Report On

Plastic Weight(grams) Reduction from 250 ml PET Bottle, Sustainable PET Bottle Manufacturing context of Transcom Beverages Ltd(Pepsi), Bangladesh

By

Shuvodip Bhattacharjee
18182001

An internship report submitted to the BRAC Institute of Governance and Development (BIGD), BRAC University in partial fulfillment of the requirements for the degree of Masters in Procurement and Supply Management (MPSM)

BRAC Institute of Governance and Development (BIGD)

BRAC University

September 2020

Declaration

It is hereby declared that

1. The internship report submitted is my/our own original work while completing degree at Brac University.
2. The report does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The report does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I/We have acknowledged all main sources of help.

Student's Full Name & Signature:

_____

Student Full Name: Shuvodip Bhattacharjee
Student ID : 18182001

Supervisor's Full Name & Signature:

_____

Supervisor Full Name: Suvransu Sarkar Nandy
Designation, Department: Additional Director-Plant & Technical
Transcom Beverages Ltd (Pepsi)

Letter of Transmittal

Full name of Supervisor
Designation,
Department
BRAC University
66 Mohakhali, Dhaka-1212

Subject: Plastic Weight(grams) Reduction from 250 ml PET Bottle, Sustainable PET Bottle Manufacturing context of Transcom Beverages Ltd (Pepsi), Bangladesh

Dear Sir / Madam,

This is my pleasure to display my entry level position provide details regarding ' Plastic Weight(grams) Reduction from 250 ml PET Bottle, Sustainable PET Bottle Manufacturing context of Transcom Beverages Ltd (Pepsi), Bangladesh, which I was appointed by your direction. I have attempted my best to finish the report with the essential data and recommended proposition in a significant compact and comprehensive manner as possible.
I trust that the report will meet the desires.

Sincerely yours,

_____

Shuvodip Bhattacharjee
Student ID :18182001
BRAC Business School
BRAC University
Date: 17th Sept,2020

Non-Disclosure Agreement

[This page is for Non-Disclosure Agreement between the Company and The Student]

This agreement is made and entered into by and between Transcom Beverages Ltd (PepsiCo) and the undersigned student at Brac University…….

Acknowledgement

Firstly, I would like to express my sincere gratitude to entire BIGD for continuous support of my master's study and related research, for patience, motivation, and immense knowledge.

Secondly I would like to thank my workplace supervisor for his continuous support and mentorship to complete this report.

I would also like to give special thanks to all of my colleagues to provide me necessary information required to compete this report.

Finally, I apologize to those whose names I have not mentioned in my acknowledgement. However, they are in the core of my heart and I am always grateful to them.

Executive Summary

This reports to examine and to extend the literature, by obtaining a deeper understanding of the link between sustainability practice and organizational commitment for manufacturing and to its stakeholders. This report analysis the plastic reduction from the 250 ml PET bottle and link up with organization way forward towards sustainability. More specifically linked up how sustainability improve organization performance in terms of improve economic condition and create positive impact on society and environment. This also include the growing sustainable culture in Beverages Industries in Bangladesh and industries adeptness with this. In this study, the quantitative findings confirmed that levels of sustainability practice are the major driver behind improving organizational performance in the selected sample. In my paper, I intend to bridge the gap between sustainability and organization. In a competitive world any organization should follow and adopt sustainability to confirms it long-life sustainability.

Keywords: Sustainability, PET, Beverages

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List of Acronyms

PET	Polyethylene terephthalate
SKU	Stock Keeping Unit
OEM	Original Equipment Manufacturer
CSD	Carbonated Soft Drinks
TBL	Transcom Beverages Ltd(Pepsi)
NCB	Non-Carbonated Beverages

Chapter 1

Introduction

1.1 Introduction

Sustainability is the ability to exist constantly. In the 21st Century it refers generally to the capacity for the biosphere and human civilization to coexist. It is also defined as the process of people maintaining change in a homeostasis balanced environment, in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations. For many in the field, sustainability is defined through the following interconnected domains or pillars: environment, economic and social, which according to, Fritjof Capra is based on the principles of Systems Thinking. Sub-domains of sustainable development have been considered also: cultural, technological and political.

