CHAPTER-1

INTRODUCTION

1.1 Industry Profile

Overview of India's consumer durables market

Consumer durables are products purchased by consumers that are manufactured for long-term use. As opposed to many goods that are intended for consumption in the short term, consumer durables are intended to endure regular usage for several years or longer before replacement.

Common example of customer durables in the possession of most households is appliances. These items may include ovens, refrigerators, toasters, and gas or electric water heaters. Consumer durables of this type are intended for use on a continuing basis, and often are sold with some type of warranty or service contract that helps to ensure the appliance will continue working for an appreciable period of time.

The consumer durables industry can be broadly classified into two segments: **Consumer Electronics** and **Consumer Appliances**. Consumer Appliances can be further categorized into Brown Goods and White Goods. Consumer electronics is basically entertainment systems like television, VCRs, audio systems and home theater systems. Consumer appliances are other household appliances like refrigerators, washing machines, air conditioners, food processors, and vacuum cleaners.

Brown goods are relatively light and low priced fast moving electronics goods on the other hand **White goods** signify for relatively high priced, heavy and slow moving electronic good.

Consumer Durables		
White Goods	Kitchen Appliances / Brown Goods	Consumer Electronics
Refrigerators	Mixers	Mobile Phones
Washing Machines	Grinders	Televisions
Air-Conditioners	Microwave Ovens	MP3 Players
Speakers & Audio Equipments	Cooking Range	DVD Players
		VCD Players

Fig 1.1

Type of Consumer Durables [Source: India Brand Equity Foundation (IBEF)

Major companies in electronics consumer durables sector in India

1. LG Electronics India Ltd.
2. Samsung India Electronics
3. Siemens
4. Sony India
5. Philips India
6. Nokia India
7. Panasonic
8. Whirlpool Appliances
9. Videocon Industries
10. Blue star

1.2 Organization Profile

1.2.2 LG history

LG is a South Korea's second largest conglomerate with its headquarters in Seoul and came into picture in the same year when India got its independence (1947) and since then the company has never looked back. The full name of LG is "Lucky GoldStar" and its tagline Life's Good goes well with its positive reputation among the people.

In 1952, Lak-Hui (pronounced "Lucky", currently LG Chem) became the first Korean company to enter the plastics industry. As the company expanded its plastics business, it established GoldStar Co. Ltd., (currently LG Electronics Inc.) in 1958.

In 1959, Goldstar produced South Korea's first radio. Many consumer electronics were sold under the brand name GoldStar, while some other household products (not available outside South Korea) were sold under the brand name of Lucky. For some time, electronics were produced under the label, while chemicals, especially household items like toothpaste and detergent, continued to be marketed under the brand.

In 1995, to better compete in the Western market, the company was renamed "LG", the abbreviation of "Lucky Goldstar". More recently, the company associates the letters LG with the company tagline "Life's Good".

LG Electronics plays an active role in world markets with its assertive global business policy.

As a result, LG Electronics controls 114 local subsidiaries worldwide, with roughly 82,000 executives and employees.

LG India corporate office

Established In : Jan 1997

MD : Mr. Soon Kwon

Corporate Office : Plot no51, Udyog Vihar, Surajpur Kasna Road, Greater Noida (UP)

Corporate Website : http://www.lg.com

Number of Employees: 3000+

1.2.2 LG product line

CATEGORY	MAIN PRODUCTS
Consumer Electronics	LCD TV , Plasma Display , Display Panel, Color Television, Home Theatre System, Music system, DVD,
Home Appliances	Room Air Conditioner, Commercial Air Conditioner , Refrigerator, Washing Machine, Dishwasher, Microwave, Vacuum Cleaner
Computer Products	Laptop, Personal Computer, LCD monitor, CRT monitor, Optical Storage Devices
Mobile Phones	Premium trend setter phone , Camera Phone , Music Phone , Color Screen GSM Handset

Fig 1.2.2

1.2.3 LG financial performance

LG Turnover in Crores [Source: http://www.lg.com/in/]

Fig 1.2.3

1.2.4 SCM network of LGEIL

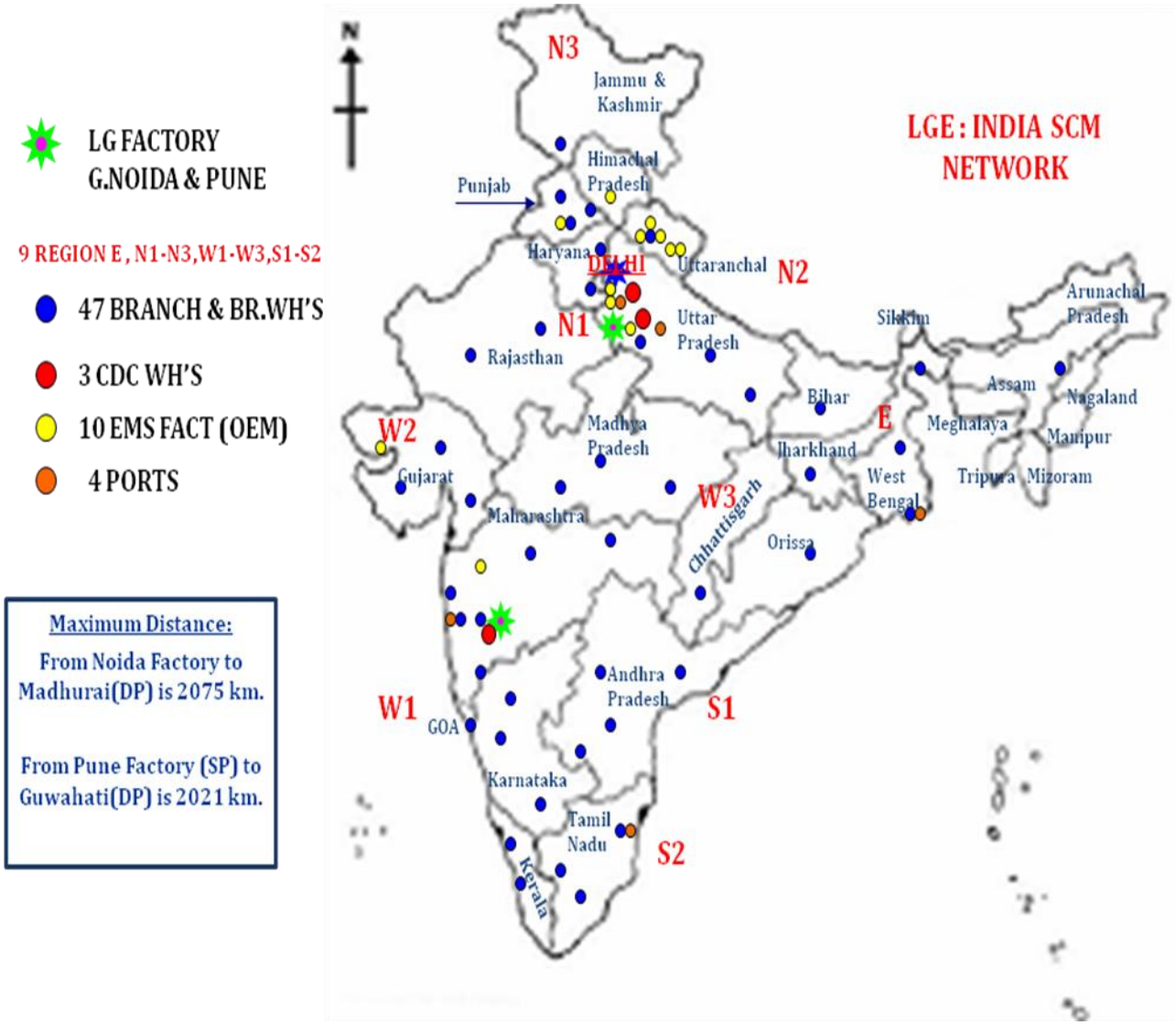


Fig 1.2.4

1.2.5 LGEIL Supply & Distribution Location

Demand Points (47) are:

E : Durgapur, Calcutta, Ranchi, Patna, Bhubaneswar, Guwahati, Siliguri

N : Jaipur, Jodhpur, Delhi, Ghaziabad, Lucknow, Varanasi, Dehradun, Agra, Ludhiana, Jammu, Karnal, Chandigarh, Gurgaon, Jalandhar

S : Hyderabad, Warangal, Hubli, Vijayawada, Bangalore, Tirupati, Mangalor, cochin, Kozhikode,Coimbatore, Chennai, Madurai

W : Thane, Mumbai, Pune, Nagpur, Aurangabad, Goa, Kolhapur, Ahmedabad, Surat, Rajkot, Bhopal, Raipur, Indore, Jabalpur

Supply Points i.e. Factory & Electronic Manufacturing System (EMS) are:

1. **Noida Factory**
2. **Pune Factory**

	EMS	OBU	LOCATION
1.	INDO COUNT industries	WMC	Kolhapur,Maharashtra
2.	KAPKAN Electronics Pvt Ltd	CTV	Solan, HP
3.	P.G. Electroplast Pvt	CTV/DVD	Roorkee, UP
4.	E-DURABLES	ACC/MWO	Dehradun, UA
5.	AMBER Enterprises	ACC/MWO	Dehradun, UA
6.	AMBER Enterprises IN	ACC/WMC/REF	Rajpura,Haryana
7.	DIXON Technology	CTV	Dehradun, UA
8.	LOTTE Electronics LTD	CTV	Rudrapur, UA
9.	BIGESTO FOODS Pvt Ltd	CTV	Surajpur, greater Noida
10.	STARION Pvt Ltd	WMC	Greater Noida

1.3 Objective of study

This dissertation is aimed at how to optimize the utilization of vehicles' volume to decrease transportation cost per unit. It is observed that different products like CTV, Refrigerator and Washing Machine etc. have different dimensions and there is a possibility of increasing vehicles volume utilization because if orientations of products are changed during loading, volume utilization changes and orientations of products during loading are decided manually.

1.4 Scope of the study

The project is applicable to those vehicles only which are sent to branches from LG / Mother Warehouses. Those dedicated vehicles which are used to transfer material from LG to warehouse are not considered because they are hired on fixed monthly expenses. Also, the scope of increasing volume utilization is only when more than one type of products are dispatched through a vehicle i.e. the condition of product-mix dispatch.

