

Republic of India
Chennai Port Trust

The Project On Improvement of Chennai Port Operation

Final Report

September, 2016

Japan International Cooperation Agency

The Overseas Coastal Area Development Institute of Japan

Mitsui Engineering & Shipbuilding Co., Ltd.

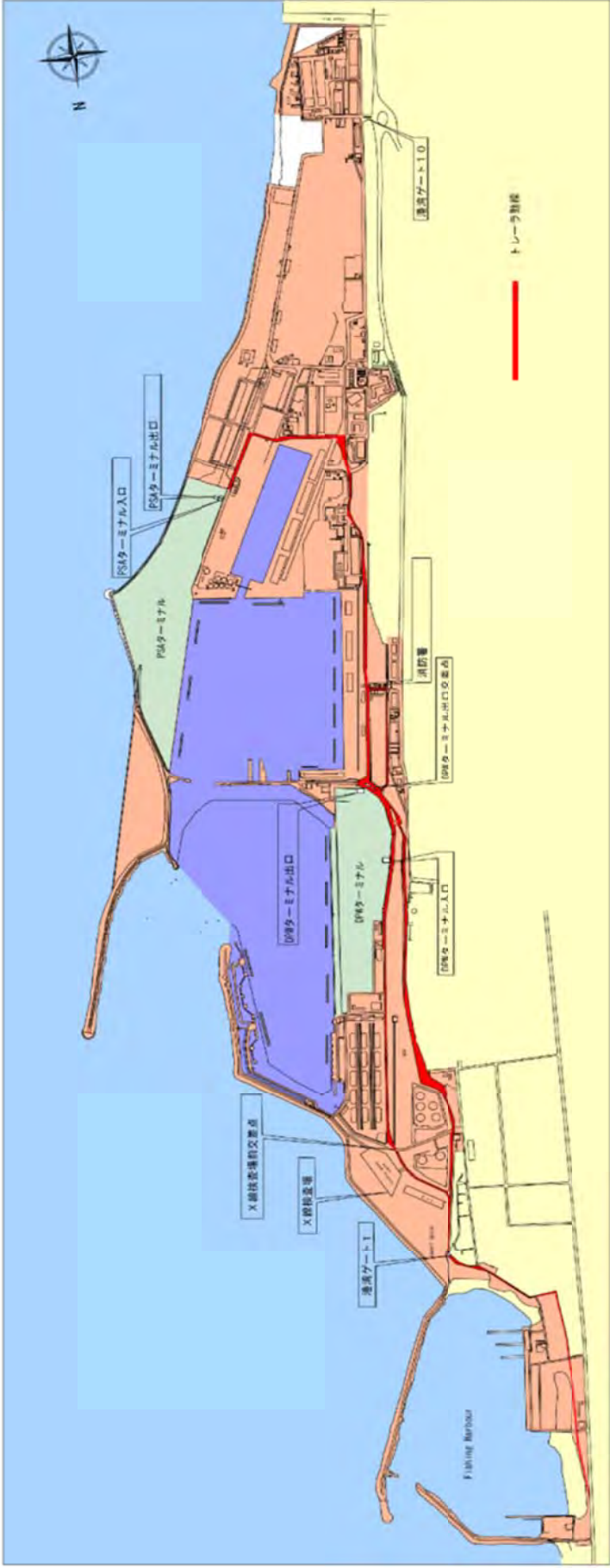
Hakata Port Terminal Co., Ltd.

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Chennai port and its hinterland



Layout of Chennai Port



List of Abbreviation and Terminology

Abbreviation	Description
B/L	Bill of Lading
CBIC	Chennai-Bangalore Industrial Corridor
CCTL	Chennai Container Terminal
CFS	Container Freight Station
CHA	Customs House Agent
ChPT	Chennai Port Trust
CISF	Central Industrial Security Force
CITPL	Chennai International Terminals Pvt. Ltd.
CONCOR	Container Corporation of India Ltd.
CWC	Container Warehousing Corporation
DO	Delivery Order
DPW	Dubai Port World
DRF	Delivery Request Form
EIR	Equipment Interchange Receipt
FORM 13	FORM 13 ①Export FORM13 ②Import FORM13
HEP	Harbour Entry Permit
HiTS	Hakata Port Logistics IT System
ICD	Inland Container Depot
IIT	Indian Institute of Technology (Madras)
JNPT	Jawaharlal Nehru Port Trust
MOS	Ministry of Shipping
NACCS	Nippon Automated Cargo and Port Consolidated System
NACFS	National Association of Container Freight Station
NHAI	National Highway Authority of India
NHTA	Nagoya Harbor Transport Association
NUTS	Nagoya United Terminal System
OOG	Out Of Gauge (Cargo)
PDCA	Plan-Do-Check-Action
PNR	Public Notification of Regarding
PPP	Public Private Partnership
PSA	Port of Singapore Authority International
RFID	Radio Frequency Identification

RO/RO	Roll On/Roll Off
S/C	Steering Committee
TEU	Twenty Feet Container Equivalent Unit
TOS	Terminal Operating System

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1 Background and Purpose of the Project

1.1 Background of the Project

Chennai port, located in Tamil Nadu State, plays a strategic role in marine transport to the Far East and South East Asia. Japanese firms including automobile manufacturers are investing in Chennai and other cities in Tamil Nadu, contributing to the state's steady economic growth.

There are thirteen major ports in India managed by the Ministry of Shipping (MOS) of the central government. Chennai port, a major port located on the western side of Chennai city, plays an important role as a gateway of physical distribution in Eastern India.

Chennai port is now being converted to a container port. It handled 1,552 thousand TEUs from April 2014 to March 2015, making it the second largest container handling port among major ports next to Jawaharlal Nehru Port (Mumbai, Maharashtra), which handled 4,467 thousand TEUs in the same period (in case of including private ports, Mundra port occupies 2nd place handling 2,720 thousand TEUs in 2014 and Chennai port drops to 3rd place).



Figure 1-1 Overview of Chennai port

On the other hand, Chennai port is suffering from serious congestion caused by container trailers inside and outside the port as shown in the pictures below. The heavy congestion is a result of various factors such as the poor condition of the road network, the tendency of trailer drivers to enter the queue without carrying a proper set of documents, the fact that trailers have to go through three gates to reach the container terminal and that gate transactions are conducted manually and are generally inefficient, etc.

Based on these circumstances, Japan and India signed a Joint Statement on “Vision for the Enhancement of Japan-India Strategic and Global Partnership on the 60th Anniversary of the Establishment of Diplomatic Relations,” aiming to improve infrastructure such as ports, industrial parks and their surrounding facilities in Ennore, Chennai and the adjoining areas.



Picture 1-1 A line of container trailers waiting to enter port gate No1



Picture 1-2 Traffic congestion in front of the terminal gate

Consequently, JICA conducted a study entitled “Data collection survey on the improvement of port operations” (hereinafter referred to as “Data collection survey”) in October and December 2013. Data collection survey revealed the need to improve port operation and port traffic control as well as develop basic infrastructure including port facilities, port road and a parking lot. The Japan Chamber of Commerce and Industry in India, which consists of over 400 Japanese companies located in India, also urged the government of India and the State of Tamil Nadu to take measures to improve operations at Chennai port.

Finally, JICA decided to dispatch experts to assist in improving port operation in Chennai port and in easing the congestion in collaboration with Chennai Port Trust.

1.2 Purpose of the Project

Objective of this project is to make Chennai port user-friendly through the following tasks.

- 1) To enhance the efficiency of Chennai port by reducing container movement lead times etc.
- 2) To enhance the capacity of container operation in Chennai port through technical assistance for introducing an effective port operation and traffic control system

Target area of this project is Chennai port and its surrounding area.

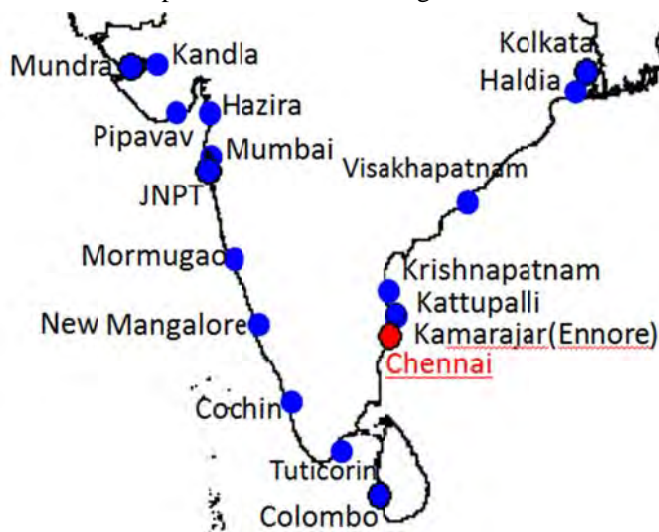


Figure 1-2 Location of Chennai in India

2 Team Members and Dispatch Schedule

The JICA Study Team (hereinafter referred to as “The Team”) members and dispatched schedule from the first dispatch to the eight dispatch are shown below.

(1) Composition of the Team

Assigned Area	Name	Organization
Team Leader / Port Planning	Akira KOYAMA	The Overseas Coastal Area development Institute of Japan (OCDI)
Management and Operation of CFS	Takeshi SUZUKI Makoto MIUTANI Ryuichi KUWAJIMA	OCDI
Port IT System Design (1)	Norihiro FUKAZAWA	Mitsui Engineering & Shipbuilding Co., Ltd.
Port IT System Design (2)	Hiroshi KIMOTO	Hakata Port Terminal Co., Ltd.
Gate Management and Port Traffic Management (1)	Daitoku FUJINO	Hakata Port Terminal Co., Ltd.
Container Traffic Simulation (1)	Makoto MIZUTANI Osamu KUNITA	OCDI
Gate Management and Port Traffic Management (2)	Osamu IGUCHI	OCDI
Container Traffic Simulation (2) / Coordinator	Ken SAITO	OCDI

Note: There are a few names in a name’s column. The lower name is a successor of the upper name.

(2) Dispatch Schedule of The Team for the first year

Dispatch No.	Dispatch Schedule	Number of Experts
First	16 th July 2014 – 14 th August 2014	6
Second	29 th September 2014 – 7 th November 2014	8
Third	18 th January 2015 – 28 th February 2015	8
Fourth	12 th April 2015 – 1 st May 2015	6
Fifth	6 th July 2015 – 4 th August 2015	6
Sixth	29 th September 2015 – 28 th October 2015	8
Seventh	26 th January 2016 – 24 th February 2016	7
Eighth	23 rd May 2016 – 10 th June 2016	5

Note: Dispatch schedule includes travel days to/from Japan.

3 Survey and Study Activities of the Project

Major Activities undertaken during the two-year period of the project are as follows.

3.1 Outline of Project Activities

Activities conducted as part of the Project are outlined in the table below.

	2014		2015				2016		
	07-09	10-12	01-03	04-06	07-09	10-12	01-03	04-06	
No. of Dispatch	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	
Congestion Survey	→								
Demonstration Trial	Preparation		Implementation			Evaluation, Follow-up			→
IT Related Measures	Propoasal			Trial		Evaluation			→
Masterplan	Proposal of Infrastructure Improvement					Study of Direction			→
Other Activities (Simulation, Hearing, Survey of other ports)	→								
S/C	⊙	⊙	⊙⊙	⊙	⊙	⊙	⊙⊙	⊙	
W/G	○	○	○			○	○		

The Steering Committees (S/C) consisting of the government of India, the State of Tamil Nadu, the terminal operators and the concerned port logistic members as well as ChPT were held as shown above in order for all stakeholders to participate in the Project under a spirit of cooperation. The Working Group (W/G) meetings were also held to exchange views on all aspects of improvement of Chennai port operation prior to the S/C. Date and agendas of the said S/C and W/G are shown below.

Table 3-1 Schedule of S/C and W/G

Stage	Meeting	Date	Chairman	The main agenda
1st Dispatch	S/C	17Jul.2014	Traffic Manager	•Eplanation of the Inception report
	W/G	17Jul.2014	Sr. Deputy Traffic Manager	•Eplanation of the Inception report •Major Activities in the 1st Dispatch
2nd Dispatch	W/G	08Oct.2014	Traffic Manager	•Congestion Alleviation Measures at Chennai Port (Demonstration Trial,I T Based Measures, Other Measures)
	S/C	17Oct.2014	Deputy Chairman	•Progress of the Study •Congestion Alleviation Measures at Chennai Port (Demonstration Trial,I T Based Measures, Other Measures)
3rd Dispatch	W/G	12Jan.2015	Traffic Manager	•Scope of Demonstration Trials •I T Based Measures
	S/C	23Jan.2015	Sr. Deputy Traffic Manager	•Scope of Demonstration Trials •I T Based Measures
	S/C	23Feb.2015	Deputy Chairman	•Results and Findings of Demonstration Trials •I T Based Measures •Futher Studies •Simulation Model
4th Dispatch	S/C	23Apr.2015	Chairman	•Status of Congestion •Evaluation of Demonstration Trials •1st Year Results •2nd Year Assistance
5th Dispatch	S/C	27Jul.2015	Traffic Manager	•1st Year Results •2nd Year Assistance •Follow-up of Demonstration Trial
6th Dispatch	W/G	9Oct.2015	Traffic Manager	•Examination of Efficient Process of Trailer Flow •Follow-up of Demonstration Trial
	S/C	15Oct.2015	Deputy Chairman	•Examination of Efficient Process of Trailer Flow •Follow-up of Demonstration Trial •Study on the Direction of the Masterplan
7th Dispatch	W/C	2Feb.2016	Traffic Manager	•Major Activities in the 2nd Year •Examination of Efficient Process of Trailer Flow
	S/C(1)	4Feb.2016	Chairman i/c	•Outline of the 2nd Year Assistance •Examination of Efficient Process of Trailer Flow •Study on the Direction of the Masterplan
	S/C(2)	18Feb.2016	Chairman i/c	•Demonstration Trial of Web Portal System •Follow-up of Demonstration Trial •Sustainable Activities by Taskforce Team
8th Dispatch	S/C	7Jun.2016	Chairman i/c	•Follow-up of Demonstration Trial •Outline and Evaluation of the 2 year Assistance •Visualized Presentation for the Project •Invioation Program to Japan

Many stakeholders participated in Steering Committee Meetings and lively discussions were held on the status of congestion and demonstration trials etc. The majority of the proposals made by the Study Team were accepted. ChPT officially requested the Tamil Nadu Government to participate in the S/C based on the advice of the Team and as result officials from the Police and Road department joined the S/C.

3.2 Status of Port Activities

(1) Cargo Handling Trend

Major cargo handled at Chennai Port is shown in the table below.

The total handling volume increased from 2007 to 2010 but has shown a tendency to decline since 2011, since the handling of iron ore and coal has been suspended due to environmental concerns as Chennai city is located close to the port. However, among major cargoes, container cargo is stable and its proportion to the total handling volume has also been increasing; containers accounted for 57% of the total cargo in 2014 and 60% in 2015.

Table 3-2 Major Cargoes Handled at Chennai Port

(In '000 Tons, '000 TEUs)

Cargo	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016 Apr-Jun
P.O.L	12,794	13,112	13,425	13,882	13,295	13,425	12,784	12,736	11,890	3,121
IRON ORE	10,815	8,247	7,882	2,176	97	52	-	146	-	-
Fertilizer	882	761	591	776	633	421	415	541	260	58
Coal	3,990	4,684	3,362	2,503	961	-	-	-	-	-
Container	18,049	20,581	23,476	29,421	30,075	29,708	28,330	29,945	30,210	7,293
Others	10,624	10,106	12,321	12,702	10,646	9,798	9,576	9,173	7,700	2,673
Total (Tons)	57,154	57,491	61,057	61,460	55,707	53,404	51,105	52,541	50,060	13,145
Container (TEUs)	1,020	1,143	1,225	1,523	1,558	1,539	1,468	1,552	1,565	-

Source: 2007-2014; Indian Ports Association, April 2015 -June 2016; ChPT
Supplement: 2007 (April 2007 to March 2008)

(2) Container Handling Trend

The container handling volume in 2011 was 1,579 thousand TEUs, the highest on record, but then decreased to 1,546 thousand TEUs in 2012 and 1,482 thousand TEUs in 2013. However, the container handling volume increased to 1,527 thousand TEUs in 2014 compared to the previous year and remained steady at 1,529 thousand TEUs in 2015. Laden import containers in 2015 increased by 2.9% compared to that of 2014, while laden export containers decreased by 9.8%. The container handling volume from January to May 2016 is 638 thousand TEUs which is virtually unchanged from the same period last year.

The container handling volume at Chennai port is shown in the table below.

Table 3-3 Container Handling Volume at Chennai Port

DPW+PSA	Import(TEU)		Export(TEU)		Tranship(TEU)	Total(TEU)	
	laden container	empty container	laden container	empty container			
2010	714,802	27,290	481,408	208,646	10,332	1,442,478	
2011	791,200	20,535	674,407	87,013	6,680	1,579,835	
2012	758,460	22,132	554,680	210,472	802	1,546,546	
2013	January	65,616	1,953	45,627	16,543	50	129,789
	February	55,897	2,214	47,038	12,352	116	117,617
	March	57,840	2,500	55,689	9,661	32	125,722
	April	61,964	2,376	46,460	8,902	2	119,704
	May	62,212	1,623	46,070	13,543	1	123,449
	June	64,274	1,754	47,958	12,674	2	126,662
	July	63,645	2,452	50,547	14,539	20	131,203
	August	62,278	2,924	49,984	13,260	0	128,446
	September	59,484	3,408	52,994	8,105	9	124,000
	October	57,226	3,271	51,100	11,304	42	122,943
	November	53,791	3,445	47,035	7,285	6	111,562
	December	57,916	3,388	53,181	6,828	2	121,315
	Total(2013)	722,143	31,308	593,683	134,996	282	1,482,412
2014	January	56,688	4,234	47,716	6,942	6	115,586
	February	47,905	4,346	50,113	6,028	6	108,398
	March	57,093	6,958	59,890	4,436	4	128,381
	April	59,196	5,492	49,962	4,046	1	118,697
	May	65,385	3,504	55,705	6,933	2	131,529
	June	66,417	4,759	47,376	9,039	4	127,595
	July	67,652	3,228	54,756	14,069	2	139,707
	August	65,520	4,445	53,746	10,795	0	134,506
	September	68,962	4,196	53,241	9,904	3	136,306
	October	61,104	4,100	51,047	13,029	1	129,281
	November	59,181	3,704	47,934	12,353	76	123,248
	December	60,318	5,635	53,775	14,202	506	134,436
	Total(2014)	735,421	54,601	625,261	111,776	611	1,527,670
2015	January	60,108	3,993	48,020	9,550	174	121,845
	February	53,292	4,294	49,047	6,443	2	113,078
	March	61,010	6,515	55,021	8,335	212	131,093
	April	70,746	4,051	51,416	11,088	0	137,301
	May	65,947	3,896	43,573	15,648	0	129,064
	June	67,634	3,901	45,115	12,076	0	128,726
	July	68,875	3,386	50,554	19,272	0	142,087
	August	60,468	5,147	47,761	14,489	0	127,865
	September	65,328	6,967	47,938	13,699	572	134,504
	October	60,668	7,650	45,768	14,988	655	129,729
	November	60,557	3,853	36,642	10,819	400	112,271
	December	62,057	2,960	43,151	11,825	2,000	121,993
	Total(2015)	756,690	56,613	564,006	148,232	4,015	1,529,556
2016	January	64,028	4,416	44,950	15,695	2	129,091
	February	55,803	3,077	46,002	12,777	0	117,659
	March	73,269	3,818	54,774	15,486	1	147,348
	April	65,544	4,164	40,729	14,111	40	124,588
	May	66,602	2,869	33,366	16,301	0	119,138
	Total(2016)	325,246	18,344	219,821	74,370	43	637,824

Source: 2010 – March 2013; Data Collection Survey 2013 JICA, April 2013 –May 2016; CHPT

The container handling volume at DPW (CCT) has been increasing recently, reaching 861 thousand TEUs in 2015, an increase of 7.2% compared to the previous year. However, the container handling volume fell sharply by 23% in April and 27% in May compared to the same months of the previous year.

The container handling volume at PSA fell to 667 thousand TEUs in 2015 compared to 724 thousand TEUs in 2014, a decrease of 7.7%. However, it significantly increased during the period from February to May 2015 compared to the same period last year. It was 69 thousand TEUs in April this year compared to 66 thousand TEUs in April last year, an increase of 5% and was 64 thousand TEUs in May this year compared to 54 thousand in May last year, an increase of 19%.

These fluctuations in the container handling volume of each terminal seem to be a result of the competition between the two terminals or re-arrangement of vessel services as the total handling volumes have not changed much during these periods.

As for the share between two terminals, DPW handled 52.6% and PSA handled 47.4% in 2014 while DPW handled 56.3% and PSA handled 43.7% in 2015. Thus, the share of DPW is increased from 2014 to 2015. However, during the period from January to May 2016 PSA's share increased to 51.4% while DPW handled 48.6%. The container handling volume by terminal is shown below.

Table 3-4 Container Handling Volume by Terminal

	Total	DPW(CCT)		PSA(CITPL)		
		Number of container(TEU)	share(%)	Number of container(TEU)	share(%)	
2010	1,442,478	1,137,726	78.9%	304,752	21.1%	
2011	1,579,835	1,090,317	69.0%	489,518	31.0%	
2012	1,546,546	944,008	61.0%	602,538	39.0%	
2013	January	129,789	66,576	51.3%	63,213	48.7%
	February	117,617	59,380	50.5%	58,237	49.5%
	March	125,722	64,127	51.0%	61,595	49.0%
	April	119,704	58,648	49.0%	61,056	51.0%
	May	123,449	61,189	49.6%	62,260	50.4%
	June	126,662	63,099	49.8%	63,563	50.2%
	July	131,203	64,930	49.5%	66,273	50.5%
	August	128,446	61,986	48.3%	66,460	51.7%
	September	124,000	62,618	50.5%	61,382	49.5%
	October	122,943	62,786	51.1%	60,157	48.9%
	November	111,562	53,054	47.6%	58,508	52.4%
	December	121,315	61,605	50.8%	59,710	49.2%
	Total(2013)	1,482,412	739,998	49.9%	742,414	50.1%
2014	January	115,586	56,502	48.9%	59,084	51.1%
	February	108,398	55,137	50.9%	53,261	49.1%
	March	128,381	69,640	54.2%	58,741	45.8%
	April	118,697	66,639	56.1%	52,058	43.9%
	May	131,529	74,280	56.5%	57,249	43.5%
	June	127,595	76,678	60.1%	50,917	39.9%
	July	139,707	64,895	46.5%	74,812	53.5%
	August	134,506	66,311	49.3%	68,195	50.7%
	September	136,306	67,356	49.4%	68,950	50.6%
	October	129,281	68,761	53.2%	60,520	46.8%
	November	123,248	61,691	50.1%	61,557	49.9%
	December	134,436	75,567	56.2%	58,869	43.8%
	Total(2014)	1,527,670	803,457	52.6%	724,213	47.4%
2015	January	121,845	65,249	53.6%	56,596	46.4%
	February	113,078	59,185	52.3%	53,893	47.7%
	March	131,093	74,141	56.6%	56,952	43.4%
	April	137,301	71,776	52.3%	65,525	47.7%
	May	129,064	74,602	57.8%	54,462	42.2%
	June	128,726	72,029	56.0%	56,697	44.0%
	July	142,087	78,687	55.4%	63,400	44.6%
	August	127,865	73,187	57.2%	54,678	42.8%
	September	134,504	80,351	59.7%	54,153	40.3%
	October	129,729	73,757	56.9%	55,972	43.1%
	November	112,271	66,724	59.4%	45,547	40.6%
	December	121,993	71,876	58.9%	50,117	41.1%
	Total(2015)	1,529,556	861,564	56.3%	667,992	43.7%
2016	January	129,091	73,712	57.1%	55,379	42.9%
	February	117,659	54,821	46.6%	62,838	53.4%
	March	147,348	71,237	48.3%	76,111	51.7%
	April	124,588	55,496	44.5%	69,092	55.5%
	May	119,138	54,742	45.9%	64,396	54.1%
	Total(2016)	637,824	310,008	48.6%	327,816	51.4%

Source: 2010 – March 2013; Data Collection Survey 2013 JICA, April 2013 –May 2016; ChPT

(3) Trends of Calling Vessels

The Team studied the changes of calling vessels at Chennai port.

The Team compared the number of the calling vessels and those vessels whose loading containers can be received in a container yard per every half day to study the correlation between both.

The transition of the vessel number per every half day at Chennai container terminals during the 7th dispatch is shown in the figure below

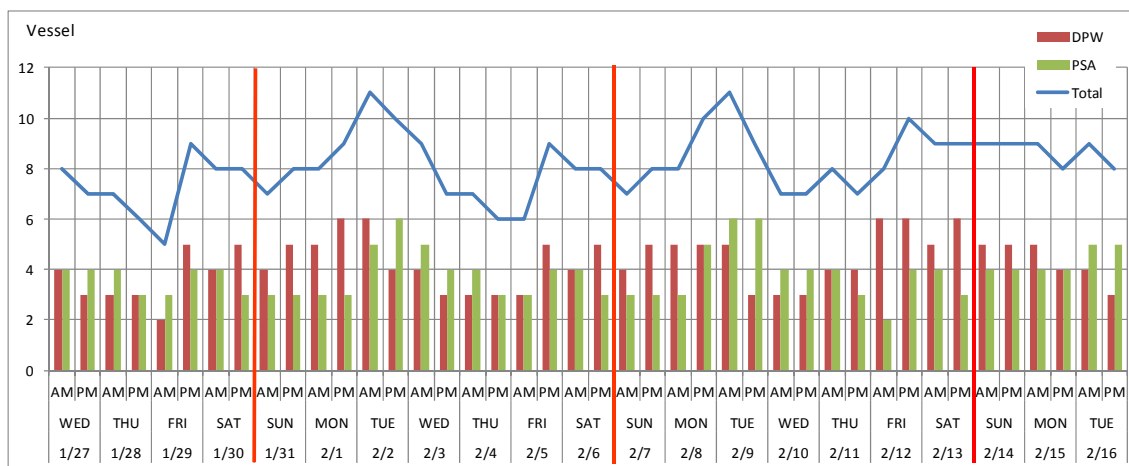


Figure 3-1 Number of vessels whose loading container can be received in container yard (from 27 January to 16 February 2016)

Maximum number of vessels whose loading container can be received in container yard was 11 vessels while the minimum number was 5. Many vessels arrive on Tuesday (10 vessels on average) and fewer vessels on Thursday (1 vessel on average). DPW terminal accepts around 5 vessels from Friday to next Monday, around 3 vessels on Wednesday and Thursday. On the other hand, PSA terminal accepts around 6 vessels on Tuesday and around 1 vessel on Friday and Sunday. The transition of the vessel number per every half day during the 2nd dispatch is shown in the Figure below.

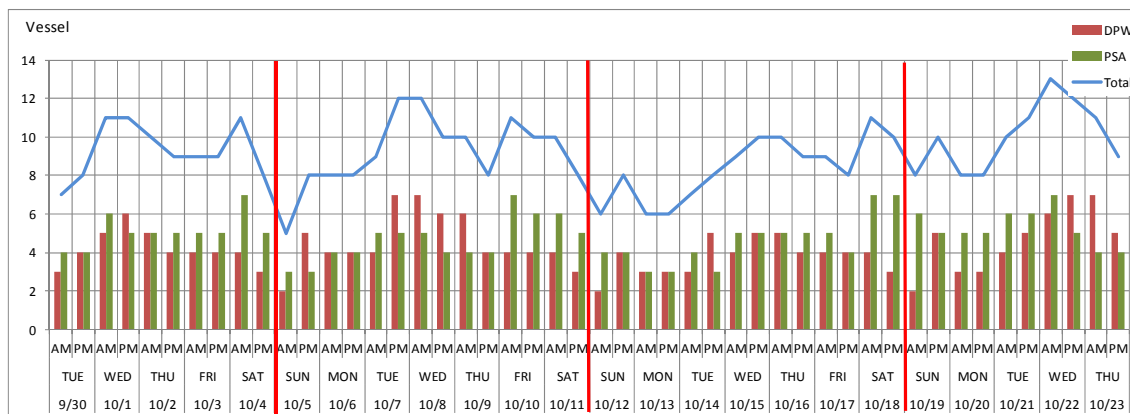


Figure 3-2 Number of the permitted vessels to receive export containers (from 30 September to 23 October 2014)

Many vessels arrive on Wednesday (11 vessels on average) and fewer vessels on Monday (7 vessels on average). DPW terminal accepts around 6 vessels on Wednesday and around 3 vessels on Monday. On the other hand PSA terminal accepts around 6 vessels on Saturday and around 4 vessels on Sunday and Monday. There are some differences in the tendency of the number of vessels between the 2nd dispatch and 7th dispatch.

The Team studied the details of the changes in container vessels calling at two terminals during the 8th dispatch as below.

Table 3-5 Table 3-6 Services of Container Vessels at Chennai Port

2nd Dispatch		7th Dispatch		8th Dispatch	
DPW	PSA	DPW	PSA	DPW	PSA
CHEX	ACS	CHEX	ACS	CHEX	ACS
NEMO	MD1	NEMO	MD1	NEMO	MD1
CCG	MD2	CCG	MD2	CCG	MD2
SIF	TCX	SIF	TCX	SIF	TCX
BOX 1	BOX2	BOX 1	TSC	BOX 1	TSC
BOX 2	TSC	MSK FEEDER	TCISX	PIX2	TCISX
IMS	TCISX	PIX2	ADHOC	YCC	ADHOC
BKYC	RMB				
IFX					

Note: names above are service names that the shipping company (single or plural) provides.

Source: Prepared by the Team based on Homepages of DPW and PSA

The number of vessel services for the 2 container terminals during the 7th and 8th dispatch decreased from 17 to 14 compared to the 2nd dispatch. However, the average number of vessel calls, approximately two calls per day, has basically remained the same.

Furthermore, the Team found the following changes in the details of vessel services between the 7th dispatch and 8th dispatch.

1) DPW Terminal

- MSK FEEDER has suspended its service from May 2016. MSK FEEDER service had called at Chennai port once a week with a vessel of 2,100 TEUs.
- YCC (Yangon Colombo Service) started its service from 11 April 2016. A vessel of 1,500 TEUs is allocated. Shipping company is Continental Shipping Line.

2) PSA Terminal

- ACS (Asia Chennai Service) alliance was realigned. After suspension of IFX server at DPW, two shipping companies (T.S Lines & SIMATECH) joined this service which was originally provided by HYUNDAI,

(Reference: Homepage of HANJIN/HYUNDAI/SIMATECH/Continental Shipping Lines)

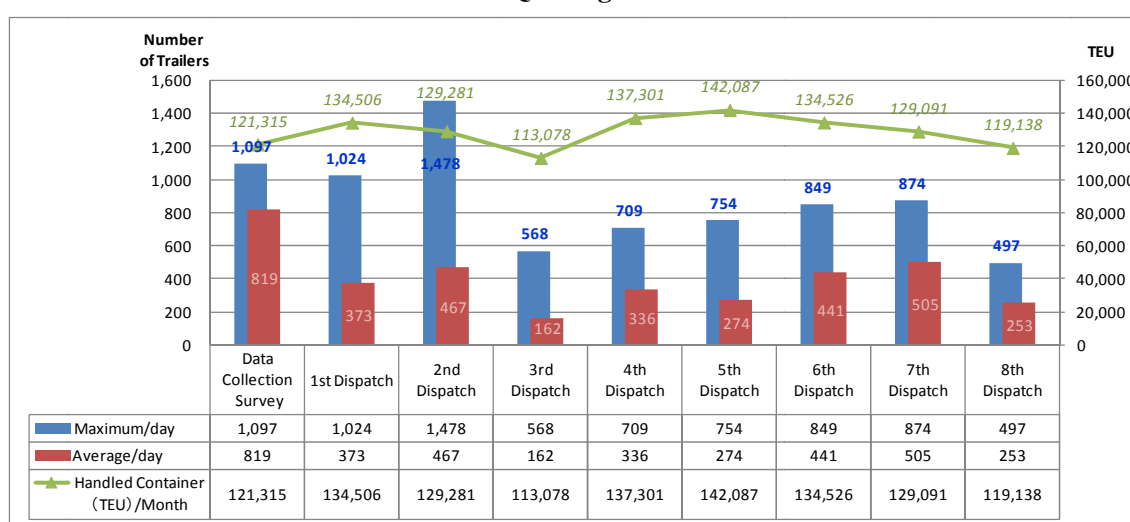
Based on the information from a shipping line and ChPT, some calling vessels which used to use the DPW terminal switched to the PSA terminal following the realignment of ACS. Moreover, feeder suspended its service at the DPW terminal. These changes occurred in early 2016. Consequently, it is thought that the container handling volume at DPW was decreased while that at PSA was increased. Furthermore, this change is thought to be one of the reasons that congestion in front of DPW IN Gate did not frequently occur while congestion in front of PSA was often observed.

3.3 Status of Congestion

(1) Regular Observation of Traffic Congestion

The Team regularly observed the traffic congestion status and examined the characteristics of the congestion at each dispatch. As part of its observation works, the Team counted the number of queuing trailers outside the port, observed the end of the queue, and confirmed congestion status inside the port from the flyover where inside the port can be viewed, etc. The figure below shows the number of queuing trailers outside the Port during the period from the 1st dispatch to the 8th dispatch and the period of the data collection survey (December 2013).

Table 3-6 Number of Queuing Trailers Outside the Port



No. of Trailers	Data Collection 2013.12.6-12.7	1st Dispatch 2014.7.21-8.13	2nd Dispatch 2014.9.30-11.5	3rd Dispatch 2015.1.19-2.7	4th Dispatch 2015.4.13-4.24	5th Dispatch 2015.7.7-7.28	6th Dispatch 2015.9.30-10.20	7th Dispatch 2016.1.27-2.16	8th Dispatch 2016.5.22-6.10
Maximum/day	1,097	1,024	1,478	568	709	754	849	874	497
Average/day	819	373	467	162	336	274	441	505	253
Handled Container /Month	121,315 (December)	134,506 (August)	129,281 (October)	113,078 (February)	137,301 (April)	142,087 (July)	134,526 (September)	129,091 (January)	119,138 (May)

The characteristics of the congestion outside the port based on this survey are described below.

The number of queuing trailers is decreasing in general though there was an increase or a decrease depending on the time. The maximum number of queuing trailers was more than 1,000 during the period of the data collection survey to the 2nd dispatch but no long queues have been observed since then. The number of queuing trailers greatly decreased during the 3rd dispatch. The Team considered that this was due to the decrease in the container handling volume. The number of queuing trailers sometimes reached more than 800 after the 4th dispatch. The traffic control, which was conducted at the west and north from the Manali Junction in the suburbs, was one of the reasons for the increase. The number of queuing trailers was drastically decreased during the latest 8th dispatch. The Team considered that this was due to the activities undertaken by the tasks force team. It is also thought to be due to efforts of the Study Team to analyze traffic congestion and share information on the congestion status with shareholders through the S/C

and so on. The demonstration trials may have also motivated stakeholders to make efforts to reduce congestion. For example, ChPT started to implement measures to ease congestion in cooperation with the private sector while the State of Tamil Nadu improved the access road through road expansion works.

