5S in Container Terminals – A Framework to Reduce Container Demand Uncertainty

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ABSTRACT

5S is a popular workplace organisation method which uses five Japanese words: seiri, seiton, seiso, seiketsu and shitsuke. This is to describe how a work place is to be organized to improve effectiveness and efficiency. 5S is applied in many fields such as FMCG, health care, banking, automobile industry etc. Container terminals around the world are in urge to gain competitive edge over their competitors and every second of their daily operations have become crucial in current business arena. This is the reason why the major ports worldwide are focussing on various continuous improvements techniques. The purpose of this research is to develop a framework that covers the two aspects of demand uncertainty for imported containers and addressing it with a special container stacking pattern and appointment system (pre gate arrangement). This sorting framework in container yard based on the 5S method also improves the turnaround time (TAT) of the trucks entering the terminal and improves value for their stakeholders eventually.

Keywords
Turnaround time, free period, anchorage time, manoeuvring time, gross berth time

1. Introduction

The International Transhipment Terminal (ICTT) at Cochin, Kerala, India locally known as Vallarpadam Terminal is unique in its position as it is the first transhipment terminal in India. It is also the first container terminal to operate in a Special Economic Zone (SEZ). It is one of the only global transhipment hubs supported by a hinterland that extends across the country of India, and has a captive volume of more than 8 million of TEUs. The vision statement of the private port operator operating ICTT focuses on continuous improvement through a culture of teamwork and engagement.

The container terminals round the world are trying to achieve the competitive edge and improve their productivity by means of various process improvement plans including kaizen, six sigma, etc. The Kochi container terminal also keeps these process improvement plans as the corner stone of their daily operations.

Implementation of 5s technique in a container terminal is challenging when compared to other process improvement techniques due to factors such as

- Uncertainty in demand for the containers
- Involvement of third party in operation of terminals
- Lack of knowledge about 5s among ground level staffs etc.

2. 5 S

2.1 Seiri (Organization)

The method involves the understanding about what belongs to a particular space and what has to be relocated.

Similar to the space optimization of warehouses of huge companies, the yards in container terminals also have to be used in an effective and optimized manner for higher levels of productivity. As certain materials that are to be trashed and discarded if not used by a certain date, certain containers are to be removed from the yards to avoid the wastage of space.

There are certain containers that remains in yards for months and years without being picked up by the vessel lines or agents due to custom clearance issues. Such containers are to be identified and removed from the yards. Usually tenders are being called during a year and the outdated containers are sold to the highest bidders, which happens to be cargo agents.

2.2 Seiton (Orderliness)

Prime location is provided to the materials that are used most often, which allows easy access to the employees and eliminates the unnecessary motion and delays. To make the material handling easy, specific spots are marked and labelled. In a container terminal yards the import containers, export containers, hazardous containers, damaged containers and reefer containers are allotted within a specific space in yard.

Import containers: These containers are kept far from the port side and closer to the terminal gate, so that the trailer vehicles coming to pick up the containers can easily reach the yard and take it without wastage of time. It also helps in reducing the Truck Turnaround Time of container terminal, which is a major Key Performance Indicator in all terminals. Truck Turnaround time is defined as the time taken by trailer vehicle to finish its mission, i.e. loading or unloading of container and exit the terminal.

Export containers: Export containers are usually placed in yards closer to the port side, so that the containers can be easily loaded to the vessels using the quay cranes. This helps in reducing the operation time and discharge time of vessels in terminals, which in turn reduces the vessel turnaround time, another crucial Key Performance Indicator.

Hazardous containers: there are nine different classes of hazardous material such as explosives, gases that are compressed or dissolved under pressure, flammable liquids, flammable solids, substances liable to spontaneous combustion, substances which in contact with water emit flammable gases, oxidizing substances, organic peroxides, toxic substances, infectious substances, radioactive materials, corrosives and miscellaneous dangerous substances. These containers are kept in separate yards with hazardous bunds and further protective measures.