CHAPTER-2

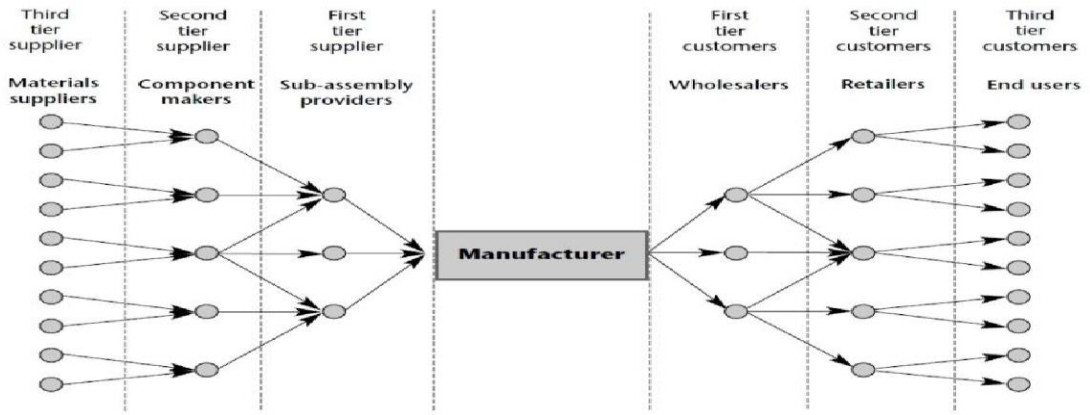
LITERATURE REVIEW

2.1 SCM introduction

The supply chain is the network of facilities (warehouses, factories, terminals, ports and stores), vehicles (trucks, trains, planes, and ocean vessels), and logistics information systems (LIS) connected by an enterprise's supplier's suppliers and its customer's customers that are involved in producing and delivering a product or service. The sequence begins with basic suppliers of raw materials and extends all the way to the final customer. Logistics activities (customer response, inventory management, supply, transportation, and warehousing) connect and activate the objects in the supply chain.

Logistics management is that part of supply chain management which plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements.

Logistics management activities typically include inbound and outbound transportation management, fleet management, warehousing, materials handling, order fulfilment, logistics network design, inventory management, supply–demand planning and management of third-party logistics services providers. To varying degrees, the logistics function also includes sourcing and procurement, production planning and scheduling, packaging and assembly, and customer service. It is involved in all levels of planning and execution—strategic, operational, and tactical.



Supply chain around a manufacturer

2.2 LGEIL SCM

In LGEIL, SCM department is divided into mainly four sub divisions, i.e.

1. Demand & Distribution Planning Team
2. Factory & CDC Operation Team
3. Secondary/ Branch Operation Team
4. EXIM (Export and Import) Team

SCM department functions are:

1. Planning team deals with Material, Distribution Planning and Forecasting (according to previous data and observation).
2. Factory Team deals with the Receiving, Storing and Dispatch of Finished goods as per instructions of the Planning Team.
3. Branch Operation team has mainly three works, i.e., Infra Management, Auditing and SOP Management and also dispatch of finished goods.
4. EXIM team deals with export and import of raw material as well as finished goods.

The company has following 3 mother warehouses where the products are stored after manufacturing:

1. Noida Factory has a total storage of 35,000 sq feet.
2. Kasna MWH, which is around 10Km from LG and has total storage area of 1,20,000 square feet.
3. Dasna MWH, which is around 34Km from LG and has total storage area of 1,33,000 square feet.
4. Surajpur MWH, which is around 5Km from LG and has total storage area of 80,000 square feet. It is the oldest warehouse of LGEIL.
5. Pune MWH, which is around 35 Km from factory and has storage area of 2.10,000 Sq feet.
6. Pune Factory has a total storage of 55,000 Sq feet.

LG uses **Oracle R12, ERP** software which enables it to drive supply chain processes based on real-time information, and in turn provide customers accurate information on availability.

In LGEIL, SCM department is divided into mainly four sub divisions, i.e.

- Demand & Distribution Planning Team (D2P) **:**

  -Responsible for FG availability at Branch DC's - SFA / SCI & OTD1/2.

  -SKU & Saleable Inventory mgmt – DIO / EOL.

- SCM Primary Operation Team (FACT / CDC & EMS)

  - Execution of FG delivery and distribution plan prepared by D2P Team.

  -Primary SCM Operations – Receipts / Dispatch & Inventory at Factory, EMS & CDC

  -Primary Transport management.

- SCM Secondary Operations & Corp. Branch Administration Support Team :

  - Responsible for SCM Architecture for secondary distribution. – WH / 3PL.

  - Responsible for Audit & Support to Regional & Branch SCM.

  -Responsible for monitoring SCM Cost & Policy adherence in secondary distribution.

  -SCM Secondary Operation Team (Regional SCM / Branch SCM / CFA, Sec.Transporters).

- Export and Import (EXIM) Team :

  - EXIM team deals with export and import of raw material as well as finished goods.

CHAPTER-3

RESEARCH METHODOLOGY

3.1 Project details

Project undertaken is how to optimize the utilization of vehicles' volume to decrease transportation cost per unit. It is observed that different products like CTV, Refrigerator and Washing Machine etc. have different dimensions and there is a possibility of increasing vehicles volume utilization because if orientations of products are changed during loading, volume utilization changes and orientations of products during loading are decided manually.

3.2 Scope of the project

The project is applicable to those vehicles only which are sent to branches from LG / Mother Warehouses. Those dedicated vehicles which are used to transfer material from LG to warehouse are not considered because they are hired on fixed monthly expenses. Also, the scope of increasing volume utilization is only when more than one type of products are dispatched through a vehicle i.e. the condition of product-mix dispatch.

3.3 Data collection

For current CBM utilization of vehicles, data of MAY 2010 was taken from LG STN Check List. No. of Vehicles dispatched to branches from LG Factory and warehouses – KASNA, DASNA, MNOI were calculated. Dispatch to warehouses from LG was not considered because that material movement is done through dedicated vehicle which are deployed and paid on monthly basis. But, for dispatch to branches freight is paid according to vehicle chosen and destination. Therefore, underutilization of vehicle space can lead to increased freight per piece of product.

The current procedure of loading the vehicles was also noted.

3.4 Brief overview of execution of SCM activities within LG premises

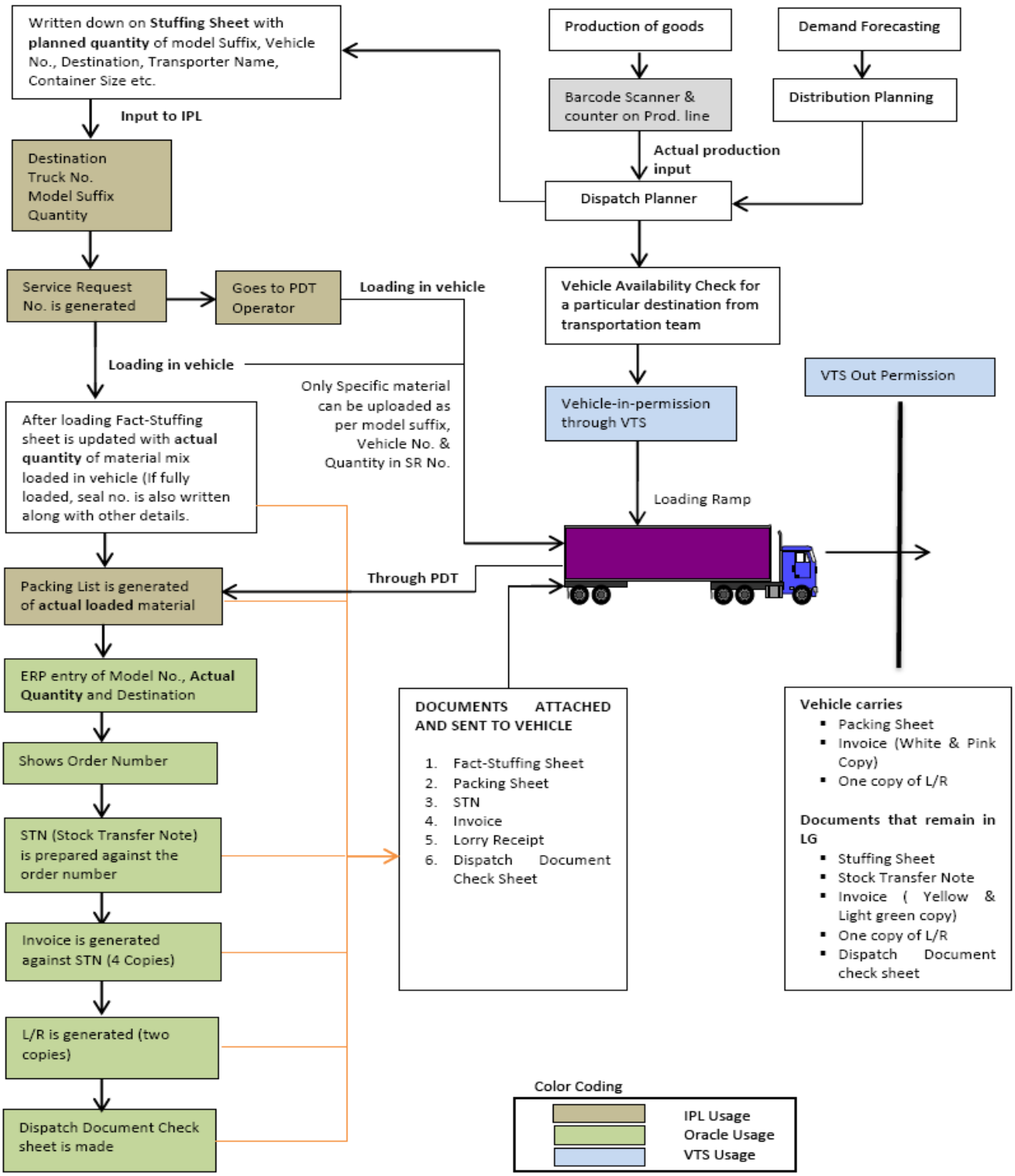


Fig 2.3

3.5 Detailed explanation of SCM activities & terms used

IPL (Intelicon Pvt. Ltd.)

IPL is software in which destination, truck no., model suffix and quantity of products to be dispatched is entered. As an output, IPL generates request number. This request no. is written on the stuffing sheet with planned quantities of products to be dispatched. Furthermore, the PDT (Portable Data Terminal) is linked with this software. Whatever products are loaded in to the vehicle, their barcodes are scanned first and only those products can be scanned which have been entered in IPL.

Stuffing sheet

Stuffing sheet is basically a document sheet which is filled with date, destination, vehicle number, transporter name, container size, Model Suffix, Planned Quantity of products to be loaded, actual quantity of products loaded, PDT Operator name and Fork Lift operator name etc.

