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**G. Raghuram
Samantha Bastian**

W.P. No. 2008-11-01
November 2008

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Strategies for Improved Servicing of the Customers: Case of Ghaziabad Goods Shed of the Indian Railways

G. Raghuram and Samantha Bastian
Indian Institute of Management, Ahmedabad¹

Abstract

The Ghaziabad (GZB) goods shed was one of the top rail goods handling points in the National Capital Region (NCR). The growth was expected to be robust in the forthcoming years, since GZB and Noida were high growth districts in the Uttar Pradesh part of the NCR. GZB goods shed was one of the fifty high traffic sheds identified for improvement, as part of the Indian Railways (IR's) Mission 900 mt loading.

The paper provides a comprehensive description of GZB goods shed, including facilities, traffic flow, customer interface, processes, etc. In this context, the paper raises questions regarding (i) main concerns in GZB goods shed as viewed (a) by customers and (b) from IR's perspective, (ii) analytical support for customer service improvement provided by demurrage (wharfage) data, (iii) operational, process and infrastructure improvements at GZB, (iv) long term improvements, and (v) need for perspective changes.

[This case research is part of the Indian Railways (IR) Chair being held by one of the authors. The question of interest to IR is how to improve customer service at railway goods sheds, given that freight contributes 66% of revenue. Rail freight movement is a core aspect of the logistics driven development of the country. The Ghaziabad goods shed of the Northern Railway was chosen for the case research.]

This project was funded by the Indian Railway's Chair constituted at IIM Ahmedabad

¹ Contact details: G. Raghuram (graghu@iimahd.ernet.in); Samantha Bastian (samantha@iimahd.ernet.in)

Introduction

The Ghaziabad (GZB) goods shed was one of the top rail goods handling points in the National Capital Region (NCR) (Exhibit 1), with the total number of rakes handled during 2007-08 being 1535. More importantly, it showed a compounded annual growth rate of 39.7% since 2004-05 and 14.4% since 2002-03.

The growth was expected to be robust in the forthcoming years, since Ghaziabad and Noida (Gautam Budh Nagar (GBN)) were high growth districts in the Uttar Pradesh (UP) part of the NCR. The population statistics of UP, Ghaziabad, GBN and adjoining districts for 2001 are given in Exhibit 2. The decadal (1991-2001) growth rate for Ghaziabad and GBN were 47.5% and 35.7% respectively, well above the UP average of 25.8% and national average of 21.5% [Census, 2001]. The population density in these two districts had increased quite significantly, reflecting a construction boom. An article from the international magazine Newsweek [Overdorf, 2007] identified Ghaziabad as one of the top ten dynamic cities in the world.

Of the 10 goods sheds in the Delhi region, Tuglakabad handled the highest number of rakes in 2007-08, consisting of 4886 rakes unloaded and 3163 rakes loaded. GZB ranked second for the same period with 1535 rakes unloaded and no rakes loaded. Out of these, cement accounted for 1107 rakes, and iron and steel (referred to as 'iron' henceforth) for 359 rakes. There were also instances of urea and oil rakes that came into GZB.

A 'mission 900 mt' for goods loading was announced by the Railway Minister for the year 2008-09 [Letter to GMs, 2008]. With this objective, 50 goods sheds of the Indian Railways (IR) were picked for upgradation in the budget proposal for 2008-09. Out of these, four were from the Northern Railway (NR): Govindgarh, Muzaffarnagar, Chandigarh and Ghaziabad. The letter also pointed out that NR was one of the regions suffering from major terminal capacity constraints, and improved performance at terminals would reduce wagon turn-around time.

The layout of the GZB goods shed as of June 2008 is shown in Exhibit 3. The GZB goods shed had two yards: Punjab Yard in the North, and New Mineral Siding (NMS) in the

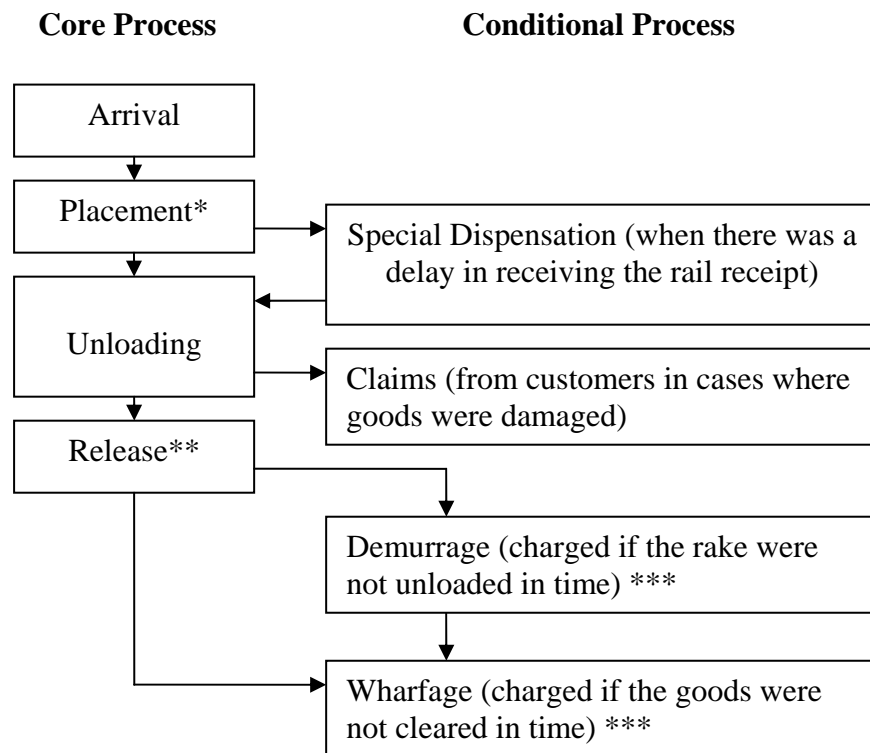
South. Punjab Yard had six tracks numbered 18, 21, 23, 24, 25 and 26. NMS had three tracks numbered 34, 35 and 36. In addition, there was a private siding called Continental Carbon Ltd (CCL) siding (which received a few oil rakes every month), in the South and to the East of NMS. Out of the nine tracks in the goods shed, through reception was possible only in one of them ie track 36. The six tracks of Punjab Yard had less than rake length wagon capacity (Exhibit 4). Only two of them, 23 and 24, had covered sheds. The three tracks of NMS were full rake length. NMS was serviced for warehousing by the Central Warehousing Corporation (CWC).