In this way the traffic congestion outside the Port has been largely alleviated. It seems that the measures conducted by ChPT and the Team are working well and have been well-received by the stakeholders.

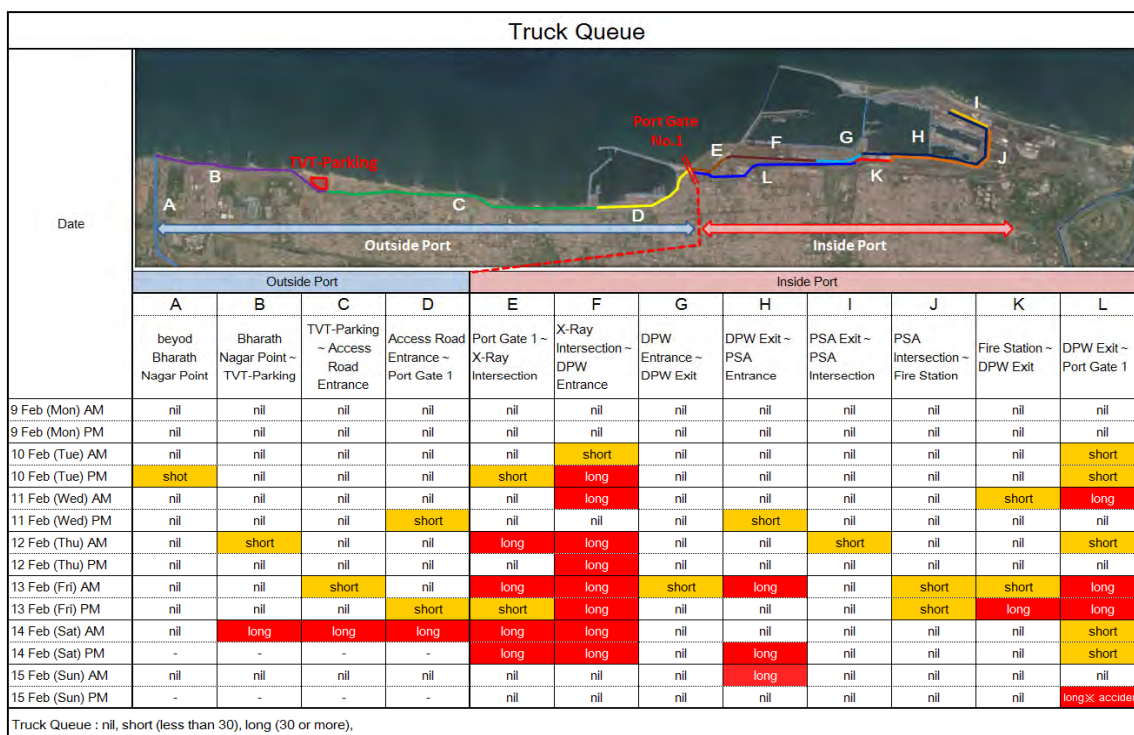
In addition, from the 1st to 8th dispatch, there were typically longer queues of trailers at the middle of the week or on the weekend and smaller queues at the beginning of the week (Monday).

The results of the surveys on the degree of traffic congestion outside Chennai Port are shown from Figure 3-3 to Figure 3-8 below (red color indicates queues of more than 30 trailers and orange color indicates queues less than 30 trailers).

The queuing trailers inside the port starts from either DPW IN Gate, PSA IN Gate, or Port Gate No.1 (Exit). The queue starting from DPW IN Gate frequently occurred during a period from the 3rd dispatch to the 7th dispatch, but congestion was significantly reduced during the 8th dispatch.

On the other hand, the queues starting from PSA IN Gate continually occurred during the period from the 3rd dispatch to the 7th dispatch and it occurred even more frequently during the 8th dispatch. This was considered to be due to the increase of container handling volume at PSA. The Team observed that the queue, which extended almost to the DPW OUT Gate, obstructed the other traffic flow.

The heavy congestion starting from Port Gate No.1 (Exit) has not occurred since procedures by Customs and CISF at Port Gate No.1 were simplified during the 5th dispatch. The enhancement of Port Gate No.1 during the 8th dispatch helped alleviate the congestion as well.



**Figure 3-3 Congestion Status inside/outside the Port
(3rd dispatch: 9 February to 15 February 2015)**

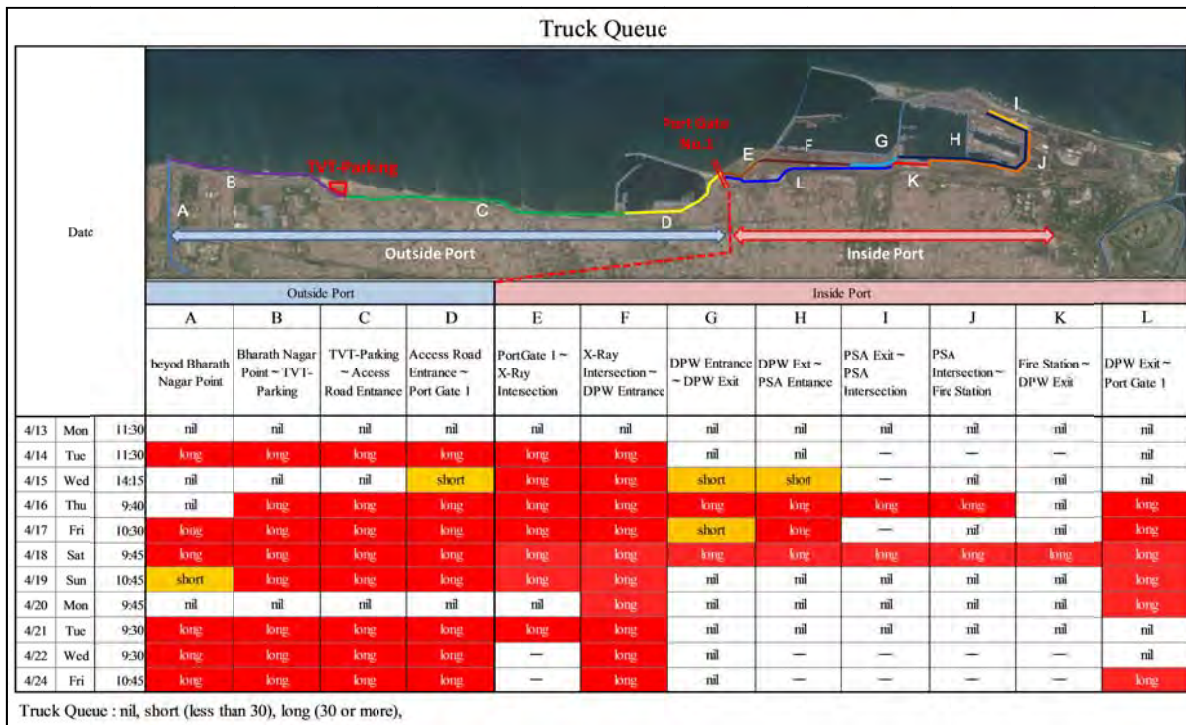


Figure 3-4 Congestion Status inside/outside the Port
(4th dispatch: 13 April to 24 April 2015)

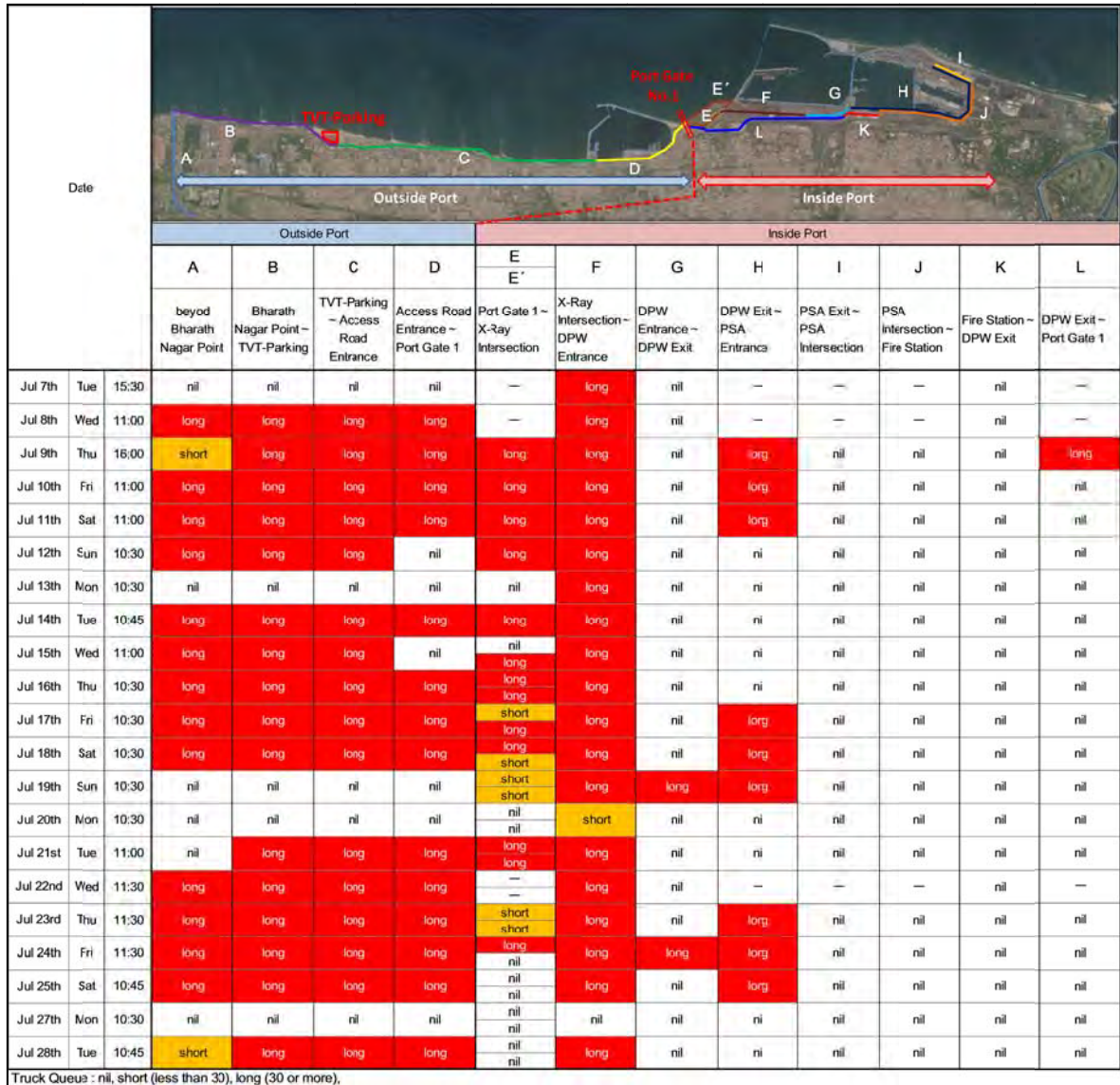


Figure 3-5 Congestion Status inside/outside the Port
(5th dispatch: 5 July to 28 July 2015)

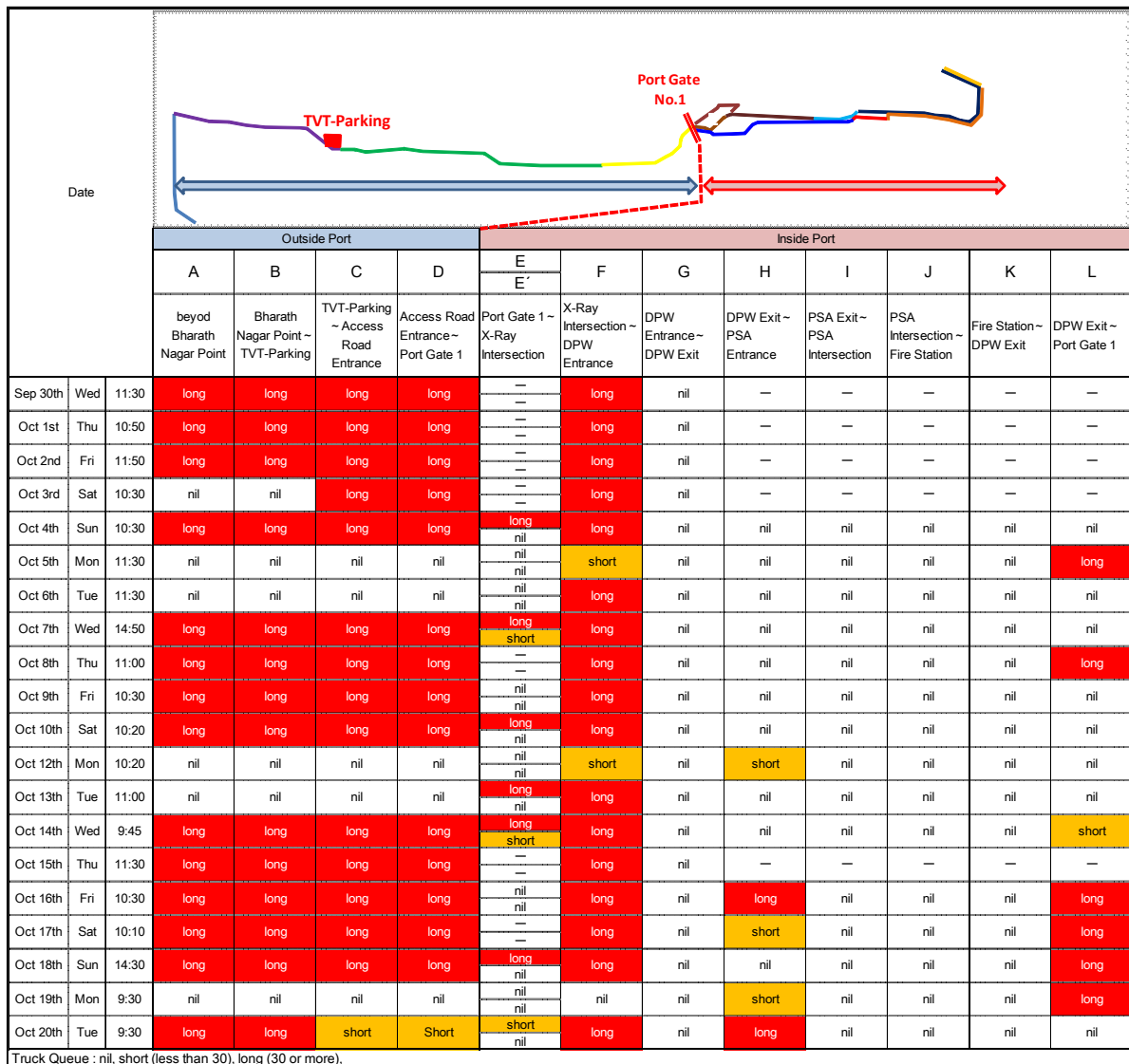


Figure 3-6 Congestion Status inside/outside the Port
(6th dispatch: 30 September to 20 October 2015)

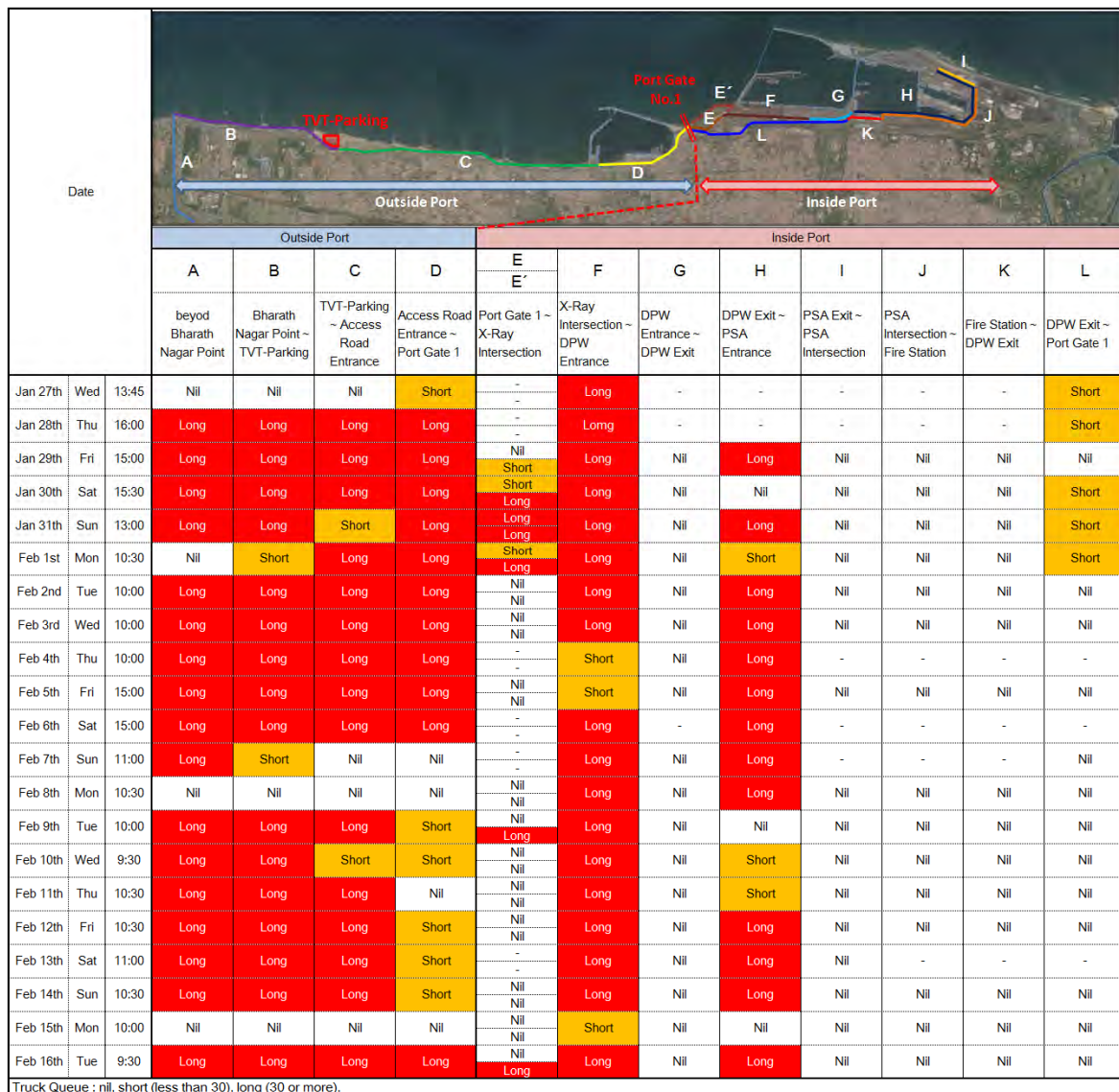
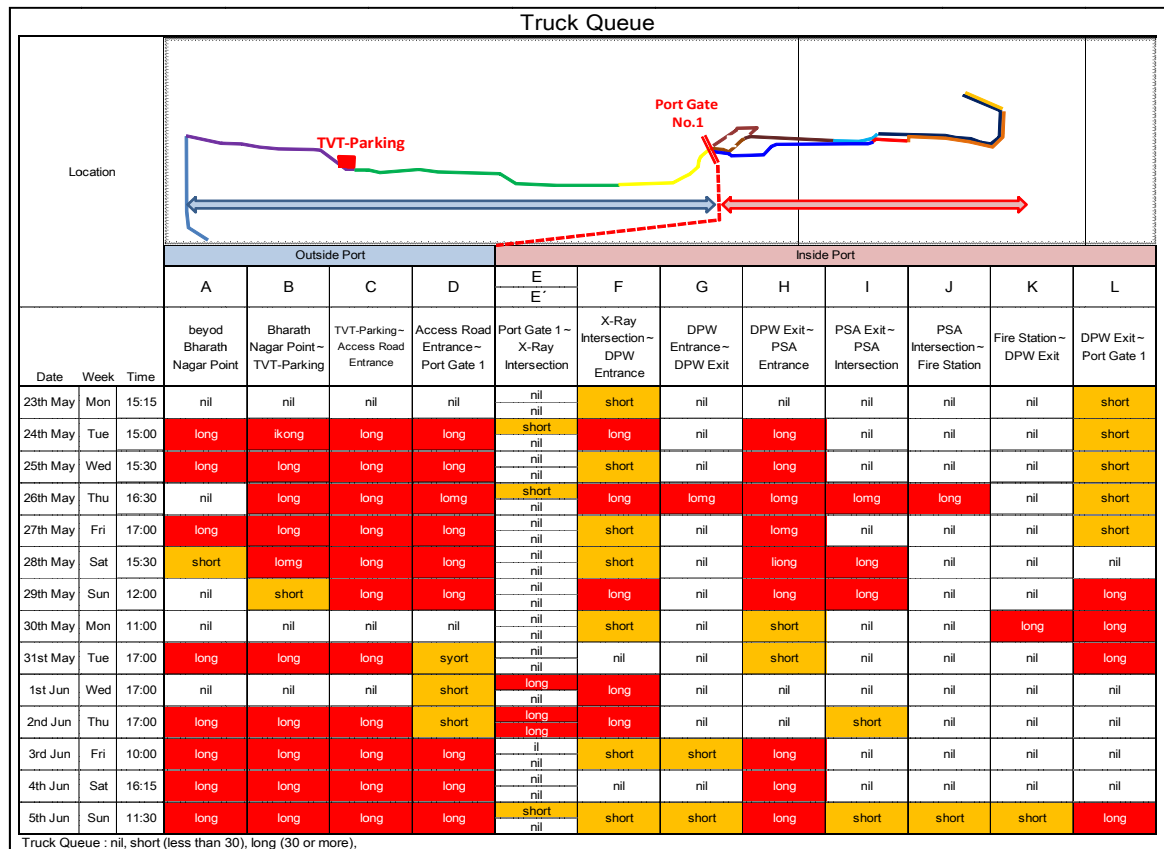


Figure 3-7 Congestion Status inside/outside the Port
(7th dispatch: 27 January to 16 February 2016)



**Figure 3-8 Congestion Status inside outside the Port
(8th dispatch: 23 May to 5 June 2016)**

(2) Survey on Traffic Congestion Status

The Team conducted a various surveys other than the regular observation of traffic congestion described in 3.3 (1). These surveys aimed at grasping the status of the traffic congestion and examining measures for alleviating the congestion. The overview and results of the major surveys are described below.

1) Survey on Processing Time at Port Gate No.1

The Team conducted the survey on the processing time at Port Gate No.1 for outgoing trailers during the 3rd dispatch. The survey was conducted for 2.5 hours continuously for two days and the processing times for 400 trailers were collected in total.

The details are described in 3.7 (2).

2) Survey on Trailers Passing through Gates

The Team conducted the survey on trailers passing through Port Gate No.1 and terminal gates in order to grasp the processing capacity at each gate. As for Port Gate No.1, the Team collected the data, which is summarized daily by CISF, at the 3rd, 4th, 7th, and 8th dispatch. As for terminal gates, the Team conducted the surveys on the number of trailers passing through the gates at DPW and PSA terminals for 2 hours each in the morning and afternoon for 2 days during the 4th dispatch. Furthermore, the Team

collected and analyzed statistical data obtained from DPW during the 6th dispatch.

The details are describes in 3.7 (3).

3) Survey on Documents carried by Trailer Drivers

a. Harbor Entry Permit

The Team conducted interviews with trailer drivers of both import and export container vehicles at Port Gate No.1 (IN) to determine if they were carrying the proper documents. The following figures show the results of the surveys conducted at the data collection survey and at the 1st, 2nd, and 6th dispatch.

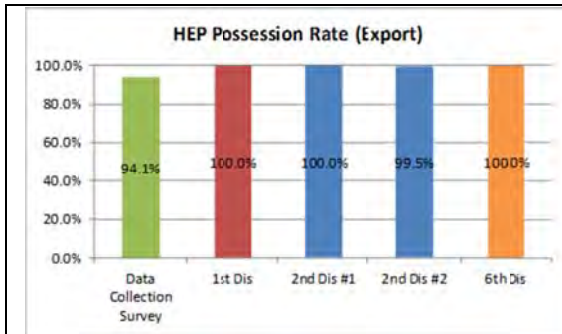


Figure 3-9 HEP Possession ratio (Export)

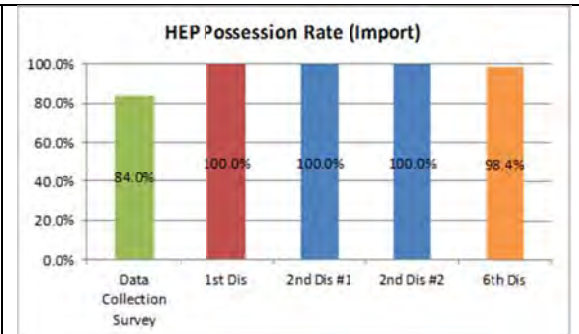
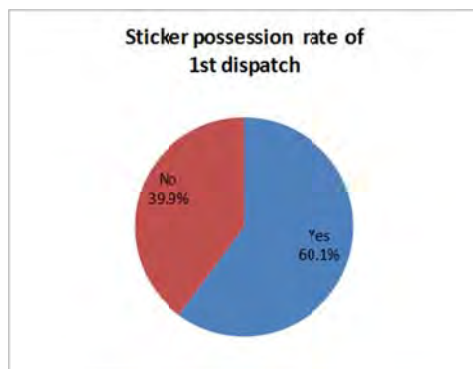


Figure 3-10 HEP Possession ratio (Import)

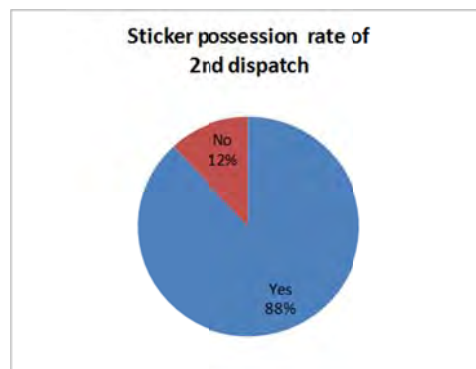
HEP possession ratio for export containers was 100% at the 1st, 2nd, and 6th dispatch, while it was 94.1% at the data collection survey (December 2013). As for import containers, it was 100% at the 1st and 2nd dispatch, and 98.4% at the 6th dispatch, while it was 84% at the data collection survey. HEP possession ratio has been improved for both Import and Export.

b. Sticker

From 15 August 2015, all laden container trailers form CFS and CWC was not permitted into the Port without the appropriate stickers. All the laden container trailers exiting form CFS/CWC were provided with stickers without fail after checking all relevant documents. According to the interview survey, sticker possession ratio of drivers was 60% (1st dispatch), but rose to 88% (2nd dispatch) two months later.



1st Dispatch (12/Aug, 2014)



2nd Dispatch (18-19/Oct, 2014)

Figure 3-11 Sticker Possession Ratio

The stickers are no longer used as trailer driver's document possession ratio was improved.

4) Survey inside the Port

a. Survey on Parked Trailers

The Team conducted interviews with trailer drivers at Port Gate No.1 (OUT) at the 1st dispatch on their entering time to the Port and calculated their staying time inside the Port. In addition, the Team interviewed trailer drivers on their staying time inside the Port, double transactions¹ and parking place during the 2nd dispatch.

i) Staying Time

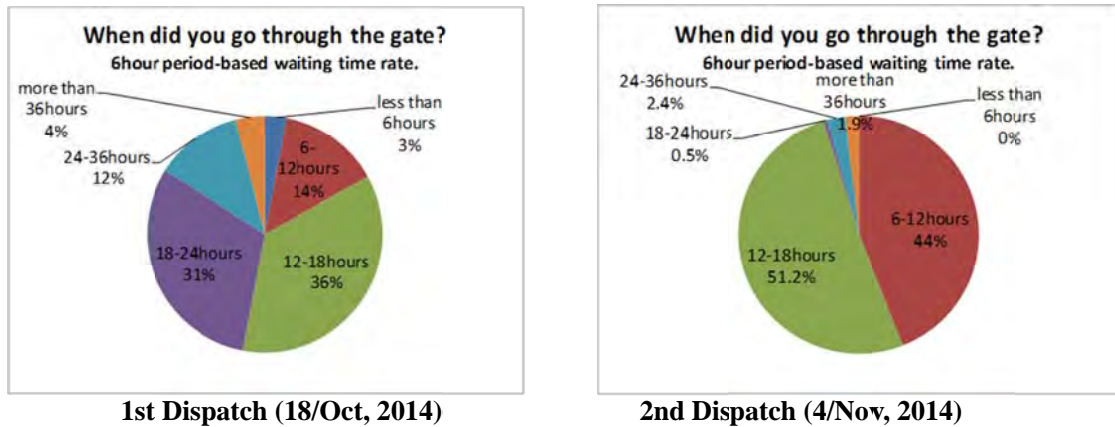


Figure 3-12 Staying Time inside the Port

Staying time inside the Port was 18.2 hours on average, and 48.9 hours at maximum. Sixty-seven percent of vehicles stayed in the port for more than 12 hours. During the second dispatch, staying time inside the Port was 13.3 hours on average, and 70.0 hours at maximum. Fifty-six percent of vehicles stayed in the port more than 12 hours.

ii) Double Transaction Ratio

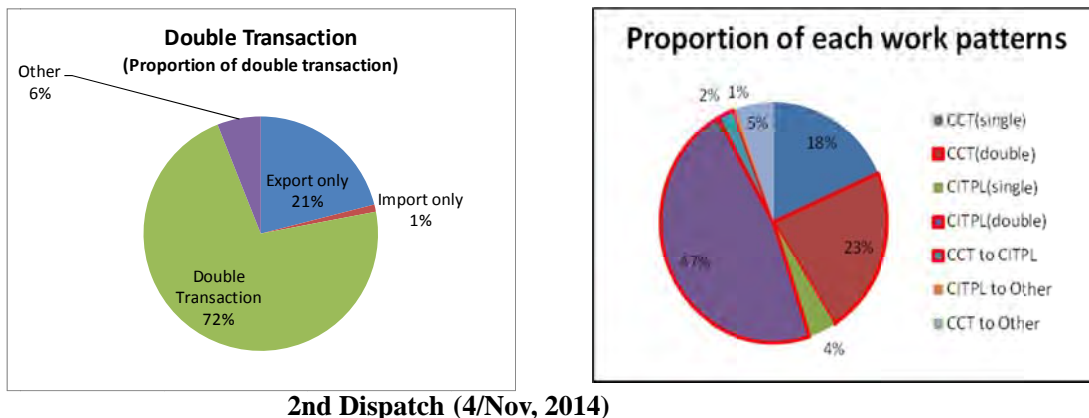


Figure 3-13 Proportion of Double Transaction and Work Patterns

The team inferred that many drivers stay inside the Port in order to perform a Double transaction. According to the Team survey, Double Transaction was conducted by 149 out of 207 trailers (72%). Among them, 144 trailers (96%) conducted a Double Transaction at the same container terminal.

¹ A trailer sometimes carries an import container out just after delivering an export container from/to container terminals.

b. Survey on Traffic Congestion

The Team conducted a survey on the number of queuing trailers inside the Port for 24 hours every two hours from 27 October to 3 November 2014. The results classified by time and place are as follows:

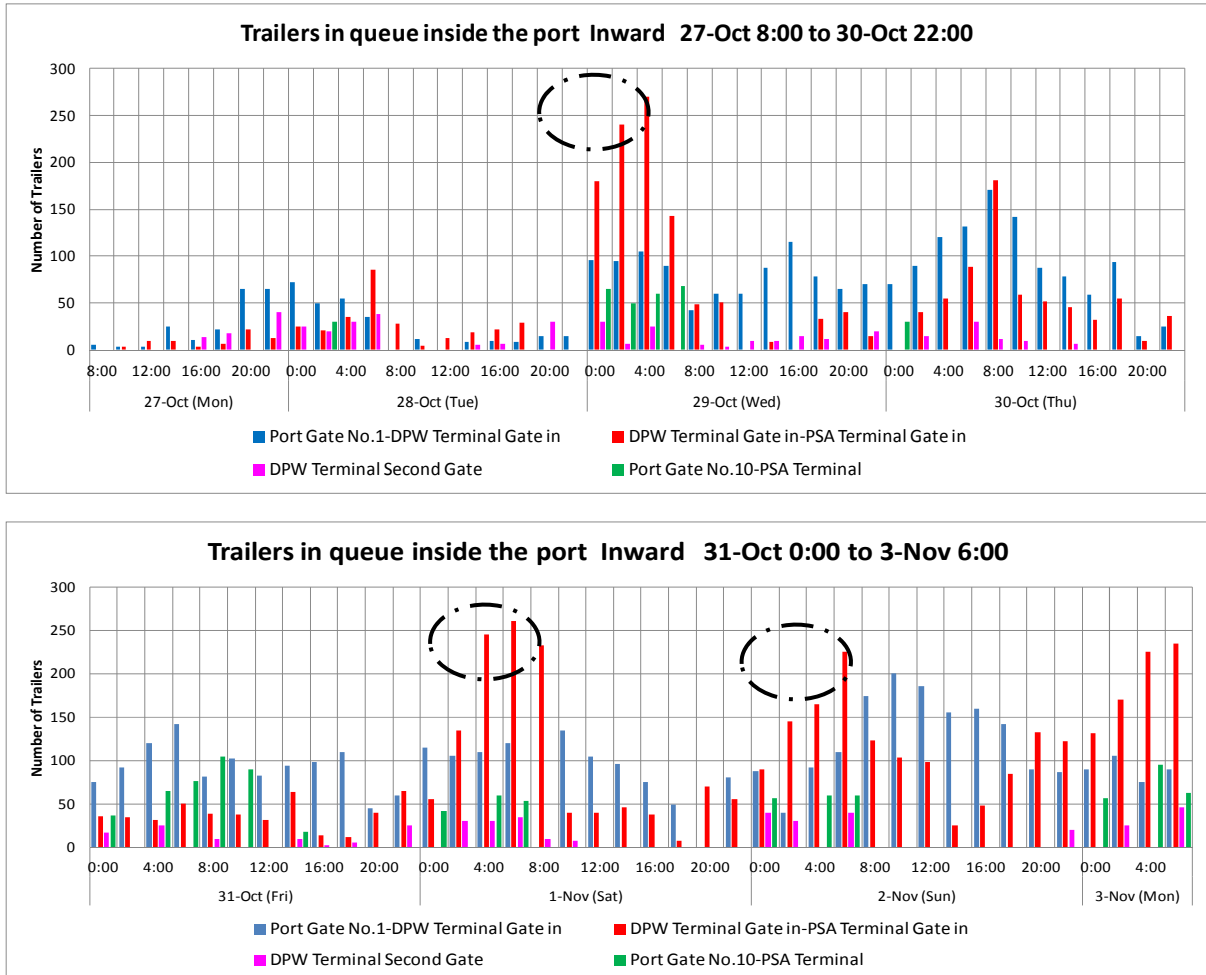


Figure 3-16 Trailers in Queue inside the Port Inward (27/Oct/2014 – 3/Nov/2014)

The number of incoming queues from Port Gate No.1 (IN) to the DPW terminal was 77 on average and that from the DPW terminal to PSA was 69 on average. The former (the blue bar in Figure 3-16) was approximately 50 at all times. On the other hand, the latter (the red bar in Figure 3-16) was occasionally more than 200 and it fluctuated by day of the week or time zone.