According to "*Our Common Future,* sustainable development" is defined as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable development may be the organizing principle of sustainability, yet others may view the two terms as paradoxical (i.e., development is inherently unsustainable).

Sustainability can also be defined as a socio-ecological process characterized by the pursuit of a common ideal. An ideal is by definition unattainable in a given time and space. However, by persistently and dynamically approaching it, the process results in a sustainable system. Many environmentalists and ecologists argue that sustainability is achieved through the balance of species and the resources within their environment. As is typically practiced in natural resource

management, the goal is to maintain this equilibrium, available resources must not be depleted faster than resources are naturally generated.

In sum, "the term 'sustainability' should be viewed as humanity's target goal of human-ecosystem equilibrium (homeostasis), while 'sustainable development' refers to the holistic approach and temporal processes that lead us to the end point of sustainability. “Despite the increased popularity of the use of the term "sustainability," the possibility that human societies will achieve environmental sustainability has been, and continues to be, questioned—in light of environmental degradation, climate change, over consumption population growth and societies' pursuit of unlimited economic growth in a closed system

1.2 Background of the study

The growing concern for sustainability and the importance of communication between an organization and its stakeholders has led firms to become more committed and responsible to shareholders. The concern about how sustainability positively and negatively affects shareholders’ perceptions has forced large companies to consider not only their organizational performance but also their environmental and social performance.

Till today, most of the businesses in Bangladesh are family owned and first generation businesses. Businesses are involved in community development work in the form of charity without having any definite policy about the expenses or any solid motive regarding financial gains in many instances. It is evident that the importance of sustainability in the first-world, questions regarding the extent to which corporations operating in developing countries have sustainability obligations are still to be worked out. (Jamali and Mirshak, 2007). There has been increasing pressure on national and multinational corporations in Bangladesh to consider the social implications of their actions (Belal, 2001). Sustainability practices in Bangladesh is still in infancy. Companies are getting aware of it because being a part of global market, it is really difficult to ignore sustainability standard particularly in the export sector. It is evident that

sustainability practices are gradually getting integrated into cross-border business practices and consequently becoming one of the determining factors for accessing market. It is becoming equally instrumental for local acceptability as well. Bangladeshi firms are to focus on sustainability not only for improving corporate governance, labor rights, fair treatment of workers, community development and environment management, but also for industrialization and ensuring global market access. The government of Bangladesh is going to undertake an initiative to promote sustainability practices. The objective would be to encourage the businesses to carry out the good citizen-like activities with the aim to reversing the perceived trend of businesses to have little commitment to society. It is also found that initiatives in sustainability activities in Bangladesh are pioneered by MNCs. Since Bangladesh is now exposed to global standards, it can be anticipated that the sustainability activities in Bangladesh will continue to be extended. Firms are now trying to uphold their corporate image of socially responsible firms and consequently influence consumer buying decisions in favor of the goods and services marketed by them.

1.3 Objective of the study

The aims of this study are to understand the how Transcom Beverages Ltd(Pepsi) adopt sustainability for PET bottle manufacturing in Bangladesh. There are several particular objectives which are also given below:

I. Weight reduction (Plastic Grams) from the 250 ml PET Bottle use for Beverages

II. Economic, Environmental & Social Impact of using lighter weight 250 ml PET bottle

III. Industry Evaluation on lighter weight bottle – Bangladesh Context

Chapter 2

The Transcom Beverages Ltd.(Pepsi) Context

2.1 Introduction

This chapter provides an overview of the Transcom Beverages Limited context for this study. Transcom Group is one of the leading, diversified and fastest growing business groups in Bangladesh with more than 10000 employees and includes Beverage, Pharmaceuticals, Newspaper, Radio channel, Electronics, Foods etc. Originated with tea plantation in 1885 is today, one of the leading and fastest growing diversified business houses in Bangladesh employing over 5000 people. Not many industrial groups in Bangladesh can claim a history of continuous business pursuits stretching back over 100 years. Initially tea and jute formed the backbone of the family business. Although these are still part of the activities, they contribute marginally to the overall group turnover.