From the commodity wise monthly rakes handled by GZB in 2007-08, we saw that October 2007 had the highest traffic for the year. Therefore, the month of October, with 164 rakes unloaded, was chosen for further analysis. Of the 164 rakes, 123 were cement, 35 were iron, one was part cement and part iron, two were urea and three were oil rakes (Exhibit 5). 88 rakes, called two destination rakes, had another destination along with GZB. Of these, 39 had Shakurbasti (serving Delhi) as the other destination. Ten rakes came jointly from two origins, of which nine were cement and one was part cement and part iron. Together, they constituted 174 'placements'. There were 32 origins from where goods trains came to GZB (21 for cement, nine for iron, one for urea and one for oil). There were 14 cement companies and four steel plants using GZB.

Processes

The goods would normally go through the following process flow from the rake's arrival at GZB to the removal of goods from the goods shed.

Arrival, placement, unloading and release were the core processes. The others were conditional processes.



*Placement Notification, **Receipt of Wagon Register, ***Demurrage/Wharfage Documents

Source: Authors' Analysis

In the process of unloading, the customer was given some free time, exceeding which demurrage charges could be levied. The free time for unloading cement was five hours (less than 15 wagons), seven hours (16 to 25 wagons) and 9 hours (more than 26 wagons), while that for iron was eight hours [Rates Circular, 2005]. Demurrage was leviable on all the wagons in the rake, even if one wagon from the rake was detained beyond the prescribed free time. If there were multiple parties to whom a rake was booked, the demurrage charges for the entire rake was levied on the party clearing the last wagon.

Customers were expected to clear the goods from the goods shed within 12 hours. After this, wharfage charges would be levied. Demurrage and wharfage charges were Rs 100 per wagon per hour.

Demurrage was a claim on the consignee and subject to appeal for waiver and review before payment. Wharfage was a charge on the consignee and was to be paid upfront, and then, if at all appealed for refund.

The customer would have the opportunity to apply for waiver of demurrage and/or wharfage charges within ten days from the date when these charges were accrued. The application would then be forwarded to the Divisional Officer for review within three days. In cases where delay occurred due to reasons beyond the control of the consignor or consignee, waiver would be granted [Rates Circular, 2004]. In a typical demurrage notification and waiver appeal document, the clients listed reasons for delay, against which waiver to the extent of 60% was granted.

Out of the 174 'placements', there were a total of 120 demurrage cases (Exhibit 6). Of these, 104 were of cement, 14 of iron and two of urea. There were many more wharfage cases, since the unit of charge was the wagon. The total demurrage amount due was Rs 17,71,350, out of which Rs 632,137 was waived after appeal. The total demurrage collected was Rs 1,021,013 and Rs 124,500 remained outstanding as of November 2007. The total wharfage amount collected was Rs 39,48,880. [Delhi Division, 2007].

Questions

The focus of this paper being strategies for the improved servicing of the customers, the authors did both a primary and a secondary assessment. The primary assessment included field visits, and discussions with customers, operating staff and concerned managers. For the secondary assessment, it was decided to focus on demurrage and wharfage documentation since these were major areas of concern in terms of customer interface. Between these two types of documentation, the analysis is based on demurrage, since (i)

the wharfage data, being at a wagon (and hence more disaggregate) level, was more complex and (ii) many of the reasons for demurrage and wharfage were similar.

In the context of the case introduction and processes described above, the following questions become relevant:

1. What are the main concerns in the GZB goods shed, both from the customers' and IR's perspective?
2. What analytical support does the demurrage (wharfage) data provide? What questions are worth asking towards improving IR's servicing of customers?
3. What operational improvements can IR make at GZB?
4. What processes can IR improve at GZB?
5. What infrastructure can IR improve at GZB?
6. What long term improvements should IR consider?
7. Towards the above, what perspective changes are required?

Analysis and Recommendations

1. What are the main concerns in GZB goods shed?

- a. Customer's Perspective

Based on the primary inputs and analysis of the demurrage waiver documents, infrastructure issues came out as the most important concern. Uncovered sheds in cloudy weather, GZB traffic police restrictions, shortage of labour and trucks (also exacerbated due to bunching of rakes) and lack of sufficient lighting were the prominent reasons provided for demurrage (and wharfage) waiver request (Exhibit 7).

An excerpt from the letter to the Divisional Railway Manager (DRM), Delhi Division by the Cement Dump Association is provided in Exhibit 8. The issues highlighted were similar to that extracted from the demurrage documents. In addition, concerns regarding the approach road being poor, narrow space for working on some of the tracks, non availability of drinking water, insufficient security (especially for cash transactions) and

need for repeat visits to the goods shed for administrative formalities were highlighted in the letter and in discussions.

Night time working was a problem at GZB due to insufficient lighting. The demurrage free time as of October 2007 was from midnight to 6 am. Keeping with the national policy of introducing 24 hour working, the GZB goods shed was brought under this from June 2008. This should have happened only after ensuring proper lighting, security and road access.

b. IR's perspective

The most important concern highlighted by the field level staff at GZB was dissatisfied customers and labour. This was an outcome of poor infrastructure and working conditions, which also affected the staff themselves. The authors noticed open and choked drains, just outside the Chief Goods Supervisor's (CGS) office. What was once supposed to be an air conditioned office due to introduction of the computerized Freight Operations Information System (FOIS) was an office with broken windows and chairs showing vestiges of an air conditioner frame.