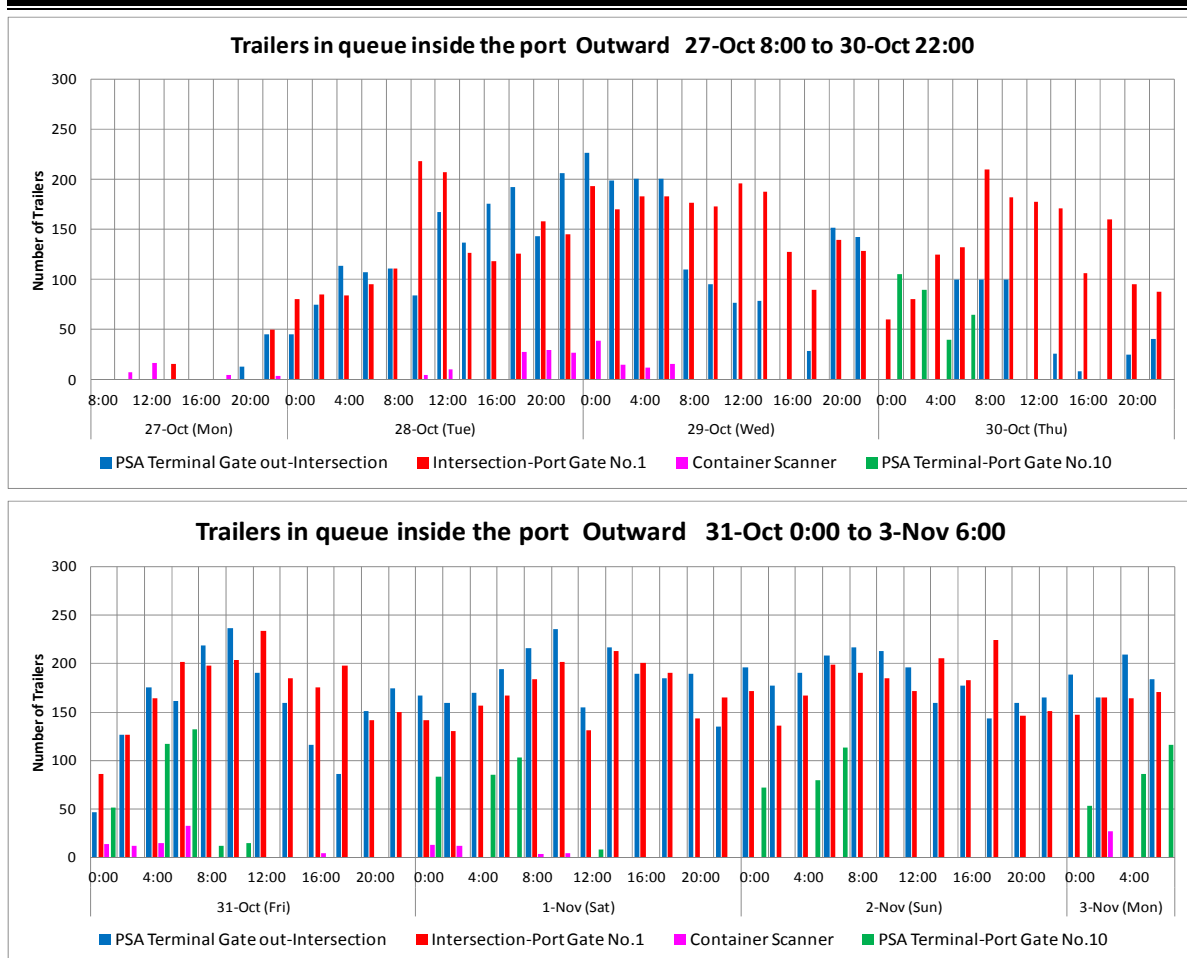


Figure 3-17 Trailers in Queue inside the Port Outward (27/Oct/2014 – 3/Nov/2014)

The number of outgoing queues from the PSA terminal to the intersection was 125 on average and that from the intersection to Port Gate No.1 (OUT) was 143 on average. The number of outgoing queues in front of the X-Ray Scanning Center was less than 50. The number of outgoing queues from the PSA terminal to Port Gate No.10 (OUT) was around 100 from midnight to 6 AM.

c. Study on the Flow of Trailers using Monitoring Camera at Terminal IN Gate

The Team monitored incoming trailers to container terminal gates continuously by setting a fixed point camera around IN Gates of both DPW and PSA terminals during the 6th and 7th dispatch. The monitoring was conducted in order to grasp the trailer flow and operational status of the terminal gates on a 24 hour basis. The Team identified factors preventing efficient gate operation such as the suspension of the gate reception, stoppage of trailer flow by parked trailers, etc. The details are described in 3.7 (4).

d. Survey on Gate Processing Efficiency

The Team conducted site observation on the operational status of container inspection, document check procedure, etc. in front of terminal IN Gates in addition to the observation by fixed point camera during the 6th and 7th dispatch.

As a result, the Team found the existence of ‘Idling Time’, which occurs when a trailer stops in front of the gate lane and does not proceed to terminal gate windows even if it is empty and trailers are waiting behind. The figures below show the ratio of the idling time against the terminal gate processing time.

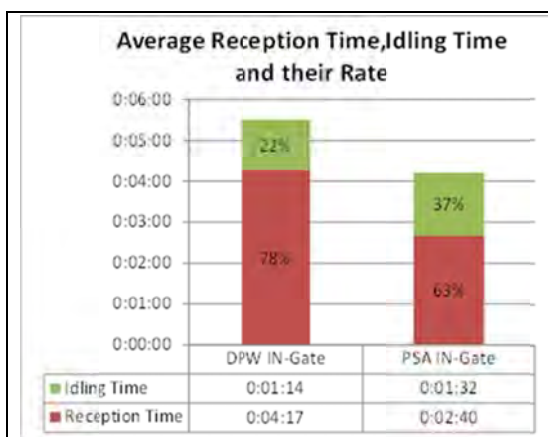


Figure 3-18 Idling Time (6th Dispatch)



Figure 3-19 Idling Time (7th Dispatch)

The result shows that while Idling Time has been reduced, the reception time has increased in both terminals. The reduction in the Idling Time is indicative of the smoother trailer flow between the facilities around the gate. The increase of the reception time may cause more waiting time in front of the gate. It may be also caused by more stops at the gate in order to avoid the overlap of container handlings in the yard with vessel operation, to avoid too many container handlings in the same area, etc.

As for the process of trailers leaving container terminals, the Team has not conducted any survey because no special issue was found through the site observations.

- 5) Outside the Port Survey
 - a. CWC/CFS Survey

The Team counted the number of departing trailers headed to Port Gate No.1 each hour at CWC/CFS from 17 to 18 October 2014. The Team also interviewed trailer drivers on staying time, stuffing place and expiry date of Form 13 at CWC/CFS. The survey results at CWC (Madhavaram) and Continental Warehousing (Red Hill) are as follows:

i) Number of Departing Trailers per Hour

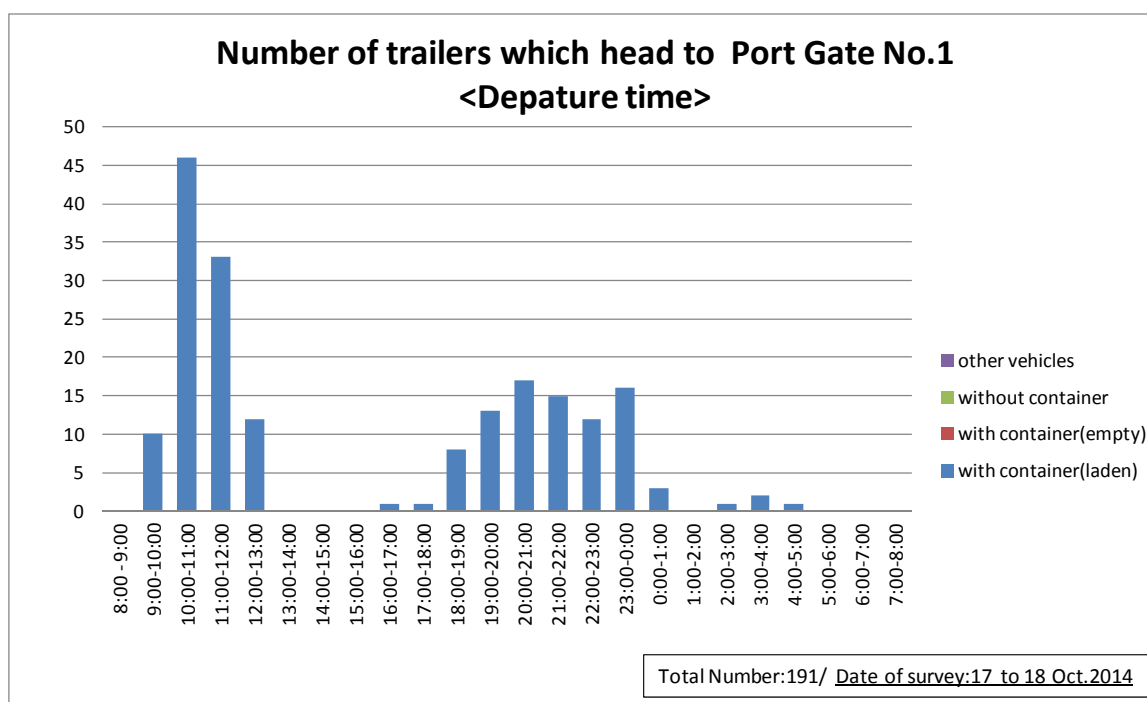


Figure 3-20 Number of Departing Trailers per Hour : CWC(Madhavaram)

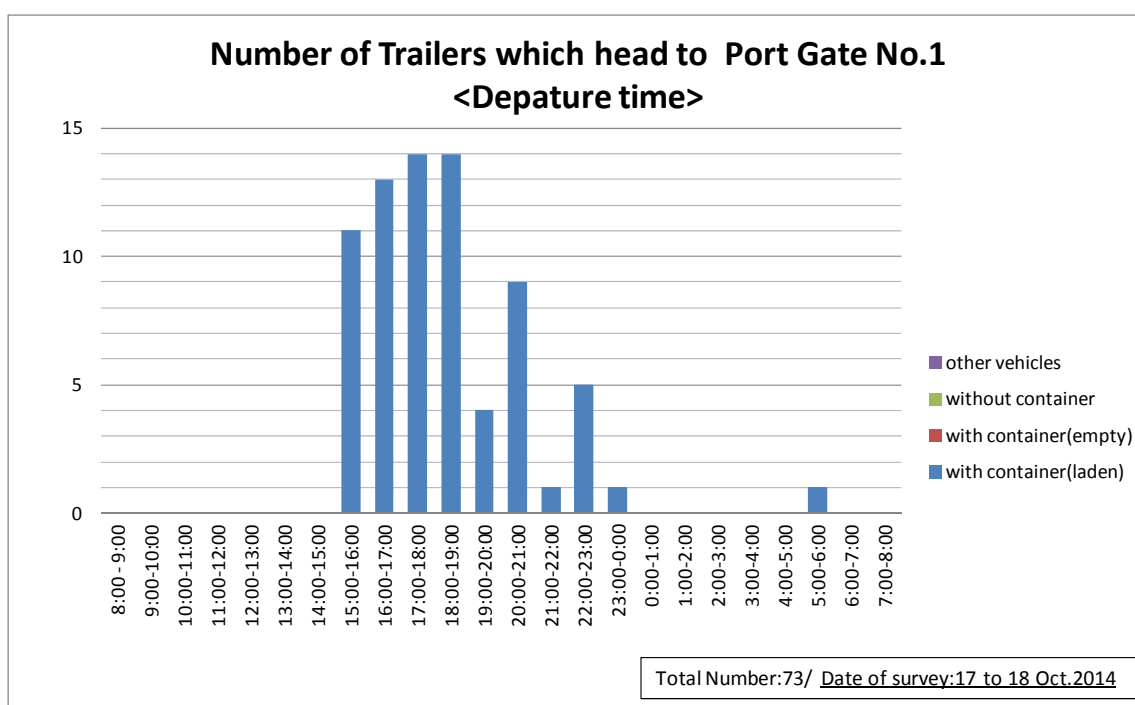


Figure 3-21 Number of Departing Trailers per Hour : Continental Warehousing (Red Hill)

Number of departing trailers from CWC/CFS was large at specific time zones. There were two peaks at CWC; 2 hours before and after 11:00 and 3 hours before and after 21:00. Departing trailers from CFS were concentrated from 15:00 to 21:00. The Team assumed that many trailers were made to wait at

CWC/CFS before departure.

ii) Staying Time

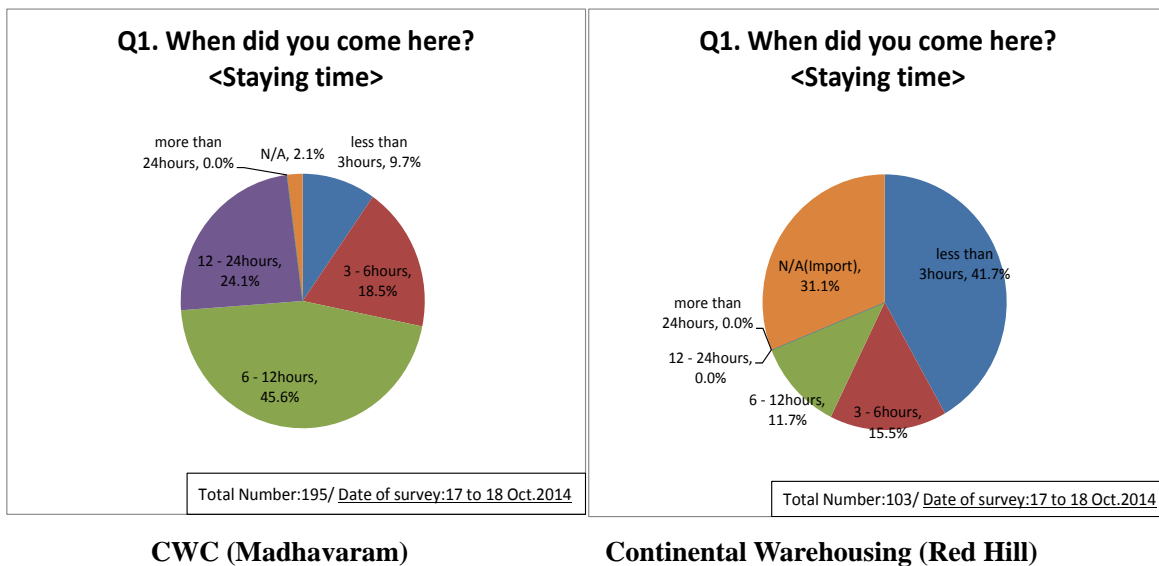


Figure 3-22 Staying Time

Many trailers were staying from 6 hours to 12 hours inside CWC (45.6%). By contrast, a lot of trailers were staying for less than 3 hours inside CFS (41.7%). The average staying time was 8.9 hours for CWC, and 3.4 hours for CFS.

iii) Stuffing Place

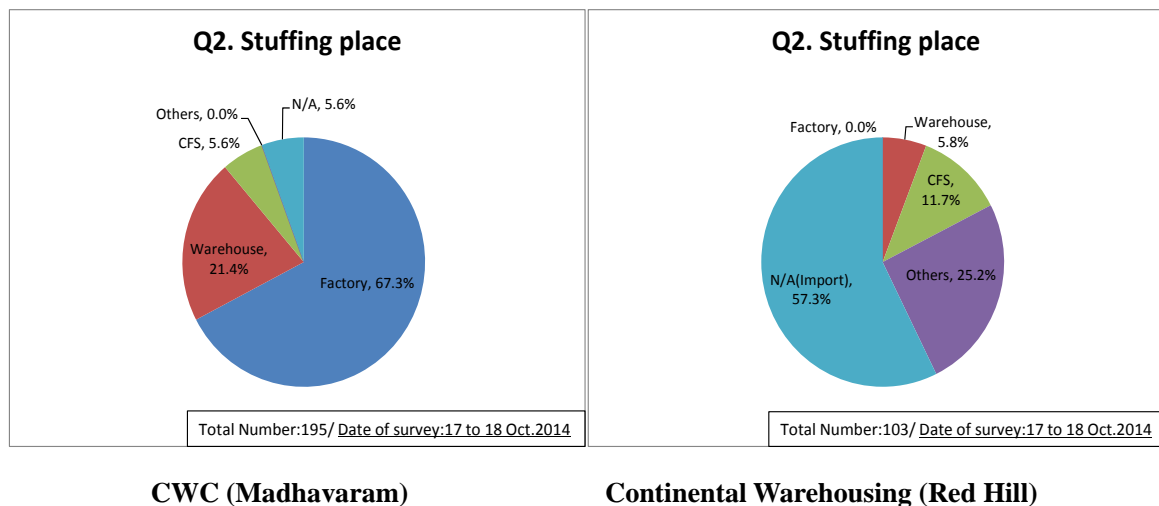


Figure 3-23 Stuffing Place

Container stuffing places were factories (67.3%) and warehouses (21.4%) for containers departing from CWC. On the other hand, container stuffing places were CFS (11.7%), warehouses (5.8%), and others (25.2%) for containers departing from CFS.

iv) Expiry Date of Form13

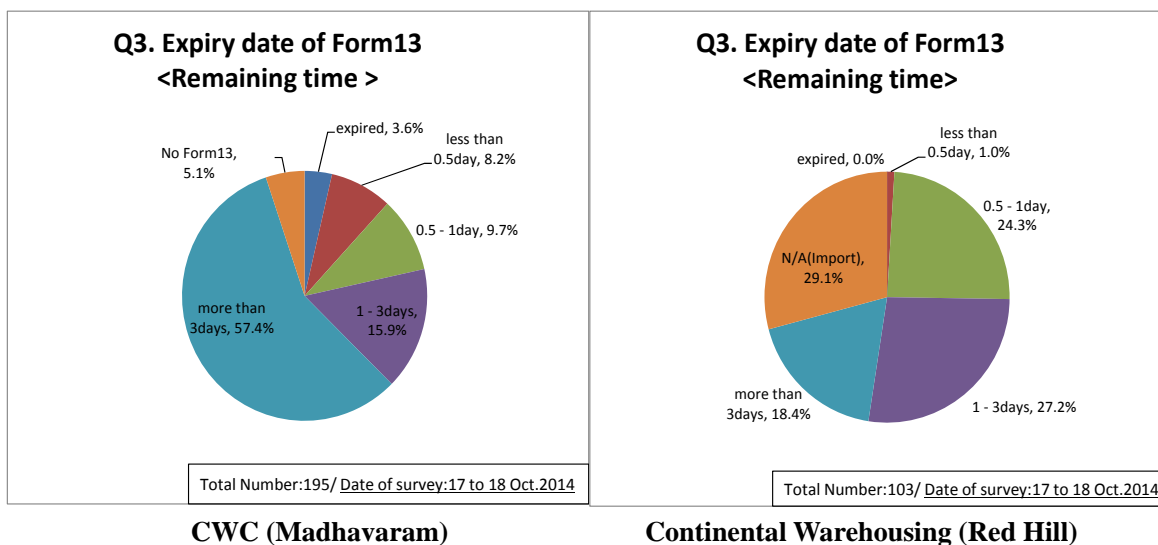


Figure 3-24 Expiry Date of Form13

Many trailer drivers at CWC carried a Form 13 with an expiry date of more than 3 days (57.4%). By contrast, many trailer drivers at CFS carried a Form 13 with an expiry date of less than 3 days (52.5%). The ratio of trailer drivers not carrying Form 13 or an expired Form 13 at CWC was nearly 9%.

b. Transportation Time from CFS to Port Gate No.1

The Team interviewed trailer drivers about transportation time from departure (CWC, CFS, etc.) to Port Gate No.1 (IN) during the 2nd, 7th, and 8th dispatch.

Average transportation time was 28 hours (1st survey) and 40 hours (2nd survey) during the 2nd dispatch. There had been no major improvement compared to the transportation time at the data collection survey (October 2013), which was more than 1 day. The results are shown below.

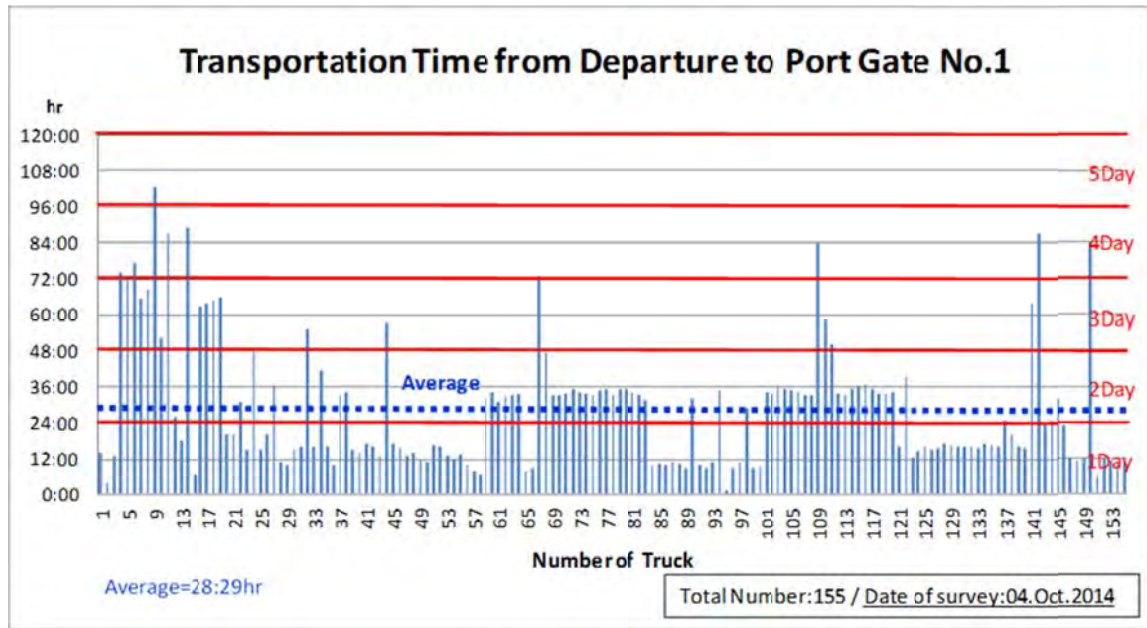


Figure 3-25 Transportation Time from Departure to Port Gate No.1 (4/Oct/2014)

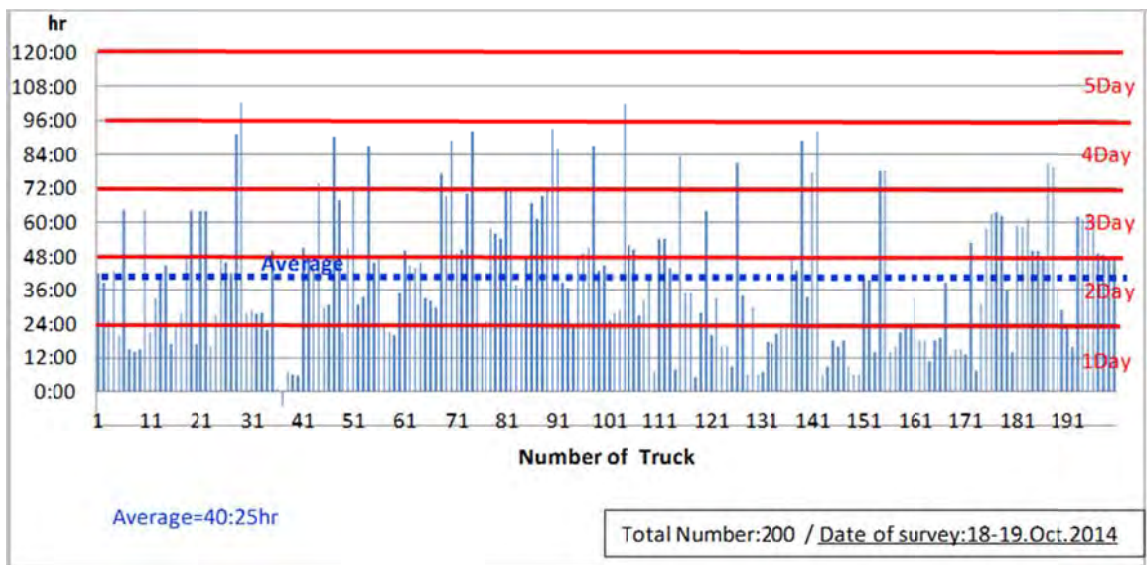


Figure 3-26 Transportation Time from Departure to Port Gate No.1 (18/19/Oct/2014)

The survey was conducted on 12 February 2016 (1st time) and 13 February 2016 (2nd time) at 7th dispatch. The average transportation time was 17.7 hours (1st time) and 19.4 hours (2nd time). The result on 13 February 2016 is shown below.

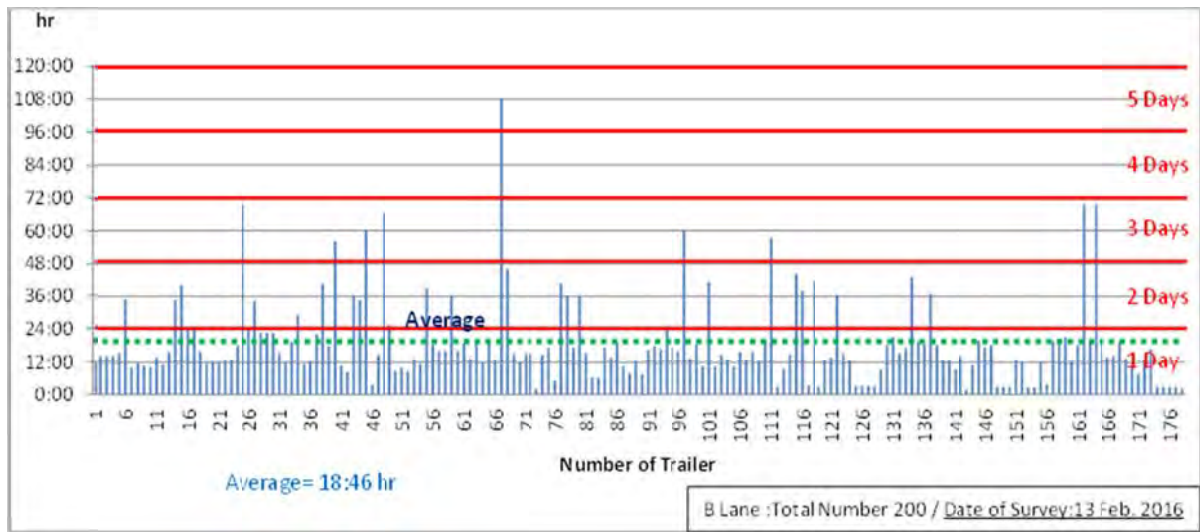


Figure 3-27 Transportation Time from Departure to Port Gate No.1 (13/Feb/2016)

The survey was conducted on 1st and 2nd of June, 2016 at the 8th dispatch. The average transportation time on 2nd of June was 14:54 hours (129 trailers are surveyed) . The Team considered the transportation time on 1st of June, 7.22 hours on average, was an exceptional case as there were only 73 queuing trailers that day.

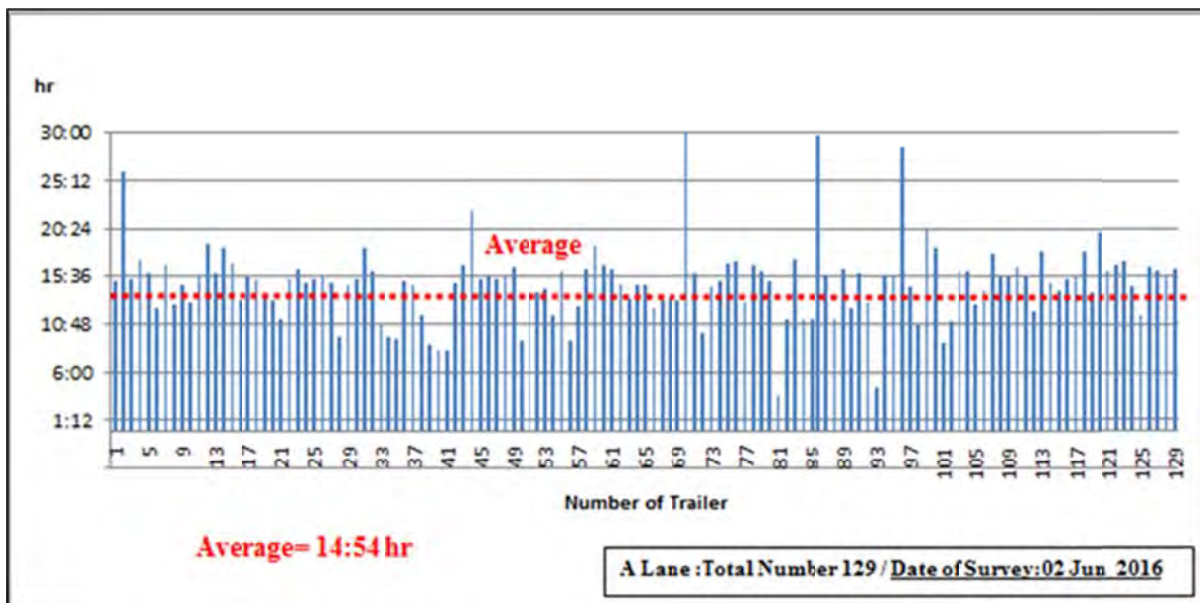


Figure 3-28 Transportation Time from Departure to Port Gate No.1 (2/Jun/2016)

The maximum transportation time at the 8th dispatch was about 30 hour, which was shorter than that at previous dispatches. In addition, the fluctuation of transportation time was smaller than that at previous dispatches.

Transportation times obtained from the various surveys are compared in the following table.

Table 3-7 Comparison of Transportation Time from Departure to Port Gate No.1

Transit Time Required from Departuer to Port Gate No.1	First Year		Second Year		
	2nd Dispatch (2014)		7th Dispatch (2016)		8th Dispatch (2016)
	03 Oct.	18/19 Oct.	12 Feb.	13 Feb.	02 Jun.
Average Transit Time during Surveys	28:29 hrs	40:25 hrs	17:43 hrs	19:24 hrs	14:54 hrs
No. of Trailers surveyed	155	200	327	398	129
No. of Queuing Trailers on the Survey days	595	803/689	874	689	497

Note: In the 8th dispatch, the team surveyed on 01 June and obtained the average transit time of 7:22 hrs.(no. of sample is 351.) However, no. of queuing trailers on the day surveyed was very few (only 75 trailers). The team evaluated that day was an exceptional day and the data was used as reference only.

The transportation time from departure (CFS, etc.) to Port Gate No.1 was shortened to 15 hours during the 8th dispatch, as compared to 18 or 19 hours during the 7th dispatch and 28 hours or 40 hours during the 2nd dispatch. The alleviation of traffic congestion is steadily in progress in terms of transportation time.

6) List of Surveys on Traffic Congestion Status

The following list shows all the surveys on traffic congestion status conducted during the technical assistance period at site.

Table 3-8 List of surveys on Traffic Congestion Status (1)

Title of Survey	Purpose	Method	Dispatch	Date
Export Container Trailer	Survey on document possession ratio, departed place, CY cut date, TVT-P usage, terminal, double transaction, etc	Survey by a local company at Port Gate No.1 200 samples	2014 1st Dispatch	29/07/2014
Import Container Trailer	Survey on document possession ratio, departed place, TVT-P usage, terminals, etc.	Survey by a local company at Port Gate No.1 200 samples	2014 1st Dispatch	29/07/2014
Export Container Trailer	Survey on document possession ratio, departed place, CY cut date, TVT-P usage, terminal, double transaction, etc.	Survey by a local company at Port Gate No.1 200 samples	2014 1st Dispatch	08/2014
Import Container Trailer	Survey on document possession ratio, departed place, delivery permission date, TVT-P usage, terminal, etc.	Interview by a local company at Port Gate No.1 200 samples	2014 1st Dispatch	08/2014
Intersection Status in front of DPW OUT Gate	Survey on operation of DPW OUT Gate where the heavy traffic congestion was observed	Survey by a local company.	2014 1st Dispatch	08/2014
Gate Processing Time at Port Gate No.1 and Terminal Gates	To detect the unbalance of processing time for each gate in order to improve the bottle neck for incoming trailers	Survey on measuring time by a local company at Port Gate No.1 and terminal gates	2014 1st Dispatch	08/2014
Export Container Delivery Trailer Document Possession	Survey on document possession ratio, sticker, lead time, double transaction, etc.	Interview by a local company at Port Gate No.1 155 samples	2014 2nd Dispatch	04/10/2014
Import Container Pickup Trailer Document Possession	Survey on document possession ratio, lead-time, usage of TVT-P, etc.	Interview by a local company at Port Gate No.1 200 samples	2014 2nd Dispatch	04/10/2014
Parked Trailer inside Port	Survey on the number of parked trailer inside Port and on the reason why they park	Survey on counting trailers and interview by a local company. 22 samples	2014 2nd Dispatch	04/10/2014
Traffic Congestion inside Port	Survey on the number of queuing trailers inside Port	Survey on counting trailers by a local company. Once by 24 hours	2014 2nd Dispatch	07-08/10/2014
Traffic Flow at CWC/CFS	Survey on the number of trailers towards Port Gate No.1	Survey on counting trailers by a local company. a. CWC(Madhavaram):195samples b. CONCOR:150samples c. Continental Warehousing (Red Hill):130samples d. Sattava:150samples	2014 2nd Dispatch	17-18/10/2014
Export Container Delivery Trailer Document Possession	Survey on document possession ratio, sticker, lead time, TVT-P usage, double transaction, etc.	Interview by a local company at Port Gate No.1 200 samples	2014 2nd Dispatch	18-19/10/2014
Import Container Pickup Trailer Document Possession	Survey on document possession ratio, lead time, TVT-P usage, etc.	Interview by a local company at Port Gate No.1 200 samples	2014 2nd Dispatch	18-19/10/2014
Parked Trailer inside Port	Survey on the number of parked trailers inside Port and the reason why they park	Survey on counting trailers and interview by a local company. 10/18: 29 samples 10/19: 25 samples	2014 2nd Dispatch	18-19/10/2014
Import Container Carrying Trailer Document Possession	Survey on document possession ratio, HEP validity for outgoing trailers	Interview by a local company at Port Gate No.1 198 samples	2014 2nd Dispatch	18-19/10/2014
Traffic Congestion inside Port	Survey on the number of queuing trailers inside Port	Survey on counting trailers by a local company. 24 hours 7 days	2014 2nd Dispatch	27/10-03/11/2014
Parked Trailer inside Port	Survey on the number of parked trailers inside Port and the reason why they park	Interview by a local company. 171 samples	2014 2nd Dispatch	27/10-03/11/2014
Import Container Carrying Trailer Document Possession	Survey on document possession ratio, HEP validity for outgoing trailers	Interview by a local company at Port Gate No.1 207 samples	2014 2nd Dispatch	04/11/2014
Processing Time at Port Gate No.1 (OUT)	Survey on processing time for each process at Port Gate No.1 for outgoing trailers (CISF check, Customs check, CISF log)	Survey on measuring time by a local company at Port Gate No.1 200 samples	2015 3rd Dispatch	02/2015
Gate Processing Time at Terminal Gates	Survey on the number of trailers passing through gates for each hour	Survey on counting trailers by a local company at terminal gates 2 hour/terminal x 2 terminal x 2 times for 2 days	2015 4th Dispatch	18,20,21/04/2015
Trailer Flow at Terminal Gates	Survey on the number of trailers passing through terminal gates for each hour	Survey on counting trailer by a local company at terminal gates	2015 4th Dispatch	04/2015
Trailer Dwell Time at Terminals	Survey on stay time of trailers in the terminal	Interview by a local company at terminal gates	2015 4th Dispatch	04/2015
Parked Trailer inside Port	Survey on the number of parked trailers inside Port	Survey on counting trailers by the Team	2015 5th Dispatch	07/2015

Table 3-9 List of surveys on Traffic Congestion Status (2)

Title of Survey	Purpose	Method	Dispatch	Date
Document Possession	Survey on document possession ratio, places receive from /deliver to, etc.	Interview by a local company at Port Gate No.1. 200 samples	2015 6th Dispatch	2015/10/7
Terminal Gate Reception Time	Survey on 'Idling Time' between processed at IN Gates of container terminals	Survey on measuring time by a local company at terminal gates	2015 6th Dispatch	19,20/10/2015
Container Lead Time	Survey on transportation time from CWC, CFS to Port Gate No.1	Interview by a local company at Port Gate No.1	2015 6th Dispatch	10/2015
Trailer Flow in front of Terminal In Gate	Examination on the status in front of terminal gates for 24 hours a week by observing pictures taken by a fixed point camera	Observation of pictures by the Team	2015 6th Dispatch	10/2015
Container Lead Time	Survey on transportation time from CWC, CFS to Port Gate No.1	Interview by a local company at Port Gate No.1	2016 7th Dispatch	02/2016
Terminal Gate Reception Time	Survey on 'Idling Time' between processed at IN Gates of container terminals	Survey on measuring time by a local company at terminal gates	2016 7th Dispatch	02/2016
Trailer Flow in front of Terminal In Gate	Examination on the status in front of terminal gates for 24 hours a week by observing pictures taken by a fixed point camera	Observation of pictures by the Team	2016 7th Dispatch	02/2016
Container Lead Time	Survey on transportation time from CWC, CFS to Port Gate No.1	Interview by a local company at Port Gate No.1	2016 8th Dispatch	02/06/2016

(3) Activities of the Task Force Team

ChPT set up the Task Force Team which consists of Terminal Operators, Trailer Owners Association etc. on 18 January 2016. According to interviews with concerned persons, its activities are described below.