Model-suffix

The suffix is the combination of letters which tells the configuration, production place and other product specific details. eg. Colour, technical details etc.

Barcode

A barcode (also bar code) is a machine-readable (using dark ink on white substrate to create high and low reflectance which is converted to 1s and 0s) representation of information in a visual format on a surface. Originally barcodes stored data in the widths and spacing of printed parallel lines, but today they also come in patterns of dots, concentric circles, and text codes hidden within images. Barcodes can be read by optical scanners called barcode readers or scanned from an image by special software. Barcodes are widely used to implement Auto ID Data Capture (AIDC) systems that improve the speed and accuracy of computer data entry.

Since barcodes permit faster and more accurate recording of information, work in process can move quickly and be tracked precisely. Quite a bit of time can be spent tracking down the location or status of materials, or anything else that moves within an organization. Barcodes can help in keeping better track so whole system becomes time saving with quick response.

Packing list

After loading of products into the vehicle, a packing list is generated which contains the barcode serial numbers of all loaded products.

Stock transfer note (STN)

Stock Transfer Note (STN) is a document that is generated at the time of doing stock transfers within the company i.e. from one LGEIL Branch/warehouse/factory to another LGEIL Branch/warehouse/factory. STN can be generated when Stock has to be transferred from "factory to warehouse" or "warehouse to warehouse".

Stock transfer note (STN) is generated to show movement of goods from the factory to the branch warehouse. The STN contains the destination branch's address, quantity and the model details, the transporter's name, the vehicle number (registration number as well as LR number).

Invoice

An invoice or bill is a commercial document issued by a seller to a buyer, indicating the products, quantities and agreed prices for products or services with which the seller has already provided the buyer. An invoice indicates that payment is due from the buyer to the seller, according to the payment terms.

From the point of view of a seller, an invoice is a sales invoice. From the point of view of a buyer, an invoice is a purchase invoice. The document indicates the buyer and seller, but the term invoice indicates money is owed or owing. In English, the context of the term invoice is usually used to clarify its meaning, such as "We sent them an invoice" (they owe us money) or "We received an invoice from them" (we owe them money).

VTS (vehicle tracking system)

LGEIL has VTS software which is linked to the entry gate and thus used to allow vehicles entry inside the factory premises. It gives logistics team details of vehicles (Transporter name, Vehicle No., Destination and time for which vehicle has been inside the factory) which have entered factory premises. Similarly, exit permission is also given through this software to the gate. At gate, various documents are checked – Stuffing Sheet, Stock Transfer Note (STN), Invoice, Lorry Receipt (L/R) and dispatch Document check sheet. Then vehicle leaves the factory premise.

CHAPTER 4

DATA ANALYSIS

4.1 DATA ANALYSIS & OBSERVATIONS

It was observed that the current CBM utilization of vehicles vary from 70% to 85%. The analysis of data give the following details:

NUMBER OF VEHICLES DISPATCHED TO BRANCHES IN MAY – 2010

	Total dispatch in the month	To Branches	Average Dispatch to Branches
Dispach of vehicles from LG Factory	3142	2087	68
Dispatch of vehicles from MNOI	675	654	21
Dispatch of vehicles from KASNA	909	874	28
Dispatch of vehicles from DASNA	373	371	12
Total Dispatch of Vehicles	**5099**	**3989**	**129**

Fig 4.1

USAGE OF DIFFERENT TYPE OF VEHICLES IN MAY – 2010

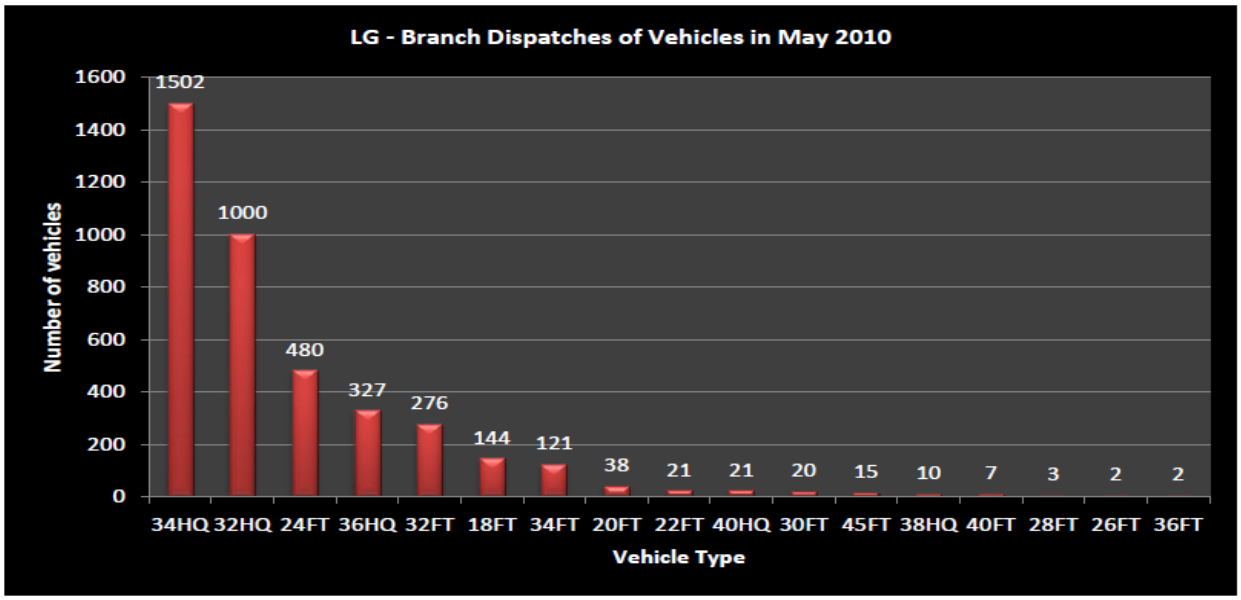


Fig 4.2

FURTHER DETAILS

Type and Number of Vehicles dispatched in May – 2010 from LG factory and warehouses

SOURCE	14FT	18FT	20FT	22FT	24FT	26FT	28FT	30FT	32FT	32HQ	34FT	34HQ	36FT	36HQ	38HQ	40FT	40HQ	45FT
FACTORY	45	107	33	6	208	0	2	19	179	542	84	671	2	156	8	7	10	8
MNOI	12	5	4	9	171	2	1	1	7	85	18	255	0	77	0	0	8	2
KASNA	25	31	0	0	73	0	0	0	62	301	12	284	0	77	1	0	3	5
DASNA	36	1	1	6	28	0	0	0	28	72	7	174	0	17	1	0	0	0
TOTAL	**118**	**144**	**38**	**21**	**480**	**2**	**3**	**20**	**276**	**1000**	**121**	**1384**	**2**	**327**	**10**	**7**	**21**	**15**

T-4.1

Note: 14FT shows that dedicated vehicles have been used and these have same volume as 34HQ

OBSERVATION: Data shows that 34HQ vehicles are used the most.

Number and Percentage of different type of vehicles used

Vehicle Type	34HQ	32HQ	24FT	36HQ	32FT	18FT	34FT	14FT	20FT	22FT	40HQ	30FT	45FT	38HQ	40FT	28FT	26FT	36FT
Number	1384	1000	480	327	276	144	121	118	38	21	21	20	15	10	7	3	2	2
Percentage	34.70	25.07	12.03	8.20	6.92	3.61	3.03	2.96	0.95	0.53	0.53	0.50	0.38	0.25	0.18	0.08	0.05	0.05

T-4.2

OBSERVATION: Data shows that 34HQ, 32HQ, 24FT and 36HQ vehicles cover 80% of the vehicle dispatches.

4.2 COST PER UNIT VOLUME ANALYSIS OF ALL VEHICLES

Preference	VEHICLE	Length	Width	Height	Total CBM	Avg. Freight (North)	Cost/Volume
1	40HQ	1219	237	271	78.29	8083	103.2408
2	28FT	853	259	259	57.22	7275	127.1407
3	36FT	1097	259	259	73.59	9700	131.8152
4	34FT	1036	259	259	69.50	9161	131.8207
5	32FT	975	259	259	65.40	8622	131.8268
6	30FT	914	259	259	61.31	8083	131.8338
7	38HQ	1158	259	310	92.98	13157	141.5099
8	36HQ	1097	259	310	88.08	12464	141.5107
9	34HQ	1036	259	310	83.18	11772	141.5237
10	32HQ	975	259	310	78.28	11079	141.5254
11	26FT	792	213	243	40.99	7005	170.8823
12	24FT	731	213	228	35.50	6467	182.1676
13	22FT	670	213	213	30.40	5928	195.0178
14	20FT	609	213	213	27.63	5389	195.0436
15	18FT	548	198	198	21.48	4850	225.7516

T-4.3

OBSERVATION: This analysis shows that the vehicles in the rows which are in same colour have same cost per unit volume. But this holds true **only** if the CBM utilization %age is same for the two.