Customer dissatisfaction was also a consequence of the large number of demurrage and wharfage cases, most of which the customers attributed to reasons over which they had no control.

In terms of operations, most of the rakes in Punjab Yard had to be split and placed in more than one track due to the less than full rake length capacity constraint. Out of the 74 cement rakes, 50 were placed on more than one track and out of the three iron rakes, all were placed on more than one track. Those that did not have to be placed on more than one track were just a consequence of the two destination rake concept.

Operations were also made more complex due to cross traffic movements. Almost all cement rakes came from the west and iron rakes from the east. Consequently, an estimate of cross traffic would be all cement rakes that came into NMS and all iron rakes that came into Punjab Yard ie 49 rakes of cement and three rakes of iron (Exhibit 9). Cross

traffic would also be created by empty traffic relocation, depending on the direction of movement.

2. What analytical support does the demurrage (wharfage) data provide? What questions are worth asking towards improving IR's servicing of customers?

The demurrage data could be used intelligently to understand the profile of demurrage charges, waiver behaviour, customer wise impact, and even to attempt some correlations with operational/infrastructural causes.

The distribution, range and central tendencies of demurrage charges are given in Exhibit 10. The average demurrage due was Rs 15,667 for a cement rake and Rs 9,268 for an iron rake. Cement rakes accrued a higher demurrage than iron rakes, even though the latter was more difficult to unload. This was primarily due to splitting of the rakes and use of unloading tracks with no covered shed. Every demurrage case was appealed and partial waiver was granted in most (111 out of 120) of the cases. The percentage amount forgone over due was 35.7% (Exhibit 6).

The company wise demurrage dues are given in Exhibit 11. All cement companies had at least 50% of their rakes receiving demurrage dues. The highest payer of demurrage was Ambuja Cement which had 100% of its rakes (10 out of 10) under demurrage, followed by ACC which had 77% of its rakes (17 out of 22) under demurrage. The next highest was Aditya Birla Cement at 82% (14 out of 17).

A correlation between track splits and cases of demurrage dues is shown in Exhibit 12. Rakes with three splits had a 76% share of demurrage being charged compared to rakes with no splits which had a 60% share.

3. What operational improvements can IR make at GZB?

At the basic and obvious level, drinking water arrangements, facilities like toilets etc for third party labour and staff, ensuring proper discharge of drains (will improve IR's own CGS office working conditions enormously), leveling of platform surface on a continuous

basis (in spite of cement accumulation), and proper furniture and maintenance of the CGS office at the Punjab Yard are required.

In the context of night time working, many improvements needed immediate attention. While mast lighting was put up at the NMS by CWC, the connections were not given, even as of the second field visit on 11th July 2008. Mast lighting at the Punjab Yard, security arrangements and access road improvements for heavy trucks at both the locations should be made.

The cost estimated for improvements to be carried out in GZB goods shed amounted to about Rs 8 crores as per DRM's office plans. This should be reviewed and implemented immediately.

Involvement of professional third party service providers for maintenance and unloading, possibly through a transparent bidding process, could help better address these issues.

4. What processes can IR improve at GZB?

The FOIS provided information about estimated rake arrivals. This was not being leveraged for proactive customer interfacing. However, queries raised by customers were answered, if possible. An analysis of rake placement time is shown in Exhibit 13. A large number of rakes were placed around 6 am, creating the possibility of bunching for the customers. A formal system for advance information (using FOIS) to the users before arrival, and then placement of rakes should be put in place. This concern came through strongly from the captive siding of CCL.

Further, all users had to make at least two trips to the CGS office at Punjab Yard, to sign on the Register of Wagons. Email based information transfer would reduce delays. In the interim, a sub office at the NMS would alleviate some of the walking.

Management Information System based on demurrage/wharfage/claims analysis should be developed, since this would provide insights into the customers' requirements.

5. What infrastructure can IR improve at GZB?

The six tracks of Punjab Yard which had less than rake length wagon capacity need to be extended to the extent possible. While full rake length is desirable, given that a significant proportion (81 out of 123, of which 52 were in Punjab Yard) of rakes were two destination, with varying but less than full rake length loads, any increase in track length would be welcome. For example, as seen in Exhibit 14, 39 (75%) rakes had a length of 25 wagons or less. Even for one destination, 8 (36%) rakes had a length of 25 wagons or less.

Two tracks in Punjab Yard and one in NMS had covered sheds. More tracks, especially in Punjab Yard need covered sheds to facilitate cement unloading. While the standard covered shed design is a deterrent for iron unloading, designs with a higher roof (and possibly even with gantry cranes) should be adopted for better unloading and protection from weather, thereby improving product quality for the customer.

6. What long term improvements should IR consider?

Due to evacuation congestion (partly reflected by restricted truck movement timings), the location of the goods shed serving the catchments of Ghaziabad, Noida and Western UP has to move out of Ghaziabad. There was a proposal to shift the good shed to Chipyana Buzurg (CYZ), the next station, 4km to the east of GZB. The layout that was considered for the development of CYZ is shown in Exhibit 15. The development of CYZ was estimated to be about Rs 45 crores. The more basic question is whether CYZ is the right alternate location from a long term perspective. This needs to be analysed based on the following drivers:

- Evacuation ease and taxation issues
- GZB being an unloading goods shed, ability to source loading traffic
- Cross traffic analysis
- Empty rake relocation analysis
- Ability to provide (and expand) modern and customized infrastructure

7. Towards the above, what perspective changes are required?

The IR mindset is restricted by perspectives that are 'within' railways rather than 'beyond', ie there is no focus on the customers' supply chain. This is further reinforced by performance measures that are primarily physical rather than financial. Further, learnings from one experience do not permeate to the larger context. These need to be corrected.

a. 'Within' to 'Beyond' Railways

We provide two examples:

High incidences of demurrage reflect customers' need for storage space. Demurrage and wharfage are more like charges on overuse of resources rather than revenues for value added services being provided to serve a fundamental customer need. IR should provide this service with systematic pricing, as opposed to the arbitrary penalty and waiver system, reflected in the demurrage concept.