1) Traffic Control Outside the Port

Staff members from the Trailer Owners Association control the trailer queue outside the Port. Thirty staff members take turns working a 12- hour shift and do such jobs as confirming the trailer queue to a single lane, instructing trailers to stop and go, while communicating with colleagues by cell phones and monitoring area on motorbikes. They control the traffic flow to the Port Gate when congestion occurs.

2) Advanced Carried Document Check

ChPT, Terminal Operators and Security Firm (which is entrusted by ChPT) are performing the document check of trailer drivers in advance around the entrance of the access road to Port Gate. One Team consists of 4 persons and they work in 8 hour shifts around the clock. They confirm if trailer drivers with container have Form 13, Shipping Bill, Gate Pass and their validity. Drivers who do not possess the necessary documents are not allowed to proceed to the Port Gate and must park along the left side of the road.

However, trailer drivers without containers were not subject to a document check (due to opposition from certain drivers). Some driver suggested that such insufficient document checks were contributing to congestion inside the port and that a document check for all drivers should be conducted.

The activities of task force team outside the Port were discontinued during the 8th dispatch. According to the interview of persons involved, this was because the traffic congestion was being reduced. It was confirmed that the queued trailers outside the Port were aligned as never before and that the number of

trailer queue had decreased. On the other hand, their activities inside the Port continued. Traffic control persons of the task force team controlled the traffic whenever congestion occurred or when trailers were not aligned with a lane.

3.4 Implementation of Demonstration Trials and Follow-up Activities

As previously stated on the status quo of traffic congestion outside the port, the Team conducted four demonstration trials as advanced measures based on the traffic survey results in order to evaluate the effect of measures for alleviating the congestion. The trials were conducted for one week from 9 February 2015 (Monday) to 15 February 2015 (Friday). The results and evaluation of the demonstration trials and succeeding following up survey are summarized below.

(1) Demonstration Trial 1: Simplification of the procedure at Port Gate No.1

1) Outline and follow-up status

The aim of demonstration trial 1 is to replace the current hand-written log book with electrical recording by reading a barcode printed on the HEP.

In preparing for the demonstration trial, the Team designed the system and prepared the detailed specification in order for ChPT EDP (Electronic Data Processing) section to develop the application software. Furthermore, the Team selected and procured the model of the barcode scanner, and lent them to ChPT. The Team also held five workshops in three days in order to teach CISF staff how to use the bar code reading system.

The demonstration trial 1 was continued after the scheduled period (1 week). The Team conducted the system implementation support in place of ChPT EDP section together with the monitoring of the demonstration trial for about 2 weeks after the start of the trial. The Team answered various questions from users and tried to identify and eliminate system issues during this period.

The system developed for demonstration trial 1 was discontinued in August 2015 due to repeated hardware failure and a lack of a sustainable system for continuous operation. Therefore, the Team prepared the recommendation on Implementing Port Entry/Exit Control System based on the experience in the trial and the succeeding 6 months of operation. The recommendation includes running rules for working group for sustainable operation, setting up emergency contact plan, system expansion plan for re-starting the bar code reading system, etc.

2) Evaluation

- a. The processing time at Port Gate No.1 has been largely reduced (refer to the table below). This is mainly due to the introduction of the bar code reading system, though the several procedural changes introduced by the CISF, Customs, etc. have contributed as well.

Table 3-10 Processing Time At Port Gate NO.1

Processing Time at Port Gate No.1		Prior to the Project (June 2014)	Demo 1 (February 2015)	Follow-up of Demo1 (April 015)
Average Processing Time (min/trailer/lane)	IN	3.5	2.5	1.8
	OUT	5.5	2.0	2.3

b. Although the bar code reading system was discontinued, Port Entry/Exit Control is being conducted by recently introduced RFID system. The knowledge obtained through the implementation of the barcode reading system and the recommendation prepared by the Team on the establishment of a sustainable system can also be applied to the new system.

(2) Demonstration Trial 2: Utilization of TVT-Parking

1) Outline and follow-up status

All trailers applying for HEP have to enter TVT-Parking. Traffic police stationed in front of TVT-Parking will guide trailer drivers back to Route 114.

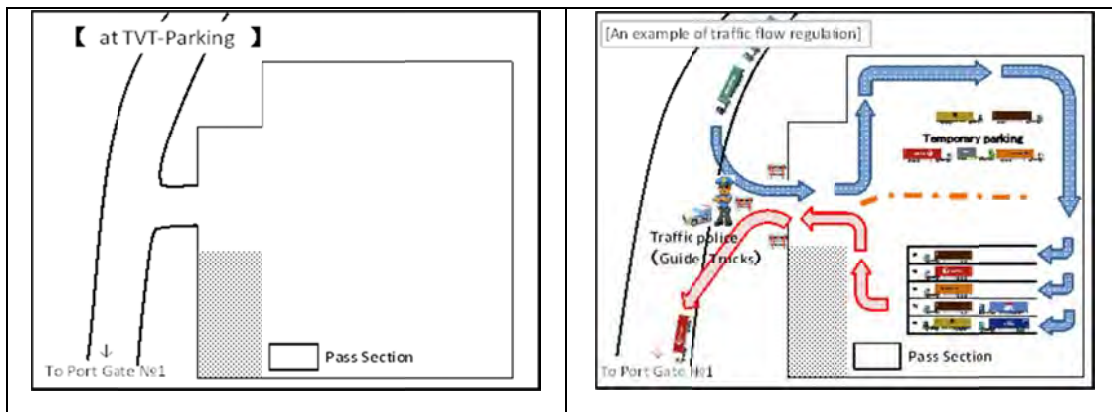


Figure 3-29 Utilization of TVT-Parking

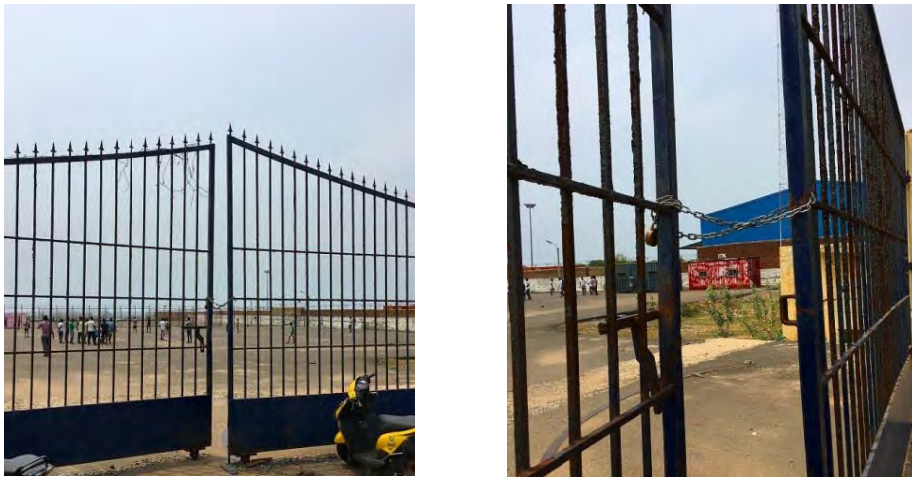
The utilization of TVT-Parking was not effective for alleviating the congestion during the implementation of demonstration trial in February, 2015 and after that. The Team confirmed that trailers were unable to enter the gate and wait there for HEP issuance or the proper documents. However, trailer drivers were able to enter and the issuance of HEP was in operation.

The Team confirmed that 3/4 of the TVT-Parking area is planned to be used for export container Customs clearance by CWC while the remaining area (1/4) is to be used for HEP issuance by ChPT.

CWC is currently waiting for approval from Customs to have the area declared a Customs bonded area.



Picture 3-1 Aerial Photo of TVT-Parking



Picture 3-2 TVT-Parking / Closed Gate and HEP issuance place at 8th dispatch (June, 2016)

2) Evaluation

- a. Demo 2 was not implemented in accordance with Scope of Demonstration Trial of Demo 2, although the document was prepared in advance in order to clarify the procedure at TVT-Parking and request that drivers be notified and a notice board be prepared etc. However, the scope of Demo 2 was not shared among trailer drivers, traffic police and Pass Section persons, and the period of the trial was too short to rectify the situation.
- b. One of the outcomes of the trial was learning that the most of the HEP applicants were not trailers drivers and confirming the necessity of the HEP issuance place. It also helped ChPT recognized the importance of cooperation with external organizations.
- c. TVT-Parking plays an important function in issuing HEP. The issuance of HEP at TVT-Parking should continue because it is very convenient for users as it is open for 24 hours while the central pass section office is open only during the daytime.
- d. The Team expects that the usage of TVT-Parking as export CFS by CWC will contribute to alleviating the traffic congestion.

(3) Demonstration Trial 3: Restriction of Parking on Internal Roads

1) Outline and follow-up status

The aim of Demonstration trial 3 was as follows.

- a. To designate No Parking Road.
- b. To allocate Road Management Person in order to order drivers to move their trailers, to put stickers on parking trailers without drivers and to report vehicle numbers of parking trailers to ChPT

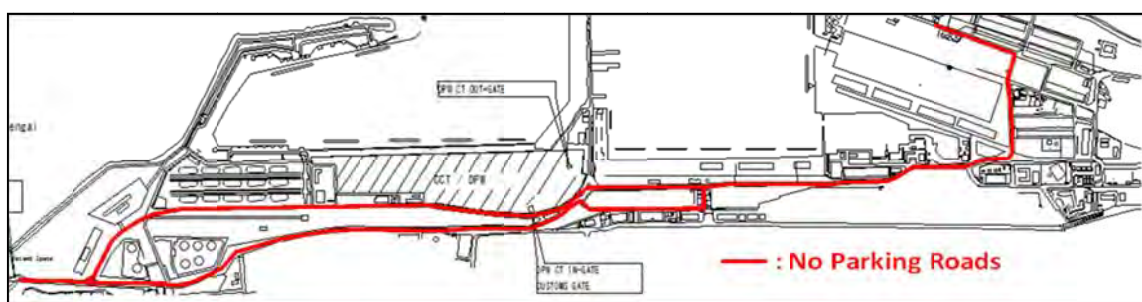


Figure 3-30 Designated No Parking Roads

The Team has conducted the follow-up surveys continually after the demonstration trial by counting the number of parked trailers along the roads and waiting areas inside the Port.

The number of parked trailers on the roads from Port Gate No.1 to the DPW IN (an entrance route) and from the DPW OUT to Port Gate No.1 (an exit route) are shown in the Table below.

Table 3-11 Number of Parked Trailers along the Roads inside Port

Survey on Parked Trailers inside the Port		3rd Dispatch 2015.2.9-2.15	4th Dispatch 2015.4.15&4.20	5th Dispatch 2015.7.9-7.25	6th Dispatch 2015.10.3-10.13	7th Dispatch 2016.1.29-2.16	8th Dispatch 2016.5.22-6.10
Port Gate 1~X-Ray Intersection	Maximum	49	15	9	10	26	17
	Average	15	15	2	6	9	6
X-Ray Intersection~DPW Entrance	Maximum	59	87	44	45	52	32
	Average	22	71	9	41	25	15
DPW Exit~Port Gate 1	Maximum	165	95	101	249	176	125
	Average	89	90	57	119	102	82

The exit route had the largest number of parked trailers; the average number of parked trailers was 82. Along the entrance route, the average number of parked trailers was 6 from Port Gate No.1 to the intersection at X-Ray Inspection Center and 15 from Port Gate No.1 to the DPW IN.

The number of waiting trailers in the four waiting areas is shown in the Table below.

Table 3-12 Number of Waiting Trailers

Survey on waited Trailers at waiting-space		5th Dispatch 2015.7.9-7.24	6th Dispatch 2015.10.3-10.13	7th Dispatch 2015.10.3-10.13	8th Dispatch 2015.10.3-10.13
Near the Port Gate 1	Maximum	34	38	8	6
	Average	16	21	4	2
Near the X-Ray Intersection	Maximum	81	91	53	53
	Average	42	57	35	39
Coal wharf	Maximum	25	27	28	14
	Average	11	18	12	6
PSA Terminal south side	Maximum	0	0	0	0
	Average	0	0	0	0

The number of waiting trailers was the maximum in the area near the intersection at the X-Ray Inspection Center; the average number of waiting trailers was 39, while it was 2 in the area near Port Gate No.1 and 6 near the coal terminal. On the other hand, the waiting area near the south side of PSA terminal was not utilized.

2) Evaluation

- a Number of parked trailers at the entrance route was decreasing after the 5th dispatch, even though the ‘No Parking’ rule was not followed on the No Parking Roads. On the other hand, many parked trailers were still observed at the exit route.
- b The number of parked trailers both at the entrance route and the exit route increased in the 6th and 7th dispatch. However, the number of parked trailers had decreased in the 8th dispatch. The parked trailers did not seem to severely impede traffic.
- c An increase of trailers waiting in the 4 waiting areas, which were set up by ChPT after the demonstration trial, was not observed. This is because number of waiting trailers has been decreasing since the 7th dispatch thanks to the road maintenance work inside the Port, such as road widening, lane separation by concrete curb, etc.
- d The following measures shall be implemented in order to reduce the parked trailers inside the Port.
 - i) Traffic control activities inside the Port and guiding of trailers to the waiting area by the task force team should be continued.
 - ii) Parking should be strictly prohibited from the DPW Entrance to the Port Gate No.1, so that separate trailer queues (i.e., 2 lanes) can be maintained for DPW and PSA and that trailers queues will not reach the Port Gate No.1
 - iii) Parking along the Periphery Road should be strictly prohibited to facilitate the exit of trucks.
 - iv) Trucks parked for an excessive period of time should be subject to a penalty, such as a fine or no-reissuing of HEP.
 - v) Infrastructure development inside the Port such as road widening, waiting area enhancement, etc. shall be further promoted.

(4) Demonstration Trials 4: Allocation of Traffic Control Persons in Port Area

1) Outline and follow-up status

Demonstration trial 4 was implemented as follows.

X-Ray Intersection

- a. Introduction of Traffic Flow Regulation.
 - i) No Vehicles may stay in the Regulated Traffic Area.
 - ii) Vehicles to/from X-Ray Screening Center have priority.
- b. Allocate 2 Traffic Control Persons

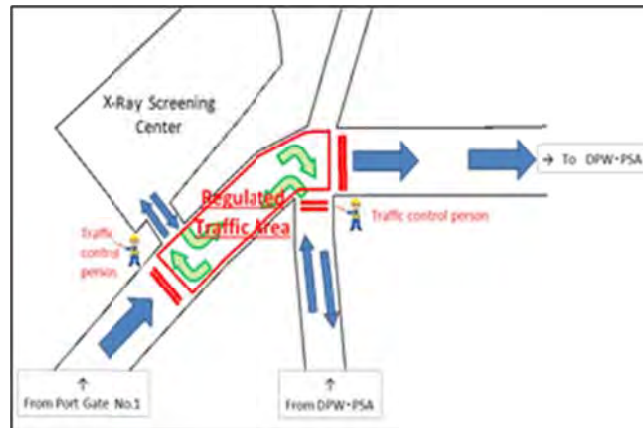


Figure 3-31 Traffic Flow Regulation at X-Ray Intersection

DPW Intersection

- a. Introduce Traffic Flow Regulation
 - i) No Vehicles may stay in the Regulated Traffic Area.
 - ii) Vehicles from DPW and PSA should move alternately.
- b. Allocate 2 Traffic Control Persons.

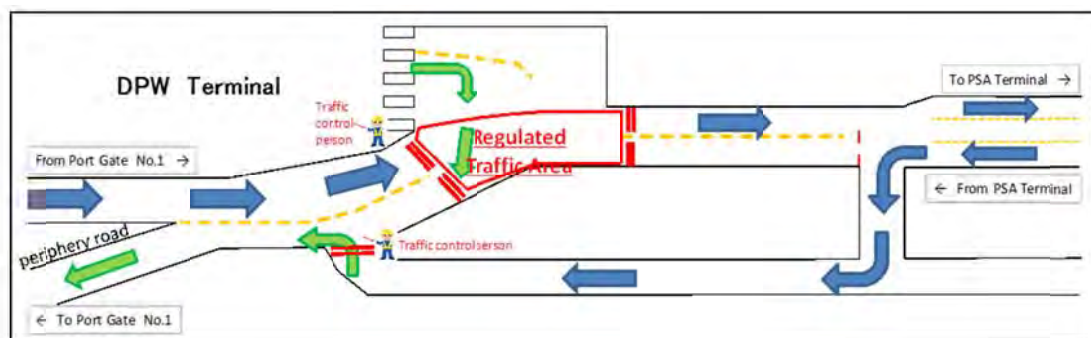


Figure 3-32 Traffic Flow Regulation at DPW Intersection

The Team has continually confirmed the status on allocation of traffic control persons and implementation of traffic regulation at the intersections after the demonstration trial.

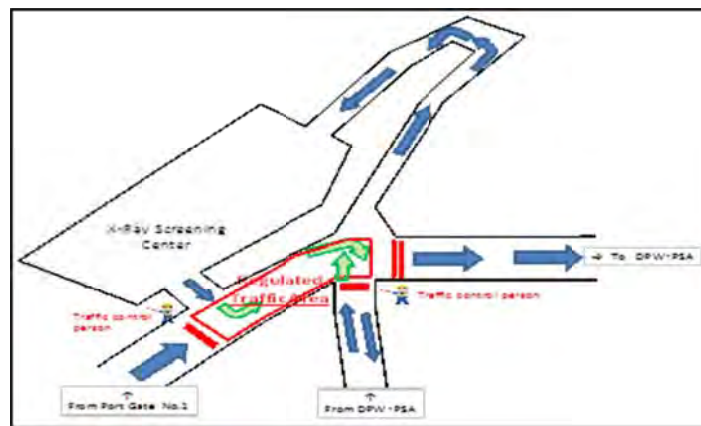
The existence of parked or stopped trailers within the intersections and lack of traffic control persons were occasionally confirmed during the 7 dispatch. It was also observed that traffic control persons were not able to give suitable instructions or guidance to trailers even though they were allocated.

During the 8th dispatch, the Team observed that traffic control persons were allocated most of the time and gave the appropriate instructions or guidance to trailer drivers through the task force activity. In addition, trailer drivers themselves began to follow the Traffic Flow Regulations (No vehicle may stay in the regulated traffic area) even without guidance from a traffic control person. This represents true progress.

2) Evaluation

X-Ray Intersection

- a. Traffic Flow Regulations were not followed during the demonstration trial. Trailers staying in the Regulated Traffic Area were observed which sometimes prevented trailers from entering the X-Ray Screening Center.
- b. Traffic Flow Regulations were followed even when traffic control persons were not present, although parked/stopped trailers within the intersections were still observed up to the 7th dispatch.
- c. The following measures are required in order to keep the smooth traffic flow at the intersections.
 - i) To monitor the X-Ray Intersection by using outdoor cameras
 - ii) To allocate traffic control persons whenever the traffic congestion occurs.



**Figure 3-33 Traffic Flow Regulation at X-Ray Intersection
(After Implementing the New Entrance Route)**

DPW Intersection

- a. Traffic Flow Regulations including moving vehicles from DPW and PSA alternately were not followed during congested periods which prevented trailers from DPW from exiting.
- b. Traffic Flow Regulation was followed to some extent after the demonstration trials and trailers were guided to go out from the DPW Exit by a traffic control person at congested times.
- c. The following measures should continue to be implemented
 - i) To allocate traffic control persons whenever the traffic congestion occurs.
 - ii) To clearly indicate no parking/stopping rules by marking white line on the road.

3.5 Effects of Measures by Simulation Model

The Team used a simulation model to illustrate the effects of Demonstration Trials (Demo1, 3 and 4) at the Steering Committee on 23rd February 2015.

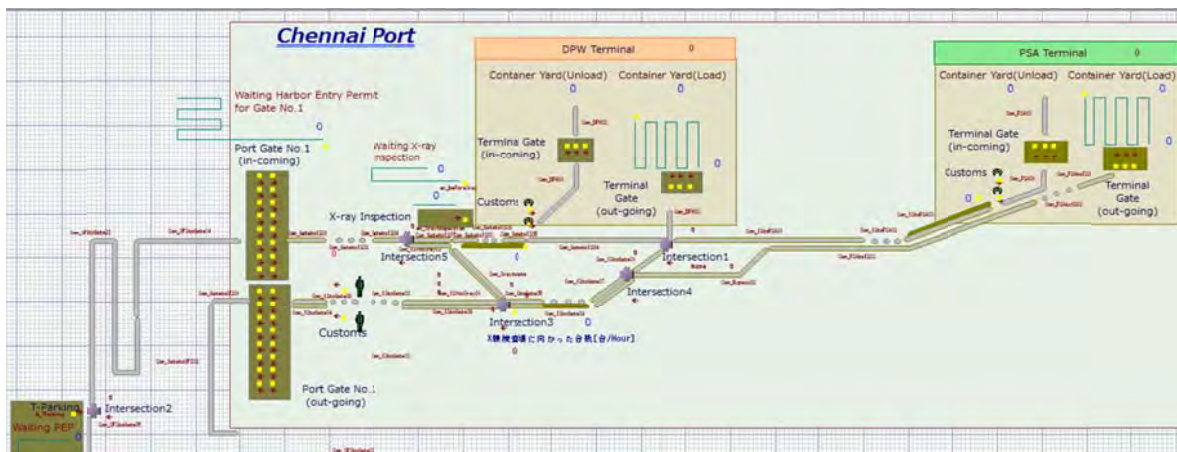


Figure 3-34 Simulation Model for the 3rd Dispatch

(1) Feedback Demonstration Trials to Simulation Model

a. Demo1 (Simplification of Gate Procedures at Port Gate No.1)

The aim of Demo1 was to reduce gate procedure time at Port Gate No.1. Simulation model demonstrated that gate procedure time was shortened in Demo1.

b. Demo3 (Restriction of Parking on Internal Roads)

The aim of Demo3 was to ease traffic congestion bound for Port Gate No.1(OUT) at the Periphery Road. The simulation model demonstrated the effectiveness of Demo3.

c. Demo4 (Allocation of Traffic Control Person in Port Area)

The aim of Demo4 was to ease traffic congestion by ensuring that vehicles from different lanes take turns entering the intersection. The simulation model reflected the results of Demo4.

The simulation model was not able to reflect the results of Demo2.

Details of input conditions to the model are as follows:

Table 3-13 Input Condition of Simulation Model

		With	Without
Demo1	Procedure time at Port Gate No.1(IN)	1.5 min	4.5 min
	Procedure time at Port Gate No.1(OUT)	1.5 min	3.5 min
Demo3	Number of lanes at Periphery Road	2 lanes	1 lane
Demo4	How to enter the intersection	Limit to maximum 20 vehicles in one direction	At random

1) Current Situation

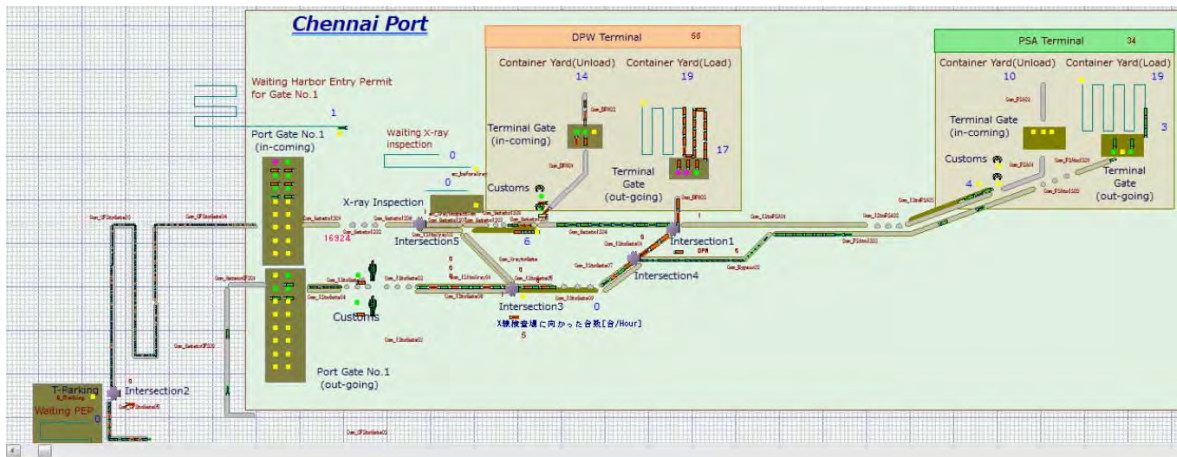


Figure 3-35 Results of Simulation (Current Situation)

Traffic congestion occurred at Port Gate No.1 (IN, OUT) and in front of the PSA terminal entrance. Total waiting time for traffic congestion and gate procedure time was 4.3 hours on average.

2) Demo1

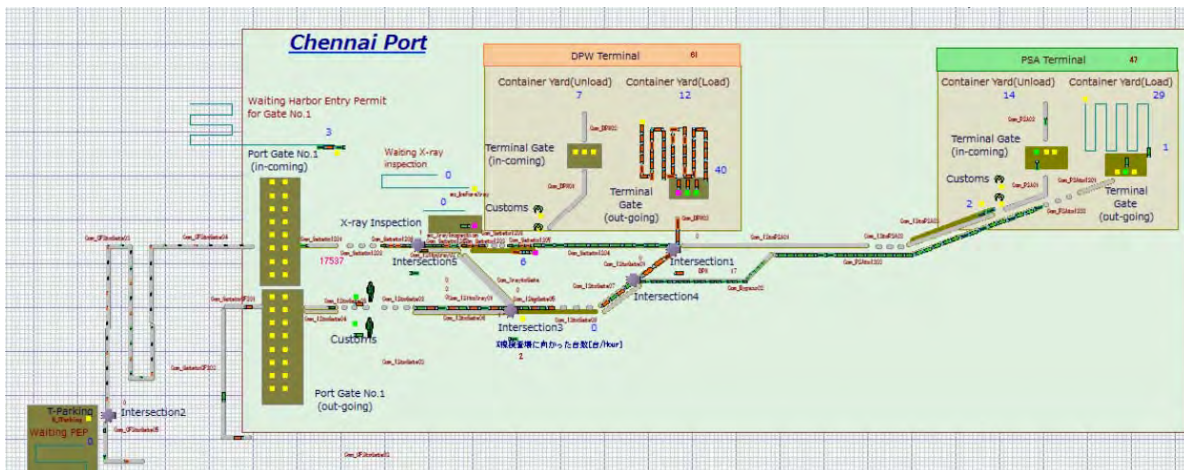


Figure 3-36 Results of Simulation (Demo1)

Although the traffic queue did not occur at Port Gate No.1 (IN), vehicles remained inside the Port a long time. Total waiting time was 3.2 hours on average (1.1 hours less than the current situation).

3) Demo3,4

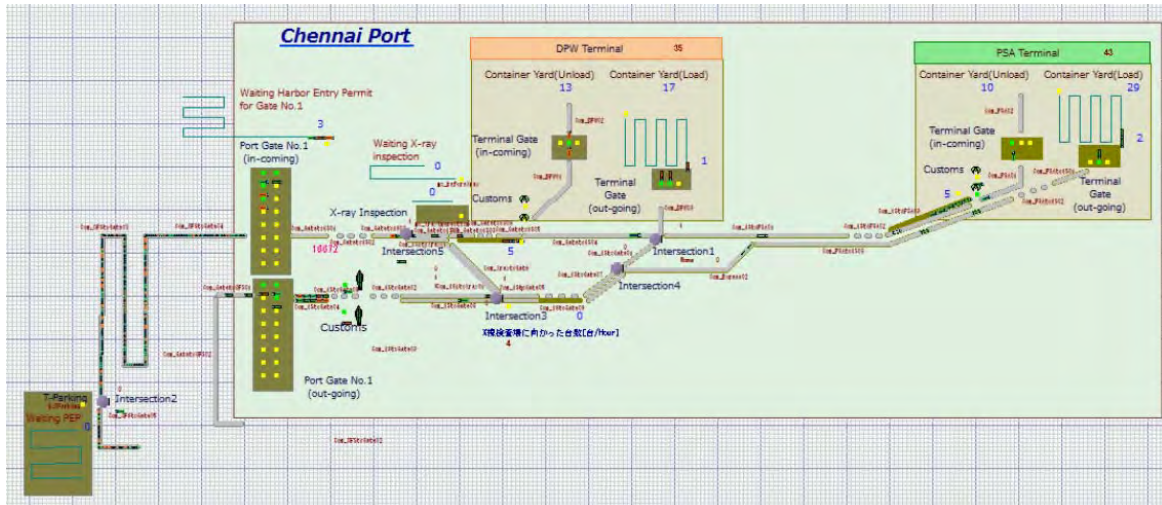


Figure 3-37 Results of Simulation (Demo3, 4)

Although traffic congestion cleared up along the Periphery Road and the intersection, vehicles waited a long time at Port Gate No.1(IN, OUT). Total waiting time was 3.8 hours on average (0.5 hours less than the current situation).

4) Demo1, 3, 4

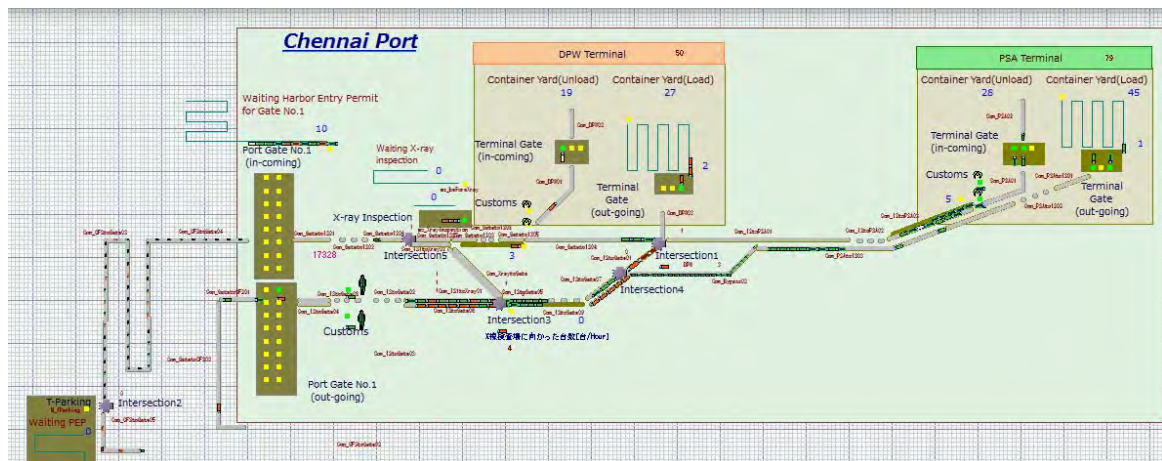


Figure 3-38 Results of Simulation (Demo1, 3, 4)

In the case of conducting Demo1, 3 and 4 at the same time, trailers entered Port Gate No.1 smoothly and the traffic congestion inside the Port was reduced. However, traffic congestion occurred at the Customs Gate in front of Port Gate No.1 (OUT). Total waiting time was 3.1 hours on average (1.2 hours less than the current situation).

3.6 Implementation of IT Related Measures

The Team has studied the implementation of IT systems as one of the measures for alleviating the traffic congestion.

(1) Web Portal System for sharing information related to traffic congestion

The system aims at providing more effective information for stakeholders in order to alleviate traffic congestion. The information to be shared among stakeholders includes traffic congestion status at various places. A live picture of the congested road, real-time summary of trailers passing through several gates, etc. will be available. Vessel schedule information, issuing status of FORM13, DRF, etc. can also be accessed.

The Team has repeatedly explained the functions of the system and introduced examples of similar systems in Japan at W/G and S/C in order to obtain a consensus on implementing the web portal system.

The following figure shows the image of the Web Portal System.