4.3 CURRENT LOADING PROCEDURE OF VEHICLES

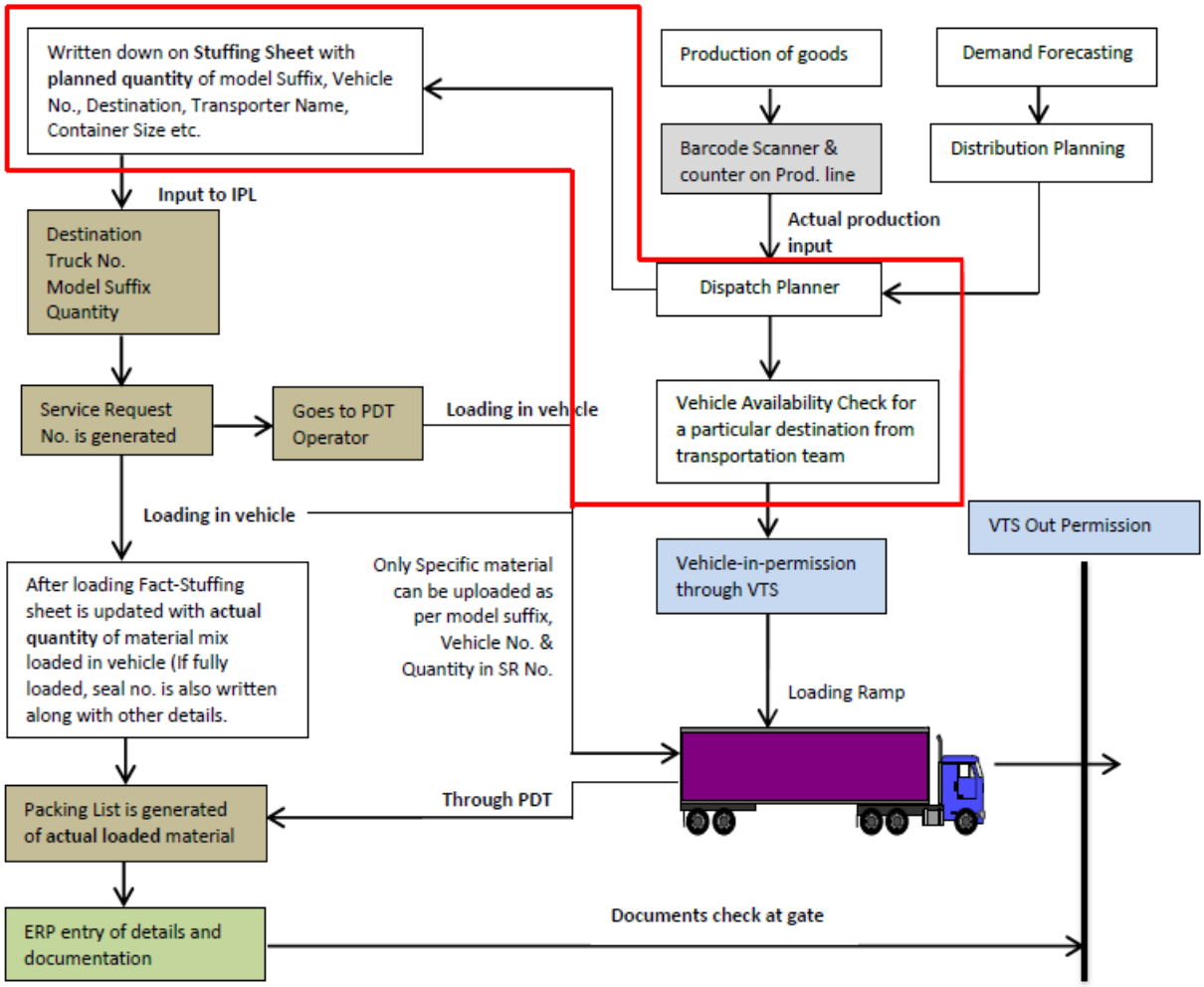


Fig 4.3

Partial procedure of execution of SCM activities shown for the purpose of identification of improvement area

***Red colour enclosed activities come under dispatch planning**

The improvement area is the system of dispatch planning. Currently, Dispatch planner arranges a vehicle from transportation team and gives the loading plan for that vehicle. The loading of vehicle is done and whatever products are loaded, they are written against the planned quantity.

The actual quantity loaded is always less than the planned quantity. It happens mainly because

(a) Either material is under quality hold so less quantity of products is available or

(b) Planned quantity written is too high to fit into a vehicle.

This is explained with an example as under

	PLANNED QTY.	ACTUAL QTY. LOADED (with reason)
Product A	100	97 (due to quality hold, less material is available)
Product B	100	90 (due to quality hold, less material is available)
Product C	60	40 (due to space constraint, only 40 could be loaded)

In which orientation a product is to be loaded is decided manually by loading workers.

4.4 RECOMMENDATIONS

Procedure which needs to be followed for dispatch planning:

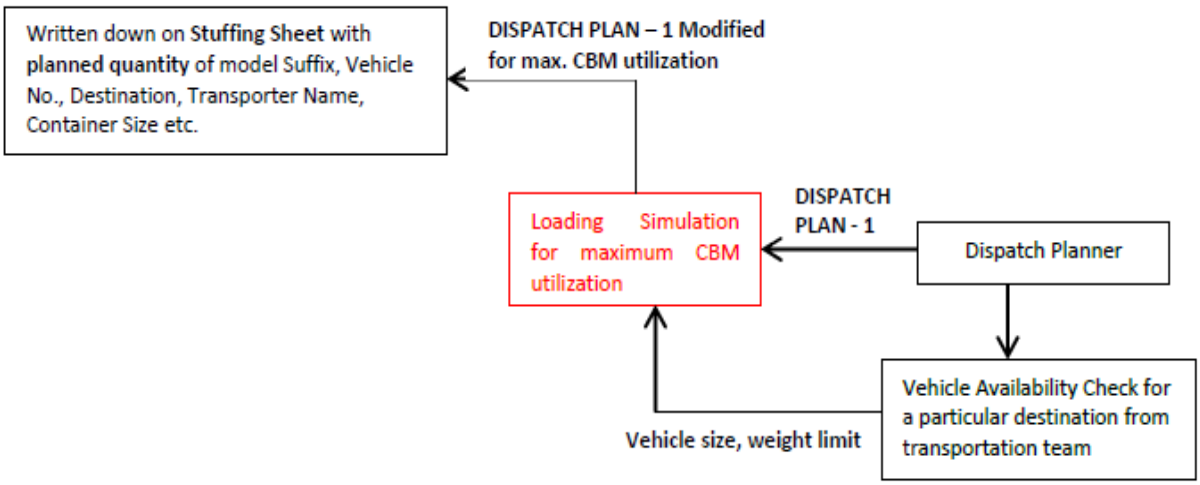


Fig 4.4

Partial procedure of execution of SCM activities shown for the purpose of presentation of improvement activities

*Red colour activities to be introduced

Loading simulation will require input of (a) Vehicle size & its weight limit and (b) dispatch plan made by the dispatch planner. It will help in selecting one out of two or more vehicles available of different sizes for the required destination in which the planned product mix quantity will maximize the CBM utilization, considering the weight limit as well.

This is explained with an example as under:

	DISPATCH PLAN – 1	DISPATCH PLAN – 1 (AFTER SIMULATION)
	PLANNED QTY	PLANNED QTY
Product A	100	91
Product B	100	89
Product C	60	46

Loading Simulation will tell which product mix quantity will maximize the CBM utilization and plan would be modified accordingly.

Chapter 5

CASE STUDY

5.1 HOW TO DO LOADING SIMULATION?

This loading simulation can be done with the help of a programmable software.

5.2 RECOMMENDATION

The recommendation is that LGEIL should use commercial software named ‘Cargowiz’. Its features are explained in the appendix.

To justify the use of software ‘Cargowiz’, the outer dimensions of packaged units and inside dimensions of vehicles were needed. Data was collected of all type of vehicles used by LGEIL and running models during June, 2010. This data is available in the appendix.

While optimizing the volume utilization, only two cases can arise:

1. Alternate Vehicle usage could achieve better volume utilization
2. Products should be loaded in those orientations which allow maximum volume utilization and unused space to be kept as minimum as possible by loading maximum number of products within weight limit.

The above two situations are presented in the proceeding section through example – 1 and example – 2. The volume utilization by current ongoing procedure and the volume utilization which could be achieved are analyzed with ‘Cargowiz’ software.

5.3 CARGOWIZ INTRODUCTION

Cargowiz is the software which takes **input** of Vehicle dimensions, Product Dimensions with allowed orientations & weight and displays the **output** in terms of loading in Kg, no. of products loaded with there orientations and % CBM utilization. It can also incorporate the weight limit consideration while loading. It is a three step Procedure which is described as under:

STEP – 1: The various truck sizes (Length, Width and Height) are fed into the software. Select the one which one to be loaded.

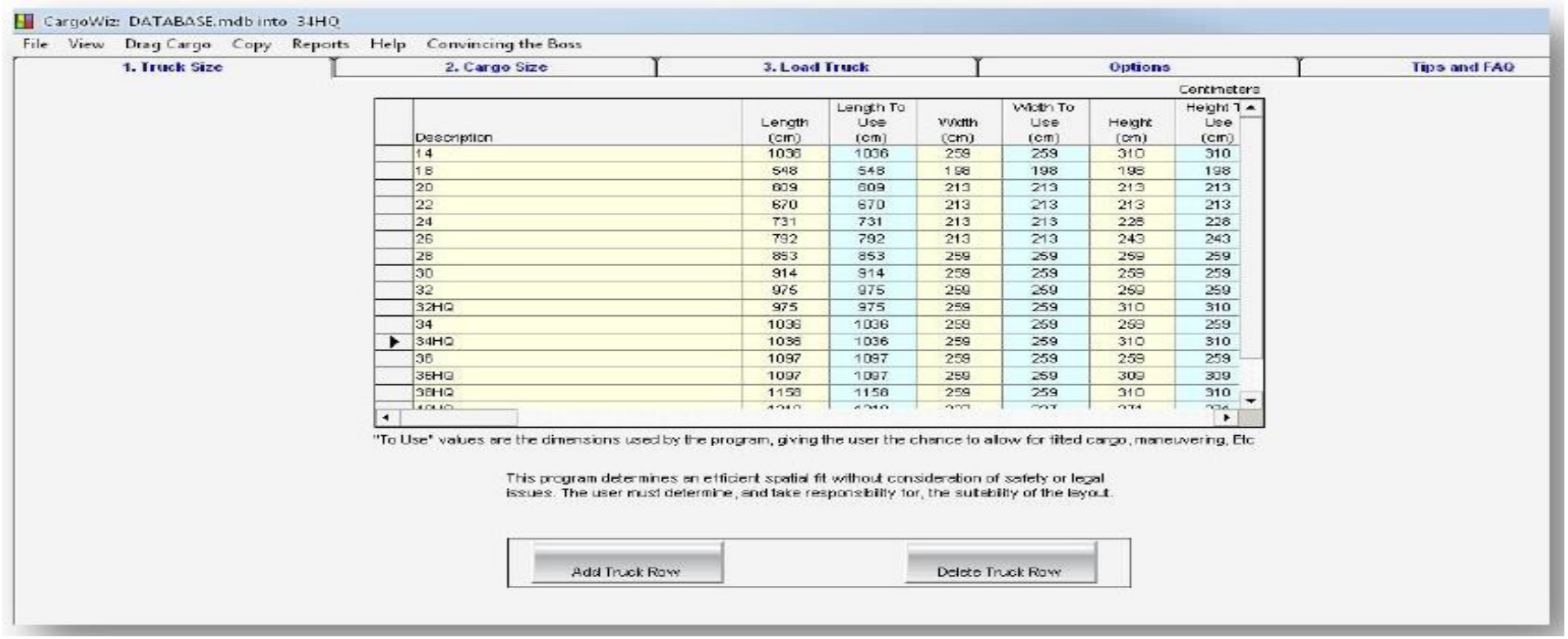


Fig 5.3
First step: Enter the truck Size

Step 2: Enter the product name, dimensions, orientations allowed and their weight with quantity. Stacking norms can also be incorporated. When all quantities are entered by just clicking on refresh button, one can see the total weight of the products.