On the basis of an exclusive Franchise for Bangladesh from PepsiCo USA, TBL acquired three modern bottling plants twice in Dhaka and one in Chittagong in March 2000. TBL manufactures the famous Pepsi range of Beverages-Pepsi, 7up, Mirinda Orange, Mirinda Lemon, Mountain Dew, Aquafina water, Slice, Pepsi diet, 7-up diet and Soda. As a corporate citizen PepsiCo believes it has a responsibility to contribute to the quality of life in our communities. TBL has put into action this philosophy through support of social agencies, projects and programs and the scope of this support is extensive and it has not been difficult to blend with this philosophy since the TRANSCOM group also followed such a corporate ideology.

2.2 The Transcom Beverages Limited (Pepsi) Context

A number of environmental factors influence the level and quality of business practices and of CSRPs in particular. The factors include social, cultural, political, economic, and legal factors, the last of which plays an important role in identifying levels of corporate practice. Transcom Beverage Ltd (TBL) is the exclusive PepsiCo Franchisee for Bangladesh. TBL owns and operates modern plants in Dhaka and Chittagong for bottling the renowned soft drink brands such as, Pepsi, 7UP, Mirinda, Slice, Mountain Dew, Pepsi Diet and 7UP Light. The company is emerging with the motto to deliver sustained growth in Bangladesh and move towards dominant Beverage Company, delighting & nourishing every Bangladeshi, by best meeting their everyday beverages needs & stakeholders by delivering performance with purpose, through talented people. 2009 has been an amazing year for TBL, winning several spectacular awards as PepsiCo's exclusive bottling partner in Bangladesh. For its' extraordinary and outstanding venture through excellence TBL has been rewarded with several prestigious national and international recognitions.

Table 2.1: Beverages Manufacturing Facility:

Category	Capacity (BPM)	Location	OEM
CSD-PET	3400	Dhaka + CTG	KHS,Krones,Techlong (Germany-China)
CSD-RGB	800	Dhaka + CTG	Linker-Poland
CSD-CAN	180	Dhaka	Muhak-Korea
NCB-Water	400	Dhaka	Techlong
NCB-Hot fill	300	Dhaka	KHS-Germany

Table 2.2: Product Portfolio, Brand & SKU

Product Portfolio	Brand	SKU
CSD	7up,Pepsi,Mirinda,Mountaindew, Pepsi Black, 7up light, Diet Pepsi	250 ml,400 ml,500 ml, 750 ml,1000 ml,2000 ml
NCB-Water	Aquafina	500 ml,1000 ml,1500 ml
NCB-Hot fill	Tropicana, Slice	200 ml,250 ml,350 ml

Chapter 3

Preform & PET Bottle manufacturing

3.1 Introduction:

This chapter overview on Transcom Beverages Ltd(PET) bottle manufacturing process. In details how to manufacture PET bottle from Preform, Process of manufacturing preform and process of manufacturing PET bottle. Also an overview of the existing preform weight use for various SKU.

3.2 PET Bottle Manufacturing and Distribution Process:

Transcom Beverages Ltd(Pepsi) manufactures various sizes of PET bottle for its consumer as per the market demand. The Product categories are divided in CSD (Carbonated soft drinks), Hot fill & water bottle. The sku of the PET bottle varies from 200 ml to 2000 ml. Up to 500 ml pack it is called Single serve(SS) & larger than 500 ml pack called multi serve(MS). This PET bottle manufactures from Preform which is initial stage of bottle make from Polyethylene Terephthalate (BOTTLE GRADE) chips or resin.

TBL CSD manufacturing with PET bottle has shown in the figure 3.2. This is the process flow of the bottle manufacturing. After receiving the preform (pre shape of the bottle) send to blow molding machine which is injection molding machine and stretching the preform to required size and shape of the bottle. High pressure inject i.e 38 to 30 bar required to blow the bottle. After blowing it is filled in online system with the beverages post that secondary packaging done.