Damaged containers: There is a separate yard called Out Gauge (OG) yard where damaged containers are kept. It includes containers with leakage, cracks, hole, cut, dent, bent, broken, push out, push in and scratch.

Reefer containers: these are the containers which are to be maintained at a certain temperature. It includes pharmaceuticals, sea food items etc. The yards for these types of containers are equipped with plug in points.

2.3 Seiso (Clean/Shine)

Once decided with what to be kept where, it is time to clean. It also involves looking for potential hazards and hard to read labeling. This is the process of keeping a clean work place which helps the employees to spot the problem quickly. The slogan “stop check and proceed” is a part of this.in container terminals frequent inspections are carried out to make sure whether the containers are safely placed in stacks and to ensure that Rubber Tyred Gantry cranes (RTGs) can travel midst the containers easily.

2.4 Seiketsu (Standardize)

For every item a standard is fixed to eliminate confusions and disparities. The standards are placed in a visible location so that all employees entering the workplace will be aware of it.it includes safety precautions such as usage of safety jacket, helmet, metal toe shoes etc. the crane operators and truck drivers are given further standards such as

- Maximum stack height
- Distance between the stacks
- Number of moves to be made in each hour
- Speed to be maintained in yard etc.

2.5 Shitsuke (Sustain/Discipline)

The staffs are trained to follow good work habits and there is strict observation of workplace rules. Each employee here is trained continuously to the 5S system. The challenge here is to change the established belief system of the staffs who have become very comfortable with the existing system and practices. Continuous training, clear communication and clear assigning of responsibility is essential. Activities like housekeeping week and 5 minutes cleaning are carried out from time to time as a part of this.

But the principles of 5s is practiced in various daily terminal operations partially. Whereas the scope for further implementation of 5s in container terminal operations is still vast and is an area that demands for more research. This research mainly focuses on the first S among the five S i.e. sorting.

3. Literature Review

Ahire et al. (1995) feels that the previous researches on Total Quality Management are mostly conceptual and practitioner directed and that there is a lack of a solid theoretical framework summarizing the past efforts and shaping future research. This paper does a study of the previously published literature on TQM and the analysis of the literature presents relevant developments in the field. The author believes that the suggestions for future research should guide the improvements and developments in the TQM field and also help in transforming the method into a formal discipline.

Hellsten et al. (2000) has discussed about TQM mentioning it as a management system that consist of three interdependent tools. The author discusses about some of the problems with TQM and also describes his own perspective of TQM as a system that comprises of the three components namely values, techniques and tools. The author strongly believes that this definition of TQM will help in understanding and implementing TQM in a better manner.

Cua et al. (2001) believes that most previous researches on manufacturing programs generally explores the implementation and impact of the manufacturing programs separately. The author feels that there is a need to understand the value of joint implementation and effect of such manufacturing programs. This study investigates the practices that revolve around the joint implementation of the three programs Total Quality Management, Just in Time and Total Productive Maintenance. They find that manufacturing performance is connected to the level of implementation of both socially and technically directed practices of these three manufacturing programs.

Rahman et al. (2010) discusses about the implementation of 5S practices in manufacturing companies. The authors suggest that in order to do proper evaluation of 5S practices it is essential to implement 5S audit at each and every division in the company. 5S audit enables each organization to find out the potential level of quality improvement that is required and at the same time enables us to analyze their potential or their ability and weakness of each division in the company. It was found out that the 5S practice is observed as an effective technique that can improve several standards like housekeeping, health and safety standards and environmental performance in the company's workplace. It was also found out that there is a need of significant effort and participation from top management and that it is an important factor that determines the success of the 5S practice.

Khamis et al. (2009) explores the practical use and the application of the 5S Checklist for housekeeping and health, environment as well as safety improvement purposes at two different manufacturing organizations. This study tries to assess the execution of 5S and development of the 5S Activity Checklist in manufacturing organizations. The study examines the factors that may act as constraints to the implementation of the 5S practice and also suggests possible solutions for the industries which are identified through careful observation and assessment of the improved environmental performance. It was found out that the effective implementation of the 5S practice requires commitment from the top-level management, complete involvement of the staff and personnel at

all levels within the company and finally the training given for the organization in the implementation of the 5S practices.