IR's understanding and interfacing with road connectivity, congestion hours and local traffic policies can help service customers better. IR should schedule rake placements and provide storage facilities accordingly.

b. Physical to Financial

We examine two financial measures. The first relates to the significance of GZB in terms of enabling freight revenues to IR as a share of total freight revenues earned by IR. The second relates to the significance of demurrage collected as a proportion to the value of goods, freight revenue and notional terminal charges, on the premise that GZB is a business entity.

The significance of GZB revenues for 2007-08 is analysed in Exhibit 16. Cement and iron were the main commodities unloaded at GZB. On an average, a wagon had the capacity to move 60 tons of cement or 65 tons of iron. Considering an average lead of about 600 km for cement and 1200 km for iron, and their IR freight classification of 140 and 180

respectively, we get freight rates as Rs 512.4 per ton for cement and Rs 1269.4 per ton for iron. Therefore, the annual revenue for GZB from 36,212 wagons of cement and 4189 wagons of iron was about Rs 111 crores and Rs 117 crores respectively. Comparing GZB revenues to the total freight revenue of IR, we find that GZB contributed 0.48%. Comparing specifically for cement and iron, GZB contributed 2.83% and 4.78% respectively.

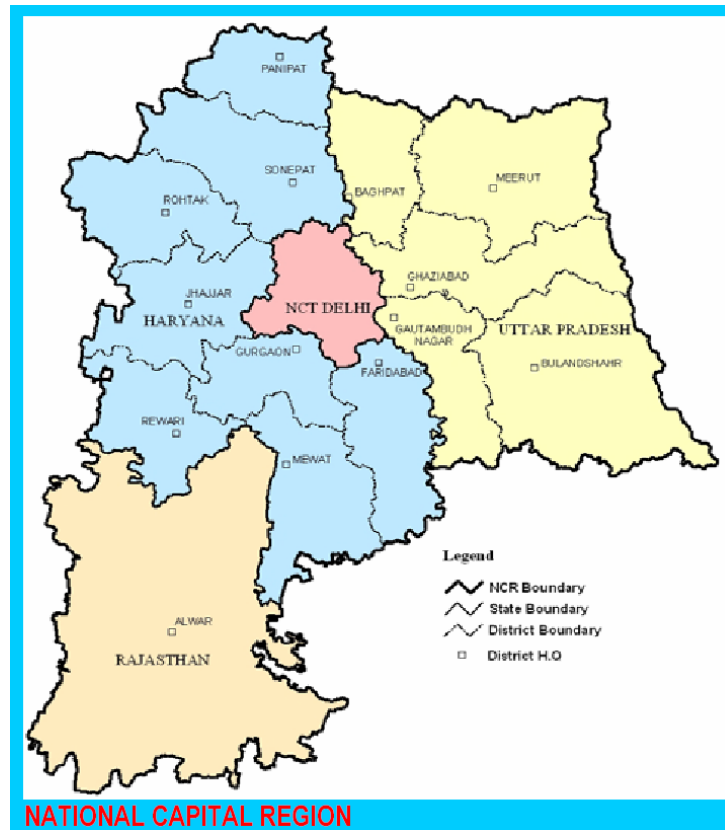
The significance of demurrage collected, with respect to value of goods, revenue earned, and notional terminal charges for October 2007 is shown in Exhibit 17. Using the average price per ton of cement and iron, we determine the value of goods unloaded at GZB. Demurrage collected as a proportion of the value of goods was negligible. Demurrage collected as a proportion of revenue was 0.81% for cement and 0.08% for iron. However, a comparison with notional terminal charges proved to be more significant. If GZB goods shed was considered an independent business entity, terminal charges would be its revenue. Notionally, 3.5% of the revenue was allotted as terminal charge for the unloading goods shed. Consequently, demurrage collected as a proportion of terminal charges were 22.9% for cement, 2.2% for iron and 12.2% as their total. (Wharfage proportions would be at least twice as much, since wharfage charges were considerably larger than demurrage.)

c. Implications for the larger context

In 2006, IR had 2300 goods sheds. Overall, about 70 high quality goods sheds (apart from captive sidings), with modern customized loading and unloading infrastructure, storage facilities, and good road evacuation serving a catchment radius of up to say 300 km may suffice for the country. For minimizing empty rake movement, proximity of unloading and loading demands should be recognized. Goods shed infrastructure should be modeled after Inland Container Depots. These developments should be structured in a Public Private Partnership mode. The value that can be unlocked due to better service and lower losses would provide the due returns. The concept of Logistics Parks should be in this direction.

Conclusion

Infrastructure services which are becoming increasingly critical to the economy still need a change of orientation from the selling concept to the marketing concept. The marketing concept essentially requires IR to (i) think beyond the railway boundaries and focus on the origin to destination supply chain of the customer, (ii) understand the financial implications and develop performance measures around this rather than physical measures, and (iii) change the mindset from looking at resources as constraints to opportunities.