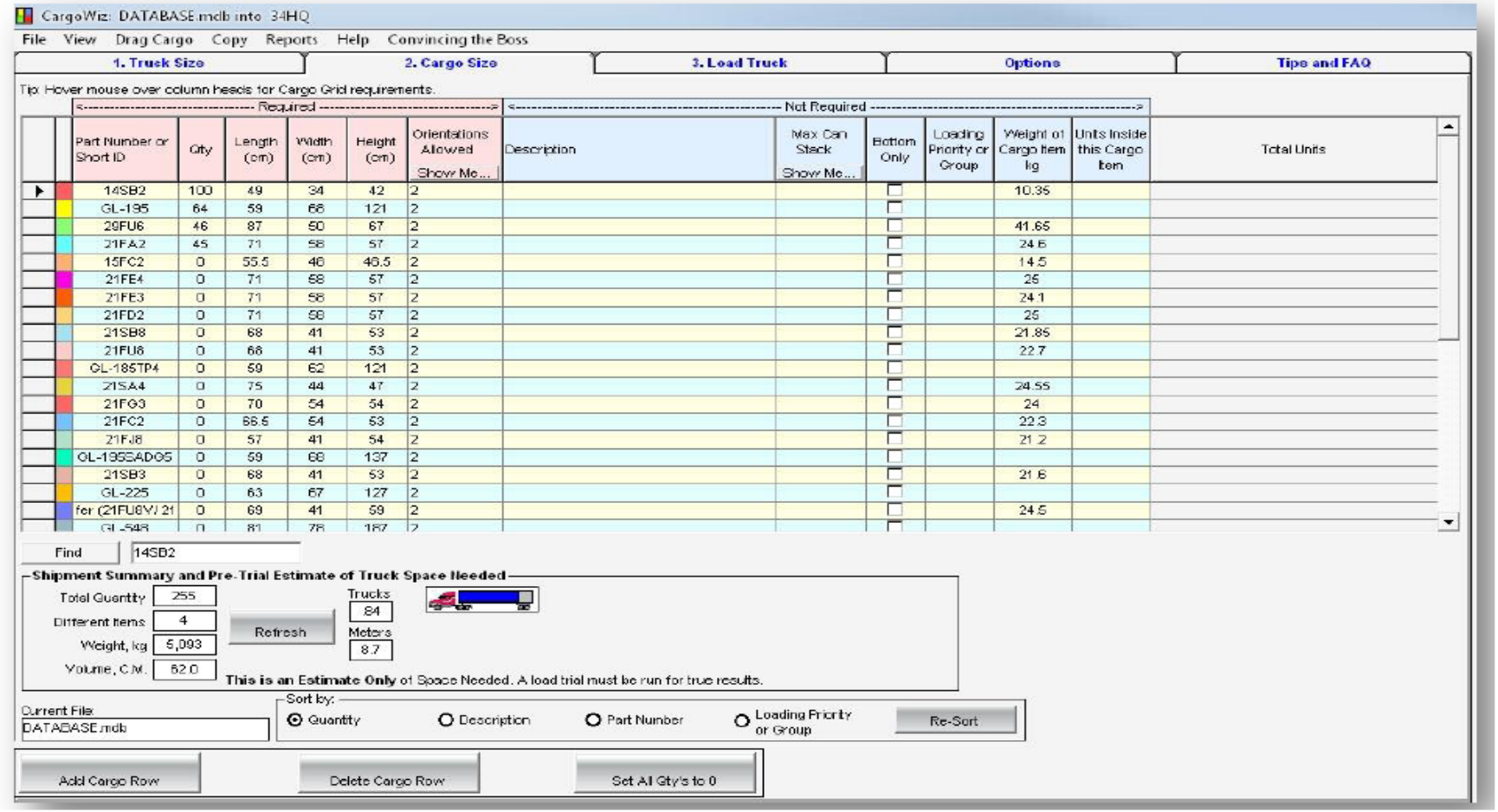


Fig 5.4

Step two: Enter the products description

Delhi School Of Management, DTU

Step 3: Software shows the output: Total no. of products loaded, space left, %age CBM utilization

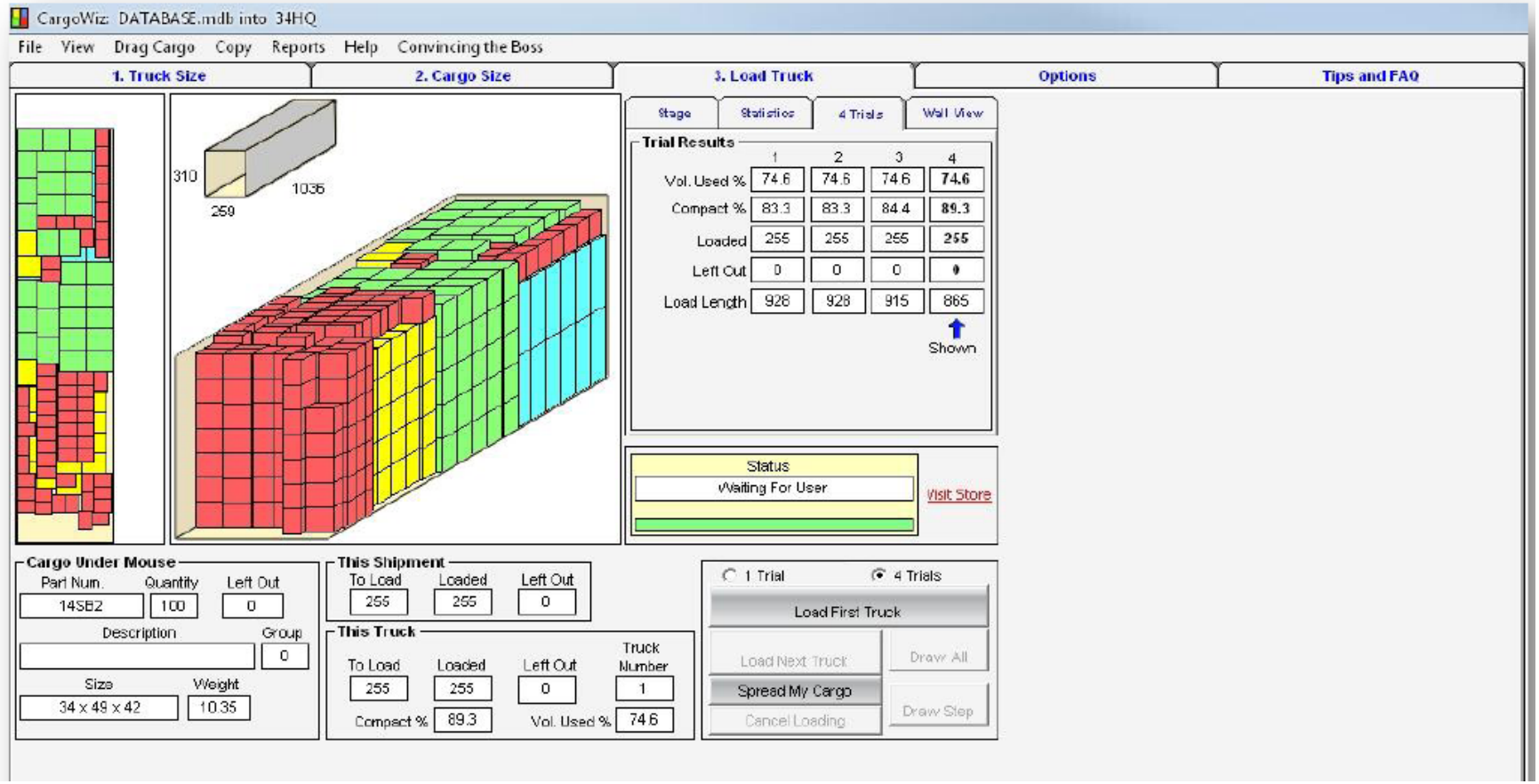


Fig 5.5

Step three: Software shows the output

5.4 FEATURES OF CARGOWIZ

1. Easy three step procedure towards optimum CBM utilization
2. Easy import of data from Excel and ERP
3. Output can be seen as 3D view, top view or any view
4. Easy edit load plan and see output by just editing the quantity of products easily
5. Output can be printed with details and sequence of loading
6. Loading priority can be set
7. Allowed orientations of loading, Stacking norms and weight limit for a vehicle can be set

The details of the software can be seen at www.softtruck.com and trial version of the software can also be downloaded from the site. Trail Version is fully functional for 20 days.

5.5 DATA ANALYZED WITH 'CARGOWIZ' SOFTWARE

EXAMPLE– 1.1: Alternate Vehicle use could increase the CBM (Cubic Meter) utilization

Vehicle 36HQ was used if 34HQ could be used, with a little less quantity of product – 14SB2, CBM utilization could be increased from 85% to 90% and saving could be achieved of Rs 2730.7

								36HQ			34HQ				
STNNO	IO_DATE	FROM_WH_CODE	TO_WH_CODE	OBU	MODEL	CBM	TRUCK_SIZE	Q (1)	TCBM (1)	FAPU (1)	Q (2)	TCBM (2)	FAPU (2)	D	TD
STNCFN1005034612	3-May-10	CFN-FACT	BU1-BHUB	CTV	21FA2RG4AZ	0.2347	36HQ	97	22.77	191.7	97	22.77	183.1	8.6	833.0
STNCFN1005034612	3-May-10	CFN-FACT	BU1-BHUB	CTV	14SB2BB-AJ	0.07	36HQ	150	10.50	57.2	138	9.66	54.6	2.6	384.2
STNCFN1005034612	3-May-10	CFN-FACT	BU1-BHUB	CTV	21FC2AB5A9	0.1903	36HQ	100	19.03	155.4	100	19.03	148.5	7.0	696.3
STNCFN1005034612	3-May-10	CFN-FACT	BU1-BHUB	REF	GL-195NVG5	0.4855	36HQ	46	22.33	396.5	46	22.33	378.7	17.8	817.2
							Total		**74.63**			**73.79**			**2730.7**
								Freight = Rs 60949			Freight = Rs 57563				
								CBM Utilization = 85%			**CBM Utilization = 90%**				
							Weight	8329 Kg			8115 Kg				
								Saving = Rs 2730.7							