Osada (1991) initiates a 5S movement and suggests that the first step in any movement directed at quality should be a 5S movement which means it should be a determination to organize and systemize the workplace, keep the workplace neat and clean, maintain standardized and consistent conditions, and maintain the discipline which is needed to do a good work. The author prescribes to use this book to initiate a 5S movement suggesting that using this book will help any organization see better results in several areas which includes higher productivity and better quality, improved ways of accident prevention, employees and personnel taking pride in their work and workplace and an overall healthier corporate climate.

Pheng (2001) referred to 5S as the five keys to a total quality environment in any process or place. The author believes that there are many similarities between the ISO 9001:2000 standard's requirements for quality management and the 5-S principles and feels that both should be integrated. 5-S principles can be introduced more easily and systematically into organizations without using any additional resources by using ISO 9001:2000 quality management systems as a basis or support.

Ho (1999) has developed the first 5-S audit worksheet in the world and has used it for training purposes in three countries Hong Kong, Malaysia and the UK since 1994. This study tries to explain the intricacy of the 5-S in order to understood the practice easily and adopt it readily. 5-S is considered as an important tool for action learning and the foundation of another worldview for quality culture.

Ho et al. (1995) talks about the 5-S practices in Japanese workplaces and the emphasis that they give to training and discipline. The study aims to determine if the Japanese 5-S practice has a significant role to play in the successful implementation of total quality management. The study suggests that 5-S essentially provides a fundamental total quality environment which serves as an important base for successfully implementing TQM and also promotes the incorporation of the 5-S practice guidelines in the TQM training policy.

Khanna (2009) explored the 5-S and TQM status in Indian organizations. The study assesses the status of TQM, 5-S and the quality tools in Indian organizations and tries to study the relationship that these three have among three categories of organizations namely large, medium and small. The study identified that organizations which are having high 5-S index usually tend to use higher number of quality tools and quality practices and they have a higher TQM index.

Patyal and Koilakuntla (2015) made a first-time attempt to develop and ratify a scale for infrastructure and core practices in the manufacturing organizations in India. The study suggested that core practices have a greater effect on quality performance than the infrastructure practices. This study took into account TQM and Six Sigma practices for interpreting infrastructure and core practices and the reliable and valid scale that was developed will help managers in measuring the level of quality management which will help in enhancing business performance.

Tripathi (2005) examined the impact of experience as a measure of time period on TQM's effectiveness in uplifting the performance of Indian manufacturing companies and tried to establish the impact that total productive maintenance support will have on TQM's effectiveness. The synergetic effect of total productive maintenance support on TQM's performance was established and various country-specific factors which tend to lead to marginal improvement during the transition phase was highlighted.

Olesen et al. (2015) explored the use of lean principles to power operational uplifts in intermodal container facilities. A theory-building approach was adopted and a lean terminalization framework was developed by merging points of lean and intermodal transport theory along with practical insights. The framework that was developed shows how lean approaches can be used to find out improvement areas and to develop solutions for better material flow in the area of intermodal transport operations.

Dias et al. (2009) performed a benchmarking analysis on the main Iberian Sea ports and the main focus was on improving their container terminals efficiency. Data Envelopment Analysis, which is considered by several researchers around the world as the most qualified method to quantify a group of key performance indicators, was used to attain this. DEA is used along with the data mining in contrasting the sea ports operational data of container terminals. Sea ports are global logistics networks and performance evaluation is essential in effective decision making in seaports in order to improve their efficiency and, thus their competitiveness as well.

The sorting of the materials (or stacking of containers in the case of container terminals) have a vital role in maintaining the performance standards and productivity of a container terminal.