Exhibit 1: NCR Map

Source: Regional Plan 2021 for National Capital Region, National Capital Region Planning Board, Ministry of Urban Development, Government of India

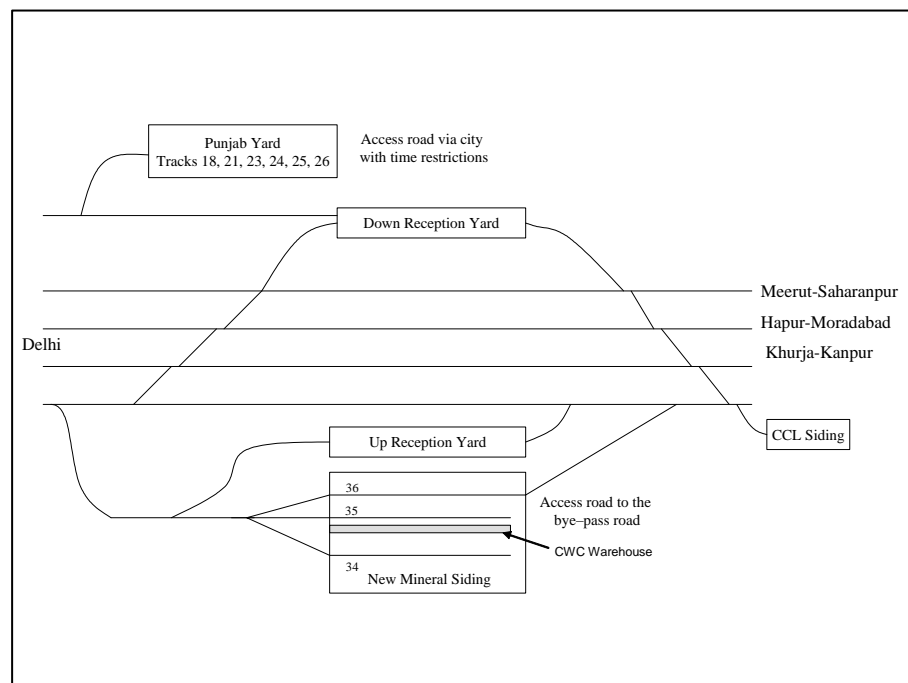
Exhibit 2: Population Statistics

State/District	Population (m)	Decadal Growth Rate (%)		Density (sq km)	
		2001	1981-1991	1991-2001	1991
India	1027.0	24.7	21.3	267	326
Uttar Pradesh	16.6	25.6	25.8	548	689
Ghaziabad	3.3	40.9	47.5	1141	1682
Gautam Budh Nagar	1.2	37.6	35.7	692	939
Meerut	3.0	24.9	24.2	959	1190
Bulandshahar	3.0	16.1	22.2	643	786
Baghpat	1.2	22.4	13.0	742	838

Source: Census 2001, Registrar General of India, Government of India, New Delhi

Exhibit 3: GZB Goods Shed Layout

June 2008



Source: Delhi Division, 2008

Exhibit 4: Yard Capacity

June 2008

Yard	Track No	Wagon Capacity
Punjab Yard	18	20
	21	06
	*23	13
	*24	08
	25	17
	26	23
NMS	34	Full rake
	**35	Full rake
	36	Full rake

*Covered Sheds

**CWC Warehouse

Source: Delhi Division, 2008

Exhibit 5: Summary of Rakes

October 2007

Rakes	One Destination		Two Destination		Total
	Punjab Yard	NMS	Punjab Yard	NMS	
Cement	22	20	52	29	123
Iron	3	25	0	7	35
Iron and Cement	0	1	0	0	1
Other	0	5**	0	0	5
Total	25	51	52	36	164*

*10 rakes from two origins (nine cement, and one cement and iron rake)

**Three rakes of oil out of the five were placed in CCL siding

Source: Authors' Analysis

Exhibit 6: Demurrage and Wharfage Summary

October 2007

(Rs)

Demurrage	Cement	Iron	Others	Total
Total Placements*	133	36	5	174
Number of Cases	104	14	2	120
Cases over Total Placements	78.2%	38.9%	40.0%	68.9%
Total Due	1,571,175	176,400	23,775	1,771,350
Collected in October	241,602	45,073	10,601	297,276
Collected in November	674,432	49,305	0	723,737
Outstanding in November	123,000	1,500	0	124,500
Number of Cases (Outstanding in November)	2	1	0	3
Forgone	538,441	80,522	13,174	632,137
Forgone over Due	34.3%	45.7%	55.4%	35.7%
Forgone over Collected	58.8%	85.3%	124.3%	61.9%
Total Collected	916,034	94,378	10,601	1,021,013

*164 rakes, with 10 rakes from two origins

Wharfage	Amount
Total Number of Wagons	2,264
Total Wharfage Collected	3,948,880
Range For Single Wagon Cases	36,720 - 30

Source: Authors' Analysis

Exhibit 7: Reasons for Demurrage and Wharfage Waiver Request

Demurrage	Frequency
Wagons parked under the open sky, cloudy weather	81
Trucks are not allowed in the morning and evening as per Ghaziabad traffic rules	47
Shortage of labour because of sharing among other offloading companies	44
Lighting problems, therefore unable to unload after 20:00	42
There were other rakes therefore also shortage of labour and trucks	40
Regular customers of the railways	30
Shortage of labor and trucks	7
Lack of space to unload	5
Breakdown of cranes, obstacles against wagons	5
Non availability of labour at late night	4
Labour strike at rail side warehouse (CWC), dump holders stopped regular labour from unloading, therefore labor not available at any cost, unskilled labour brought from far off stations, therefore delay	3
Poor condition of road around shed	2
Confirmation of arrival of wagon was delayed till next morning, Organizing cranes took some time, Cranes' breakdown during operations	2
Holiday a day prior influenced the availability of cranes in the market, breakdown of cranes	1
Wagons are under 'no goods space' (NGS) category	1
Only one door was available to offload because of blockages on other sides	1
Total (out of 120)	304

Wharfage	
Cement (two cases)	Iron (three cases)
Non availability of labour and trucks because of unloading by others	Regular Customer of Railway for long distance and high rated traffic and paid lot of money as freight to Railway
Barred passage of trucks during morning and evening (8AM-12PM & 4PM- 8PM)	Could not release within free time from SAIL because they could not get Rail Receipt from SAIL at time
No proper arrangement/ facility of light. Due to this, labour can not work after 20:00 hrs	There is no Railway crane at Ghaziabad goods. They arranged their own crane.
Weather was bad	One of the wagons was detained for want of space.
-----	No outstanding and pending amount
The reasons have been the same across the cases considered above for cement and iron respectively. An examination of other cases suggests further such similarities.	