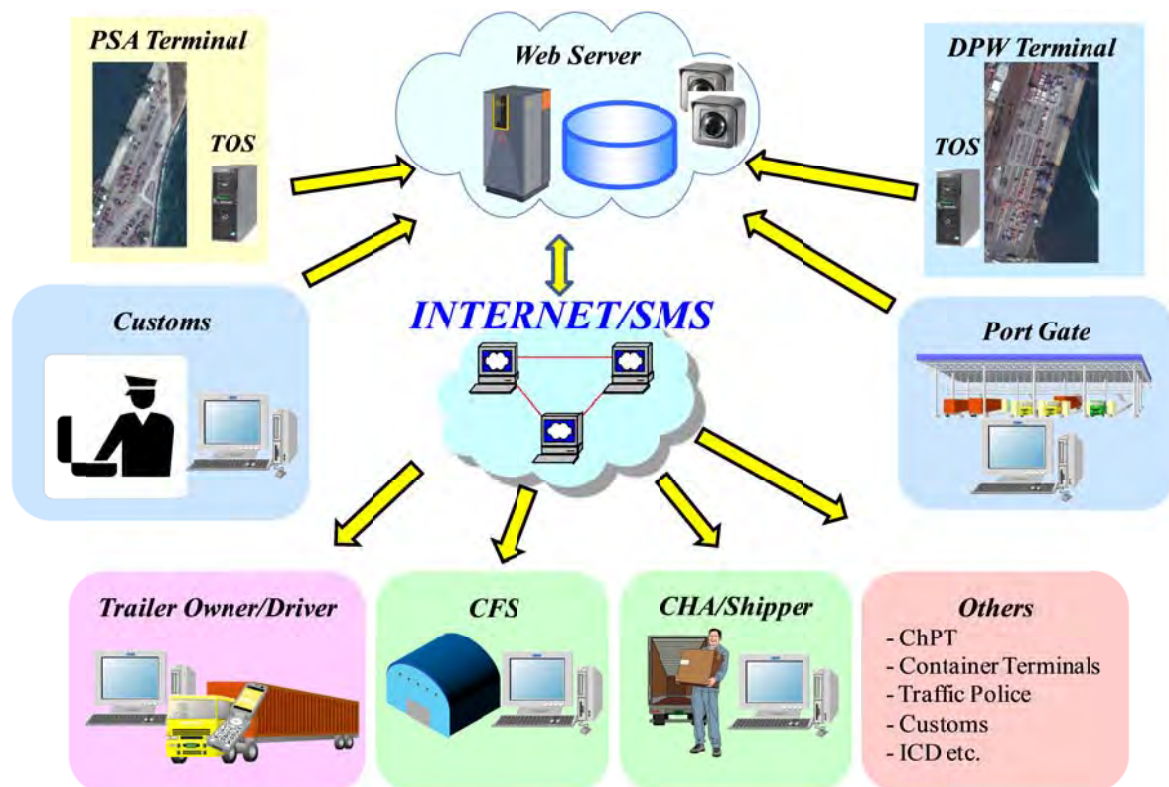
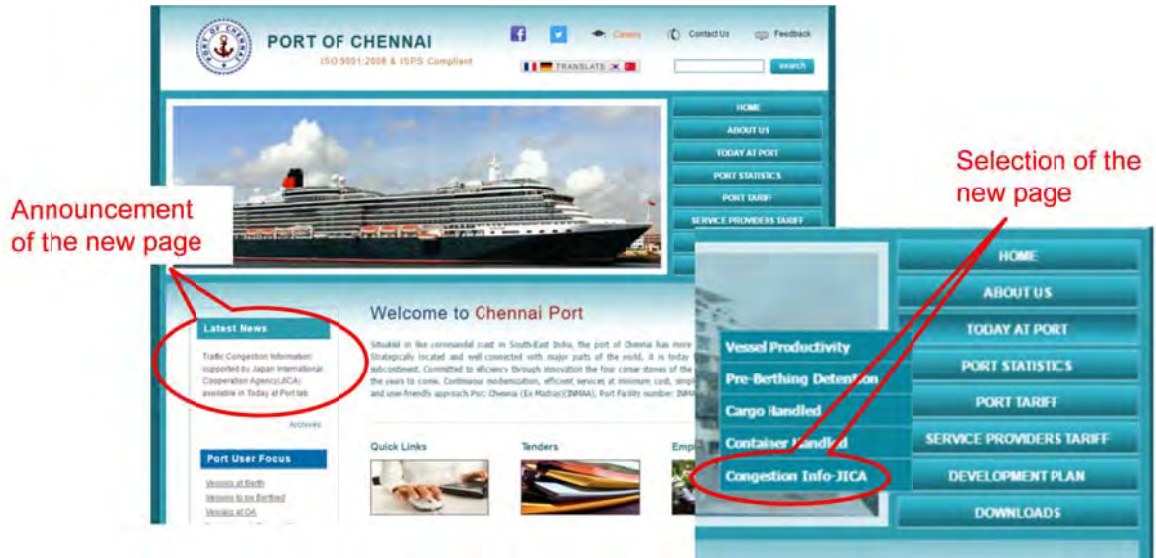


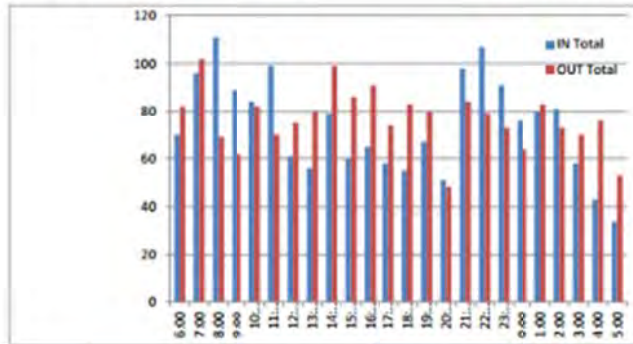
Figure 3-39 Image of Web Portal System

The Team exchanged the MOU on implementation of demonstration trial of Web Portal System with ChPT during the 6th dispatch. The trial is for publishing the information related the traffic congestion on the existing ChPT Homepage. The trial was implemented during the 7th and 8th dispatch based on the MOU with the cooperation of ChPT and CISF. The following figure shows the ChPT Homepage and the additional pages.



Activity Summary at Port Gate No.1

DATE:11.02.16



Time	IN			OUT		
	Load	Empty	Total	Load	Empty	Total
6:00			70	71	11	82
7:00			96	78	24	102
8:00			111	56	13	69
9:00			89	51	11	62
10:00			84	66	16	82
11:00			99	51	19	70
12:00			61	62	13	75
13:00			56	58	22	80
14:00			79	72	27	99
15:00			60	75	11	86
16:00			65	76	15	91
17:00			58	55	19	74
18:00			55	71	12	83
19:00			67	69	11	80
20:00			51	43	5	48
21:00			98	70	14	84
22:00			107	69	10	79
23:00			91	54	19	73
0:00			76	61	3	64
1:00			80	70	13	83
2:00			81	63	10	73
3:00			58	62	8	70
4:00			43	69	7	76
5:00			34	50	3	53
Total	1043	511	1769	1522	316	1838
Average	43.5	21.3	73.7	63.4	13.2	76.6
Max	0	0	111	78	27	102

Figure 3-40 Modification to the ChPT Homepage

(2) Proposal of Entry/Exit Control System for the Port

The Team proposed a Port Entry/Exit Control System at Port Gate No.1 to enhance the flow of trailers inside the Port. Initially, the Team proposed the barcode reading system but later opted for an RFID based Entry/Exit Control System after learning that such a system was planned to be implemented.

3.7 Examination of Efficient Process of Trailer Flow Inside the Port

The Team has conducted the following activities in order to enhance the flow of trailers inside and outside the Port.

(1) Examination of Operation Flow

The Team conducted surveys inside and outside the port including interviews with ChPT, CISF, Customs, CFS and container terminals in order to grasp the operation flow. The results were summarized in the Document Check Flow, which describes the documentation required and procedures between CFS, Port Gate, and terminal gates.

(2) Survey on Processing Time at Port Gate No.1

a. Incoming Trailers to the Port

The Team calculated the processing time for incoming trailers to the Port using the number of trailers passing through the gate as the documentation check is only conducted at a single window of CISF. Calculation results are shown in Table 3-14.

b. Outgoing Trailers from the Port

The Team conducted the survey on the processing time for outgoing trailers from the Port as the documentation check is conducted at multiple windows by CISF and Customs. The survey is conducted during the 3rd dispatch for 2 days and the processing times for 400 trailers were collected. The results of the survey are shown in the following table.

Table 3-14 Average Processing Time for Outgoing Trailers at Port Gate No.1

Place	Average Processing Time (Sec)	
	Other than Empty Trailers	All Trailers
CISF Check	28	23
Customs Check	55	39
CISF/HEP Scan	53	51

Table 3-15 Tendency of Processing Time for Outgoing Trailers at Port Gate No.1

Place	0sec < X ≤ 40sec	40sec < X ≤ 60sec	0sec < X ≤ 60sec	60sec < X
CISF Check	80%	16%	96%	4%
Customs Check	31%	44%	75%	25%
CISF / HEP Scan	32%	54%	86%	14%

(3) Survey on Number of Trailers Passing Through Gates

The Team conducted a survey on the number of trailers passing through Port Gate No.1 and terminal gate for each hour.

The data at Port Gate No.1 is summarized from the data collected by the demonstration trial 1 (barcode reading system) and the daily summary manually prepared by the CISF.

Table 3-4 Transition of Number of Trailers Passing Through Port Gate No.1

		3rd dispatch (Feb. 2015)	4th dispatch (April 2015)	7th dispatch (Feb. 2016)	8th dispatch (June 2016)
Ave # of trailers /lane / hour	IN	24.4	33.9	34.9	28.4
	OUT	29.6	26.3	23.4	23.1
Max # of trailers /lane/hour	IN	54	78	64	72
	OUT	69	48	56	54
Ave # of trailers / hour (all lanes)	IN	-	76.9	69.8	56.9
	OUT	59.2	72.4	70.2	61.6
Max # of trailers /hour (all lanes)	IN	-	176	121	111
	OUT	113	111	106	99

As for terminal gates, the Team conducted the survey on actual number of trailers passing through terminal gates for three days during the 4th dispatch. The following table shows the results of the survey.

Table 3-16 Number of Trailers Passing Through Terminal Gates (Actual Survey)

	Max # of trailers / terminal / hour	Ave. # of trailers / terminal / hour
IN	64	34.2
OUT	65	32

The Team requested both terminals to submit the statistical data of trailers entering/exiting for one week during 6th dispatch in order to collect the data covering longer period of time. The data obtained has been summarized in the following table. However, data was not submitted by the PSA terminal.

Table 3-17 Number of Trailers Passing Through Terminal Gates (DPW Statistics)

	Max # of trailers / terminal / hour	Ave. # of trailers / terminal / hour
IN	73 ²	35.7
OUT	75	25.8

(4) Survey around Container Terminals

The Team conducted the following survey around container terminals during the 6th and 7th dispatch based on the request from ChPT. As a result, the Team identified instance of ‘Suspension’ and ‘Idling Time’, which reduce terminal gate efficiency. Based on these findings, the Team proposed operational rules for the entry process at terminal IN Gates during the 8th dispatch.

a. Study on the Flow of Trailers using Monitoring Camera at Terminal IN Gates

A monitoring camera is a useful tool for grasping the operational status of the terminal IN Gate and examining the causes and countermeasures of traffic congestion in front of terminal gates. For this reason, the Team has monitored incoming trailers to container terminal gates continuously for a week including at night and on holidays by setting a fixed point camera around IN Gates of both DPW and PSA terminals during the 6th and 7th dispatch³. The Team has analysed the flow of trailers using the pictures which were taken continuously in 30 second intervals during the survey period. The Team has confirmed the existence of suspension time, which is defined as a stoppage in trailer movement for more than 20 minutes. Gate operation was evaluated by identifying and measuring the suspension time during the period.

As a result, the Team found that suspensions occurred in average 3 to 5 times a day at both terminals. The suspensions often continued for more than one hour and most of the suspensions were for a single lane. However, the cause of the suspension has not been clarified. The operational efficiency at terminal gates will be improved if the suspensions are eliminated. The photographs which show the incoming trailers around DPW IN Gate and parked trailers around DPW IN Gate are shown below.



Picture 3-3 Incoming Trailers around DPW IN Gate (6th dispatch)

² Exceptional data (more than 90 trailers / hour) was excluded as it only occurs twice during the whole survey period,

³ The camera was installed only at DPW terminal in the 7th dispatch to determine if there were any changes in the situation.



Picture 3-4 Parked Trailers around DPW IN Gate (7th dispatch)

The following tables show the suspensions detected at both terminals.

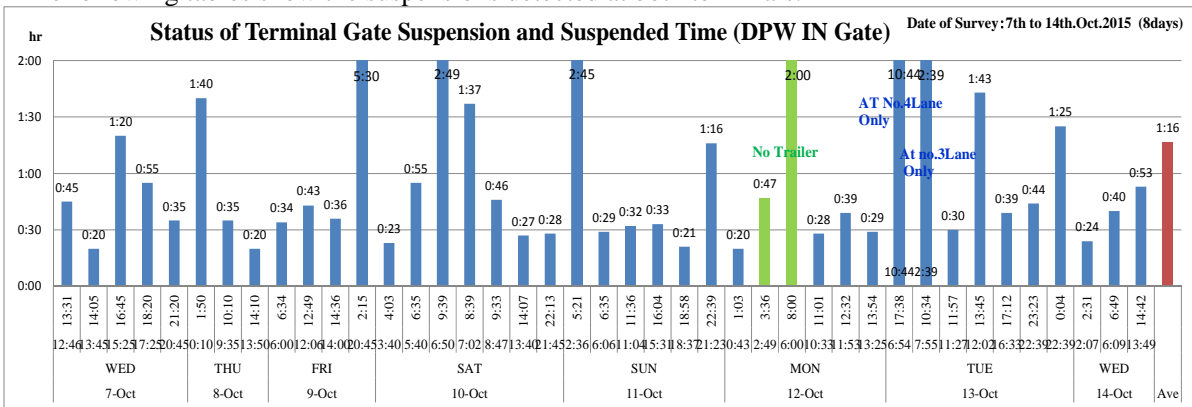


Figure 3-41 Suspensions at DPW IN Gate (6th dispatch)

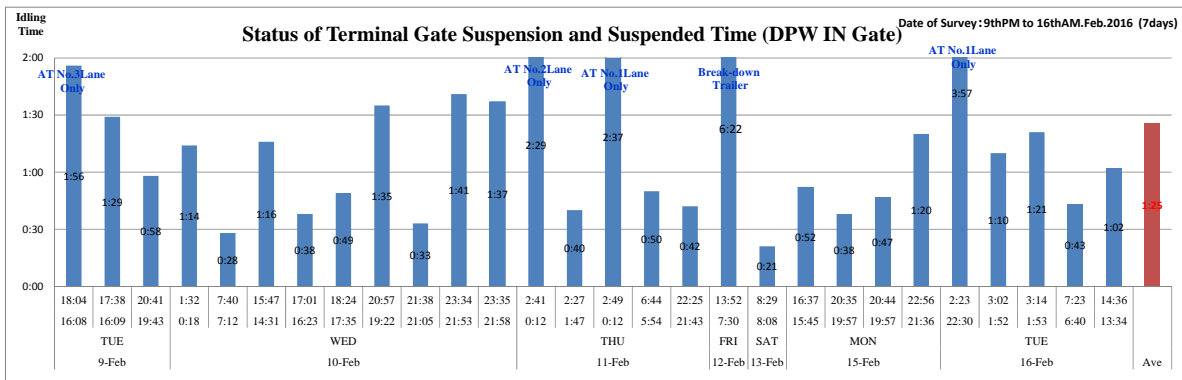


Figure 3-42 Suspensions at DPW IN Gate (7th dispatch)

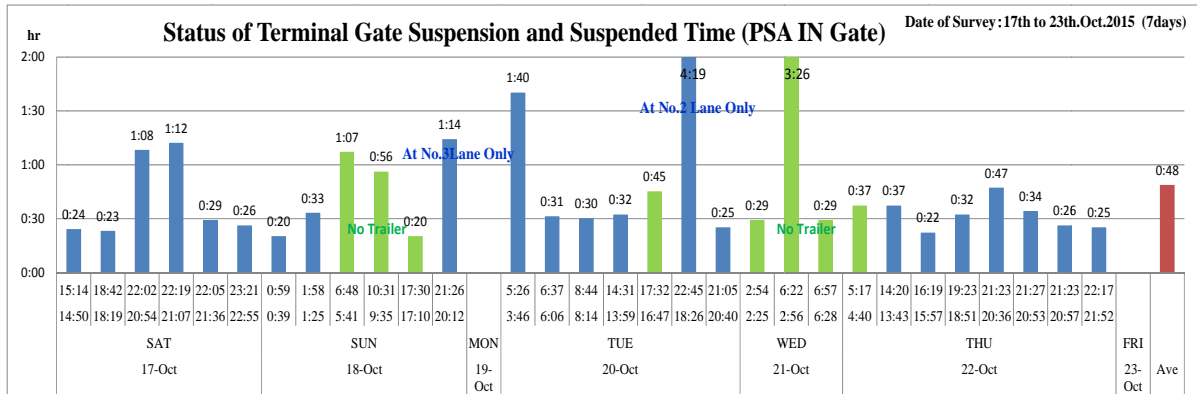


Figure 3-43 Suspensions at PSA IN Gate (6th dispatch)

b. Survey on the Gate Process Performance

The Team considered the possibility that the bottleneck of the incoming trailer flow originated at the container terminal gates. Therefore, the Team conducted a survey around the terminal gates during the 6th and 7th dispatch in order to find out the reasons for the traffic congestion.

The terminal IN Gate consists of 1) Survey station, 2) Customs windows, 3) Terminal gate windows, in both DPW and PSA terminals. The layouts of the two terminals are slightly different, which results in a different trailer movement flow, though the structures are the same (Customs windows and terminal gate windows are located in the same building in DPW).

The works conducted at each place were confirmed as follows.

- 1) Survey station: Surveyors inspect an incoming container by checking the container number, seal number, and container damages (DWP: 4 trailer queues, PSA: 3 trailer queues) and put stamps on the documents after the inspection. They inspect 4 trailers for each queue x 4 lanes; in other words, a total of 16 trailers are inspected at one time at DPW.
- 2) Customs windows: Customs officers confirm the documents of trailer drivers, keep a log book, put stamps on the documents, and return the documents.
- 3) Terminal gate windows: Terminal gate clerks receive the documents from a trailer driver, enter the information to TOS, and indicate the location of container to the drivers.

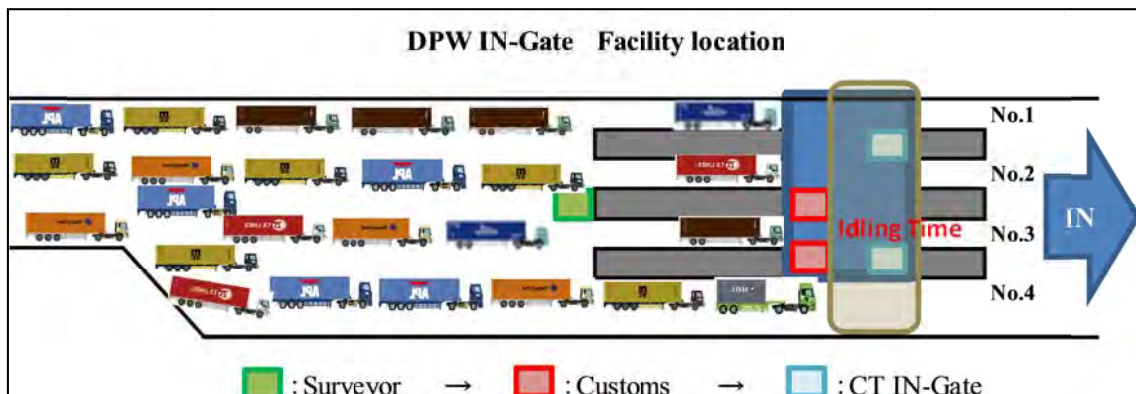


Figure 3-44 Layouts of Gate Facilities at DPW IN Gate

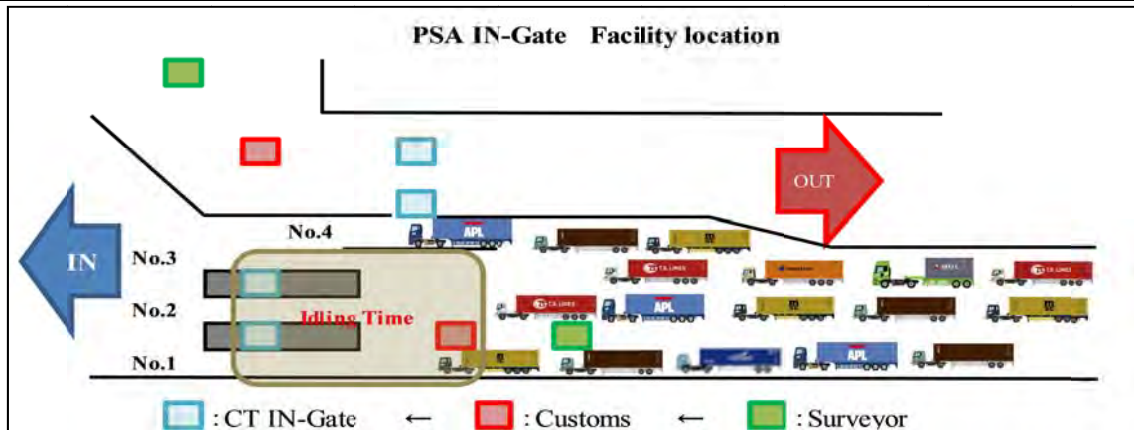


Figure 3-45 Layouts of Gate Facilities at PSA IN Gate

Note: The difference in layout between both terminals is just the positional relation between Customs windows and terminal gate windows. The terminal gate windows and Customs windows are located side by side and drivers must get off trailers twice at DPW for the surveyor station and the Customs window which is located at ground height (Customs windows at PSA are located in a separate house from the terminal gate along the trailer paths and are at a height of trailer cabin). It is time consuming for drivers to get off trailers and the following trailers sometimes cannot go forward during such times. As for the container inspection by surveyors, more containers can be inspected at DPW than at PSA as there are 4 trailer lines at DPW while only 2 or 3 lines at PSA.

During the site observation, the Team often observed that the above works had not been conducted smoothly. Namely, there were times when no trailer proceeded to the terminal gate windows even if it was vacant and many trailers were waiting behind. The Team refers to such times, when no work is conducted, as “Idling Time” and reported its ratio against the total time to pass through a terminal gate at the S/C. The Team considers that some measures for reducing the ‘Idling Time’ will be required as the average ‘Idling Time’ accounted for from 16% to 37% of the total reception time.

The following figures show the occurrence rate of the Idling Time according to the site survey conducted by the Team during the 6th and 7th dispatch.

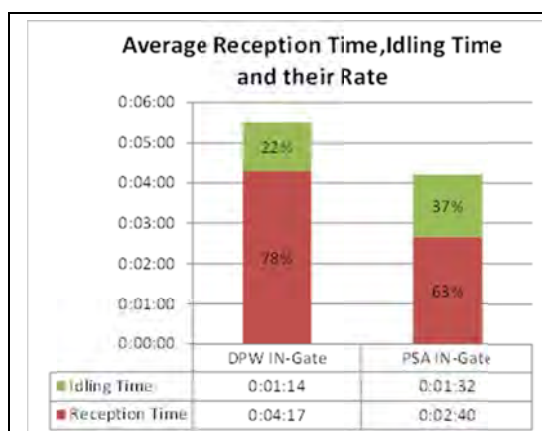


Figure 3-46 Idling Time (6th dispatch)

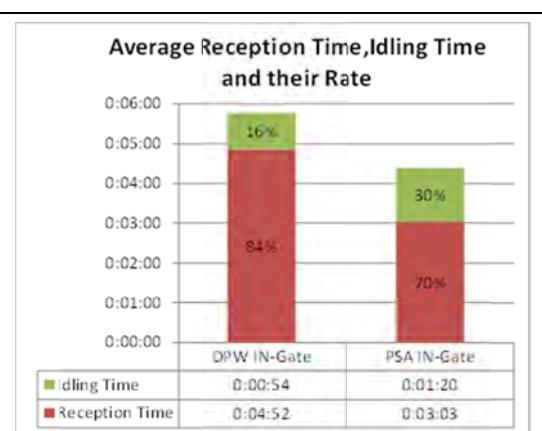


Figure 3-47 Idling Time (7th dispatch)

c. Study on the Trailer Process Inside Terminals

The Team has conducted a survey on the container handling status in the yard as for container receiving and delivery in order to enhance the processing of trailers at container terminals. The following surveys were conducted for both DPW and PSA terminals since the 6th dispatch.

- a. Interviews on yard operation
- b. Collection of statistical reports from container terminals
- c. Site observation

Among them, interviews and site observation could be conducted for both terminals but the statistical reports could be collected only from DPW.

3.8 Study on the Direction of the Master Plan

During the 1st to the 5th dispatch, the study team collected information related to the activities of Chennai Port. Based on the information collected, the team made proposals to alleviate the traffic congestion which included the improvement of port infrastructure. During the 6th to 8th dispatch, the Team conducted further observation, and exchanged views with ChPT on the direction of the master plan.

During the 1st dispatch, information on the following projects was collected.

1) The highway bridge project between Chennai Port and Maduravoyal

The plan is to connect Chennai port to the Maduravoyal area, 19km away from Chennai Port to the west. However, some were opposed to the project due to the risk of flooding, since the piers of the bridge stand on the Couum River bed. The construction was suspended by the new state governor.

2) Modernization plan of Chennai Port

Harbor road network and railway expansion are being planned by ChPT. The harbor road will have 4 lanes in both directions and the railway will have more lines at the inlet of the port.

3) The road expansion project between Chennai Port and Ennore Port

The port authorities and road authorities are jointly implementing this project.

4) Sriperambudur dry port development plan

The ICD known as the Sriperambudur dry port has already opened. It is located 60 km from the port in the southwest direction. Currently, one of the areas of the dry port has been awarded for concession.

Customs services will be available there. The dry port is accessible from the Chennai port by road (through the national highway Route 4) and will be accessible through railway.

In the 2nd dispatch, the Team visited Jawaharlal Nehru Port and observed severe congestion near the gates. One of the countermeasures taken by the port was to simplify the gate-entry procedures. The team also proposed that ChPT develop and implement a traffic facilitation plan based on its findings during its visit to Jawaharlal Nehru Port.

In the 3rd dispatch, based on the Marine Agenda 2010-2020 prepared by the Shipping Ministry, the Team examined cargo demand, port capacity, major projects, and accessibility to the hinterland of the Chennai Port. The team also conducted an analysis on congestion and proposed some solutions.

In the 4th dispatch, the Team examined the Business Plan for Chennai Port Trust which was published in 2008 and has served as the Master Plan of Chennai Port.

However, circumstances surrounding Chennai Port have considerably changed since the above plan was published. For example competitive container ports (Ennore Port, Kattupalli Port) have emerged and coal and iron ore are no longer handled at Chennai Port. Accordingly, the Business Plan, including a master plan for infrastructure development, may need to be updated. The Team proposed that an advisory study be conducted on basic policy for the master plan of infrastructure development, including improvement of internal roads (widening, pavement, lane regulation, etc.)

In the 5th dispatch, the progress of the business plan was examined. A PPP scheme for infrastructure development of the mega terminal could not be successfully introduced. As a result, ChPT is attempting to construct the breakwater and channel using public funds. The Team also obtained information concerning the utilization plan of the railway and widening of SH 114.

In the 6th dispatch, the land use inside Chennai port, Ennore port, and Kattupalli Port, as well as the inland depot of the railway in Tondiapet, 5km away from the port, were examined. The Team also exchanged the views on the direction of the study of the master plan and confirmed important issues related to the study.

In the 7th dispatch, the current land use plan inside the port, and the situation of the roads and railways were confirmed. Workshops were held twice in which important issues related to the master plan study were discussed and projects that will enhance the efficiency of the port were proposed.

The main points discussed at the workshops were as follows.

- 1) Meeting the cargo demand and role-sharing among ports
- 2) Coping with the increasing size of container ships
- 3) Development of roads and waiting areas for trailers.
- 4) More utilization of IT, i.e. information service to the drivers via Internet
- 5) Better Connection to the hinterland of the port
- 6) Promotion of railway use
- 7) Review of land use
- 8) Environmental improvement and sustainable development

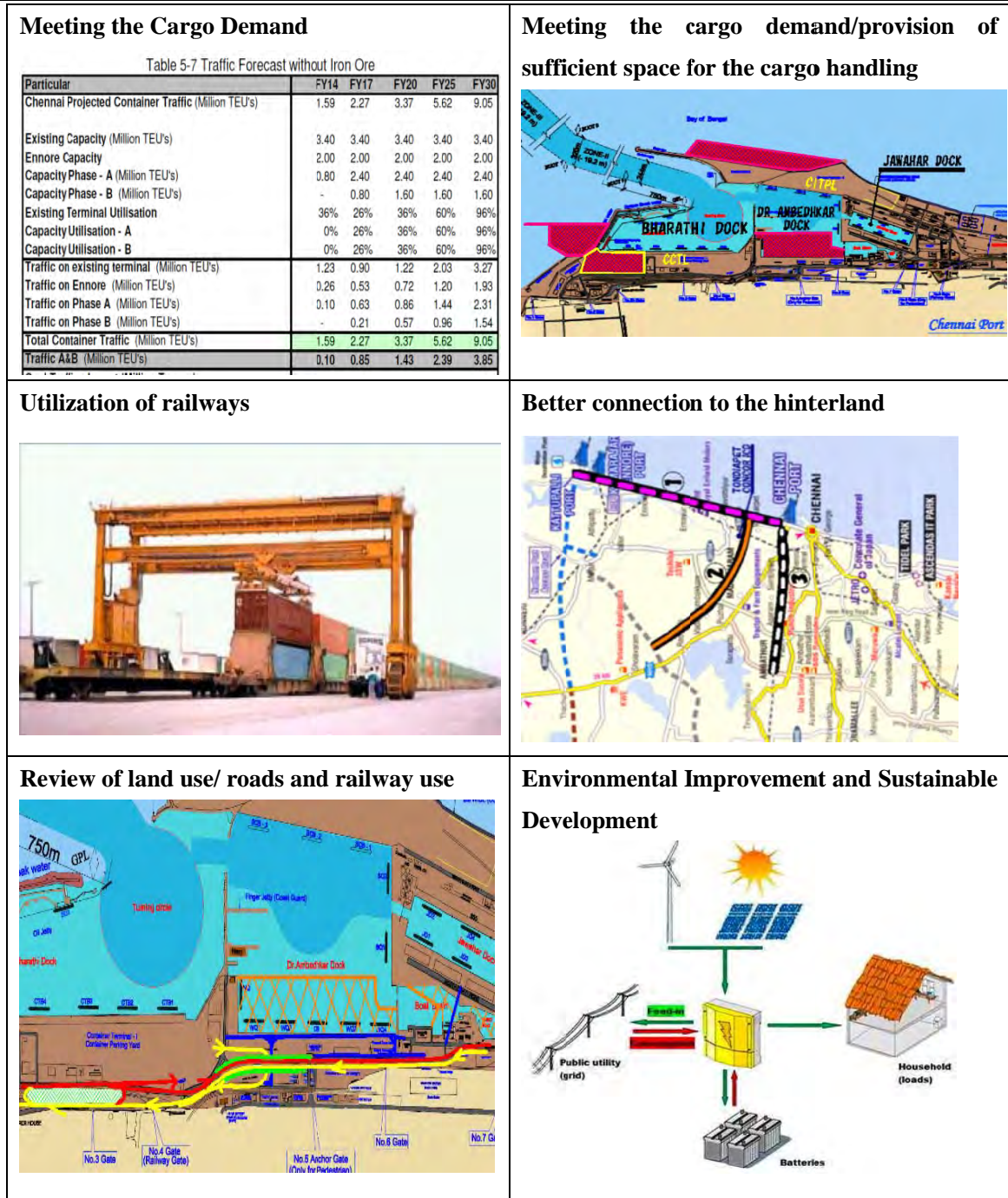


Figure 3-48 Proposed project image

In the 8th dispatch, a workshop on the master plan was also held in which the following issues were discussed.

- Necessity of deepening berths of the DPW terminal
- Necessity of upgrading the access road
- Sharing of cargo among Kattupalli, Kamarajar, Krishnaopatnam, and Chennai
- Necessity of infrastructure development and funding methods
- Necessity of deepening the Jawahar Dock and widening the entrance

In response to the strong request of the president of ChPT, the Team examined the widening of the entrance of the Jawahar Dock.

ChPT requested JICA to continue technical assistance and conduct feasibility studies on the projects proposed by the Team.

3.9 Improvement of Synergy on the Operation of Regulatory Authorities Concerned

Congestion is a complicated issue which involves many stakeholders. A steering committee (S/C) was set up in the project for the purpose of discussing matters related to traffic congestion among stakeholders. S/C allows stakeholders to understand the project and share information on traffic congestion. Therefore, the Team has strongly recommended strengthening further coordination among stakeholders, specifically coordination with regulatory authorities of the state government such as the traffic police section and the road department to tackle congestion issues effectively. The establishment of an enlarged S/C is deemed necessary for sustainable improvement in the operations of Chennai port, and a draft running rule for the enlarged S/C has been prepared, which describes the scope of works and members etc.

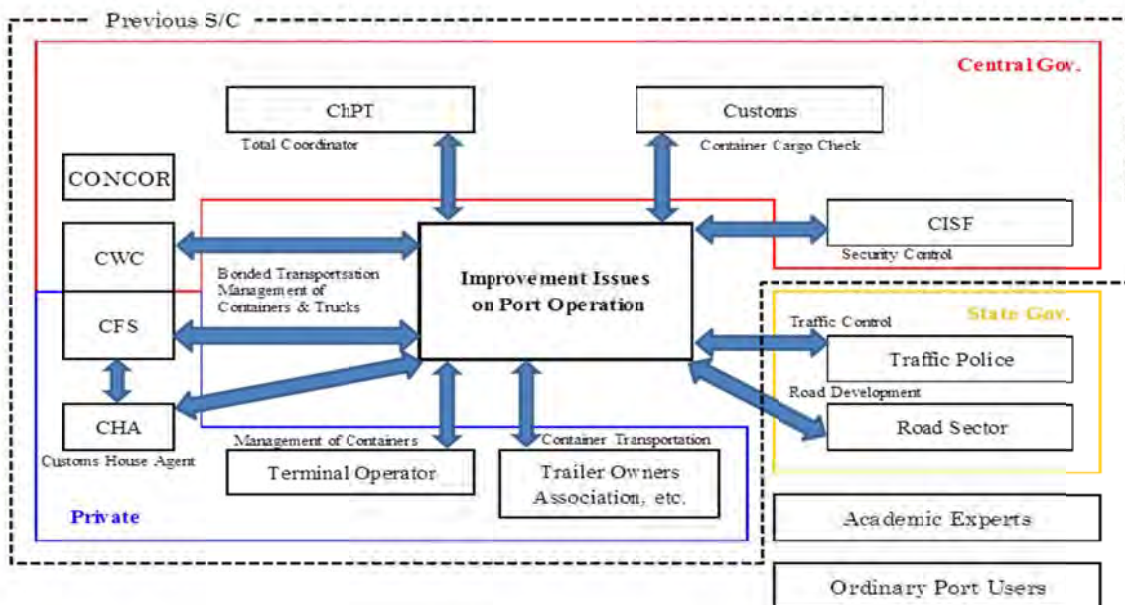


Figure 3-49 Stakeholders of Congestion Issue

A task force was formed at the initiative of ChPT to tackle congestion issues. It consists of ChPT, Trailers Owners Association, Terminal Operators and CFS association etc. Pre-document check prior to Port gate No.1 and promoting traffic discipline among drivers along SH114 are major activities of the task force outside the port, while traffic control at the intersections and instructions to drivers are major activities inside the port.