The purpose of this research is to reduce the uncertainty in demand for the containers, since it's impossible to eliminate the uncertainty completely.

4. Proposed Framework

The framework proposed in this research is addressing two aspects of uncertainty that can occur in a container terminal.

1. Demand for laden containers that has reached its free period end.
2. Demand for the containers that has not reached its free period end.

4.1 Free period

Free period in a container terminal is the time period for which laden containers can be kept in the container yards free of storage costs. The average free period of International Container Transhipment Terminal operated by DP World is seven days. Most of the cargo agents make use of this free period till the last date to avoid their storage costs in warehouse, which in turn causes congestion at the terminal yard.

4.2 Demand for laden containers that has reached its free period end

This issue can be addressed by a proper stacking method in the container yard. This demand is predictable to a considerable extent when compared with the latter. The import container demand follows FIFO pattern (First in First Out). Thus the container that comes first will be arranged in the topmost level of stack followed by the containers imported during subsequent days so that restacking operations can be reduced and the Turnaround Time of the trucks can be reduced to a great extent.

4.3 Demand for the containers that has not reached its free period end

This demand is unpredictable but occurs in much lower frequency when compared with the first case of demand. Here it's impossible to avoid the restacking operations but the turnaround time of the trucks can be reduced to a great extent by eliminating the waiting time of trucks in the yard by installing the terminal operating system at the pre gate of the container terminal.

By arranging the terminal operating system (Zodiac, in case of DP World, Navis in other major container terminals) at the pre gate of the terminal which is 2 kms away from the entry gate to the container terminal, the Rubber tyred Gantry Crane operator gets sufficient time to do the restacking operations to make the required container ready for dispatch. The information about the required container is communicated with the RTG operator by means of a Vehicle Mounted Terminal (VMT).

4.4 Bay Allocation Ticket (BAT)

BAT is an identification ticket containing 3 digit unique number. It is an unavoidable document in import and export procedures in a terminal.

4.5 Mission

The turnaround time of the truck varies in accordance with the mission. Every trucks enters to the container with one among the following mission:

- Pick up laden (P/L): These are the trucks that enter the container terminal to pick up imported containers.
- Pick up empty (P/E): These are the trucks that enter the container terminals to pick up the empty containers to the nearby container freight stations.
- Arrival laden (A/L): These trucks arrive with loaded containers that are to be exported from the terminal through various vessel lines.
- Arrival empty (A/E): The trucks that enter the container terminals with empty containers.
- Arrival empty pick up laden (A/E P/L): These are the trucks that arrive with two missions. It arrives with an empty container and leaves the terminal with a laden container.

In the observation only the pickup laden and arrival empty pick up laden vehicles are taken into account since they take more time to complete the mission comparatively and contributes more to the average turnaround time of the terminal.

5. Data

5.1 The weekly data of turnaround time before implementation of the framework (24/04/2017 to 28/04/2017)

DATE	BAT NUMBER	ENTRY TIME (HH:MM)	EXIT TIME (HH:MM)	MISSION	TRUCK TURN AROUND TIME (HH:MM)
24/04/2017 MONDAY	E691	10:23	10:38	P/L	00:15
	E581	11:47	12:10	P/L	00:23
	E220	10:43	11:36	P/L	00:53
	E986	11:56	12:33	P/L	00:37
	E993	10:41	11:31	A/E P/L	00:50
	E595	11:13	12:36	A/E P/L	01:23
	E683	10:33	11:37	A/E P/L	01:04
	E912	10:24	11:41	A/E P/L	01:17
AVERAGE TRUCK TURNAROUND TIME					00:50