Source: Authors' Analysis

Exhibit 8: Cement Association Complaints

The main reasons due to which rakes go under demurrage and wharfage, which can be avoided by providing requisite facilities (*in their own words*):

- ‘Ghaziabad open railway siding.’
- ‘No working at night because not proper light arrangement both siding.’
- ‘Approach road of railway siding is very poor.’
- ‘Our Ghaziabad imposed no entry system by local authorities.’
- ‘Siding Labour belong to nearest village so can not working in night.’
- ‘Our Cement commodity is very sensitive due to rain because GZB open siding.’
- ‘Line No 21 is very narrow line and working is very poor on this line.’
- ‘No arrangement of drinking water for labour at railway both siding.’
- ‘In rainy season railway siding filling with water approx 1 to 2 fits.’
- ‘Our Ghaziabad area is very unsecured for cash Transaction of Demurrage / Wharfage at night.’
- ‘Not proper security arrangement at railway siding at night.’

Source: Letter to Divisional Railway Manager, Northern Railway, by Cement Dump Association dated 10/6/2008

Exhibit 9: Cross Traffic

October 2007

(No of Rakes)

Siding	Cement	Iron	Iron and Cement	Others	Total
Punjab Yard	74	3	-	-	77
NMS	49	32	1	2	84
Total	123	35	1	2	161*

* Not including three rakes of oil

Source: Authors' Analysis

Exhibit 10: Distribution of Demurrage Charges

October 2007

(No of Rakes)

Distribution	Demurrage Due	Number Forgone	Total Collected by November	Outstanding in November
Cement				
More than 40000	10	8	9	1
40000-35000	3	3	3	0
35000-30000	1	1	1	0
30000-25000	3	2	3	0
25000-20000	8	6	8	0
20000-15000	5	5	5	0
15000-10000	15	13	14	1
10000-5000	28	28	28	0
Less than 5000	31	31	31	0
Total	104	97	102	2
Range (Rs)	63,000 - 750		44,120 - 750	
Average (Rs)	15,667		9268	
Median (Rs)	9000		4500	
Iron				
More than 40000	0	0	0	0
40000-35000	1	1	1	0
35000-30000	0	0	0	0
30000-25000	0	0	0	0
25000-20000	2	2	2	0
20000-15000	4	4	4	0
15000-10000	0	0	0	0
10000-5000	1	1	1	0
Less than 5000	6	4	5	1
Total	14	12	13	1
Range (Rs)	36,900 - 975		25830 - 598	
Average (Rs)	14380		7488	
Median (Rs)	15000		7520	
Other				
15000-10000	1	1	1	0
10000-5000	1	1	1	0
Total	2	2	2	0
Grand Total	120	111	117	3