Fig 3.1 : PET Bottle

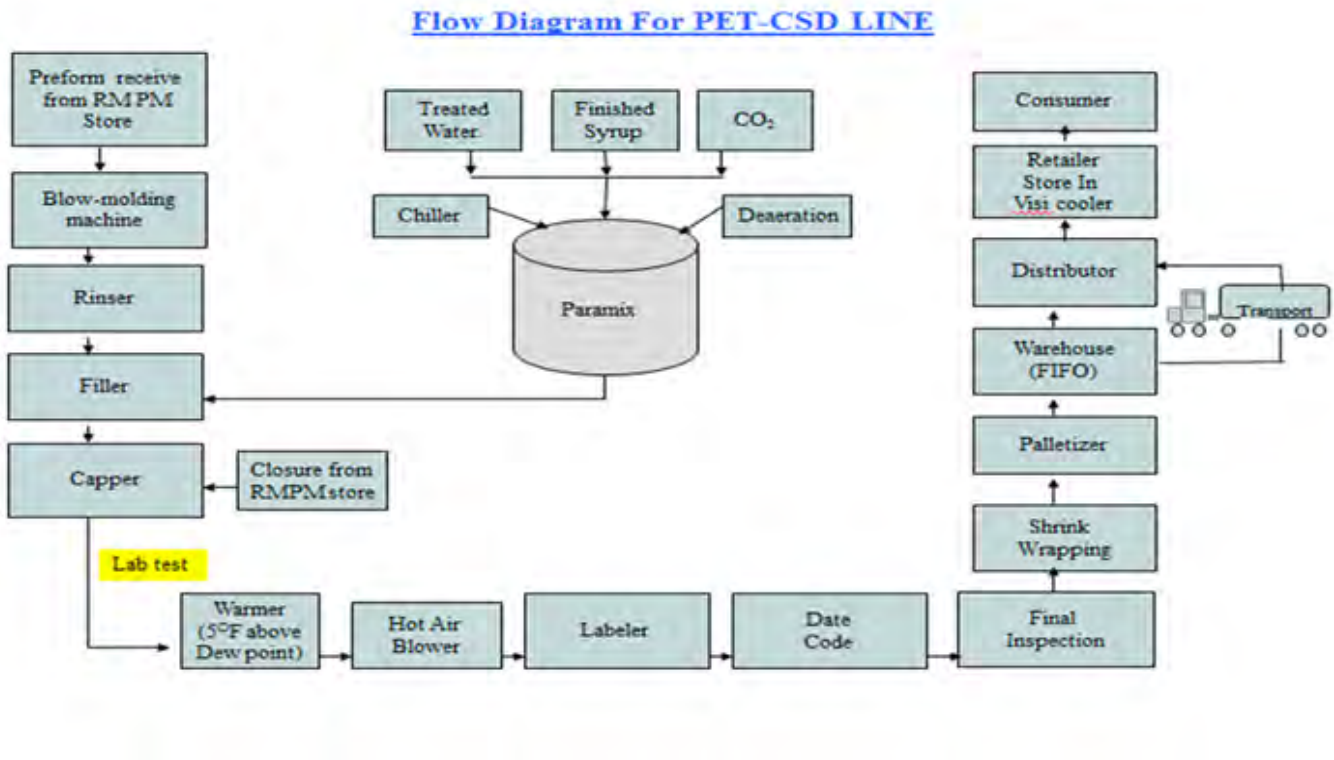


Fig 3.2: Beverages Manufacturing Process with PET bottle

Category wise pack formation of the bottle finally distributed throughout the country. Pack formation are listed below:

Table 3.3: SKU wise CSD pack formation

Category	SKU	Pack formation	Total Bottle
CSD	250 ml,400 ml,500 ml	6 x 4	24 Nos
	1000 ml	4 x 3	12 Nos
	2000 ml	3 x 2	06 Nos

3.3 Distribution system:

The distribution and shipping department supervises the distribution and delivery of finished products to depot and dealers. TBL has 11 depots in total among which 6 are actively operational. Distribution and shipping department receives market requirements and takes necessary arrangements to ship products from FGWH to depots.