Table 1: Monday

DATE	BAT NUMBER	ENTRY TIME (HH:MM)	EXIT TIME (HH:MM)	MISSION	TRUCK TURN AROUND TIME (HH:MM)
25/04/2017 TUESDAY	E948	10:01	11:29	P/L	01:28
	E913	10:27	12:23	P/L	01:56
	E501	10:22	12:25	P/L	02:03
	E286	11:30	01:36	P/L	02:06
	E575	10:19	11:37	A/E P/L	01:18
	E229	10:04	10:42	A/E P/L	00:38
	E514	11:26	11:54	A/E P/L	00:28
	E846	12:38	13:18	A/E P/L	00:40
AVERAGE TRUCK TURNAROUND TIME					01:19

Table 2: Tuesday

DATE	BAT NUMBER	ENTRY TIME (HH:MM)	EXIT TIME (HH:MM)	MISSION	TRUCK TURN AROUND TIME (HH:MM)
	E586	10:27	11:31	P/L	01:04
	E698	12:10	12:56	P/L	00:46

26/04/2017 WEDNESDAY	E692	10:48	11:47	P/L	00:59
	E531	11:25	12:34	P/L	01:09
	E518	11:49	12:08	A/E P/L	00:19
	E849	10:26	11:25	A/E P/L	00:59
	E820	11:57	13:39	A/E P/L	01:42
	E235	10:51	11:48	A/E P/L	00:57
AVERAGE TRUCK TURNAROUND TIME					00:59

Table 3: Wednesday

DATE	BAT NUMBER	ENTRY TIME (HH:MM)	EXIT TIME (HH:MM)	MISSION	TRUCK TURN AROUND TIME (HH:MM)
27/04/2017 THURSDAY	E889	10:21	10:49	P/L	00:28
	E527	11:35	12:27	P/L	00:52
	E695	10:53	12:45	P/L	01:52
	E275	11:28	11:53	P/L	00:25
	E840	10:33	12:12	A/E P/L	01:39
	E538	11:30	13:14	A/E P/L	01:44
	E951	11:49	13:13	A/E P/L	01:24
	E226	12:00	13:27	A/E P/L	01:27
AVERAGE TRUCK TURNAROUND TIME					01:13

Table 4: Thursday

DATE	BAT NUMBER	ENTRY TIME (HH:MM)	EXIT TIME (HH:MM)	MISSION	TRUCK TURN AROUND TIME (HH:MM)
28/04/2017 FRIDAY	E937	10:31	11:37	P/L	01:06
	E232	11:15	12:17	P/L	01:02
	E256	11:33	12:59	P/L	01:26
	E670	12:44	13:15	P/L	00:46
	E927	10:53	12:23	A/E P/L	01:30
	E683	12:53	13:37	A/E P/L	00:43
	E505	10:44	12:10	A/E P/L	01:26
	E648	11:25	13:15	A/E P/L	01:50
AVERAGE TRUCK TURNAROUND TIME					01:13

Table 5: Friday

5.2 The weekly data of turnaround time after implementation of the framework (15/05/2017 to 19/05/2017)

DATE	BAT NUMBER	ENTRY TIME (HH:MM)	EXIT TIME (HH:MM)	MISSION	TRUCK TURN AROUND TIME (HH:MM)
	E932	10:27	11:11	P/L	00:44
	E644	11:51	12:17	P/L	00:26

15/05/2017 MONDAY	E267	10:19	11:07	P/L	00:48
	E824	11:08	11:32	P/L	00:24
	E555	12:20	12:36	A/E P/L	00:16
	E294	11:12	11:26	A/E P/L	00:14
	E605	11:25	11:46	A/E P/L	00:21
	E909	11:35	11:53	A/E P/L	00:18
AVERAGE TRUCK TURNAROUND TIME					00:26

Table 1: Monday

DATE	BAT NUMBER	ENTRY TIME (HH:MM)	EXIT TIME (HH:MM)	MISSION	TRUCK TURN AROUND TIME (HH:MM)
16/05/2017 TUESDAY	E602	11:13	11:34	P/L	00:21
	E537	12:00	12:25	P/L	00:25
	E255	10:44	11:02	P/L	00:18
	E520	11:10	11:22	P/L	00:22
	E604	10:36	10:49	A/E P/L	00:13
	E911	11:15	11:32	A/E P/L	00:17
	E949	10:40	10:55	A/E P/L	00:15
	E653	10:52	11:09	A/E P/L	00:17
AVERAGE TRUCK TURNAROUND TIME					00:19