Source: Authors' Analysis

Exhibit 11: Company Wise and Commodity Wise Demurrage

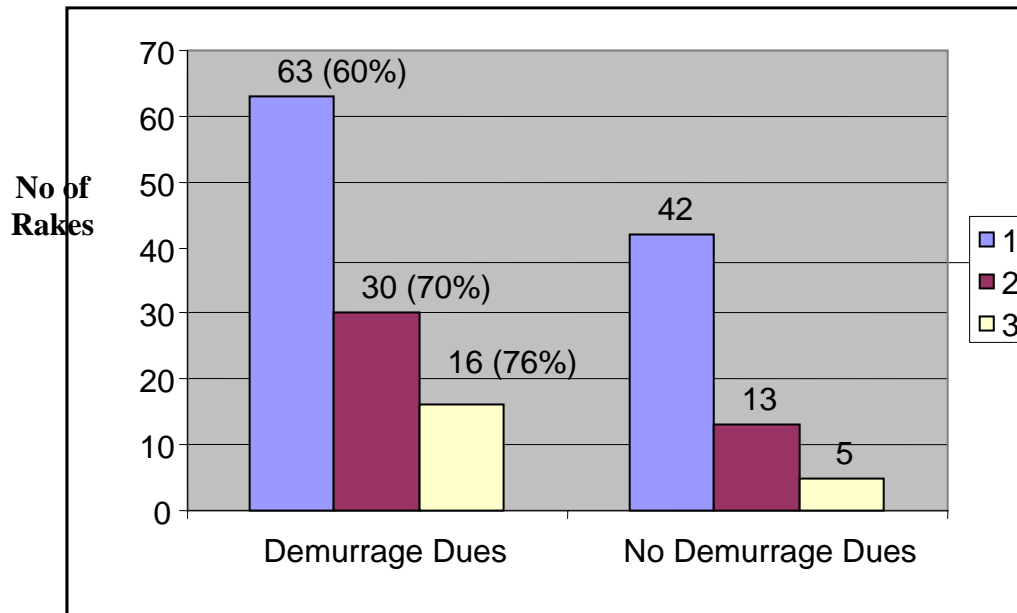
October 2007

Name of Company	Rakes (Total) (No)	Rakes (Dues) (No)	Proportion of Rakes with Dues (%)	Wagons Unloaded (No)	Due (Rs)	Total Forgone (Rs)	Total Collected (Rs)	Outstanding in November (Rs)
Cement								
Ambuja	10	10	100	216	229650	73775	155875	0
Maihar	7	7	100	260	162000	60300	101700	0
Vikram	4	4	100	64	36225	16923	19662	0
Binani	3	3	100	54	19125	9093	10032	0
Diamond	6	5	83	171	132300	38102	94198	0
Aditya Birla	17	14	82	423	348525	88498	145027	112500
ACC	22	17	77	580	226275	81185	151390	0
J K	4	3	75	118	39675	13005	26670	0
Mangalam	19	14	74	455	123150	50360	73330	0
Shree	13	9	69	383	112200	42635	63965	0
J P Associate	12	8	67	344	64200	37720	33680	0
La Farge	6	4	67	175	42000	10330	21170	10500
Shriram	3	2	67	33	15150	4995	10155	0
J K Laxmi	8	4	50	198	20700	11520	9180	0
Total	134	104	78		1571175	538441	916034	123000
Average					15667	5357	9268	61500
Median					9000	4095	4500	61500
Iron								
Jindal	9	4	44	346	46350	24016	22334	0
SAIL	19	9	47	452	125775	53542	70733	1500
Bhushan Steel	7	1	14	360	4275	2964	1311	0
Total	35	14	36		176400	80522	94378	1500
Average					14380	6891	7488	1500
Median					15000	7480	7520	1500
Others								
IFFCO	2	2	100	79	23775	13174	10601	0
Indian Oil	3	0	0	211	0	0	0	0
Total	5	2	40		23775	13174	10601	0
Average					8213	4168	4045	0
Median					8213	4168	4045	0
Grand Total	174	120	69		1771350	632137	1021013	124500
Average					9627	3436	5549	41500
Median					4500	1867	1645	10500

Source: Authors' Analysis

Exhibit 12: Correlation between Track Splits and Demurrage Dues

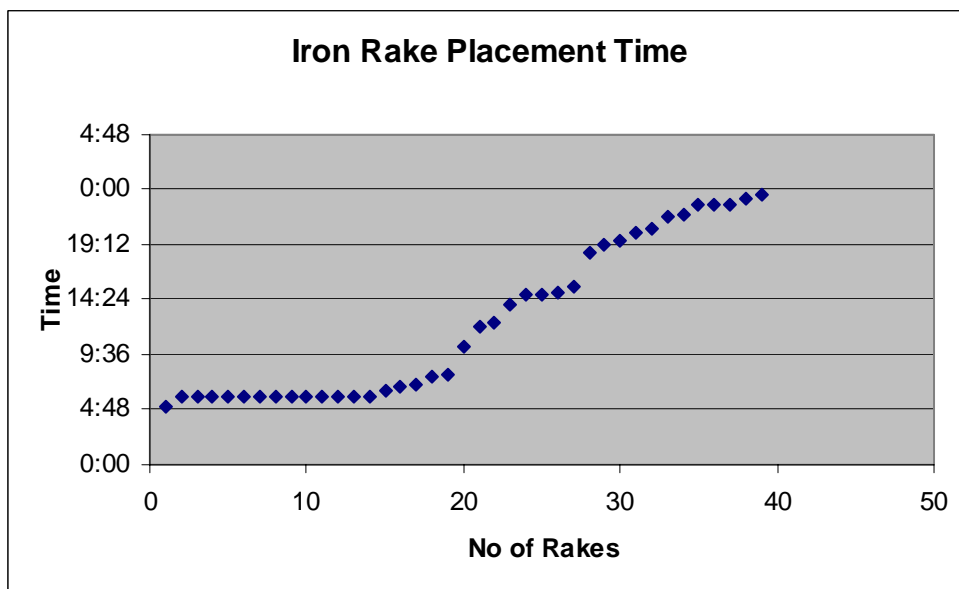
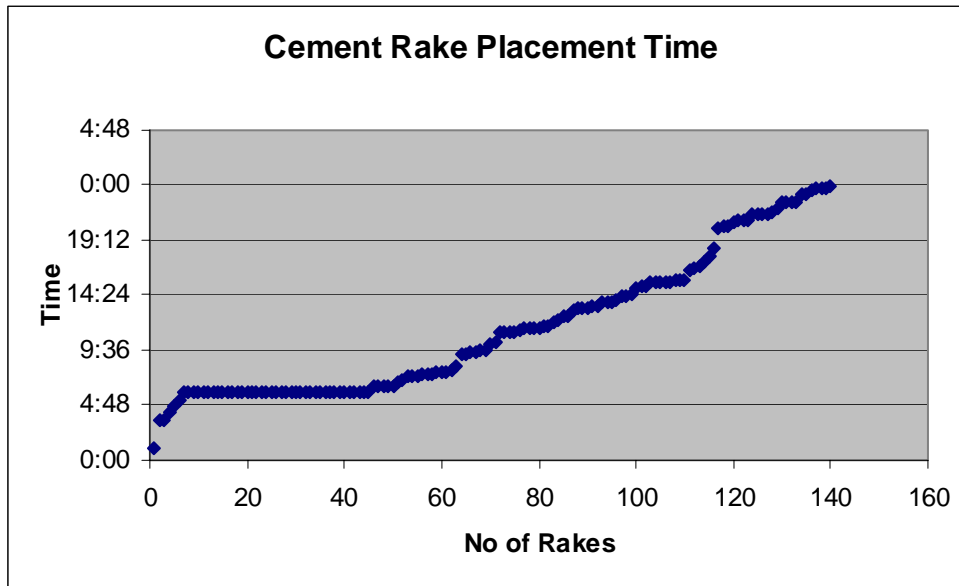
October 2007