Fig 5.6

Suffix (1) shows that calculation is for 36HQ and Suffix (2) Shows that calculation is for 34HQ
Q – Quantity CBM – Cubic Meter (Volume)
TCBM – Total CBM for loaded a particular product, equals to Q × CBM
FAPU – Freight Allocation per unit, equals to Freight × [Product CBM × TCBM] ÷ [Total CBM × Q]
D – Difference, equals to FAPU (1) – FAPU (2)
TD – Total Difference, equals to D × Q (1)

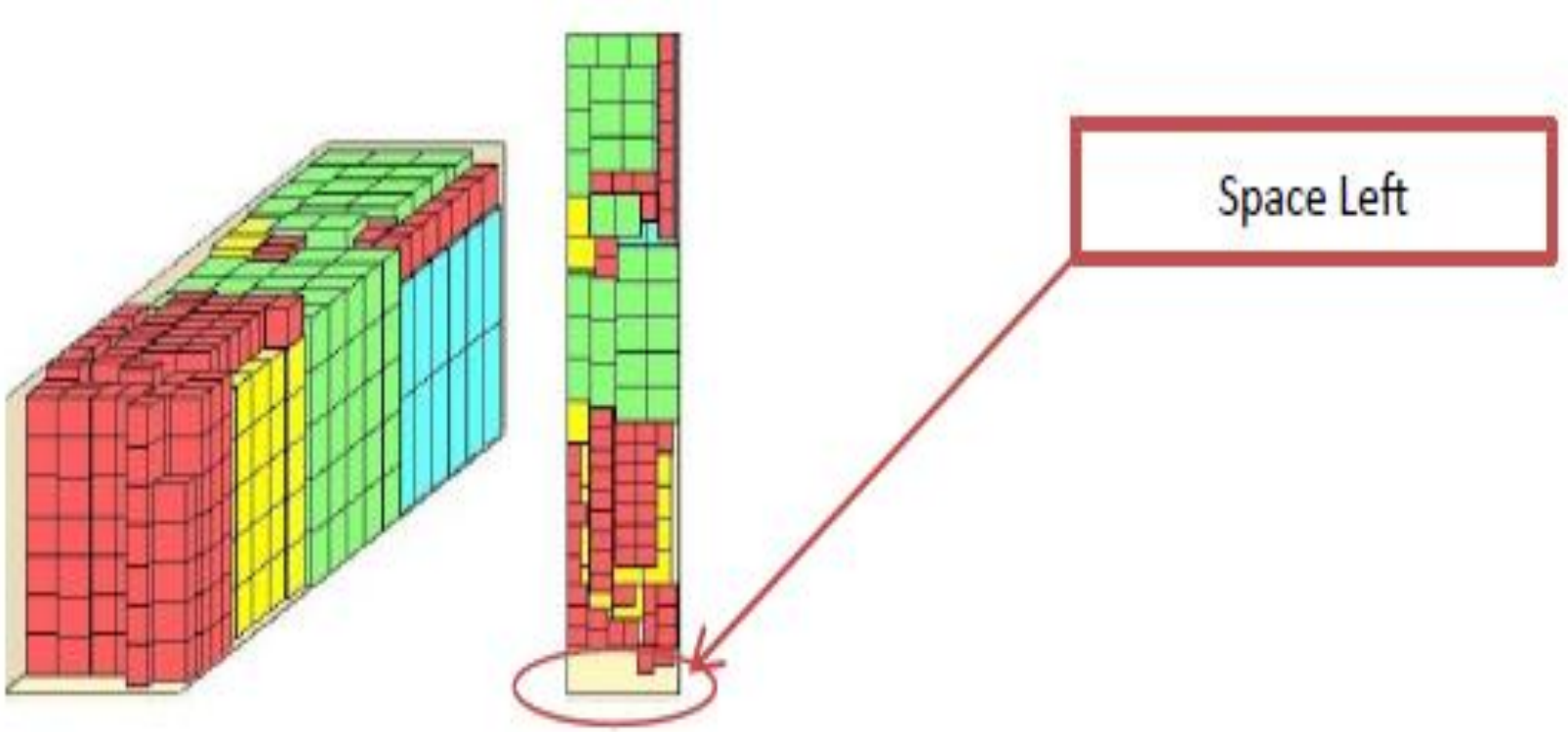


Fig 5.7

Cargowiz generated 36HQ Views (3D, Top) showing the scenario of actual loading

EXAMPLE – 1.2: Alternate Vehicle use could increase the CBM utilization

Vehicle 34HQ was used if 34FT could be used, with less quantity of product – 14SB2, CBM utilization could be increased from 74.6% to 88.7% and saving could be achieved of Rs 10719.4 (too high).

								34HQ			34FT				
STNNO	IO_DATE	FROM_WH_CODE	TO_WH_CODE	OBU	MODEL	CBM	TRUCK_SIZE	Q (1)	TCBM (1)	FAPU (1)	Q (2)	TCBM (2)	FAPU (2)	D	TD
STNCFN1005075077	7-May-10	CFN-FACT	VI1-VIJA	CTV	29FU6RG5T5	0.2915	34HQ	46	13.41	232.6	46	13.41	182.3	50.4	2316.7
STNCFN1005075077	7-May-10	CFN-FACT	VI1-VIJA	CTV	21FA2RG4AZ	0.2347	34HQ	45	10.56	187.3	45	10.56	146.8	40.6	1824.8
STNCFN1005075077	7-May-10	CFN-FACT	VI1-VIJA	REF	GL-195NM5	0.4855	34HQ	46	22.33	387.5	46	22.33	303.6	83.9	3858.6
STNCFN1005075077	7-May-10	CFN-FACT	VI1-VIJA	REF	GL-195NM5	0.4855	34HQ	18	8.74	387.5	18	8.74	303.6	83.9	1509.9
STNCFN1005075102	7-May-10	CFN-FACT	VI1-VIJA	CTV	14SB2BB-AJ	0.07	34HQ	100	7.00	55.9	94	6.58	43.8	12.09	1209.42
							Total		**62.04**			**61.62**			**10719.4**
								Freight = Rs 49516			Freight = Rs 38534				
								CBM Utilization = 74.6%			**CBM Utilization = 88.7%**				
							Weight	6938 Kg			6876 Kg				
								Saving = Rs 10719.4							

Fig 5.8

Suffix (1) shows that calculation is for 34HQ and Suffix (2) Shows that calculation is for 34FT

Q – Quantity CBM – Cubic Meter (Volume)
TCBM – Total CBM for loaded a particular product, equals to Q × CBM
FAPU – Freight Allocation per unit, equals to Freight × [Product CBM × TCBM] ÷ [Total CBM × Q]
D – Difference, equals to FAPU (1) – FAPU (2)
TD – Total Difference, equals to D × Q (1)

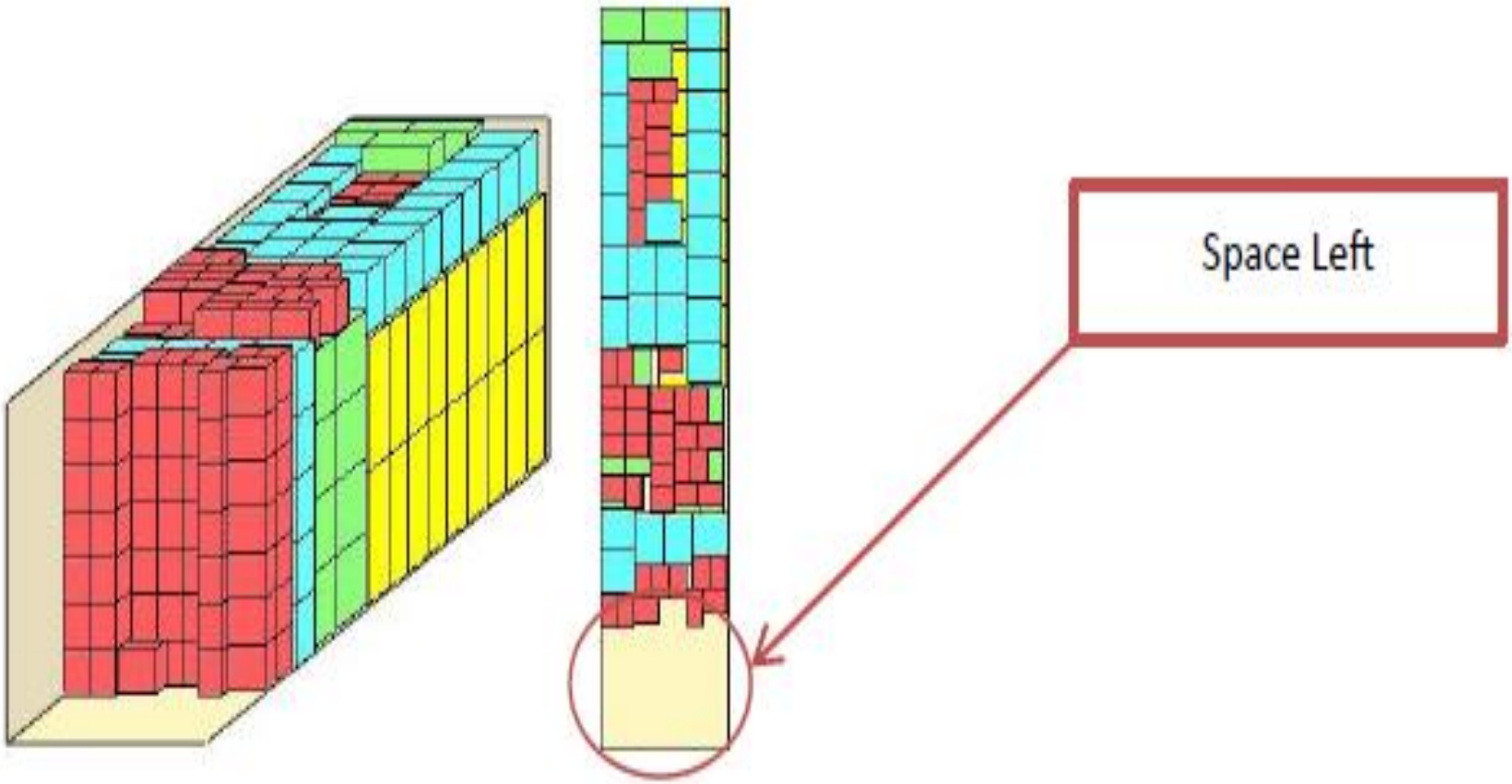


Fig 5.9

Cargowiz generated 34HQ Views (3D, Top) showing the scenario of actual loading

EXAMPLE – 2.1: More product loading could increase the CBM utilization

Vehicle 34HQ was used with less quantity of product. Suppose if product 14SB2 was loaded to maximum quantity which could be 143 , CBM utilization could be increased from 83.1% to 86.7% and saving could be achieved of Rs 1966.1.