Table 2: Tuesday

DATE	BAT NUMBER	ENTRY TIME (HH:MM)	EXIT TIME (HH:MM)	MISSION	TRUCK TURN AROUND TIME (HH:MM)
17/05/2017 WEDNESDAY	E955	11:48	12:04	P/L	00:16
	E202	12:53	13:14	P/L	00:21
	E973	13:00	13:22	P/L	00:22
	E922	11:06	11:25	P/L	00:19
	E658	13:20	13:46	A/E P/L	00:26
	E505	10:44	11:02	A/E P/L	00:18
	E285	13:03	13:26	A/E P/L	00:23
	E278	12:11	12:28	A/E P/L	00:17
AVERAGE TRUCK TURNAROUND TIME					00:20

Table 3: Wednesday

DATE	BAT NUMBER	ENTRY TIME (HH:MM)	EXIT TIME (HH:MM)	MISSION	TRUCK TURN AROUND TIME (HH:MM)
18/05/2017	E585	12:23	01:09	P/L	00:46
	E300	12:43	01:15	P/L	00:32
	E893	11:47	12:16	P/L	00:29
	E930	10:59	11:58	P/L	00:59

THURSDAY	E954	11:02	11:21	A/E P/L	00:19
	E962	11:55	12:18	A/E P/L	00:23
	E613	12:04	12:22	A/E P/L	00:18
	E237	10:35	10:54	A/E P/L	00:19
AVERAGE TRUCK TURNAROUND TIME					00:31

Table: 4 Thursday

DATE	BAT NUMBER	ENTRY TIME (HH:MM)	EXIT TIME (HH:MM)	MISSION	TRUCK TURN AROUND TIME (HH:MM)
19/05/2017 FRIDAY	E949	11:37	12:20	P/L	00:43
	E261	12:48	13:34	P/L	00:46
	E552	10:23	10:36	P/L	00:13
	E685	12:30	13:21	P/L	00:51
	E879	11:29	11:51	A/E P/L	00:22
	E296	13:05	13:21	A/E P/L	00:16
	E915	12:59	13:20	A/E P/L	00:21
	E529	11:33	11:56	A/E P/L	00:23
AVERAGE TRUCK TURNAROUND TIME					00:29

Table 5: Friday

6. Methodology

To understand the impact of 5s on the turnaround time, the entry and exit time of vehicles were noted for the duration of a week (Monday to Friday) before and after the implementation of proposed framework for three hours (10:00 a.m. to 13:00 p.m.) at International Container Transhipment Terminal Kochi. The results of the observation are tabulated in Table 1. Direct interviews were conducted with the RTG operators, planning tower staff and drivers of inter- terminal vehicles for more information.

Week days	T.A.T BEFORE	T.A.T AFTER
Monday	00:50	00:26
Tuesday	01:19	00:19
Wednesday	00:59	00:20
Thursday	01:13	00:31
Friday	01:13	00:29