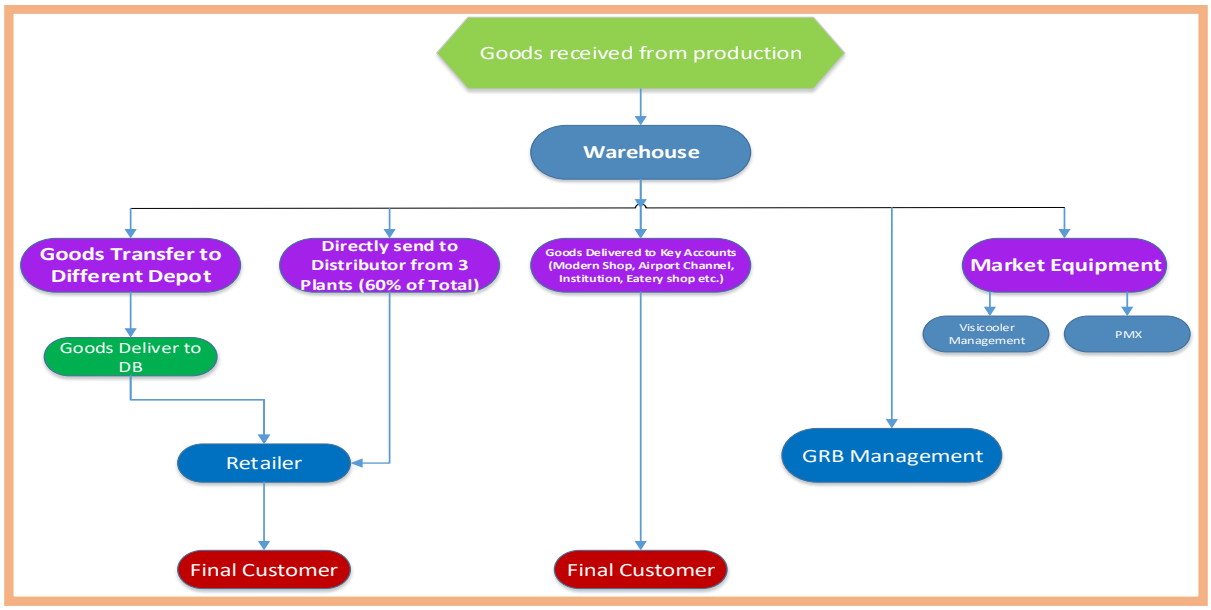


Fig 3.3: Transcom Beverages Ltd(Pepsi) distribution system

3.4 PET Preform and PET Resin:

A preform is an intermediate product of bottle that is ultimately shaped into PET bottles by blow molding. Preforms vary in neck finish, weight, color and shape, and are specifically designed to meet the needs of customers in different market segments.

TBL has seven manufacturing unit of Huskey Injection Molding System Limited, Canada. Manufactured pre-forms here meet the demands of all three plants of TBL.

This preform manufacturing from PET resin. PET, which stands for polyethylene terephthalate, is a clear, strong and lightweight plastic belonging to the polyester family. It is typically called "polyester" when used for fibers or fabrics, and "PET" or "PET Resin" when used for bottles, jars, containers and packaging applications. This PET resin TBL import from overseas which have following PepsiCo global spec.

Fig 3.4: PET Preform before Blowmolding

Table 3.4: PepsiCo Global PET Resin Specification

Sr. No	Parameter	Unit	Specification
1	Intrinsic Viscosity (ASTM/D4603-03)	dl/g	0.840 +/- 0.020
2	Carboxyl End Group	Meq/kg	Max. 30
3	Moisture content (when packed)	Wt%	Max. 0.25
4	Chips weight (wt of 100 chips)	Gm	Max. 1.7
5	Color L* (D65-2)	CIE	84.0+/- 2
6	Color b* (D65-2)	CIE	-1.5 +/- 1.0
7	Melting Point (DSC)	Deg C	246~250
8	Acetaldehyde	PPM	Max. 1
9	Crystallinity	%	Min. 50
10	Dust content	PPM	Max. 100

TBL imported this PET resin from different country and uses multi sourcing.

