgradation of infrastructure; commercial rules; weigh-bridge calibration, certification for construction. etc.

Operational Constraints in handling of coal :

1. Indian Railway has increase carrying capacity of BOXN wagon by 17% from 58 MT in 2004 to 68 in 2012.

2. Carrying capacity for all type of coal is kept same, irrespective of large variation of difference in density of Indian coal and imported coal.

Inherent Property	Indian Coal	Imported Coal
Ash Content :	30% to 45%	8% to 12%
Caloric value	3300 to 4500	5000 to 6500
Bulk Density (gm/cc)	1.25 to 1.45	0.8 to 0.929*

Source : Report of the group for studying range of blending of imported coal with domestic coal, Central Electricity authority.

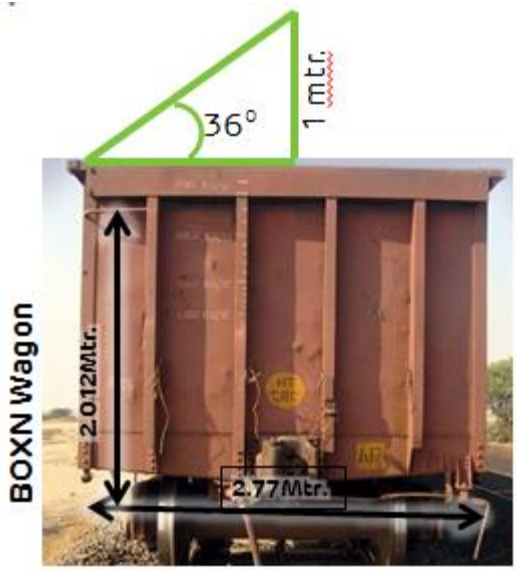
BOXN wagon

BOXN HL wagon

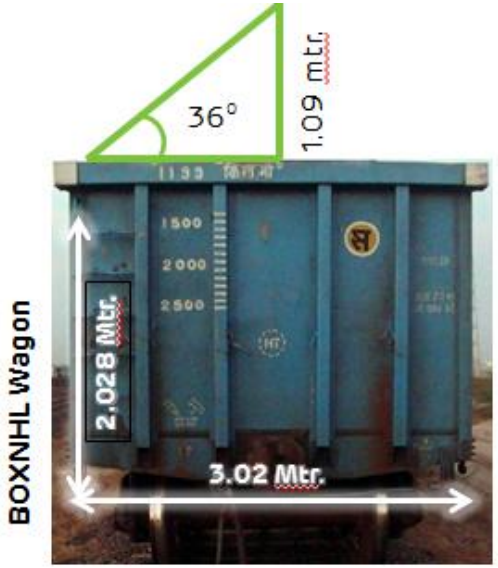
	BOXN	BOXNHL
Carrying Capacity	68.00	70.00
Cube Capacity	54.99	61.49

BOXN HL Wagon is 10% larger then BOXN wagon.

Operational Constraints in handling of coal :



Total available volume including 1 mtr. heap loading is 65.15 Cube mtr. To accommodate 68 MT of coal with 0.93 density, total 71 cube mtr. Area is required. So, Maximum 61 MT of coal can be loaded without manual compacting. Dead freight of 7 MT. Depending on density, dead freight would change.



Total available volume including 1.09 mtr. heap loading is 73.11 Cube mtr. To accommodate 70 MT of coal with 0.93 density, total 73 cube mtr. Area is required. So maximum 68 MT can be loaded. Dead freight of 2 MT. Depending on density, dead freight would change.

Operational Constraints in handling of coal :

Wagon Type	PCC in MT	Length	Width	Height	Cube Capacity in M3
BOXN	68	9845	2777	2012	54.99
BOXNR	69	9845	2777	2164	59.16
BOXNM1	68	9845	2777	2012	54.99
BOXNHS M1	68	9845	2777	2012	54.99
BOXNHL	70	10034	3022	2028	61.49

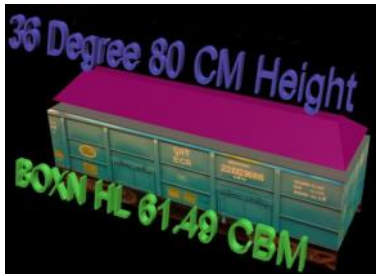
- Cube Capacity of BOXN wagon is lesser by 10% of BOXN HL, though carrying capacity for coal is only 2.85% less.

- Even with heap loading, achieving 68 MT of carrying capacity in BOXN wagon is very difficult.

Operational Constraints in handling of coal :

- Cube capacity of wagon - 54.94 CBM
- Additional 10.21 CBM of coal can be loaded, maintaining 36 degree's natural angle of repose
- Total theoretical cube capacity for imported coal is 65.15 CBM with maximum possible heap loading

52 to 61 MT of imported coal can be loaded in BOXN wagon



- Cube capacity of wagon – 61.49 CBM
- Additional 11.62 CBM of coal can be loaded, maintaining 36 degree's natural angle of repose.
- Total theoretical cube capacity for imported coal is 73.11 with maximum possible heap loading

Maximum 59 to 68 MT of imported coal can be loaded in BOXNHL wagon

Operational Constraints in handling of coal : BOXN Wagon

Rapid Wagon Loading System (WLS)

- Under rapid wagon loading system, where free fall coal loading takes place.
- It is not possible to load 68 MT of imported coal as no compaction takes place in free flow loading by WLS

Loading of Coal with Excavator

- Image of BOXN wagon loaded with **Imported coal.** Height of 3 feet to above brim level required to achieve CC of 68 MT.
- Requires compaction while loading which is done by excavator (manual operation). Leads to detention and imprecise operation.

Customers are bearing huge dead freight if cargo up to brim level is loaded.

Operational Constraints in handling of coal – HL Wagon:

Rapid Wagon Loading System (WLS)

- Due to more cubical capacity, less cargo up to 68 MT can be loaded.
- No damage to wagon, environment friendly, speedy and efficient wagon loading system.

Loading of Coal with Excavator

- Image of BOXNHL wagon loaded with **Imported coal.** Height of 2.5 to 3' above brim level required to achieve CC 70 MT mechanically.
- Less Compaction required during mechanical loading by excavators.

Operational Constraints in handling of coal :

Image of BOXN wagon loaded with **Indian Coal**, it is evident that Indian coal can be loaded well within brim level and PCC can be achieved.

No compaction required due to higher density of Indian coal

- Due to higher density, Indian coal can be loaded up to 66 / 68 MT in ordinary BOXN easily, but imported coal with lesser density cannot be loaded even by loading up to 3' above brim level due to its inherent angle of repose which makes the coal slide out.
- Problem is aggravated by increase in tare weight of old wagons due to numerous patch work repairs which results in reduced loadability.

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