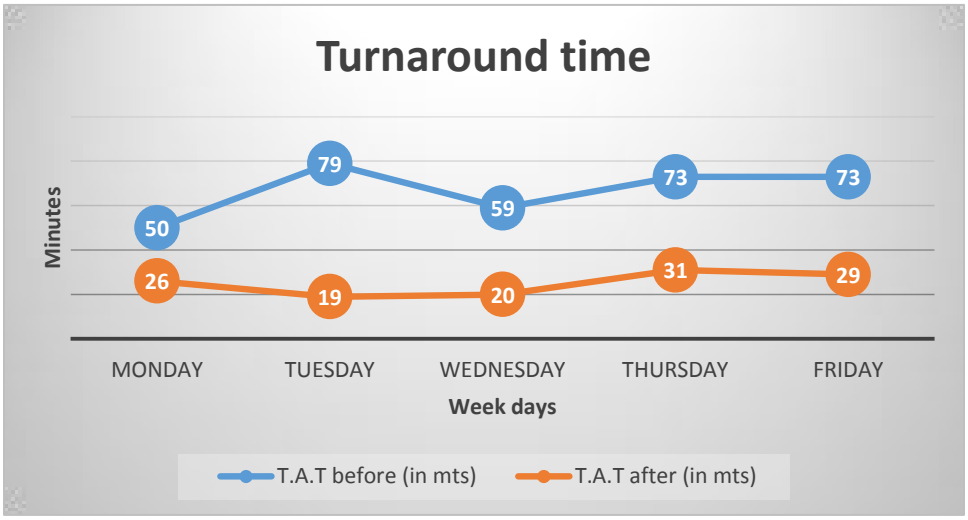
7. Analysis

The analysis clearly shows that the proposed framework has reduced the turnaround time of trucks considerably (Graph 1).

The average turnaround time before implementation: 67 minutes

The average turnaround time after implementation: 25 minutes

Percentage reduction in turnaround time: 62.68 %



8. Findings

The implementation of 5 s in container terminal, especially in the terminal yards can make radical changes in the key performance indicators and improve the performance of terminal. Though most of the KPIs in a terminal are internal performance based, TAT is something that also involves the external parties such as truck drivers, vessel agents, cargo agents etc. thus it's highly crucial for a terminal operator to improve this for keeping their stakeholders satisfied.

On implementation of the framework it was found that the average turnaround time reduced drastically by 62 percent. It shows that the sorting (stacking) of containers have a vital role in improving the competitiveness of the terminal.

9. Limitations

The proposed framework of sorting is only impacting the turnaround time of the trucks coming to the container terminals. The other key performance indicators such as vessel turnaround time cannot be addressed using this framework due to the complexity. Vessel turnaround time is influenced by numerous factors such as

Anchorage time: It can also be referred as the waiting time of the vessels to enter the port. That is, due to port congestion the vessel must wait for a berth. Anchorage is the location at sea where the vessel can lower their anchors and wait till the berth gets vacant. It is defined as the time duration between the points at which the ship reaches the anchorage area and the pilot from port enters the ship for maneuvering.

Maneuvering time: The sailor who maneuvers the vessels through congested waters, such as harbors, river mouths etc. is

known as marine pilot (harbor pilot) sometimes simply called a pilot. He must have detailed knowledge about the particular waterway such as depth, current and tide at any time of the day, direction and strength of wind etc.

Maneuvering time is defined as the time duration between the point at which the pilot enters the ship and the point at which the first rope of ship is tied to the harbor.

Gross berth time: The time interval between the point at which first rope is tied and the vessel is sailed is known as the gross berth time of a vessel. It plays a vital role in determining the productivity of a sea port.

10. Conclusion

In truck turnaround time, it was found that the turnaround time was more for trucks with pick up laden mission, which further raised the overall truck turnaround time. The increased turnaround time was because of the re-handling of other containers in the same stack. In fact, it is not uncommon to require 3 re-handles for each import delivery.

The proposed framework would reduce the uncertainty of container demand to a great extent. It also addresses the uncertainty that happens in two different ways i.e. demand for laden containers that has reached its free period end and demand for the containers that has not reached its free period end.

First, you can setup a small 'pre-gate' a mile ahead of your main gate, and capture the information on the needed import container there. This can give you maybe 15 minutes more time, which won't help much on total re-handles, but you can start re-handling sooner thus reducing the time the truck spends inside the terminal.

Second, there may be patterns on pick-up time of imports you can find. For example, you may be able to 'guess' the pick-up day depending on the dwell time, the bill of lading, and the trucking company supposed to pick up the container. Then you can use that timing information in your Expert Decking configuration. However, these ideas won't eliminate re-handles, but will help direct Expert Decking to make better re-handle decisions.

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