Table 3.5: Sources of PET resin uses by TBL

Sr. No	Manufacturer	Intrinsic Viscosity	Country
1	ASPET	(0.84 +/- 0.02)	India
2	GATRONOVA		Pakistan
3	RELPET		India
4	CR 8828		China

After reciving PET resin from RMPM warehuse it is send to preform manufacturing plant for manufacturing various sizes of the preform.Below is the preform manufactruing process uses in TBL.

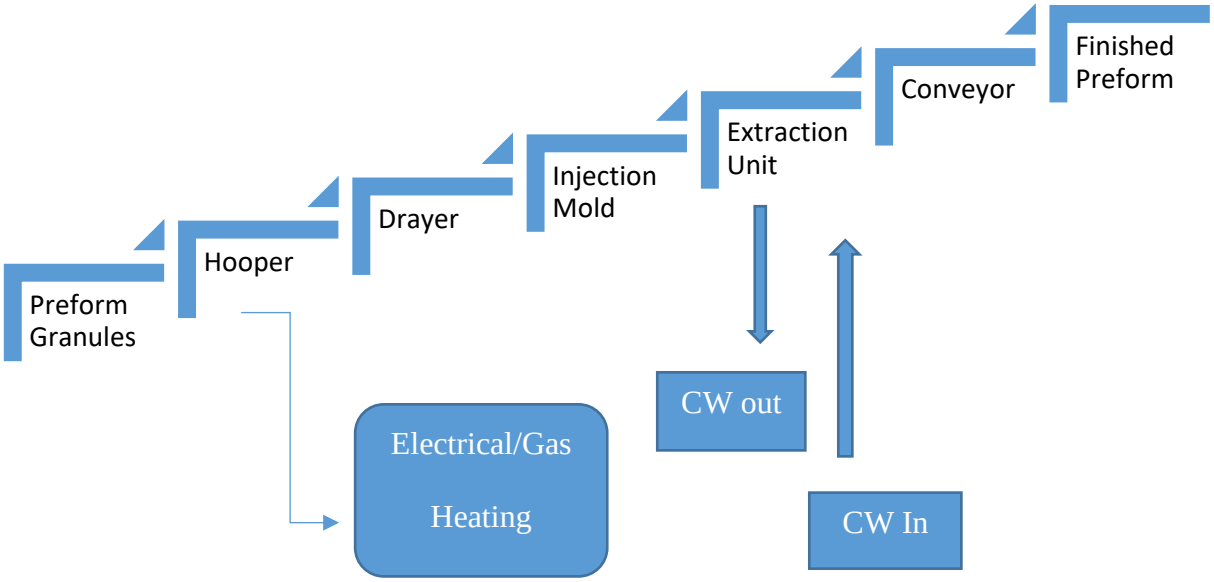


Fig 3.5: Preform Manufacturing Process

Table 3.6: SKU wise CSD preform weight & manufacturing unit

Unit	Cavity(Mold)	Preform Weight(grm)	SKU
Huskey-01	32	46	2000 ml
Husky-02		21.4	500 ml
Huskey-03	72	21.04	250 ml
Huskey-04		21.4	500 ml
Huskey-05		31.9	1000 ml
Huskey-06		34.8	1000 ml
Huskey-07	144	21.4	500 ml

Chapter 4

Weight reduction from 250 ml PET Bottle

4.1 Introduction

This chapter overview a selection of SKU for weight reduction and overall process how to minimize the weight from 250 ml bottle and implement after various phase gate approval. This chapter also contain the PepsiCo global policy how to pass PepsiCo global qualification criteria for launching a new bottle in any market.