Note: Planned dispatch can be 100 only but to convert lost volume into rupees, quantity of product 14SB2 is increased 100 to 143 and calculations are done.

								34HQ			34HQ				
STNNO	IO_DATE	FROM_WH_CODE	TO_WH_CODE	OBU	MODEL	CBM	TRUCK_SIZE	Q (1)	TCBM (1)	FAPU (1)	Q (2)	TCBM (2)	FAPU (2)	D	TD
STNCFN1005044643	4-May-10	CFN-FACT	CA1-CALC	REF	GL-195NH5	0.4855	34HQ	130	63.12	330.7	130	63.12	317.1	13.6	1769.8
STNCFN1005044643	4-May-10	CFN-FACT	CA1-CALC	CTV	14SB2BB-AJ	0.07	34HQ	100	7.00	47.7	143	10.01	45.7	2.0	196.3
							Total		70.12			73.13			1966.1
								Freight = Rs 47764			Freight = Rs 47764				
								CBM Utilization = 83.1%			CBM Utilization = 86.7%				
							Weight	6885 Kg			7330 Kg				
								Saving = Rs 1966.1							

Fig 5.10

Suffix (1) shows that calculation is for 34HQ vehicle in actual case and Suffix (2) Shows that calculation is for same vehicle if optimum loading were done.

Q – Quantity CBM – Cubic Meter (Volume)
TCBM – Total CBM for loaded a particular product, equals to Q × CBM
FAPU – Freight Allocation per unit, equals to Freight × [Product CBM × TCBM] ÷ [Total CBM × Q]
D – Difference, equals to FAPU (1) – FAPU (2)
TD – Total Difference, equals to D × Q (1)

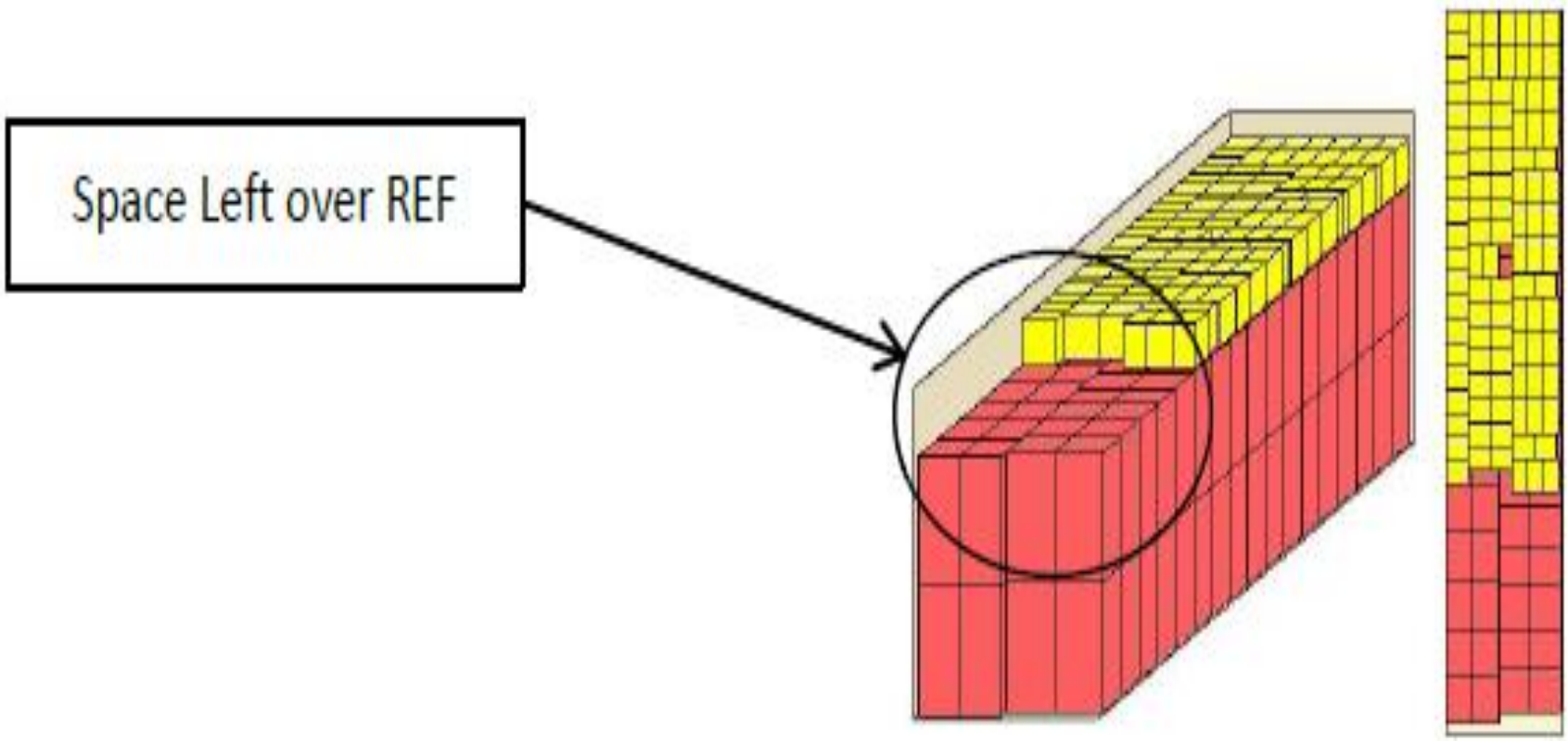


Fig 5.11

Cargowiz generated 34HQ Views (3D, Top) showing the scenario of actual loading

EXAMPLE – 2.2: More product loading could increase the CBM utilization

Vehicle 32HQ was used with less quantity of product. Suppose –

a) If product 21FU8 was loaded to maximum quantity which could be 54, CBM utilization could be increased from 85.2% to 87.0% and saving could be achieved of Rs 249.6.

b) If product 14SB2 was loaded to maximum quantity which could be 140, CBM utilization could be increased from 85.2% to 88.7% and saving could be achieved of Rs 463.9.

Note: Planned dispatch quantity can be same but to convert lost volume into rupees, quantity of products is increased and calculations are done.

								32HQ			32HQ				
STNNO	IO_DATE	FROM_WH_CODE	TO_WH_CODE	OBU	MODEL	CBM	TRUCK_SIZE	Q (1)	TCBM (1)	FAPU (1)	Q (2)	TCBM (2)	FAPU (2)	D	TD
STNCFN1005216660	21-May-10	CFN-FACT	CH1-CHAN	CTV	21FJ8RG3T8	0.1262	32HQ	52	6.56	21.8	52	6.56	21.3	0.5	24.6
STNCFN1005216660	21-May-10	CFN-FACT	CH1-CHAN	CTV	14SB2BB-AJ	0.0700	32HQ	100	7.00	12.1	100	7.00	11.8	0.3	26.2
STNCFN1005216660	21-May-10	CFN-FACT	CH1-CHAN	CTV	21FU8RGE3AZ	0.1478	32HQ	44	6.50	25.5	54	7.98	25.0	0.6	24.3
STNCFN1005216662	21-May-10	CFN-FACT	CH1-CHAN	REF	GL-195NH5	0.4855	32HQ	60	29.13	83.8	60	29.13	82.0	1.8	109.1
STNCFN1005216662	21-May-10	CFN-FACT	CH1-CHAN	REF	GL-195NH5	0.4855	32HQ	36	17.48	83.8	36	17.48	82.0	1.8	65.4
							Total		66.67			68.15			249.6
								Freight = Rs 11511			Freight = Rs 11511				
								CBM Utilization = 85.2%			CBM Utilization = 87.0%				
							Weight	7456 Kg			7683 Kg				
								Saving = Rs 249.6							

Fig 5.12 (a)

								32HQ			32HQ				
STNNO	IO_DATE	FROM_WH_CODE	TO_WH_CODE	OBU	MODEL	CBM	TRUCK_SIZE	Q (1)	TCBM (1)	FAPU (1)	Q (2)	TCBM (2)	FAPU (2)	D	TD
STNCFN1005216660	21-May-10	CFN-FACT	CH1-CHAN	CTV	21FJ8RG3T8	0.1262	32HQ	52	6.56	21.8	52	6.56	20.9	0.9	45.7
STNCFN1005216660	21-May-10	CFN-FACT	CH1-CHAN	CTV	14SB2BB-AJ	0.0700	32HQ	100	7.00	12.1	140	9.80	11.6	0.5	48.7
STNCFN1005216660	21-May-10	CFN-FACT	CH1-CHAN	CTV	21FU8RGE3AZ	0.1478	32HQ	44	6.50	25.5	44	6.50	24.5	1.0	45.3
STNCFN1005216662	21-May-10	CFN-FACT	CH1-CHAN	REF	GL-195NH5	0.4855	32HQ	60	29.13	83.8	60	29.13	80.4	3.4	202.7
STNCFN1005216662	21-May-10	CFN-FACT	CH1-CHAN	REF	GL-195NH5	0.4855	32HQ	36	17.48	83.8	36	17.48	80.4	3.4	121.6
							Total		66.67			69.47			463.9
								Freight = Rs 11511			Freight = Rs 11511				
								CBM Utilization = 85.2%			CBM Utilization = 88.7%				
							Weight	7456 Kg			7870 Kg				
								Saving = Rs 463.9							

Fig 5.12(b)

Suffix (1) shows that calculation is for 32HQ vehicle in actual case and Suffix (2) Shows that calculation is for same vehicle if optimum loading were done.