Source: Authors' Analysis

Exhibit 13: Rake Placement Time

October 2007



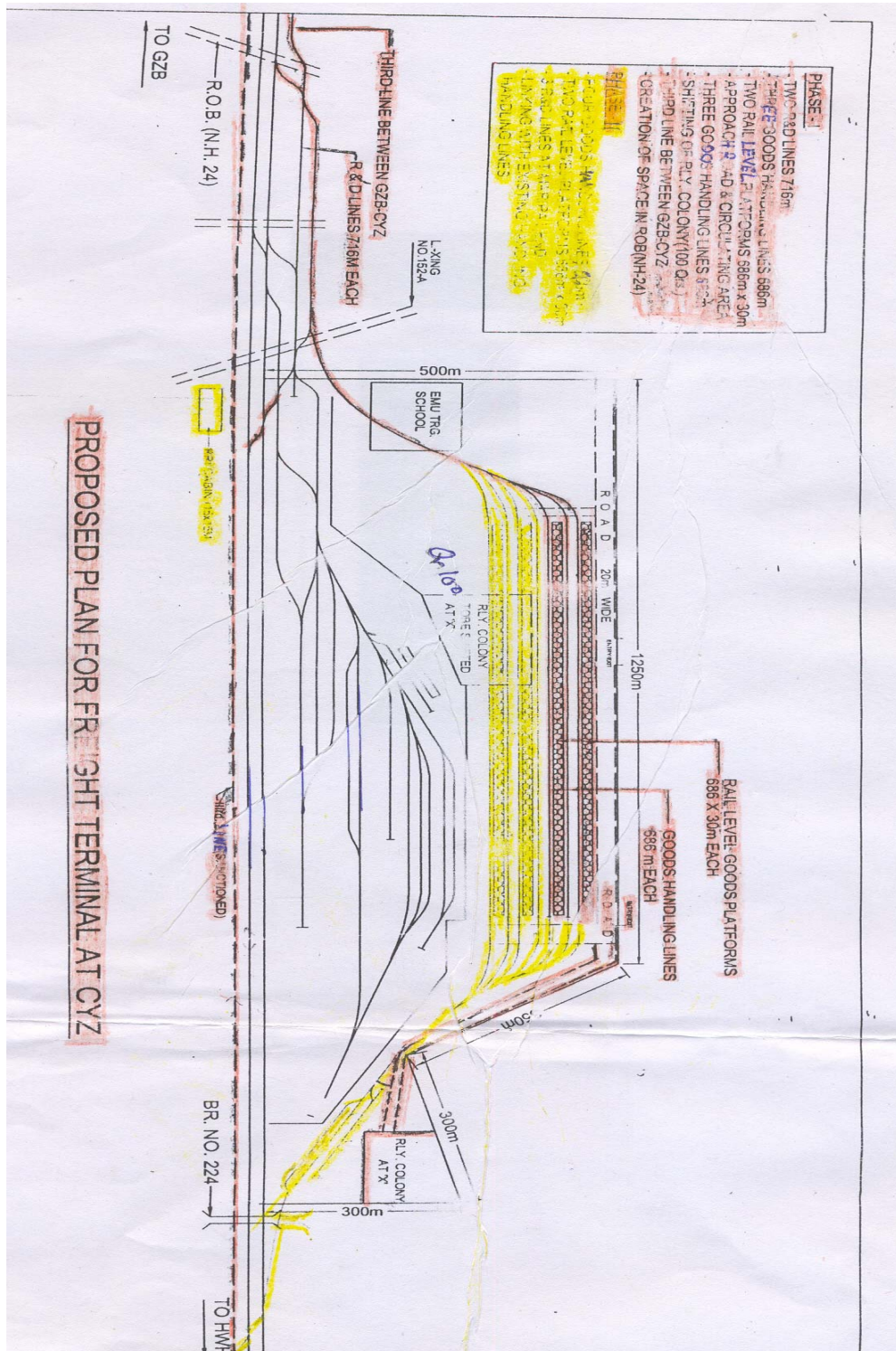
Source: Authors' Analysis

Exhibit 14: Distribution of Rake Length: Punjab Yard
October 2007

Rake Length (No of Wagons)	Frequency (No of Rakes)
Two Destination	
3	1
15	3
16	1
19	5
20	8
21	7
23	1
24	3
25	10
28	3
30	10
Total	52
One Destination	
13	1
15	1
19	1
20	1
21	1
23	1
24	1
25	1
30	2
40	11
42	1
Total	22
Grand Total	74

Source: Authors' Analysis

Exhibit 15: CYZ Layout



Source: Delhi Division, 2008

Exhibit 16: Revenue Analysis

2007-08

Commodity	Load per Wagon (ton)	Wagons Unloaded (no)	Total Throughput (ton)	Freight Classification	Average Distance (km)	Rate (Rs/ton)	Revenue (Rs cr)
Cement	60	36,212	2,172,725	140	600	512.4	111
Iron	65	14,189	922,269	180	1200	1269.4	117
Total		50,401	3,094,994				228

Commodity	IR Freight Revenue (Rs cr)	GZB Revenue (Rs cr)	GZB share Over IR (%)
Cement	3,932	111	2.83
Iron	2,449	117	4.78
Total	47,743	228	0.48

Source: Authors' Analysis

Exhibit 17: Revenue and Demurrage Analysis

October 2007

Commodity	Total Collected (Rs)	Load per Wagon (ton)	Wagons Unloaded (no)	Total Throughput (ton)	Average Price (Rs/ton)	Value of Goods (Rs cr)	Revenue (Rs cr)*	Terminal Charges (Rs cr)**
Cement	916,034	60	3,685	221,100	5,100	112	11	0.40
Iron	94,378	65	1,502	97,630	37,000	361	12	0.43
Total	1,010,412		5,187	318,730		473	23	0.83

*Calculated as per IR freight rates

**Terminal charges: 3.5% of revenue

Commodity	Proportion of Collected to Value of Goods (%)	Proportion of Collected to Revenue (%)	Proportion of Collected to Terminal Charges (%)
Cement	0.082	0.833	22.901
Iron	0.003	0.079	2.195
Total	0.021	0.439	12.174

Source: Authors' Analysis

Acknowledgments

- Mr Rakesh Saxena, Divisional Railway Manager (DRM), Delhi
- Mr Sanjay Kumar Jain, Senior DOM
- Mr B K Shukla, Senior DOM (Planning), Delhi
- Mr Vikram Singh, Senior DCM
- Mr F X Tirkey, Station Superintendent, Ghaziabad
- Mr S R Meena, CGS, Ghaziabad
- Mr Harvilas, CGS, Ghaziabad
- Mr R P Pandey, AO, Ghaziabad

Visits

- Field visit, Ghaziabad, June 9th 2008
- Field visit, Ghaziabad, July 11th 2008
- GZB case presentation, Delhi, August 27th 2008

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