ChPT holds a port users meeting each month under the instruction of MOS. The purpose of this meeting is to exchange views between ChPT and port users about related issues. Both port users and organizations related to port activities are invited. As these activities are meaningful not only for congestion alleviation

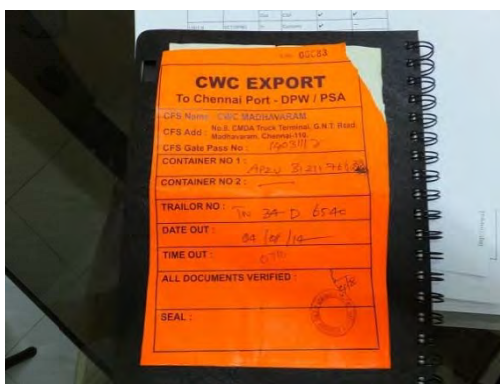
but also for improvement of the port operation as a whole, such activities need to be continued.

Furthermore, the Team would again like to emphasize that the state government, specifically, the traffic police and the road department, needs to become more involved in issues related to congestion.

3.10 Related Information

(1) Introduction of a Sticker System

From 15 August 2015, all laden container trailers from CWC & CFS have not been permitted into the Port without appropriate stickers (Refer to the pictures below). All the laden container trailers exiting from CWC/CFSs are provided with stickers without fail after checking all relevant documents.



Picture 3-5 Sticker for CWC



Picture 3-6 Sticker for CFS

This means that a trailer which has the sticker is also carrying the proper documents. This sticker system was started when the screening centre operation at the TVT parking was discontinued. The purpose is to increase the number of trailer drivers carrying the proper documents. The sticker possession rate was improved from 80% to nearly 90% according to the survey conducted during the 2nd dispatch, which means that the percentage of drivers carrying the proper documents has increased as well. However, the sticker system was not properly explained to drivers as many were unsure where stickers were checked or collected and as a result we were gradually seeing fewer containers with stickers and did not see them at all lately.

(2) Study on Introduction of RFID System

The Team has been studying the details of the implementation plan and its status of the RFID (Radio Frequency Identifier) system after confirming that ChPT had the plan to implement it to expedite gate procedures. The RFID system consists of the following 3 sub-systems. System 1 and System 2 are now being implemented concurrently and System 3 will be implemented in few years later.

a. System 1

The reception procedure at a terminal gate is speeded up and the information on CFS departure and the

one on terminal arrival are recorded automatically according to the following procedure

- i) RFID Tags will be placed on the front doors of all trailers. Trailer information such as trailer ID, its owner, etc. are contained in the tag. RFID tags are purchased by transportation operators.
- ii) In case of export container, when a trailer depart from CFS;
 - RFID reader at CFS entrance/exit reads the trailer information from RFID tag and registers them in CFS server.
 - A camera at CFS entrance/exit takes a picture of the truck driver and registers it in CFS server.
 - A CFS clerk manually enters the number of container. Then, the container information is linked with the trailer information in CFS server and the linked information is transferred to terminal server through NACFS server.
- iii) When the trailer arrives at a terminal, RFID reader at a terminal entrance reads the trailer information and retrieve the container information and the photograph of the truck driver. The information is, then, shown on a display at terminal gate.
- iv) In case of import containers, the procedure is just the other way around.

b. System 2

The reception procedure of a trailer at Port Gate No.1 is speeded up and Port entry/exit information for a trailer is recorded automatically according to the following procedures. Harbor Entry Permit (HEP) can be eliminated for trailers.

- i) By applying RFID tag used in the system 1, the entrance and exit of a trailer from Port Gate No.1 is recorded automatically.
- ii) On arrival of a trailer at Port Gate No.1 from outside the Port;
 - RFID reader at Port Gate No.1 reads the trailer information from RFID tag and register them in ChPT server.
 - A camera at Port Gate No.1 takes a photo of trailer number and shows it together with the trailer information on a display in a gate booth.
- iii) In case of outbound trailers, the procedure is similar to the above.

c. System 3

The reception procedure of a personnel at Port Gate No.1 is speeded up and the Port entry/exit information for a personnel is recorded automatically according to the following procedures. Harbor Entry Permit (HEP) will be replaced by RFID card.

- i) A trailer driver and his assistants wear the RFID card around the neck. The personnel information such as driving license number, photo, etc is contained on the RFID card.
- ii) On arrival of a trailer at Port Gate No.1 from outside, RFID reader reads the personnel information from RFID car. The system registers the personnel information in ChPT server and shows them on a display in a gate booth.

iii) In case of outbound trailers, the procedure is similar to the above.

The system verification test for both System 1 and 2 was completed at the end of 2015; all that remained was to install the hardware equipment for each gate and attach RFID tags on trailers. However, the system has not yet in operation mainly because only 5% of trailers currently have RFID tags. On the other hand, hardware has been installed at major CFSs, Port Gate No.1, and DPW/PSA terminals.



Picture 3-7 RFID Reader around CFS Entrance and Exit

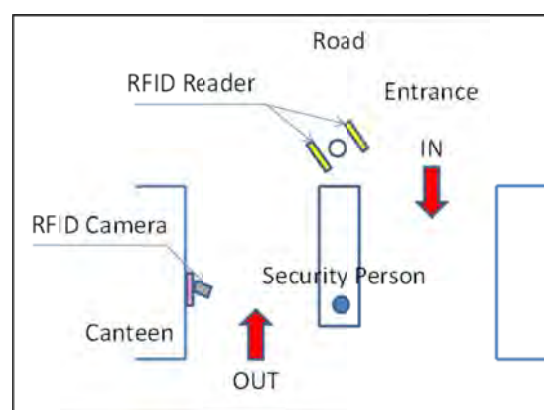
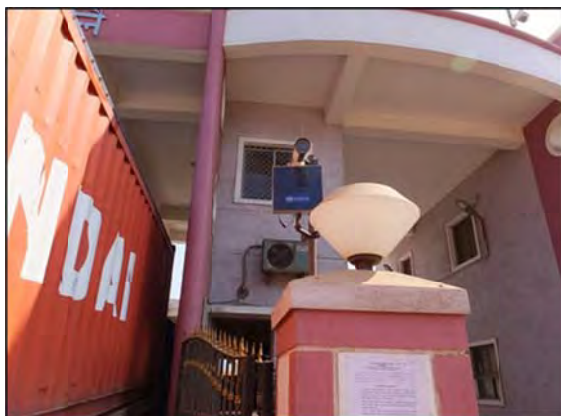


Figure 3-50 Arrangement of Equipment around CFS Entrance and Exit



Picture 3-8 RFID Reader around Entrance of Port Gate No.1



Picture 3-9 RFID Reader around Exit of Port Gate No.1



Picture 3-10 RFID Reader around DPW IN Gate



Picture 3-11 RFID Reader around PSA IN Gate

Sealed RFID Tag



Picture 3-12 RFID tag on Front Glass of a Trailer

(3) Interviews with Japanese Companies

The Team, in cooperation with JETRO Chennai, conducted interviews with several Japanese Companies (including forwarders, shipping lines, etc.) in Chennai and Bangaluru which usually use Chennai port on the subject of congestion and transit time (lead time) during the 8th dispatch. The purpose of the interviews was to confirm the results of the two-year technical assistance.

Almost all the companies have noticed both an improvement in the level of congestion and a reduction in transit time became 16-20 hours from 3days as before, which is similar to the result of the Team's survey described in section 3.3 (2) 5) b.

(4) Survey at Other Major Ports

The Team conducted a field survey and held a hearing on congestion issues at Jawaharlal Nehru Port (also known as Nhava Sheva Port), the largest container port in India during the 2nd dispatch. Two officials from Chennai Port Trust accompanied the Team. The Team visited the following organizations:

- i) Jawaharlal Nehru Port Trust
- ii) Gateway Terminal India Pvt. Ltd.
- iii) NYK Line (India) Ltd.

Jawaharlal Nehru Port, located 70km from Mumbai, is a dedicated container port consisting of 3 container terminals: Gateway Terminal India, Jawaharlal Nehru Port Container Terminal, and Nhava Sheva International Container Terminal.

Particulars	GTI (APM Terminals)	JNPT (Govt. of India)	NSICT (DP World)
Terminal Throughput (FY 2013- 14 – 4.3 Mn. TEUs)	2.06 Mn. TEUs (47 %)	1.20 Mn. TEUs (28 %)	1.04 Mn. TEUs (25 %)
Quay Length (m)	712	680	600
RMQCs	10 (Twin lift 18 wide)	3 (13 Wide) 6 (18 Wide)	2 (14 Wide) 6 (18 Wide)
RTGs	40 (Twin Lifts)	18	29
Reefer Slots	840	200	400
Back up Area (Hectares)	52	58	26
Rail Sidings	3 (Integrated)	4	2
Frequency of Train (Per day)	9	4	3
Mode of Transportation	Rail / Road : 47 / 53 %		



Figure 3-51 Container Terminals in Jawaharlal Nehru Port

Major findings of the survey and hearing were as follows:

- i) Heavy congestion was observed toward port gates just like the Port of Chennai. However, the congestion might not affect residents since few residential buildings are observed alongside the roads.
- ii) The Port had three port gates, one in each container terminal. The lane of the roads toward each port gate was separated for about 1 km.
- iii) Security check procedure is more simplified and computerized than that in the Port of Chennai. For example, it is not necessary to obtain a HEP (Harbour Entry Permit) before entering the Port.
- iv) Measures for alleviating congestion such as the construction of a by-pass road, the allocation of pre-examination space, and traffic control by the police have been taken.
- v) Customs do not carry out a physical inspection of export containers at the port gate (IN).
- vi) X-Ray scanning of randomly selected import containers as per Customs RMS (Risk Management System) is conducted before exiting from each terminal.

Circumstances in and around the port, such as container throughput, the layout of roads and other port facilities, and land use around the port, etc. are different between the Port of Chennai and Jawaharlal Nehru Port. However, the following congestion alleviation measures taken at Jawaharlal Nehru Port should be considered at the Port of Chennai:

- i) lane separation on the roads toward the gates
- ii) pre-screening by Customs
- iii) allocation of pre-examination space
- iv) simplification of gate procedures

3.11 Additional Technical Assistance Issues

Initially, technical assistance issues for the project on improvement of Chennai port operation were as follows:

- Traffic Normalization with CFS Cooperation
- Efficient Inspection at Port Gate No.1
- Introduction of Traffic Regulation
- Introduction of Portal Web System
- Introduction of Authenticate Gate System
- Draft Long Term Port Facility Plan
- Establishment of Cooperation Framework

The following issues were added in the second year of technical assistance at the request of ChPT.

- Efficient Inspection at Terminal Gate
- Study on Basic Direction of Master Plan
- Improvement of Synergy of Authority

In this way, the Team has continuously conducted technical assistance in cooperation with ChPT and agencies concerned.

3.12 Arrangement of Study Tour in Japan

The study tour in Japan to be undertaken in June was postponed due to delays on the Indian side.

However, the Ministry of Shipping issued an approval letter on 10th May 2016, in which the Chairman and Traffic Manager were approved to participate in the tour only for four (4) working days. The Team forwarded this letter with a cover letter of ChPT to the JICA Headquarters.

The JICA Delhi office discussed this matter with the chairman i/c of ChPT on 7th June at the chairman's office. The Chairman explained that the approval letter was the final decision and requested JICA to execute the study tour in September. Accordingly, JICA will start preparations for the study tour in consultation with the JICA Delhi office. They are tentatively scheduled to stay in Japan from 12th to 15th September.

3.13 Presentation Materials on Activities and Outcomes of the Project

Japanese companies including those in the automotive industry are increasing their business and manufacturing activities in Tamil Nadu. It is important to conduct public relations activities on the measures taken to improve port management & operation at Chennai Port under JICA's technical assistance .

The Study Team created presentation materials which explain the activities and outcomes of the Project over the past 2years and provide key information to stakeholders in India as well as Japanese companies in Chennai. Furthermore, the Team also visited Bengaluru and made a presentation on the project to Japanese firms there.

4 Outcome and Evaluation of the Project

4.1 Systematic Implementation of Measures for Technical Assistance.

(1) Measures introduced under Technical Issues

The Team implemented measures for the alleviation of traffic congestion in cooperation with ChPT and concerned authorities. Decongestion measures which were systematically organized under the technical assistance are outlined below.

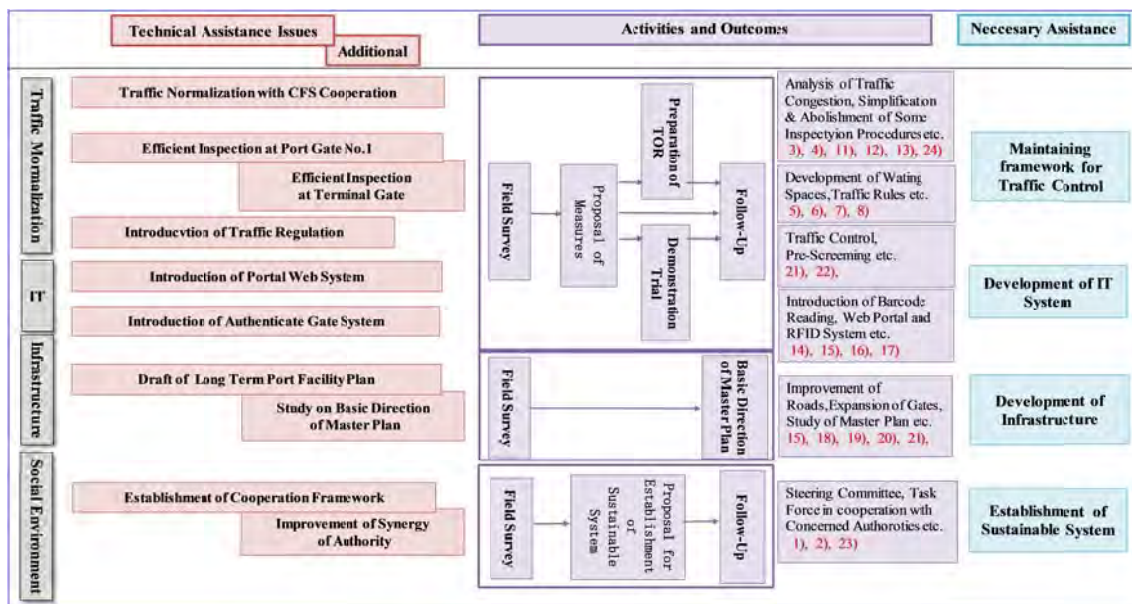


Figure 4-1 Activities Undertaken under Technical Assistance

Major activities and outcomes of the project are listed below. (The numbers in the figure correspond to the items below.)

1) Steering Committee (S/C) on Improvement of Chennai Port Operation

S/C has been set up to improve the operation of Chennai Port by ChPT, Terminal operators, CFSs, Trucker Associations and JICA etc. Concerned persons can share related information in the committee and tackle traffic problems and so on together.

2) Working Group (W/G) on Improvement of Chennai Port Operation

W/G meeting has also been held as preparatory talks before the S/C as well as to provide an opportunity to discuss various issues on Chennai port management & operation. W/G was chaired by the Traffic Manager and representatives of traffic, civil and mechanical, IT, financial and others offices of ChPT participated.

3) Introduction of a Sticker for a Container Trailer

As trailer drivers who do not carry the proper documents are one of the causes of traffic congestion, a trial was conducted with the cooperation of the private sector in which stickers were attached to trailers when drivers possessed the proper documents. This was a good initiative which demonstrated the willingness on the part of the private sector to cooperate in congestion alleviation measures. However, the sticker system was soon discontinued due to management problems.

4) Simulation Model Analysis for Traffic Congestion

The Study Team developed a traffic simulation model and showed the qualitative effect of measures for decongestion in the S/C. It is hoped that ChPT and stakeholders will continue efforts to alleviate the congestion.

5) Effective Utilization of TVT Parking (Demonstration Trial)

HEP (Harbor entry permit) was issued to trailer drivers at the TVT Parking located along State Highway 114, about 5km north from Port Gate No.1. Utilizing this parking space, required documents for drivers were pre-checked as a demonstration trial. The area was also used as a waiting space for trailers to discourage drivers from parking trailers along the road while waiting to enter the port.

6) No Parking along internal Roads and Establishment of Waiting Area(Demonstration Trial)

Parking along internal roads encumbers trailers as they move. Parking has been banned at some road sections and a waiting area has been set up for trailers to wait inside Chennai Port.

7) Allocation of Traffic Officers (Demonstration Trial)

Congestion at the intersection in Chennai Port was so serious that traffic control was becoming increasingly necessary. Therefore, traffic officers were allocated at key intersections to give instructions to drivers inside the port.

8) Additional Gate for empty container trailers at DPW terminal

An additional terminal gate for empty container trailers was set up at the area of the DPW terminal which used to be for the handling of iron ore. It has streamlined the traffic flow inside Chennai Port and contributed to alleviating traffic congestion.

9) Pre-Document Check prior to Port entry (Task Force Activity)

Task Force Team was formed at the initiative of Chennai Port Trust to combat traffic congestion. It consists of ChPT, Terminal Operators and CFS association etc. Before entry to the port, trailer drivers are subject to a document check by the Task Force. They are not allowed to enter the port until they show the proper documents.

10) Promoting Traffic Discipline among Drivers (Task Force Activity)

As one of activities of the Task Force Team, trailer drivers are instructed to keep proper intervals by traffic officer while forming a line on the road toward Port Gate No.1. The officer patrols the road on a motorbike. Traffic discipline of drivers is expected to be improved and traffic congestion decreased.

11) Survey of Terminal Gate Operation

With the cooperation of the DPW terminal, the movement of container trailers passing through the terminal gate was recorded by a camera set up at the entrance in order to grasp the efficiency of gate processing. This survey was useful for analyzing the causes of congestion related to the terminal gate and suggesting measures for alleviation.

12) Incoming Traffic throughput Analysis

The Team analyzed the processing capacity of Port Gate No.1, terminal gates and terminal yards in order to identify bottlenecks and proposed measures for upgrading the processing capacity to attain the target at each gate and yard.

13) Continuous Traffic Congestion Survey

The Team conducted a traffic congestion survey outside/inside Chennai Port during every dispatch. The survey results were utilized to grasp the present situation and examine the outcome of efforts to alleviate traffic congestion and so on. Findings were fed back to the study activity on improvement of Chennai Port Operation.

14) Technical Seminar for staff of Chennai Port Trust and CISF

Technical Seminars were held for staff of ChPT and CISF by the Team when the bar-code reading system was introduced as a demonstration trial. Trainees could learn how to use the bar-code reading system in the seminar.

15) Introduction of Bar-code Reading System (Demonstration Trial)

As part of modernization of access control procedures for trailers using IT, the Bar-code reading system was introduced at the Port Gate No.1.

16) Introduction of Web Portal System (demonstration Trial)

As one of the demonstration trials to alleviate traffic congestion using IT, Web Portal System has been established to provide congestion information. Everyone can access the information on the number of trailers passing through the Port Gate No.1 on an hourly basis using the website of ChPT.

17) Introduction of RFID System

ChPT has a plan to introduce an RFID (Radio Frequency Identification) System to attach IC tags to trailers with the cooperation of related organizations. The system aim to increase the efficiency of cargo handling management and gate processing by sharing information among ChPT, CFS and terminal operators etc.

18) Widening and improvement of roads in Chennai Port

The widening and improvement of internal roads have been carried out inside Chennai Port to alleviate traffic congestion. In addition, the traffic flow has been clearly separated.

19) Expansion of Port Gate No.1

Port Gate No.1 is the only gate for container trailers to enter and exit Chennai Port, but the lane capacity was insufficient to cope with the number of waiting trailers. Accordingly, ChPT expanded Port Gate No.1 from 4 to 8 lanes.

20) Widening and Improvement of State Highway 114

State highway 114 is the only road connecting to the Port Gate. Widening and improvement works of Highway 114 are ongoing in order to provide a dedicated lane for container trailers.

21) Development of Approach Road to Port Gate No.1

Insufficient road infrastructure is also one of the causes of traffic congestion. The approach road to Port Gate No.1 has been widened and improved to improve the traffic flow of trailers.

22) Study on Direction of the Master Plan

The workshop on the master plan was held in ChPT. The Team discussed the direction of the master plan and stressed the importance of infrastructure projects as well as the need to further alleviate traffic congestion.

23) Strengthening of Partnership with Tamil Nadu Government ChPT invited officials of the Tamil Nadu Government to attend the S/C. Officers from Traffic Police and Road section of Tamil Nadu joined the expanded S/C to assist with congestion alleviation efforts.

24) Activity Report of JICA Study

The Team prepared an activity report which details the current state of traffic congestion, analyzes congestion trends, describes the efforts and outcome of measures to decrease congestion and all other study activities undertaken at each dispatch. It is submitted to ChPT, JICA etc. ChPT will utilize the results of the report to take further measures for decongestion.

The following tables show the decongestion measures proposed by the Team suggested which have been taken inside/outside port and at the terminals. They are also classified by the causes and dispatch times

Table 4-1 Measures conducted outside the port in the last two years

【 Program Matrix of Congestion Issue 】			Data Collection Survey 6-7/12/2013	Technical Assistance : 1st Year of Assistance				Technical Assistance : 2nd Year of Assistance			
				1st Dispatch 21/7-13/8/2014	2nd Dispatch 30/9-5/11/2014	3rd Dispatch 19/1-7/2/2015	4th 13-24/4/2015	5th Dispatch 7-28/7/2015	6th Dispatch 30/9-20/10/2015	7th Dispatch 27/1-16/2/2016	8th Dispatch 22/5-5/6/2016
Site	Cause of Congestion	Issue	Examined/Proposed and/or Implemented Congestion Alleviation Measures								
Outside the Port	Insufficient Capacity of Access Road	Low Standard Road	Improvement of SH114 and Approach Road to Port Gate No.1 by NHAI/ Development of Dedicated Lane for Trailers								
		Lack of Traffic Regulation	Proposal for Introduction of Traffic Regulation								
			Demonstration Trial for Utilization of TVT-Parking has not been utilized afterward								
	Staying Trailers without Proper Documents	Insufficient Document Check	Successive Traffic Flow Control by Traffic Police								
			Introduction of Sticker by CFS								
		Insufficient Document Check	Introduction of Screening Center at TVT-Parking								
			Screening at Entrance of Approach Road								
	Concentration of Trailers at Specific Times	Trailer Departure at Specific Time	Issuance of HEP at TVT-Parking								
		Lack of Information on Congestion	Instruction for Export Containers to Terminate at CFS by Customs (no abidance)								
	Proposal for Leveling of Trailer's Departing Time										
Lack of Driver's Discipline	Bad Driving Manners	Proposal for Provision of Information on Congestion by Utilizing IT									
		Demonstration Trial on Web-Portal System									
			Traffic Control by Trailer Owners Association								

Table 4-2 Measures conducted inside the port in the last two years

【 Program Matrix of Congestion Issue 】			Data Collection Survey 6-7/12/2013	Technical Assistance : 1st Year of Assistance				Technical Assistance : 2nd Year of Assistance			
				1st Dispatch 21/7-13/8/2014	2nd Dispatch 30/9-5/11/2014	3rd Dispatch 19/1-7/2/2015	4th 13-24/4/2015	5th Dispatch 7-28/7/2015	6th Dispatch 30/9-20/10/2015	7th Dispatch 27/1-16/2/2016	8th Dispatch 22/5-5/6/2016
Site	Cause of Congestion	Issue	Examined/Proposed and/or Implemented Congestion Alleviation Measures								
Inside the Port	Lack of Driver's Discipline	Bad Driving Manners	Proposal for Allocation of Traffic Control Person at Intersections								
			Allocation of Traffic Control Person								
Inside the Port	Insufficient Capacity of Port Gate No.1	Long Processing Time	Proposal for Introduction of No-Parking Regulation on the Roads								
			Introduction of Waiting Areas for Trailers								
		for Verification/Registration (CISF(IN))	Proposal for Simplification of Procedure by Utilizing IT								
			Proposal for Simplification of Verification/Registration								
			Simplification of Verification/Registration								
			Demonstration Trial on Bar-Code Reading System								
	for Verification(Customs(OUT))	Study on Introduction of RFID System									
		Introduction of RFID System									
	for Registration(CISF(OUT))	Simplification of Verification/Registration									
		Random Verification									
Insufficient Capacity of Internal Road	Lack of Lanes	Expansion of Port Gate No.1 from 4 Lanes to 8 Lanes									
		Proposal for Traffic Planning and Road Improvement Planning									
Confusion at Intersections	Lack of Traffic Regulation	Low Standard Road	Successive Road Improvement								
			Proposal for Introduction of No-Parking Regulation and Waiting Space								
		Establishment of Three Waiting Areas for Trailers									
Monitoring											
Proposal for Allocation of Traffic Control Person											
Demonstration Trial											
Allocation of Traffic Control Person (on occasional basis)											
Monitoring											

Table 4-3 Measures conducted at Terminal and Overall Agendas in the last two years

【 Program Matrix of Congestion Issue 】			Data Collection Survey 6-7/12/2013	Technical Assistance : 1st Year of Assistance				Technical Assistance : 2nd Year of Assistance			
				1st Dispatch 21/7-13/8/2014	2nd Dispatch 30/9-5/11/2014	3rd Dispatch 19/1-7/2/2015	4th 13-24/4/2015	5th Dispatch 7-28/7/2015	6th Dispatch 30/9-20/10/2015	7th Dispatch 27/1-16/2/2016	8th Dispatch 22/5-5/6/2016
Site	Cause of Congestion	Issue	Examined/Proposed and/or Implemented Congestion Alleviation Measures								
Terminal	Insufficient Capacity of Terminal Gate	Long Processing Time	Proposal for Smooth Passing at Gate								
		Insufficient Processing Capacity	Examination of Gate Capacity								
	Control at Terminal Gate	Inefficient Gate Operation	Completion of Gate Capacity								
Overall Agenda	Lack of Sustainable System for Improvement on Port Operation	Establishment of Entry/Exit Control	Study on Improving Efficiency of Gate Operation								
			Proposal for Establishment of Entry/Exit Control System								
	Improvement of Synergy among Authorities Concerned	Forming of WG									
		Proposal for Enlarged Steering Committee (ChPT has started to call on State Gov. officials to S.C)									
Lack of Master Plan	Study on Direction of the Master Plan	Task Force for Congestion Free Chennai									
		Proposal for Improvement of Infrastructure inside the Port									
Examination of Basic Direction of the Master Plan											

4.2 Evaluation of Technical Assistance

(1) Optimization of Trailer Flow

The measures implemented for optimizing trailers flow are evaluated as follows.

1) Introduction of a Sticker for a Container Trailer

The sticker introduced during the 1st and 2nd dispatch is no longer being used. It was originally introduced to confirm whether a trailer had cleared the documentation check as it entered the gates. However, as the percentage of drivers carrying the proper documents increased, the need for this system disappeared. According to the survey conducted by the Team, the document possession ratio was improved by 3-4 % at the 6th dispatch, when stickers were no longer used, compared to the 2nd dispatch, when it was first implemented.

2) Simulation Model Analysis for Traffic Decongestion

The simulation model analysis was conducted in order to project the effects of demonstration trial 1 (Barcode reading system), trial 3 (No parking rule and waiting area), and trial 4 (arrangement of traffic officers). The simulation contributed to the optimization of trailer flow as it allowed the relevant parties to visualize the effects of the trials before their implementation.

3) Effective Utilization of TVT-Parking (Demonstration Trial 2)

The utilization of TVT-Parking was originally based on the idea that a trailer driver himself would pick up the HEP. The trial, however, revealed that most of the people who came inside were not drivers but employees of CHA (Customs House Agent), CFS, etc. Therefore, this measure did not directly contribute to the optimization of trailer flow. However, TVT-Parking plays an important function in issuing the HEP; a HEP can be issued at TVT-Parking 24 hours a day while it can only be issued during the day at the central HEP issuance office. In this sense, it contributed to the optimization of trailer flow indirectly.

4) No Parking along Internal Roads and Set-up of Waiting Area (Demonstration Trial 3)

The traffic regulation to prohibit parking along internal roads was not implemented after the demonstration trial and the parked cars are still one of the main factors impeding the trailer flow.

On the other hand, the establishment of the waiting area did contribute to optimizing the trailers flow (to some extent). After the trial, four waiting areas were newly established inside the Port which have been used by some trailers. However, despite the establishment of these waiting areas, the number of cars parked along internal roads did not decrease. This is considered to be due to an increase in empty trailers waiting for jobs inside the Port as well as the fact that trailer drivers have not been properly guided to the waiting areas.

Accordingly, further enhancement of measures to guide parked trailers to the waiting areas is required as well as compliance with the no parking rule along the internal roads.

5) Allocation of Traffic Officers (Demonstration Trial 4)

Traffic officers continued to be allocated after the demonstration trial. Although just a single traffic officer, security guard or a ChPT officer, was allocated at first, officers from multiple organization as a task force team are allocated lately. The Team also observed that CISF officers were additionally allocated during period of heavy congestion. However, traffic officers require training on traffic control because instructions by traffic officers were sometimes ignored by trailer drivers.

6) Additional Gate for Empty Trailers at DPW Terminal

The implementation of the new DPW gate specialized for empty trailers in April 2015 was one of the effective measures for the optimization of trailer flow. Separating the flow of empty trailers from that of export container trailers has been effective because empty trailers often wait for job orders or proper documents inside the Port.

However, the trailer flow has not been completely separated because empty trailers were still accepted at the DPW IN Gate which was meant for export container trailers. This occurred because an empty trailer could not exit from the entrance queue before entering into the DPW terminal once it reached to the DPW terminal. Furthermore, the empty trailer flow and the export trailers flow sometimes crossed at the intersection near the X-Ray inspection area after the implementation of the new gate. Further optimization of the trailers flow can be achieved if these issues are addressed and the empty and export container flows are completely separated.

7) Pre-Document Check Prior to Port Entry (Task Force Activity 1)

The pre-document check, which was conducted on the access road toward Port Gate No.1 during the 7th dispatch, was one of the activities undertaken by the Task Force Team (which consists of ChPT, container terminals, trucking companies, etc).

This document screening activity was similar to the one which used to be conducted at TVT-Parking in 2014. The document screening aims at removing parked trailers which are waiting for the proper documents on the road. As the number of drivers carrying the proper documents actually increased for export container, these screening activities have somewhat contributed to optimization of trailers flow inside and outside the Port.

8) Promoting Traffic Discipline among Drivers (Task Force Activity 2)

The Team observed that traffic officers instructed trailer drivers to drive along a lane, keep proper intervals, etc. during the 7th dispatch. The traffic officers were dispatched from trucking companies organized by ChPT. Although, the Team had previously observed similar activities by the trailer union and CFS association, it was the first attempt for ChPT to organize such a team by themselves. Thanks to the instructions from officers, situation in which container trailers prevented general vehicles from proceeding were avoided. Furthermore, together with the restrictions on trailers entering the city area which have been enforced by the traffic police, the traffic flow along the State Highway 114 has greatly improved. These activities definitely contribute to optimizing the traffic flow outside the Port.

However, activities undertaken by the task force team were discontinued at the 8th dispatch. Although the traffic flow has remained in good condition, it was often observed that only a few trailers proceeded to

Port Gate No. 1. This may be a result of traffic police ordering trailers to stop even when the road ahead is cleared in the suburbs. It is caused by a lack of communication among the various traffic police officers working on the access roads. These issues need to be addressed.

9) Survey on Terminal Gate Operation

Based on the findings from the survey on terminal gate operation during the 6th and 7th dispatch, the Team proposed the TOR for the operational rules on the entry process of trailers at terminal IN Gates during the 8th dispatch. The TOR is based on the three basic concepts, that is, eliminating parking trailers in front of terminal gate, relocation of survey point, and full-time allocation of traffic control persons. The TOR proposes the improvements to facilities, operational rules which should be followed by trailer drivers, the procedures to be followed by surveyors or traffic control persons when instructing or guiding trailer drivers, etc. If the TOR is fully implemented, the trailer flow in front of DPW IN Gate will become smoother, which will enhance not only the trailer flow towards terminals inside the Port but also the whole trailer flow towards the Port.

10) Incoming Traffic Throughput Analysis

The Team studied the relation between the trailer processing capacity among major points in the trailer flow and the traffic congestion during the 8th dispatch. In this study, the required capacity, the current capacity, and the target capacity were calculated, summarized, and compared. The results of the study are shown in the following figure.

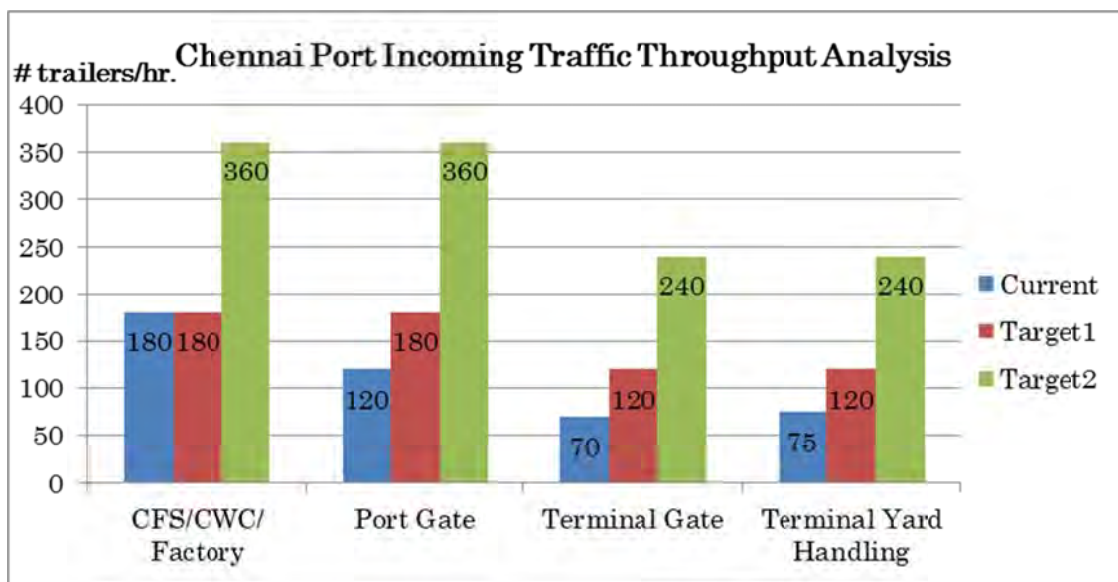


Figure 4-2 The Comparison of Processing Capacity among major Points in the Trailer Flow

The study clarified the target processing capacity of trailers both at the port gate, terminal gates, and terminal yard handling. The target values and the optimization of trailer flow inside and outside the Port

can be achieved by both ChPT and container terminals if the necessary improvements are made.