Q – Quantity **CBM** – Cubic Meter (Volume)
TCBM – Total CBM for loaded a particular product, equals to Q × CBM
FAPU – Freight Allocation per unit, equals to Freight × [Product CBM × TCBM] ÷ [Total CBM × Q]
D – Difference, equals to FAPU (1) – FAPU (2)
TD – Total Difference, equals to D × Q (1)

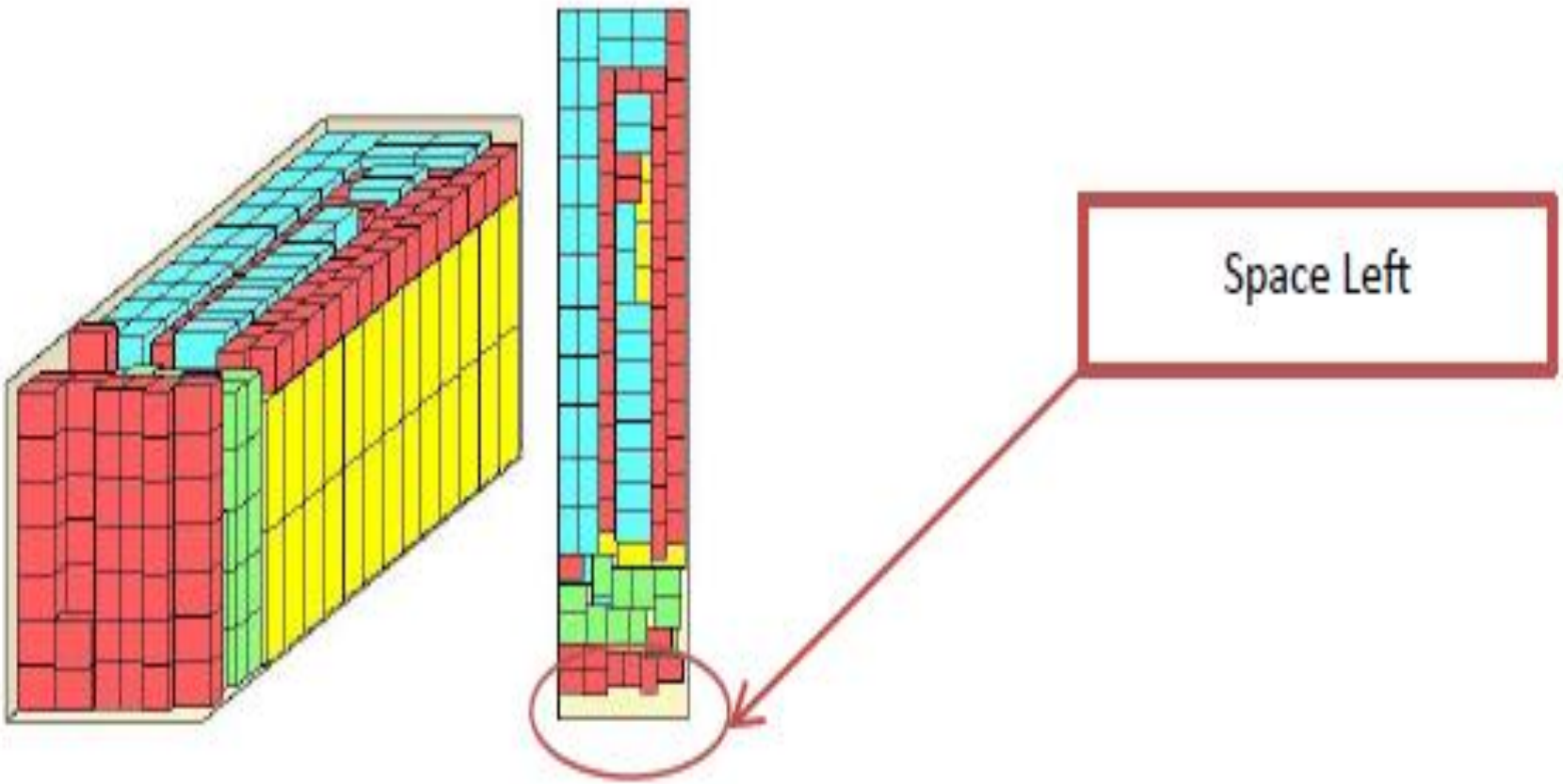


Fig 5.13

Cargowiz generated 32HQ Views (3D, Top) showing the scenario of actual loading

5.6 COST SAVING

As per analyzed data of May-2010, total vehicles dispatch to branches from LG, Kasna, Dasna and Surajpur mother warehouses is 129. Assuming, out of these 129, 100 vehicles contain product-mix and are dispatched every month to branches. If optimum utilization of all vehicles is done (as compared by 'Cargowiz' software), say on an average only Rs 500 are saved per vehicle. Then,

Total saving which can be achieved during one year = (Rs 500) × (100 Vehicles per day) × (350 working days)

= Rs 1,75,00,000 (minimum)

5.7 INVESTMENT AND PAYBACK PERIOD

Fixed Cost

1. The cost of Cargowiz software is Rs 34978/- for one user license. For 4 users license, its cost is Rs 82412/-. If it is to be implemented at all the four places – LGEIL, Kasna, Dasna, Surajpur warehouse, 4 users license is required.

PAYBACK PERIOD = 2 days only

5.8 LIMITATION OF STUDY

Only those vehicle's data is analyzed which contained the product mix of CTV and REF. The same can be done with the product mix of REF, CTV, Washing Machine and RAC. The data is analyzed only for CTV and REF and as there is scope of increasing the volume utilization & decreasing the transportation cost per unit volume, the same can be achieved for various other product-mixes.

Chapter 6
APPENDIX

DIMENSIONS OF VARIOUS VEHICLES USED BY LG

	Feet					CM			CBM
VEHICLE	Length	Width	Height		VEHICLE	Length	Width	Height	
18FT	18	6.5	6.5		18FT	548	198	198	21.48
20FT	20	7	7		20FT	609	213	213	27.63
22FT	22	7	7		22FT	670	213	213	30.40
24FT	24	7	7.5		24FT	731	213	228	35.50
26FT	26	7	8		26FT	792	213	243	40.99
28FT	28	8.5	8.5		28FT	853	259	259	57.22
30FT	30	8.5	8.5		30FT	914	259	259	61.31
32FT	32	8.5	8.5		32FT	975	259	259	65.40
32HQ	32	8.5	10.2		32HQ	975	259	310	78.28
34FT	34	8.5	8.5		34FT	1036	259	259	69.50
34HQ	34	8.5	10.2		34HQ	1036	259	310	83.18
36FT	36	8.5	8.5		36FT	1097	259	259	73.59
36HQ	36	8.5	10.2		36HQ	1097	259	310	88.08
38HQ	38	8.5	10.2		38HQ	1158	259	310	92.98
40HQ	40	7.8	8.9		40HQ	1219	237	271	78.29

CBM – Cubic Meter Volume of the vehicle

CTV MODELS' DIMENSIONS, WEIGHT, STACKING NORMS
(Based on actual measurement)

Model No.	Box Outer Dimension (CM)			CBM Per Unit	Other Details	
	Width	Depth	Height		Weight (Kg)	S. Norms
14SB2	49	34	42	0.0700	10.35	8
15FA2	55.5	48	46.5	0.1239	14.2	8
15FC2	55.5	48	46.5	0.1239	14.5	8
21SA4	75	44	47	0.1551	24.55	8
21SB3	68	41	53	0.1478	21.6	6
21FU8	68	41	53	0.1478	22.7	6
21FU8 with Woofer	69	41	59	0.1669	24.5	6
21SB8	68	41	53	0.1478	21.85	6
21FC2	66.5	54	53	0.1903	22.3	6
21FA2	71	58	57	0.2347	24.6	6
21FD2	71	58	57	0.2347	25	6
21FE4	71	58	57	0.2347	25	6
21FG4	71	58	57	0.2347	24.2	6
21FE3	71	58	57	0.2347	24.1	6
21FJ8	57	41	54	0.1262	21.2	6
21FJ6	59	55	55	0.1785	21	6
21FG3	70	54	54	0.2041	24	6
21FG6	70	54	54	0.2041	25.2	6
21SA1	68	42.5	55	0.1590	22.75	6
21SA2	70	41	53	0.1521	22.2	6
29FU8	87	49	66	0.2814	41.3	4
29FU8 With Woofer	88	50	72	0.3168	45	4
29FU6	87	50	67	0.2915	41.65	4

REF MODELS' DIMENSIONS & STACKING NORMS (Based on actual measurement)

MODEL	Box Outer Dimension (CM)			CBM per Unit	S. Norms
	Width	Depth	Height		
185	59	62	121	0.4426	2
195NM5 / NH5	59	68	121	0.4855	2
195SADG5	59	68	137	0.5496	2
225	63	67	127	0.5361	2
254, 255, 258	61	74	153	0.6906	2
274, 275, 278	61	74	163	0.7358	2
305, 308	64	75	168	0.8064	2
335, 338	64	75	177	0.8496	2
365, 368	65.5	74.5	179	0.8735	2
528	81	75	188	1.1421	2
548	81	78	187	1.1815	2

FPD MODELS' DIMENSIONS, CBM & STACKING NORMS
(Based on actual measurement)

Model	W	D	H	CBM per Unit	S. Norms
22LU	71	14	42	0.0417	17
22LE	67	12	44	0.0354	20
26LD	86	19	53	0.0866	5
32LD	97	19	59	0.1087	4
42PJ	110	26	75	0.2145	4
50PJ	134	33	84	0.3714	3

AC MODELS' DIMENSIONS, CBM, Weight & STACKING NORMS
(Based on actual measurement)

Indoor	W	D	H	S. Norms	Wt.	Outdoor	W	D	H	S. Norms	Wt.	Total CBM per Unit
LSA3	97	37.5	26	10	10		92	36	59	4	33	0.2900
LSA5	117	39	26	10	14.6		96	38	60	4	47.4	0.3375
LSA6	107	39	26	10	14		103	43	72	4	51	0.4274

MICROWAVE MODELS' DIMENSIONS, CBM & STACKING NORMS
(Based on actual measurement)

Model	W	D	H	CBM per Unit	S. Norms
MC - 71	57	54	34	0.1047	6
MC - 76	60	56	36	0.1210	6
MC - 80	62	56	39	0.1354	6
MH - 40	54.5	39	30	0.0638	6
MH - 63	58	49	34	0.0966	6
MS - 20	55	39	30	0.0644	6
MS - 23	57	48	34	0.0930	6

REFERENCES

Logistics: An introduction to supply chain
management by Donald Waters Operations
Management 9th edition by William J. Stevenson

http://www.articlesbase.com/electronics-articles/lg-is-is-a-lucky-goldstar-or-a-lifes-good-1384982.html

http://www.fundinguniverse.com/intranet/sphider/search.php?query=goldstar&search=1 http://en.wikipedia.org/wiki/LG_Corp.

http://ezinearticles.com/?A-Short-History-of-LG&id=2837847

http://www.in.lge.com/AboutUs/aboutus-companyProfile-factsnfig.aspx

http://www.ibef.org/download/consumer_durables_10708.pdf

http://www.cci.in/pdf/surveys_reports/consumer-durables-sector.pdf

http://www.clearleadinc.com/site/durables.html

http://www.wisegeek.com/what-are-consumer-durables.htm

http://www.oracle.com/applications/scm/index.html