11) Continuous Traffic Congestion Survey

The Team has conducted the traffic congestion survey continuously from the 1st dispatch to 8th dispatch and summarized the results in the activity reports. Furthermore, the Team tried to optimize the trailer flow inside and outside the Port by making a various proposals based on the results of the survey. The Team believes it is necessary to continue conducting such traffic congestion surveys and propose congestion alleviation measures base on the findings.

(2) Introduction of IT Related Measures

1) Barcode Reading System (Demonstration Trial 1)

The Barcode Reading System introduced in the demonstration trial 1, was continued for 6 months. The system confirms and records the entry and exit of trailers at Port Gate No.1 by scanning the barcode printed on HEP into the system.

The introduction of the system helped alleviate the traffic congestion as the processing time for confirming and recording the entry and exit of trailers at Port Gate No.1 was shortened. The processing time was reduced due to the continuous improvements of the procedures at Port Gate No.1 by CISF. (Refer to Figure 3-1 for the transition of the processing time at Port Gate No.1)

The Team proposed the establishment of a sustainable system at Port Gate No.1 base on the experience in the trial and the succeeding 6 months of operation of the Barcode Reading System. The proposal includes the necessary organization and operating method as well as the functions necessary for the actual implementation of the Port Entry/Exit Control System. This proposal can also be applied to the RFID system which will be implemented and operated by ChPT.

2) Web Portal System

The Team conducted the demonstration trials on Web Portal System during the 7th and 8th dispatch. However, they were suspended after the Team returned to Japan and have yet to be restarted. The aim of the demonstration trial was to show the importance of sharing information on traffic congestion with stakeholders. Although the trial period was short, the Team thoroughly explained its objectives prior to the start of the trial and thus believes the aim was achieved.

The trial was conducted by using the existing ChPT Homepage. CISF entered the data daily and ChPT/EDP rearranged the Homepage and retrieved the data entered by CISF. As a result, it was clarified that there is no technical issue in implementing the Web Portal System.

However, the system operation was finally suspended after several issues arose. No actions were taken to resolve these issues despite the fact that the Team covered such matters as the detection of issues, reception of failure report, arrangement of the persons in charge, etc. during its stay in Chennai. The Team thus recognized the necessity of establishing a sustainable system in order to operate the system continuously as described above.

3) RFID System

The RFID system consists of 1) the system to utilize the shared information among CFS/ChPT/terminals by reading a RFID tag on a trailer at the CFS, port gate, terminal gate, and 2) the system to control entry/exit of the Port by using a RFID based HEP, which will replace the existing HEP.

The system of the 1) is to improve the processing efficiency at terminal gates. Furthermore, the system will also contribute to improving the efficiency of the reception procedure at Port Gate No.1 and enable the dissemination of more advanced information on traffic congestion by using the information collected by RFID tags.

The purpose of 2) is to further improve the efficiency of the reception procedure at Port Gate No.1 and to realize a complete Port Entry/Exit Control System with fewer CISF officers than at present.

(3) Improvement of infrastructure

1) Improvement of infrastructure inside the port

The Team has surveyed the status of infrastructure inside the port and has proposed measures to reduce traffic congestion at every dispatch. Based on these proposals, various projects (originally planned by ChPT) such as extension of the gate, widening of the roads, and streamlining of the vehicle flow are being expedited. Accordingly, ChPT's efforts to improve infrastructure inside the port in order to reduce traffic congestion should be positively evaluated.

2) Improvement of access roads outside the port

Widening of State Highway 114 (SH114) has been expedited on the recommendation of the steering committee. Furthermore, improvement works of the approach road from SH114 to Port Gate No.1 are on-going. These projects have been contributing to reduction of traffic congestion.

3) Examination of the basic direction for a master plan

The Team examined the basic direction for formulation of a master plan and proposed some project ideas through holding workshops.

As traffic congestion has been reduced thanks to the congestion alleviation measures that the Team and ChPT jointly conducted, ChPT requested the Team to conduct the master planning study which focuses on infrastructure projects for improvement of port operation.

4) Examination for remodeling of Jawahar dock

The Chairman in charge requested the Team to support the study on the remodeling of Jawahar dock. The dock is located in the center of the port and handles bulk cargoes; however, its facilities are superannuated. The purpose of remodeling the dock is to increase cargo handling efficiency.

(4) Development of Social Environment

1) Steering Committee (S/C) on Improvement of Chennai Port Operation

S/C has been set up to discuss and implement measures for easing congestion. Concerned authorities can share related information in the committee and tackle traffic problems together. The working group (W/G) meeting, where preliminary discussions are held prior to the S/C, has also been set up. The Team reported on the status of congestion and presented its survey results which enabled participants to deepen their understanding of congestion issues. After reaching a consensus through discussions, various measures to alleviate congestion have been successfully implemented.

2) Establishment of a sustainable Port Entry/Exit Control System

The Team prepared the TOR on implementing a sustainable Port Entry/Exit Control System based on the results of the demonstration trial on the barcode reading system and the succeeding 6 months of operation. The TOR includes running rules for sustainable operation, an emergency contact plan, a system expansion plan for re-starting the bar code reading system, etc.

Although the TOR has not been implemented, the need to establish a sustainable system is gradually being recognized in ChPT and CISF. In particular, ChPT traffic department held a Working Group meeting on its own initiative with CISF and ChPT EDP section in order to discuss issues related to the demonstration trial on the Web Portal System. CISF also stressed the necessity of establishing a sustainable system for system maintenance at several meetings. In this way, a change in thinking on the part of ChPT and CISF officers was observed

3) Strengthening the Partnership with the Tamil Nadu Government

The Tamil Nadu Government which develops and manages the access roads to the port is also involved in congestion issues. Therefore, ChPT invited officials of Tamil Nadu Government to attend the S/C based on a suggestion by the Team. Officers from the Traffic and Road section of Tamil Nadu have joined the expanded S/C to assist with congestion alleviation. ChPT has also formed a Task Force Team at its own initiative to combat traffic congestion. It consists of ChPT, Terminal Operators and CFS association etc. In this way, the management & operation of ChPT has been greatly improved.

4.3 Objective Evaluation for the Project

The outcomes of the efforts made to decrease congestion over the last 2 years are objectively evaluated as follows.

(1) Outcome of measures for decreasing the number of trailers outside the port

The Team surveyed the congestion status outside the port from the beginning of the study. The number of queuing trailers along SH 114 and Manali area was counted every day during the Team's stay. Trend of the number of queuing trailers outside the port is as follows. The number of queuing trailers depends on the container handling volume; therefore, the figure is converted to the number of queuing trailers per handling volume of 100 thousand containers per month.

Table 4-4 Number of queuing trailer outside the port

No. of Trailers outside the Port	Data Collection Survey 6-7/12/2013	First Year Technical Assistance				Second Year Technical Assistance			
		1st Dispatch 21/7-13/8/2014	2nd Dispatch 30/9-5/11/2014	3rd Dispatch 19/1-7/2/2015	4th Dispatch 13-24/4/2015	5thDispatch 7-28/7/2015	6th Dispatch 30/9-20/10/2015	7thDispatch 27/1-16/2/2016	8thDispatch 22/5-10/6/2016
Number of Trailers by converting the handled containers per month to 100,000									
Maximum No./Day	906	759	1146	502	517	530	628	678	415
Average No./Day	676	278	362	143	245	193	326	391	211
Max No./Day on SH114	—	297	346	217	230	216	332	147	248
Ave No./Day on SH114	—	160	186	53	133	113	130	88	127

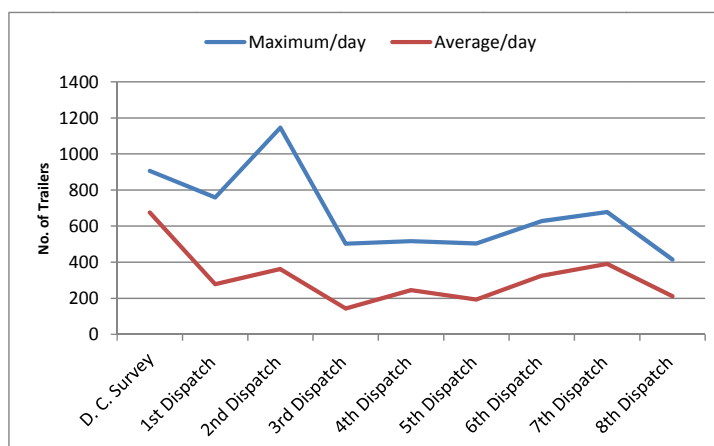


Figure 4-3 Trend of number of queuing trailers outside the port

The maximum number of queuing trailers has clearly been reduced, while the average number of queuing trailers showed a slight declining tendency. Recently, heavy congestion has often been observed at the Manali area but not on SH114. This reason is thought to be due the traffic control efforts by the traffic police and the task force in which trailers have been forced to make queues at the Manali junction far from Port Gate No.1 instead of SH114. Overall traffic control operations will be required.

(2) Outcome of measures for improving the processing time at Port Gate No.1

The processing efficiency at Port Gate No.1 was drastically improved by simplifying the verification process and introducing the bar-code reading system (although the latter has been discontinued).

Table 4-5 Processing time at Port Gate No.1

Processing Time at Port Gate No.1		Jun. 2014	Feb. 2015(during the Demonstration Trial)	Apr. 2015(after the Demonstration Trial)
Average Processing Time / Truck / Lane	IN Gate	3.5	2.5	1.8
	OUT Gate	5.5	2.0	2.3

ChPT intends to introduce a RFID system which is now in the trial stage. After full implementation,

it will be possible not only to secure entry/exit control, but also to enhance the processing efficiency at the Gate.

(3) Outcome of measures for reducing the transit time from CFSs to Port gate No.1

The Team also conducted surveys on the transit time (lead time) from CFSs to Port gate No.1 on three occasions. Shortening of the transit time results in significant economic merits for port users. Degree of shortening of the transit time is thought to be an index to grasp the effect of the congestion alleviation measures. The results of the three surveys on the transit time are shown below.

Table 4-6 Transit time required from CFSs to Port gate No.1

Transit Time Required from CFSs to Port Gate No.1	First Year		Second Year		
	2nd Dispatch (2014)		7th Dispatch (2016)		8th Dispatch
	04 Oct.	18/19 Oct.	12 Feb.	13 Feb.	02 Jun.
Average Transit Time during Surveys	28:29 hrs	40:25 hrs	17:43 hrs	19:24 hrs	14:54 hrs
No. of Trailers surveyed	155	200	327	398	129
No. of Queuing Trailers on the Survey days	595	803/689	874	785	497

Note: During the 8th dispatch, the average transit time on June 1st was 7:22 hrs. (no. of samples: 351.) However, no. of queuing trailers on that day was unusually small (only 75 trailers). Therefore, the team regarded this as an anomaly and data obtained is used for reference only

During interviews, Japanese companies in Chennai and Bengaluru confirmed that the transit time in Chennai port has been shortened.

5 Future Issues

5.1 Follow-up for improvement of Chennai Port operation

In the project on improvement of Chennai Port Operation, the Team has conducted various measures for alleviating congestion after examining the status of trailer movements inside /outside the port and the processing situation at terminal gates. The Team also conducted several trials including the use of IT to test the effectiveness of its proposed measures.

Some of the measures introduced have already produced the desired results. However, other measures such as the web portal system using IT require further technical assistance from JICA as ChPT does not yet possess the expertise to effectively operate such as system. In addition, the Indian government intends to introduce a RFID system at all major ports including Chennai Port. It is recommended that the implementation of the RFID and web portal systems be combined in order to increase ChPT's port management and operation capacity. Accordingly, the project on improvement of Chennai Port operation should be extended for an additional year in order for ChPT to gain the expertise which will allow it to sustainably operate these systems by itself.

The technical assistance rendered in this project to date has mainly focused on non-structural (software) measures. Such measure should continue to be refined. However, the modernization of Chennai port is vital to successfully compete with newly developed neighboring ports, and thus it is also necessary to focus on hardware aspects (infrastructure). In discussions on the direction of the Master Plan, ChPT requested assistance for improving the operation of Chennai port by introducing the required infrastructure in addition to following up on the abovementioned software measures.

5.2 Modernization of Chennai Port I

(1) Introduction of a Web Portal System

The Web Portal System, which publishes information such as a Key Performance Indicator (KPI) representing the degree of congestion, is an indispensable measure for alleviating the traffic congestion inside and outside the Port. Although, there are many active Web System around Chennai Port, such as ChPT Homepage, Port Community System, Homepages of DPW/PSA terminals and shipping lines, etc., there is no such a system which provides the PKI for traffic congestion to all the stakeholders including the state government and trailer unions. The Team has proposed the necessity of such Web Portal System to all the stakeholders from the beginning the project and even implemented a demonstration trial during the 7th and 8th dispatch. It is an opportune time to introduce the Web Portal System because the RFID system, which is capable of automatically collecting information as a common indicator of the traffic congestion in real time, is now being implemented.

In addition, traffic control by the Task Force Team or the traffic police has recently been conducted on the access roads outside the Port. Although this is effective for alleviating the traffic congestion, it may

sometimes control the trailer flow too much in the suburbs so that only few trailers arrive at the Port Gate No.1. Traffic congestion in the suburbs is also exacerbated. The introduction of an IT system to improve the current situation should be examined.

(2) Improvement of Gate Efficiency and Port Entry/Exit Control System

The demonstration trial on the barcode reading system was implemented at Port Gate No.1 during the 2nd dispatch. Since then, the gate processing efficiency has been continuously improved in Chennai Port. The Team has proposed the implementation of sustainable Port Entry/Exit Control System based on the experience in operating the barcode reading system. Although the proposal has not been implemented yet, the need to establish a sustainable system is gradually being recognized among the stakeholders in Chennai Port.

ChPT is currently implementing the first step of the RFID system for controlling the entry and exit of trailers at Port Gate No.1 instead of the barcode reading system. It is necessary for ChPT to complete the Port Entry/Exit Control system using the RFID system up to the 2nd step, which includes the implementation of the RFID based HEP, in order to modernize Chennai Port. Furthermore, the establishment of the sustainable system proposed by the Team is also required for operating these systems. This remains a challenging issue.

5.3 Modernization of Chennai Port II

The government of India and ChPT should request JICA assistance in formulating the master plan of Chennai Port. The necessary infrastructures need to be developed in order to modernize the port. The main issues related to infrastructure development of Chennai Port are as follows.

(1) Improvement of access to the hinterland

Congestion created by container trailers was the main reason behind this project. Further improvement of access roads to the port is an urgent issue which needs to be addressed. Railroad is extended inside the port, but it is currently not utilized to a great extent. Accordingly, the modernization of railroad infrastructure should be examined to increase the efficiency of operations.

(2) Infrastructure development to ease congestion and enhance cargo handling efficiency

No parking along internal roads, the establishment of a waiting area for trailers, traffic control by traffic officers and widening and improvement of internal roads in Chennai port are positive measures which have been introduced as part of this project. However, further improvement of road infrastructure including the construction of a new flyover needs to be examined. Enhancing cargo handling operations and protecting the environment are also important issues which should be simultaneously addressed.

(3) Competing with neighboring ports

Chennai port is playing an important role in stimulating economic growth around Chennai area as the largest port in eastern India. However, new ports such as Kamarajar and Kattupali have recently been developed which feature modernized port facilities. Therefore, the modernization of infrastructure at Chennai port as well as management & operation need to be examined. To compete with neighbouring ports, it will be necessary to determine which types of cargo Chennai port should target. In this regard, a cooperative relationship with neighbouring ports should be fostered.

(4) Improvement of Customs service

Customs service procedures inside/outside the port for export/import container also have a significant impact on traffic congestion. Japanese companies which utilize Chennai port have pointed out that their business activities are hampered by the inefficient customs procedures. Therefore it is important to grasp the situation and identify aspects that can be improved through interviews with stakeholders and so on.

(5) Timely development of infrastructure through PPP and ODA

Proper procurement of a budget is necessary to develop port facilities in a timely manner. As the government is facing financial constraints, PPP (Public Private Partnership) is one possible effective scheme for the development of port facilities. However, a PPP scheme is only applicable to profitable facilities. The Government will have to finance the development of non-profitable facilities.

(6) Implementation of sustainable development including environmental protection measures

Environmental burden related to port activities should be reduced at Chennai port due to its proximity to the city. Iron ore and coal are no longer handled at Chennai port due to environmental concerns but the port does handle gravel and fertilizer which may generate dust. The working environment also needs to be improved such as providing a sufficient number of toilets and shaded break areas for trailer drivers, as well as ensuring that there is a sufficient water supply.

Recently, ChPT launched a trial of the use solar energy for small buildings. Further efforts to promote a clean environment should be elaborated in a comprehensive master plan

Attached Documents

- A) Memorandum of Understanding (MOU) on The Implementation of Demonstration Trial (21 October 2014)**
- B) Memorandum of Understanding (MOU) on The Implementation of Demonstration Trial of Web Portal System (21 October 2015)**
- C) Recommendation of Implementation Port Entry/Exit Control System**
 - New Barcode Reading System and its Sustainable Operation System -**
- D) Improvement of Synergy on Operation of Regulatory Authorities Concerned**
- E) TOR on Operation Rule for Trailer Entry Process at Terminal IN Gates**
- F) Written Request of Extension of the Project Period for One Year**
- G) Visualized Presentation Materials (English Version) (June 2016)**

A) Memorandum of Understanding (MOU) on The Implementation of Demonstration Trial (21 October 2014)

Memorandum of Understanding (MOU) on The Implementation of Demonstration Trials

The JICA Study Team (hereafter referred to as "The Team") for the project on Improvement of Chennai Port Operation, headed by Mr. Akira KOYAMA, and Chennai Port Trust (hereafter referred to as "ChPT"), based on the discussion at the Steering Committee on 17 October 2014, agreed the implementation of demonstration trials as follows:

1. Background

The Team observed that traffic congestion at Chennai Port was very severe both inside and outside port area and understood that comprehensive measures which include smoothing gate procedures by avoiding duplication and hand-writing, establishing traffic regulations, and improving road facilities, should be taken through coordination among agencies concerned.

Based on the understanding that a demonstration trial is useful method to verify the effects of measures for congestion alleviation, The Team proposed the implementation of demonstration trials for alleviating congestion which should be carried out by agencies concerned at an early stage in collaboration with The Team.

2. Demonstration Trials

The demonstration trials consist of the following items. The outline of demonstration trials are attached in Appendix.

- (1) Simplification of Gate Procedures at Port Gate No.1
- (2) Utilization of TVT-Parking
- (3) Restriction of Parking and Provision of Waiting Spaces
- (4) Allocation of Traffic Control Persons in Port Area

The scope of demonstration trials will be agreed between The Team and ChPT by the end of January 2015.

3. Implementation of Demonstration Trials



The demonstration trials will be implemented at the next dispatch of The Team (from January to February, 2015) on the present facilities of Chennai Port.

The duration of demonstration trials will be determined in the scope of demonstration trials.

4. Undertaking of ChPT

Undertaking by ChPT in close cooperation with agencies concerned includes the followings to implement demonstration trials.

- (1) To be responsible for the implementation of demonstration trials in coordination with agencies concerned
- (2) To prepare necessary facilities, equipment, and personnel to implement demonstration trials; such necessary equipment will be prepared by The Team in case that ChPT is unable to provide it, upon consultation basis
- (3) To assign Senior Deputy Traffic Manager as counterpart personnel
- (4) To implement demonstration trials according to the scope of demonstration trials
- (5) To report The Team on the results and findings of the demonstration trials by the end of March 2015

5. Undertaking of The Team

Undertaking by The Team includes the followings to implement demonstration trials.

- (1) To prepare draft scope of demonstration trials
- (2) To provide guidance and advices for the implementation of demonstration trials
- (3) To evaluate the effectiveness of congestion measures based on the results and findings of demonstration trials

21 October 2014



Mr. Akira KOYAMA
Team Leader, JICA Study Team
Principal Researcher
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Appendix

Outline of Demonstration Trials

1. Demonstration Trials for Alleviating Congestion in City Area

1-1. Simplification of Gate Procedures at Port Gate No.1(IN) (to be conducted by ChPT and CISF)

- The role of Port Gate No.1 will be restricted mainly to the entry/exit control of persons and vehicles.
- Gate procedures should be simplified.
- Advisable procedures at Port Gate No.1(IN) by CISF are as follows.
- Bar-code reader will be used for log book entry in order to reduce entry time.

- visual check
 - ① verification of vehicle number with HEP(vehicle)
 - ② verification of driver's license with HEP(driver)
 - ③ sticker for export container, DRF(or DO) for import container
 - ④ validity of Form13 for export container
 - ⑤ inside of empty containers
- log book entry
 - ① HEP(driver) number, HEP(attendant) number, HEP(vehicle) number
 - ② gate pass time
 - ※No log book entry for driver's license number and vehicle number
(Such information can be traced by HEP number.)
 - ※No log book entry for container number, load/empty, and terminal
(Such information can be traced by a sticker.)

1-2. Utilization of TVT-Parking (to be conducted by ChPT and Traffic Police)

- Re-issuing HEP at TVT-Parking is meaningful in that it may prevent truck drivers arriving at Port Gate No.1(IN) without proper documents. Hence the re-issuing is to be compulsory so that truck drivers without a valid HEP can be identified at TVT-Parking.
- Since trucks will enter TVT-Parking to receive HEP, traffic congestion on Route114 may be prevented. Trucks will be guided back to Route114 soon after receiving HEP.

2. Demonstration Trials for Alleviating Congestion in Port Area

2-1. Restriction of Parking and Provision of Waiting Spaces (to be conducted by ChPT)

- Parking at congested roads including the road toward Port Gate No.1(OUT) will be prohibited so that trucks can pass smoothly.
- Waiting spaces will be temporarily provided for trucks waiting for a double-transaction or for other reasons.
- Trucks other than waiting ones will be guided outside the port area.

2-2. Allocation of Traffic Control Persons in Port Area (to be conducted by ChPT)

- Traffic regulations will be strictly implemented and traffic control persons to patrol and direct truck drivers to secure smooth traffic flow will be allocated in port area.
- Especially at the intersection near DPW Terminal exit and at the entrance/exit of scanning center, traffic flow regulation will be considered and the direction by traffic control persons will be introduced.

2-3. Simplification of Gate Procedures at Port Gate No.1 (OUT) (to be conducted by ChPT and CISF)

- The role of Port Gate No.1 will be restricted mainly to the entry/exit control of persons and vehicles.
- As with Port Gate No.1 (IN), advisable procedures at Port Gate No.1(OUT) by CISF are as follows.
- Bar-code reader will be used for log book entry in order to reduce entry time.

- visual check
 - ① verification of vehicle number with HEP(vehicle)
 - ② verification of driver's license with HEP(driver)
 - ③ EIR for import container (to be collected thereafter)
- log book entry
 - ① HEP(driver) number, HEP(attendant) number, HEP(vehicle) number
 - ② gate pass time
 - ※ No log book entry for driver's license number and vehicle number
(Such information can be traced by HEP number.)
 - ※ No log book entry for container number and load/empty
(Such information can be traced by a sticker.)

B) Memorandum of Understanding (MOU) on The Implementation of Demonstration Trial of Web Portal System (21 October 2015)

Memorandum of Understanding (MOU) on The Implementation of Demonstration Trials of Web Portal System

The JICA Study Team (hereafter referred to as "The Team") for the project on Improvement of Chennai Port Operation, headed by Mr. Akira KOYAMA, and Chennai Port Trust (hereafter referred to as "ChPT"), based on the discussion at the Steering Committee on 15 October 2015, agreed to implement a demonstration trial of a Web Portal System as follows:

1. Background

The traffic congestion at Chennai Port is very severe both inside and outside port. Many stakeholders are involved in congestion issues, but the actual data concerning the traffic congestion are currently not open to the public. The Team considers that this is one of the reasons which make it difficult for the stakeholders to cooperate with each other and solve congestion issues. Therefore, The Team has proposed to implement a Web Portal System for information sharing concerning traffic congestion. In order to promote the Web Portal System, The Team considers that it is important to provide the actual environment where the stakeholders can realize the effectiveness and the necessity of such a system.

Based on the above, the Team proposes the implementation of a demonstration trial of a Web Portal System, which should be carried out by agencies concerned at an early stage in collaboration with The Team.

2. Demonstration Trial

The demonstration trial is implemented on the existing Internet Homepage of ChPT (hereinafter referred to as "Homepage"). The new page, which shows the information concerning the traffic congestion, is created on the Homepage.

The details of the demonstration trial are described in the Appendix.

3. Implementation of Demonstration Trials

The demonstration trial will be implemented at the next dispatch of The Team (around February, 2016) on the Homepage. The trial will be conducted for 2 weeks.

NZ



4. Undertakings of ChPT


Undertakings by ChPT include the following to implement the demonstration trial.

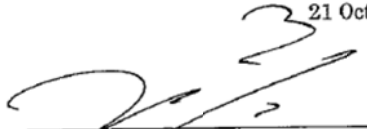
- (1) To be responsible for the implementation of the demonstration trial in coordination with agencies concerned
- (2) To finance and implement the modification to the Homepage and the development of software for the demonstration trial. The modification and the development shall be completed and fully tested by 20th January, 2016. The details of the software modification and development are described in the Appendix
- (3) To assign a Senior Deputy Traffic Manager as counterpart personnel
- (4) To implement the demonstration trial according to the procedure described in the Appendix
- (5) To hold the steering committee where all the stakeholders can exchange opinions regarding the demonstration trial within one week after the completion of the trial.

5. Undertakings of The Team

Undertakings by The Team include the following to implement the demonstration trial.

- (1) To take necessary actions for the demonstration trial according to the procedure described in the Appendix.
- (2) To evaluate the effectiveness of the demonstration trial and explain the result of the evaluation at the steering committee of the above 4. (5).


FOR
Mr. Akira KOYAMA
Team Leader, JICA Study Team
Principal Researcher
The Overseas Coastal Area
Development Institute of Japan

21 October 2015

Mr. B. VIMAL
Traffic Manager ic
Traffic Department
Chennai Port Trust

CC: Ministry of Shipping, India
Japan International Cooperation Agency (JICA)

C) Recommendation of Implementation Port Entry/Exit Control System -New Barcode Reading System and its Sustainable Operation System -

Recommendation on Implementing Port Entry/Exit Control System - New Barcode Reading System and its Sustainable Operation System –

1. Background

The barcode reading system was implemented in February, 2015 as one of the demonstration trials by the JICA study team (the Team) and was in operation for about 6 months. The user, CISE, stopped using the system in September due to several issues including barcode reading error and the tendency for PC/UPS to stop after a few hours of consecutive operation. Computers and other related hardware will eventually need repair/maintenance when operated for long periods of time but a department or organization that is responsible for such support works has not been designated. The barcode reading error, which is probably caused by a displacement of barcode on HEP, can only be avoided by periodically adjusting the alignment of barcode printers which are used in ChPT pass section. The Team has observed that the real issue here is not these failures, but the lack of an operation system to ensure continuous operation of the system by the party concerned.

Therefore, the team recommended ChPT to set up a Working Group for sustaining the operation of the Entry / Exit Control system. Running Rules of the Working Group are described below.

**Running Rules for the Working Group for Sustainable Operation System of Entry /
Exit Control for Chennai Port**

Article 1 (Purpose)

A Working Group shall be established for the purpose of strengthening the cooperation among parties concerned for the sustainable operation system of Entry / Exit Control for Chennai Port at Port Gate No.1.

Article 2 (Scope of Works)

The Working Group shall carry out the following.

- 1) To set up the objectives of the Entry / Exit Control System.
- 2) To set up rules of an operational procedure for the Entry / Exit Control system. The operational procedure defines the procedure for each party concerned in time sequence.
- 3) To establish an Emergency Contact Plan (ECP) among CISF, traffic department, EDP section, and Pass section in the event of serious trouble. ECP defines the contact point (phone number) for each type of emergency in a 24 hour/365 day environment.
- 4) To discuss the improvement of the system when any issues arise.
- 5) To discuss the enhancement of the system to cope with changes in the surrounding environment.

Definition and details of the works are explained in an attached document.

Article 3 (Composition and Roles)

Members of the Work Group shall be composed of the representatives of the following departments. The roles of each member are described below.

- 1) Representative from Chennai Port Trust (ChPT) Traffic Department
To be responsible for overall control of the operation of Entry / Exit Control System including the effective usage of the information obtained by the system
- 2) Representative from Gate Team of ChPT Traffic Department
To be responsible for the arrangement of gate lanes, maintenance of the access paths and the gate building including the power supply, air conditioning, etc.
- 3) Representative from Pass Section of ChPT Traffic Department
To be responsible for issuing Harbor Entry Permit (HEP) and its authorization.
- 4) Representative from EDP Section of ChPT Financial Department
To be responsible for development, procurement, installation, and maintenance of the computer hardware, application software, and necessary network, etc. of the Barcode Reading System
- 5) Representative from Port Gate No.1 Team of CISF
To be responsible for the security control of personnel and trailers passing through the gate

Article 4 (Leader)

- 1) The leader of the Working Group shall be the Traffic Manager of ChPT
- 2) The leader shall be representative of the Working Group
- 3) The Senior Deputy Traffic Manager of ChPT shall substitute for the leader of the Working Group in

case that the leader is unable to perform his duties.

Article 5 (Holding of Working Group Meeting)

- 1) The Working Group meeting shall be held every month as a regular session.
- 2) The leader of the Working Group shall be able to hold the Working Group meeting if needed.
- 3) The Working Group meeting shall be called up by the leader of the Working Group.

Article 6 (Secretariat)

- 1) The ChPT Traffic Department shall serve as the secretariat of the Working Group.
- 2) The secretariat of the Working Group shall deal with matters of the Working Group by order of the leader of the Working Group.

Article 7 (Miscellaneous Provision)

Matters necessary for running of the Working Group other than Articles from one to five above shall be determined by the leader of the Working Group.

Supplementary Provision

These running rules shall enter into force from *****

Definition and details of the works to be conducted by the Working Group

1. Definition of the System Objectives

The objectives of the system are as follows.

1) Simplification of the document check procedure at Port Gate No.1

The operation to record the log of trailers' entry and exit is done just by scanning the Harbor Entry Permit (HEP), which is far simpler than making handwritten entries. Furthermore, gate lanes can be increased using the minimum number of staffs because a single staff can operate the barcode reader for multiple lanes.

2) Strict control on the entry and exit of container trailers at Port Gate No.1

The entry and exit of trailers are more strictly controlled and checked using the system. The system can detect the illegal usage of HEP by drivers and trailers as the entry and exit record can be traced in the system. The statistical data for the entry/exit of drivers and trailers is accumulated and can be utilized for improving the Port Operation.

Note: When the RFID tag system is implemented, entry/exit of trailer is recorded automatically by the system. However, the barcode reading system is still required until the RFID tag base HEP is implemented.

2. Operation Procedure of the Entry / Exit Control system for Chennai Port

1) Periodical Adjustment of Barcode Printer Alignment

The alignment of barcode printers used in HEP issuance at ChPT pass section shall be adjusted periodically (e.g. once every three month). Otherwise, many HEPs with misprinted barcode have been already distributed widely when the misprinting is detected at Port Gate No.1. The adjustment shall be done by EDP section.

2) Document Check Procedure at Port Gate No.1

HEP of drivers, trailers, and driver's assistants are scanned at the Port Gate No.1 by CISF staff and their entry and exit records are logged in the system. The software of the barcode reading system shall be improved so that the hourly summary of trailers in/out is shown on the data entry screen. Furthermore, modification function for the registered data shall be provided for a CISF supervisor.

3) Supporting System and Environment

The following supporting system for the operation shall be established.

- a. To establish an Emergency Contact Plan among CISF, traffic department, EDP section, and pass section in the event of serious trouble. CISF mainly uses this plan and calls EDP for system failure including PC, UPS, power supply, network, and software. It may also be used to call the pass section for any HEP authorization issues.
- b. To setup a regular meeting among traffic department, pass section, EDP, and CISF to discuss enhancement needs, changes in the environment, system maintenance, etc.
- c. To provide the preliminary training course on the use of PC including virus protection, PC

maintenance, etc. for CISF supervisor.

- d. To provide a service so that the hardware / software engineers visit site periodically (e.g. once a week)

4) Usage of information obtained by the Entry/Exit Control System

The information obtained by the barcode reading system can be used in a variety of ways. Some examples are listed below.

- a. To publish the real time and hourly summary of trailers passing through the Port Gate No.1 on the ChPT Homepage.
- b. To periodically generate the following warning reports
 - Trailer and driver retention list
 - Trailers with different drivers in entry and exit
 - Drivers with different trailers in entry and exit
- c. To prepare a statistic report on container trailer movement

3. Emergency Contact Plan

- 1) CISF at Port Gate No.1:
- 2) ChPT Traffic Department (Marketing):
- 3) ChPT Traffic Department Gate Team:
- 4) ChPT Traffic Department Pass Section:
- 5) ChPT Financial Department EDP Section:

Hardware:

Software:

4. System Expansion

1) Hardware

- a. One set of PC/UPS/barcode reader shall be provided in every lane of Port Gate No.1. In total 9 lanes will be available for entry/exit from Port Gate No.1
- b. The same number of sets of PC/UPS/barcode reader as the above a. shall be provided as spare in case of hardware failure. One of the spare sets can be used by the CISF supervisor for confirming the data entry and data correction.
- c. At least one set of PC/UPS/barcode reader shall be provided in every pass section office where the HEP is issued. They are used to confirm the barcode is properly printed on the HEP.

2) Application Software

- a. Date entry screen shall be modified according to the Appendix 1. This modification helps CISF staff to generate the hourly summary of in/out trailers manually.
- b. Data correction screen shall be provided in case CISF staff makes data entry error.
- c. Daily summary screen which is identical to the existing hand prepared summary sheet shall be provided.

5. Others

- 1) Expansion of gate lanes of Port Gate No.1
- 2) Implementation of RFID tag at Port Gate No.1
- 3) Expansion of the barcode reading system to the other gates of the Port
- 4) Others

Appendix 1. The modification of Harbor Entry Permit Inquiry Screen

Summary			
Number of Trailers OUT from 1C			
	Laden	Empty	Total
06:00 - 07:00	10	10	20
07:00 - 08:00	15	5	20
08:00 - 09:00	20	3	23
09:00 - 10:00	18	6	24
10:00 - 11:00	4	5	9
11:00 - 12:00	8	2	10
12:00 - 13:00	20	15	35
13:00 - 14:00			
14:00 - 15:00			
15:00 - 16:00			
16:00 - 17:00			
17:00 - 18:00			
18:00 - 19:00			
19:00 - 20:00			
20:00 - 21:00			
21:00 - 22:00			
22:00 - 23:00			
23:00 - 24:00			
00:00 - 01:00			
01:00 - 02:00			
02:00 - 03:00			
03:00 - 04:00			
04:00 - 05:00			
05:00 - 06:00			
TOTAL	95	46	141

Additional part of the screen

Hourly summary is displayed when the window is opened and it is re-calculated / refreshed whenever the screen is initialized by the action of OK or CLEAR button.

In case of OK button, the summary must be re-calculated after the transaction is registered in the database.

(The other functions are kept as they are)

D) Improvement of Synergy on Operation of Regulatory Authorities Concerned

Improvement of Synergy on the Operation of Regulatory Authorities Concerned

Rationale

Chennai Port Trust has been tackling traffic congestion issues for many years. The Team in collaboration with ChPT has also introduced a variety of measures to alleviate traffic congestion. Some of the measures have been effective for reducing traffic congestion.

However traffic congestion still exists inside and outside the Port and some measures are not able to be implemented continuously. A lack of a sustainable system for implementing measures continuously and a lack of coordination among stakeholders are the reasons for the above.

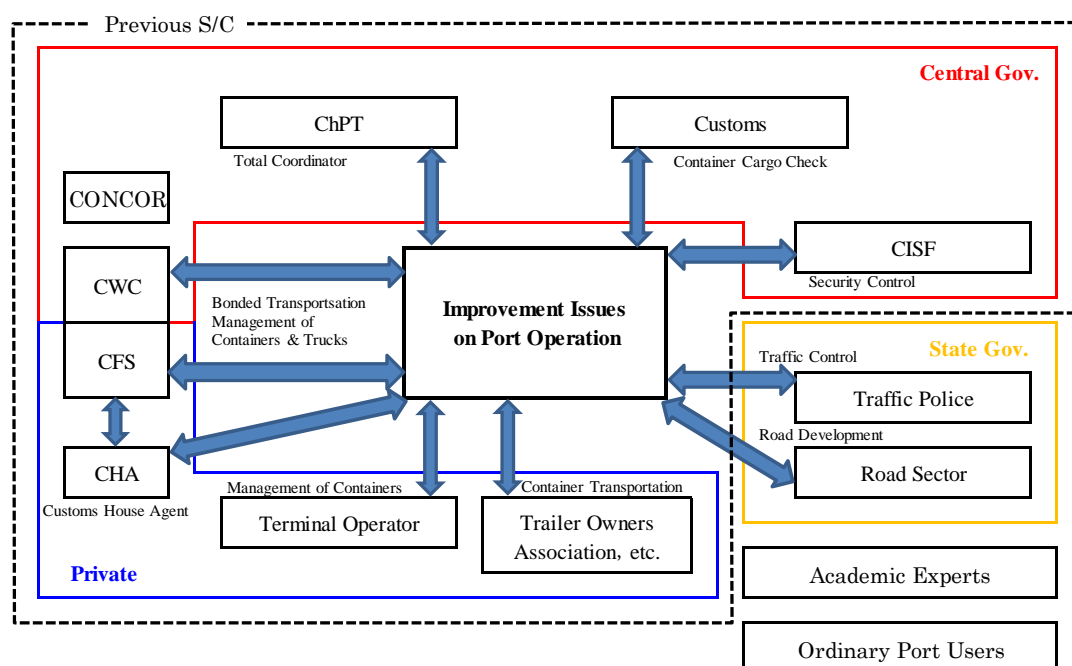
Therefore, the establishment of a sustainable system is very important.

The Project on Improvement of Chennai Port Operation has a steering committee for the purpose of discussing matters related to traffic congestion among stakeholders. The steering committee plays a vital role for stakeholders to understand the project and share information on traffic congestion.

After completion of this project, the steering committee might be disbanded.

Instead of the steering committee, a sustainable system that tackles congestion issues with the collaboration of stakeholders needs to be established.

The Team strongly recommends the establishment of an enlarged steering committee for the purpose of sustainable improvement on the operation of Chennai port.



By JICA Study Team

(Draft)

**Running Rules for the Committee for Improvement of
Port Operation and Management**

Article 1 (Establishment)

A Committee for Improvement of Port Operation and Management of Chennai port (hereinafter referred to as the Committee) shall be established for the purpose of sustainable improvement of port operation and management through exchanging views among the stakeholders of Chennai port.

Article 2 (Scope of Works)

The Committee shall carry out surveys and investigations and exchange views related to the following items:

- i. Items related to traffic congestion alleviation of Chennai port
- ii. Items related to improvement of user-friendliness of Chennai port
- iii. Items related to improvement of the accessibility of Chennai port
- iv. Items related to other issues for improvement of port operation and management and which are admitted to be required by the chairman of the Committee

Article 3 (Composition)

Members of the Committee shall compose the representatives of the following organizations.

- Chairman of Chennai Port Trust (ChPT)
- Representative from Ministry of Shipping
- Representative from Customs Office
- Representative from Central Industrial Security Force (CISF)
- Representative from Highway & Minor Port Department, Government of Tamil Nadu
- Representative from Traffic Police of Chennai
- Representative from Shipping Line Agents Association
- Representative from Dubai Port World
- Representative from PSA International
- Representative from Chennai Chapter, National Association of CFS
- Representative from CWC
- Representative from CONCOR
- Representative from Customs House Agent (CHA)
- Representative from Trailer Owners Association
- Representative from Academic Society
- (Representative from Ordinary Port Users)
- (Traffic Manager, ChPT)

- (Chief Engineer, ChPT)
- (Chief Mechanical Engineer, ChPT)
- (Financial Advisor, ChPT)

Article 4 (Chairman)

- i. The chairman of the Committee shall be the Chairman of Chennai Port Trust.
- ii. The chairman shall be representative of the Committee.
- iii. The Deputy Chairman of Chennai Port Trust shall substitute the chairman of the Committee in the case that the chairman is unable to perform his duties of the Committee.

Article 5 (Holding of the Committee)

- i. The Committee shall be held every three months as a regular session.
- ii. The chairman of the Committee shall be able to hold the Committee if needed.
- iii. The Committee shall be called up by the chairman of the Committee.

Article 6 (Secretariat)

- i. The Traffic Department of Chennai Port Trust shall serve as the secretariat of the Committee.
- ii. The secretariat of the Committee shall deal with matters of the Committee by order of the chairman of the Committee.

Article 7 (Miscellaneous Provision)

Matters necessary for running of the Committee other than Article from one to six shall be determined by the chairman of the Committee.

Supplementary Provision

These running rules shall enter into force from *****.

E) TOR on Operation Rule for Trailer Entry Process at Terminal IN Gates

TOR on Operation Rule for Trailer Entry Process at Terminal IN Gates

1. Background

The Team has identified instances of 'Idling Time' and 'Suspension' by observing the pictures taken using the fixed point static camera and the site observation during the 6th and 7th dispatch. 'Idling Time' and 'Suspension' significantly reduce terminal gate efficiency. Furthermore, the Team has often observed many parked trailers such as OOG trailers, empty trailers, etc. in front of the DPW terminal IN gate which also lowers terminal gate efficiency.

2. Objective

Trailer entry process at the terminal IN gate shall be improved in order to alleviate traffic congestion starting from that point. The proposed operation rules aim to reduce 'Idling Time' and 'Suspension' by eliminating parked and stopped cars in front of terminal IN gates and improving the trailer flow. This TOR describes the operational rules and business flow using the new operation rules.

3. Required Measures

The following measures shall be taken before starting the operation under the TOR (refer to figure 1.).

(1) Road Improvements in front of the terminal IN gate

- To allocate space around the Survey Area, Customs Reception Area, and Gate Area by removing curbs, etc.
- To implement an Exit Lane for trailers around the Survey Area
- To clearly indicate the No Parking Areas through the use of painted signs
- To allocate space in the Survey Area for 4 trailers to line up in 3 rows and mark the stop lines on a road with paint
- To keep space for trailers to line up in 4 rows and mark the stop lines on a road with paint

(2) Relocation of the Survey Area

The Survey Area shall be relocated about 130m forward.

(3) Full Time Allocation of Traffic Control Persons

One traffic control person around the No Parking Area and another traffic control person around Customs Reception Area shall be allocated on a full time basis. They will be responsible for ensuring that trailers drivers follow the operation rules.

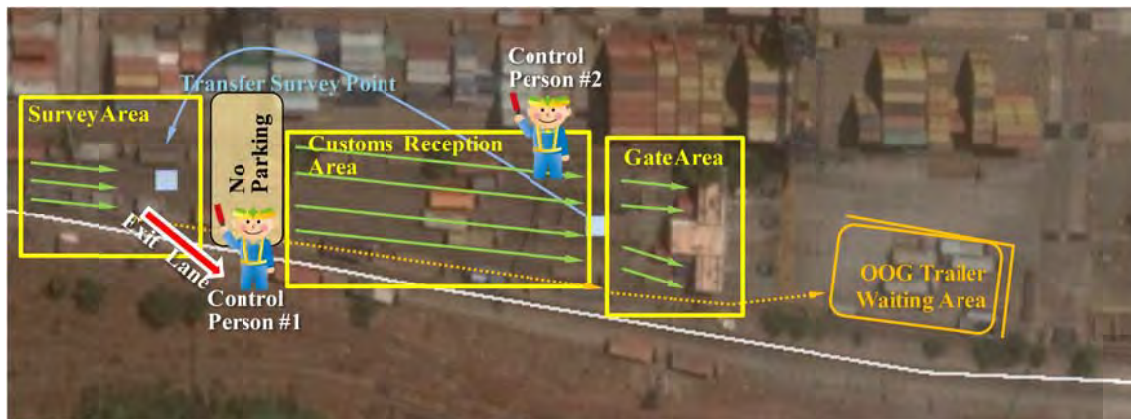


Figure 1. Layout around the DPW IN Gate

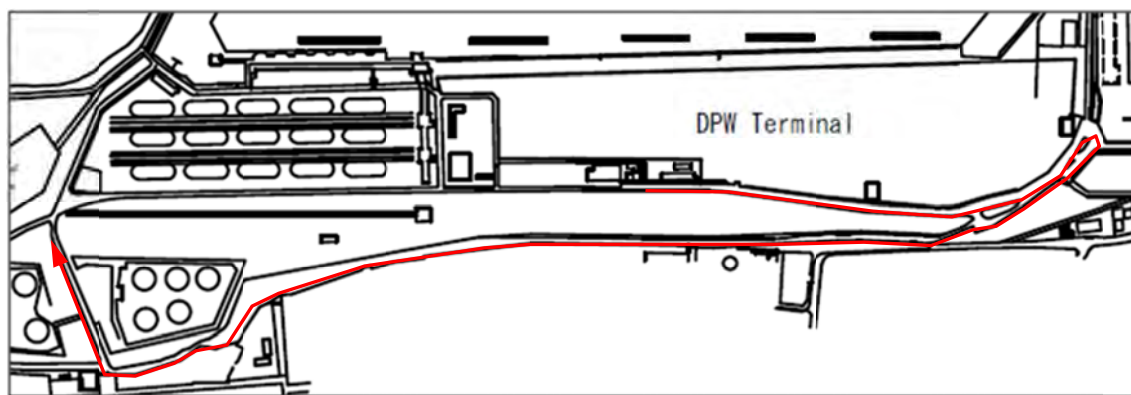


Figure 2. Diversion from the DPW IN Gate

4. Composition and Roles

Players	Roles	Details
ChPT Traffic Dept.	Improvement of Access Road	Allocating space in front of terminal gates, implementing Exit Lane, painting white marker, fixing lane separation, etc.
Container Terminals	Allocation of Traffic Control Persons	Allocating two persons 24 hours a day
	Relocation of Survey Area	Relocating Survey Area 130 m forward
	Improvement of Reception Procedure Efficiency	Allocating sufficient gate clerks and providing efficient gate processing at all times
Trailer Drivers	Observation of Operation Rules	
Customs Officers	Improvement of Reception Procedure Efficiency	Allocating sufficient officers and providing efficient Customs processing at all times

5. Operation Rules

(1) Trailer drivers shall observe the operation rules and follow instructions by traffic control

persons, surveyors, and terminal gate clerks at all times.

- (2) Trailer drivers shall proceed along the lane in order without keeping too much distance from the other trailers. They shall not pass the other trailers or cut into queue without an instruction from traffic control persons, etc.
- (3) Empty trailers shall use the dedicated terminal gate (north gate for DPW and dedicated lane for PSA). Terminal IN gates shall not accept empty trailers.
- (4) Parking shall not be allowed along the access road to the terminal IN gate. Moreover, parking shall be strictly prohibited between the Survey Area and Gate Area to ensure sufficient space for trailer traffic.
- (5) Trailers which are allowed to proceed following the container survey shall proceed to the Customs Reception Area promptly. On the other hand, trailers which are not allowed to proceed shall exit via the Exit Lane immediately. They shall remain at a waiting area until everything is in order and then line up again.
- (6) Documentation check by Customs is conducted after the survey is completed while a trailer is parked in the Customs Reception Area. After its completion, trailers proceed to the Gate Area for the reception procedure of a terminal. Trailers which do not clear the documentation check by Customs must exit via the Exit Lane when instructed by a traffic control person.
- (7) OOG (Out Of Gauge) trailers which arrive prior to the CY-Open shall be allowed to wait inside a terminal until the CY opens.

6. Operation Procedure

Entry Processing of Terminal Gate		Reception flow		
		Survey Area	Customs Reception Area	Gate Area
Player				
A) Trailer Driver	<ol style="list-style-type: none"> 1) To line up by 4 trailers each in 3 rows within the Survey Area and stop. 2) To get off trailer and delivery documents to a surveyor. 3) After the check by a surveyor, to receive the documents with stamp and container number, seal number, damage info, etc. filled in. 4) To proceed to the Customs Reception Area. 5) To exit via the Exit Lane if any issue is detected during the documentation check by a surveyor. Then, to park at the waiting area through the diversion route (refer to Figure 2.) 	<ol style="list-style-type: none"> 1) To proceed to a waiting queue in one of 4 rows in the Customs Reception Area and stop. 2) To get off and walk down to the Customs window and let a Customs officer check the documentation. 3) To wait for Gate reception after completing Customs check. 4) A trailer who is the first in line shall proceed immediately into a gate lane, if the gate reception window becomes available. 	<ol style="list-style-type: none"> 1) To deliver documents to a terminal reception clerk. 2) To depart from the gate lane towards the instructed yard location in the terminal after completing the gate reception procedure. 	
B) Surveyor	<ol style="list-style-type: none"> 1) To check the documents received from a driver and check container number, seal number, damage of the container. To press stamp and write container number, seal number, etc on the documents, if the documents are OK. 2) To return the documents to the driver and let him proceed. 3) To inform the trailer number to a traffic control person and instruct him to have the trailer exit through the Exit Lane if any issue is found. 4) To confirm if driver wants to wait inside the terminal for OOG trailers which shall wait until CY-OPEN date. <ol style="list-style-type: none"> a. To instruct a traffic control person to let the trailer exit through the Exit Lane if he wants to wait outside the terminal b. To instruct a traffic control person to let the trailer proceed to the terminal if he wants to wait inside the terminal. 5) To stop surveying if a traffic control person informs him that the Reception Area is full. 	<ol style="list-style-type: none"> 1) To stop survey operations if the Customs Reception Area is full. The survey shall be re-started soon after space becomes available. 2) To direct a trailer who does not pass the documentation check by Customs to the Exit Lane promptly. 3) To direct trailers who do not proceed to Customs window or do not move after Customs check to proceed to the next process. 4) To ensure the smooth flow of trailers by directing them to pass through or switch lanes if a trailer has stopped due to mechanical problems, etc. 		
C) Traffic Control Persons (at No Parking Area & Customs Reception Area)		<ol style="list-style-type: none"> 1) To receive documents from a driver and check them. 2) To stamp them and return to the driver if they are OK. 3) To efficiently conduct the documentation check at all times. 		
D) Customs Officer		<ol style="list-style-type: none"> 1) To receive the documents from the trailer driver. 2) To enter data into TOS according to the documents and instruct the driver to go to the location directed by TOS. 3) To efficiently conduct the reception procedure at all times. 4) Empty trailers shall not be received. They shall be instructed to proceed to the north gate. 		
E) Terminal Reception Clerk		<ol style="list-style-type: none"> 1) To proceed to terminal if waiting inside the terminal is requested. 2) Or follow the same process as in above A) for cases other than 1) 	<ol style="list-style-type: none"> 1) To have the same process for trailers who do not wait inside the terminal 2) To wait inside the terminal until the CY-Open date. <ol style="list-style-type: none"> a. To walk down to the Customs window for the documentation check when the CY opens. b. Then, to walk to the terminal gate window for the reception procedure by the terminal. c. To proceed to the terminal yard after the completion of terminal reception procedure. 	
F) OOG Trailer Driver	<ol style="list-style-type: none"> 1) To line up in the right most rows in a waiting queue and stop at the right side of the Survey Area. 2) To have surveyor's check, the same as the above A). 3) To proceed to the terminal and request to wait inside the terminal if the CY is not open 			

F) Written Request of Extension of the Project for one Year

CH.P.T. Item Code No. C-81804355
1000 Pads / Dt. 19-04-2014



Port
Par-Excellence
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Rajaji Salai, Chennai - 600 001.
Website : www.chennaiport.gov.in

Date :

No.Mktg.Cell/16/2014/T(M&S)

Dt: 22.03.2016

To

Japan International Co-operation Agency (JICA) Headquarters

Sir,

Sub: JICA - Extension of study period for one year – reg.

The JICA study team has submitted the proposals based on Team's observations and surveys in its 7th dispatch, during February 2016. The efforts of the study team in the improvement of Chennai Port operation, is greatly appreciated.

It is opined that the formulation of master plan should be studied further and more suggestions on the infrastructure project are expected from the JICA study team. Further, priority projects should be identified in order to bring a logical and beneficial solution for the traffic study. The present project duration of the JICA study team with Chennai Port expires on June 2016.

It is requested that the study period of the JICA study team may be extended for a further period of one year from July 2016 to June 2017, to analyze the feasibility and technical evaluation of the priority projects identified in the master plan study. Further the JICA could consider studying the projects proposed below for funding and implementation.

1. Reclamation and Development of Operational area at
 - a. Eastern side of east break water arm
 - b. Northern side of North break water arm
 - c. Part of Ambedkar Dock water front area
2. Overpass bridge to ease congestion near Centre Berth.
3. Dedicated road from Tondiarpet to Outer-Ring road
4. Dedicated rail/road to Ambathur from Chennai Port alongside railway.

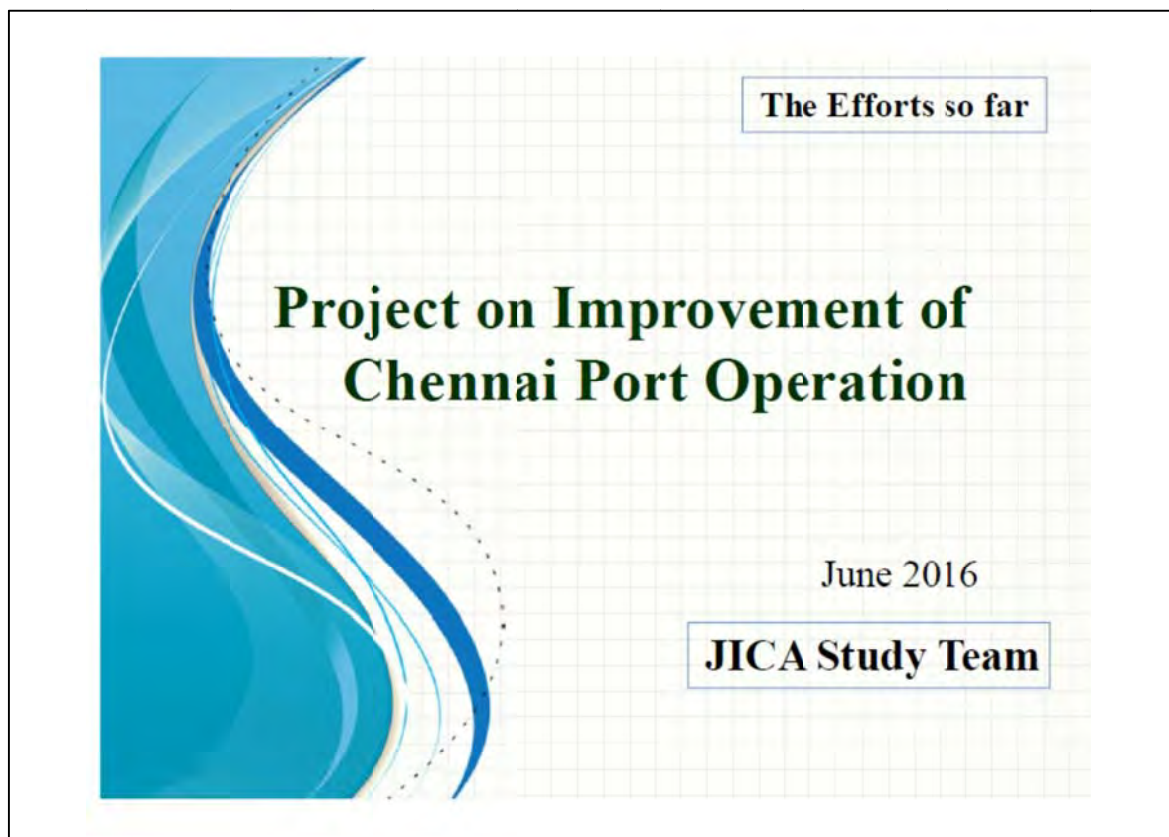
5. Elevated Link Road from Northern side of Chennai Port to Manali with suitable entry and exit ramps.

The Chennai Port will extend its support to JICA study team in taking necessary action, in this regard.

Yours faithfully,


CHAIRMAN
3/3

G) Visualized Presentation Materials (English Version) (June 2016)



1. Background of Technical Assistance

Chennai port has been suffering from container traffic congestion and has not been able to realize speedy and efficient container transport because of inefficient operation of port and logistic facilities, improper traffic management and insufficient capacity of roads and port facilities.

For this reason, technical assistance for alleviating traffic congestion and improving the efficiency of container transport is being extended.



A line of container trailers waiting for passing through the port gate No.1 to enter the port



Traffic congestion in front of the terminal gate

2. Objectives of Technical assistance

- (1) To make Chennai port user-friendly through decreasing the transit time (lead time) and increasing the efficiency of container transport
- (2) To enhance the capacity of container operation in Chennai port through technical assistance for introducing an effective port operation and traffic control system

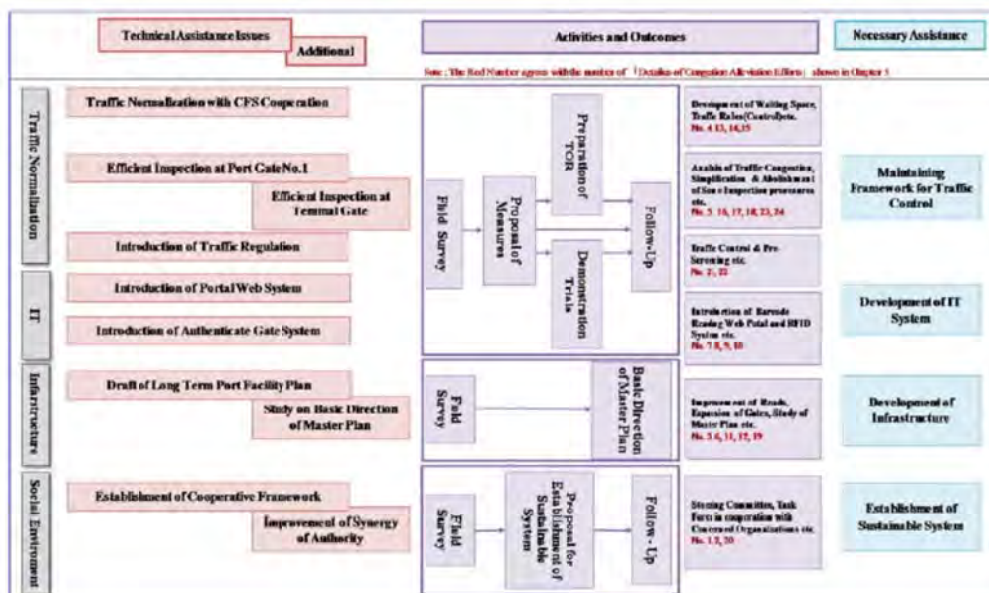


The location of Chennai port in India



The location of two container terminals and 1 port gate in Chennai port

3. Tackling Issues and Activities of Technical Assistance



4.1 Outcomes of Congestion Alleviation Measures

Trend of Congestion outside the Port

No. of Trailers outside the Port	Data Collection Survey @ 7/11/2013	First Year Technical Assistance				Second Year Technical Assistance			
		1st Dispatch 21/7-13/8/2014	2nd Dispatch 30/9-5/11/2014	3rd Dispatch 19/1-7/2/2015	4th Dispatch 13-24/4/2015	5th Dispatch 7-28/7/2015	6th Dispatch 30/9-20/10/2015	7th Dispatch 27/1-16/2/2016	8th Dispatch 22/5-10/6/2016
Based on container handling volume for 100 thousands per month									
Maximum No./Day	906	759	1146	502	517	530	628	578	415
Average No./Day	676	278	362	143	245	193	326	391	211
Max No./Day on SH114	—	297	346	217	230	216	332	147	248
Ave No./Day on SH114	—	160	186	53	133	113	130	88	127

The number of queuing trailers has been decreasing.

Activities by Task Force

Trailer Traffic is gradually becoming normalized.



before Task Force's Activity



Traffic Control at SH 114



Screening at the Access Road

4.2 Outcomes of Congestion Alleviation Measures

Improvement of Processing Efficiency at Port Gate No.1

Processing Time at Port Gate No.1		Jun. 2014	Feb. 2015(during the Demonstration Trial)	Apr. 2015(after the Demonstration Trial)
Average Processing Time / Truck / Lane	IN Gate	3.5	2.5	1.8
	OUT Gate	5.5	2.0	2.3

Processing efficiency was improved; one of the reasons was the introduction of a Bar-Code reading system.

Dramatic Shortening of Transit Time (Lead Time)

Transit Time Required from CFSs to Port Gate No.1	First Year		Second Year		
	2nd Dispatch (2014)		7th Dispatch (2016)		8th Dispatch
	04 Oct.	18/19 Oct.	12 Feb.	13 Feb.	02 Jun.
Average Transit Time during Surveys	28:29 hrs	40:25 hrs	17:43 hrs	19:24 hrs	14:54 hrs
No. of Trailers surveyed	155	200	327	398	129
No. of Queuing Trailers on the Survey days	595	803/689	874	785	497

Shortening of the transit time results in significant economic merits for port users.



Port Gate No.1



Bar-Code Reading



State Highway (SH)114

5. Details of Congestion Alleviation Efforts



1. Steering Committee on Improvement of Chennai Port Operation

The Steering Committee has been set up to improve the operation of Chennai Port by ChPT (Chennai Port Trust), Terminal operators, CFS (Container Freight Station), Trucker Associations and JICA etc. Concerned persons can share related information in the committee and tackle the traffic problems etc. together.



2. Working Group on Improvement of Chennai Port Operation

The working group meeting has also been held as the preparatory talks before the Steering Committee. Various issues are being discussed, for example, the current status analysis of traffic congestion and the proposed demonstration trials by the JICA Study Team etc.



3. Widening and Improvement of State Highway 114

State highway 114 is the only road connecting to the Port Gate No.1 but it is not wide enough for heavy container trailer traffic. Road widening and improvement of the Highway 114 is under construction for better access to Chennai Port.



4. Effective Utilization of TVT Parking (Demonstration Trial 1)

HEP (Harbor entry permits) were issued to trailer drivers at TVT Parking located along State Highway 114, about 5 km north from Port Gate No.1. Utilizing this parking space, required documents by drivers were pre- checked as a demonstration trial. The area was also used as waiting space for trailers to discourage drivers from parking trailers along the road while waiting for enter the port.



5. Introduction of a Sticker for a Container Trailer

Some trailers' drivers don't carry required documents and this is one of the causes of traffic congestion. CFS members worked together with ChPT to conduct a trial in which stickers were attached to trailers when drivers possessed the proper documents. This is a good initiative of cooperation to decrease congestion by the private sector.



6. Development of Approach Road to the Port Gate No.1

Insufficient road infrastructure is also one of the causes of traffic congestion. The approach road to the Port Gate No.1 has been widened and improved by Tamil Nadu Government and National Highway Authority of India to improve the traffic flow of trailers.



7. Technical Seminar for staff of Chennai Port Trust and CISF

Technical Seminars were held for staff of Chennai Port Trust and CISF (Central Industrial Security Force) by the JICA Study Team when the bar-code reading system was introduced as a demonstration trial. Trainees could learn how to use the bar-code reading system in the seminar.



8. Introduction of Bar-code Reading System (Demonstration Trial 2)

Every HEP (Harbor Entry Permit) has an original Bar-code printed in it. As part of modernization of access control procedures for container trailers using IT, the Bar-code reading system was introduced at the Port Gate No.1. The system proved that time was saved and procedures became efficient.



9. Introduction of Web Portal System (Demonstration Trial 3)

As one of the demonstration trials to alleviate traffic congestion using IT, Web Portal System has been established to provide congestion information. Everyone can share the information on the number of trailers passing through the Port Gate No.1 per hour by Web Site of Chennai Port Trust.



10. Introduction of RFID System

Chennai Port Trust has a plan to introduce RFID (Radio Frequency Identification) System with the cooperation of related organizations. The System is aimed to make the management of cargo handling effective and the gate procedure effective by sharing information among ChPT, CFS and Terminal operators etc.



11. Expansion of Port Gate No.1

Port Gate No.1 is the only gate for container trailers to enter and exit Chennai Port but it lacks sufficient lane capacity which results in the long line of waiting trailers. Consequently, Chennai Port Trust has expanded Port Gate No.1 from 4 lanes to 8 lanes.



12. Widening and improvement of the internal roads in Chennai Port

The widening and improvement of internal roads have been done inside Chennai Port to alleviate traffic congestion. In addition, new routes from/ to the port gate to/from the terminal gate have been regulated and the traffic flow has been separated clearly.



13. No Parking along internal roads and Set-up of Waiting Area (Demonstration Trial 4)

Parking along internal roads encumbers container trailers as they move. Parking has been banned at some road sections and a waiting area has been set up for trailers to wait inside Chennai Port.



14. Arrangement of Traffic Officers (Demonstration Trial 5)

Congestion at the Intersections in Chennai Port was so serious that traffic control was becoming increasingly necessary. Therefore traffic officers were arranged at key intersections to give instructions to drivers inside the port.



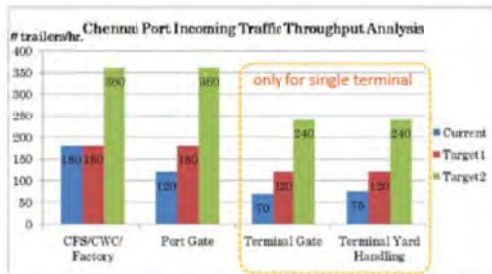
15. Additional Gate for empty container trailers at DPW terminal

An additional terminal gate for empty container trailers was set up at DPW terminals at the area which used to be for the handling of iron ore. It has streamlined the traffic flow inside Chennai Port and contributed to alleviating traffic congestion.



16. Survey of Terminal Gate Operation

The movement of container trailers passing through the terminal gate was recorded by a camera set up at the entrance and the gate processing situation was grasped in cooperation with Terminal Operator. This survey is useful for analyzing the causes of congestion related to the terminal gate.



Current : Current throughput
 Target 1 : Target throughput for congestion free movement under the current traffic volume
 Target 2 : Expected throughput if terminals handle up to their capacity

17. Incoming Traffic throughput Analysis

The Team analyzed the processing capacity of Port Gate No.1, Terminal gates and terminal yards in order to identify the bottle necks, and proposed measures for upgrading the processing capacity to attain the targets at each gate and yard.



18. Simulation Model Analysis for Traffic Decongestion

JICA Study Team developed a traffic simulation model and analyzed the causes of traffic congestion in Chennai Port. The model allowed relevant parties to understand the factors of congestion and effects of measures for decongestion.



19. Study on Direction of the Master Plan

The workshop on the master plan was held in Chennai Port Trust. Chennai Port Trust staff and the JICA study team discussed and deepened their understanding about the necessary infrastructure projects (Master Plan) as well as improvement of traffic congestion etc. in the workshop.



20. Strengthening of Partnership with Tamil Nadu Government

The Steering Committee which was set up at the outset of the JICA Study now has a new partner: the Tamil Nadu Government. Traffic Police and Road section from Tamil Nadu Govt. have joined the expanded Steering Committee to assist with congestion alleviation efforts.



**21. Pre-Document Check prior to Port entry
(Task Force Activity 1)**

Task Force Team was formed at the initiative of Chennai Port Trust to combat traffic congestion. It consists of the Port Trust, Terminal Operators and CFS association etc. Before entry to the port, trailer drivers are subject to a document check. They are not allowed to enter the port until they show the proper documents.



**22. Promoting Traffic Discipline among Drivers
(Task Force Activity 2)**

As one of activities of the Task Force Team, trailer drivers are instructed to keep proper intervals by a traffic officer while forming a line on the road. The officer patrols the road on a motorbike. Traffic discipline of drivers is expected to be improved and traffic congestion decreased.



(Results of Congestion Survey)

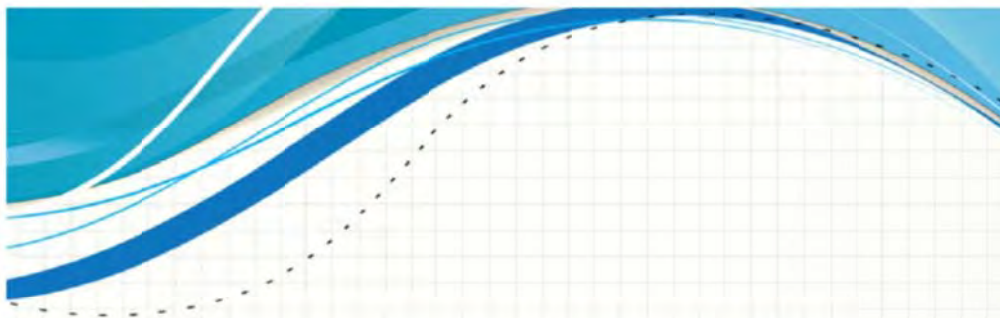
23. Continuous Traffic Congestion Survey

The JICA study team has conducted a traffic congestion survey outside/inside Chennai Port during every dispatch. The survey results are utilized to grasp the present situation and examine the outcome of efforts to alleviate traffic congestion and so on. It is fed back to the study activity on improvement of Chennai Port Operation.



24. Activity Report of the JICA Study

The JICA study team has prepared an activity report which details the current state of traffic congestion, analyzes the trend of traffic condition, describes the efforts and outcome of measures to decrease congestion and all other study activities in every dispatch. It is submitted to Chennai Port Trust for their reference based on the field survey and fact-finding results.



Thank you for your attention