4.2 Selection of 250 ml bottle for weight reduction and selection of preform

TBL always believed in giving back to the society as the company strictly follows its motto "Performance with Purpose". To adopt sustainability in PET bottle manufacturing TBL decided to go with single serve i.e 250 ml bottle first to deduct weight from it. It is observed that with growing economy 250 ml consumption is increasing every year significantly. Total percentage of 250 ml volume is about 20% of total volume. The soft drinks industry has tremendous potential in Bangladesh, which is a home to a big pool of young population and has posted healthy economic growth in the last 10 years. The industry normally grows along with the economy, which is evident from annual per capita consumption of soft drinks in developed countries: it is 450 bottles in Germany, 550 in the US and 600 in Mexico but only 17 in Bangladesh. Consumption of hard drinks in Bangladesh is highly regulated whereas it is widely consumed in developed countries – another factor that offers immense opportunities for the sector to grow. The sector has grown at 7-8 percent annually in the last five years whereas Transcom Beverages has grown more than 18 times since its inception in 2000. "PepsiCo is now the strong CSD market leader in Bangladesh with a huge gap in market share with its competitors,"

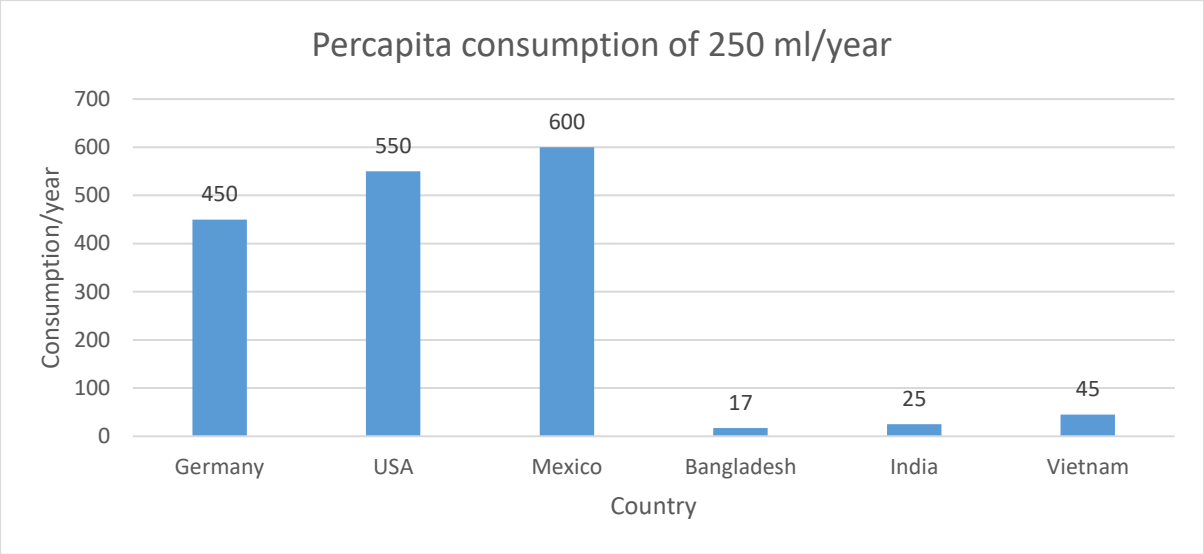


Fig 4.1: Per capita Consumption of CSD of 250 ml /year

After selecting the SKU 250 ml need to determine what will be the optimize size of the preform. In this regards we evaluate Bangladesh Market along with advance world and find all the preform weight in between 18 to 21 grm. To further explore PepsiCo R & D has involved and give clearance that we may try with 15.17 grm preform with short neck finish. In this process both preform manufacturing OEM Huskey and Bottle manufacturing OEM has involved as early supplier involvement

Table 4.1 Selection of Preform

Bottle type	SKU	Existing Preform/bottle weight	Target Preform/Bottle weight	Weight reduction/bottle(grm)
Carolina,AXL,LongNeck	250 ml	21.04 grm	15.17 grm	5.87 gram

4.3 Develop Preform Drawing

After selecting correct preform weight the most import sequence is to develop correct preform drawing. Preform drawing is developing with the help of OEM, Huskey, PepsiCo global R & D and TBL. First of all conceptual preform drawing is made by Huskey and then need to done preform evaluation. The main part of the drawing preform body, neck finish that is 1818, called short neck. Below are the details preform drawing which was made during implementation of 15.17 grm preform.

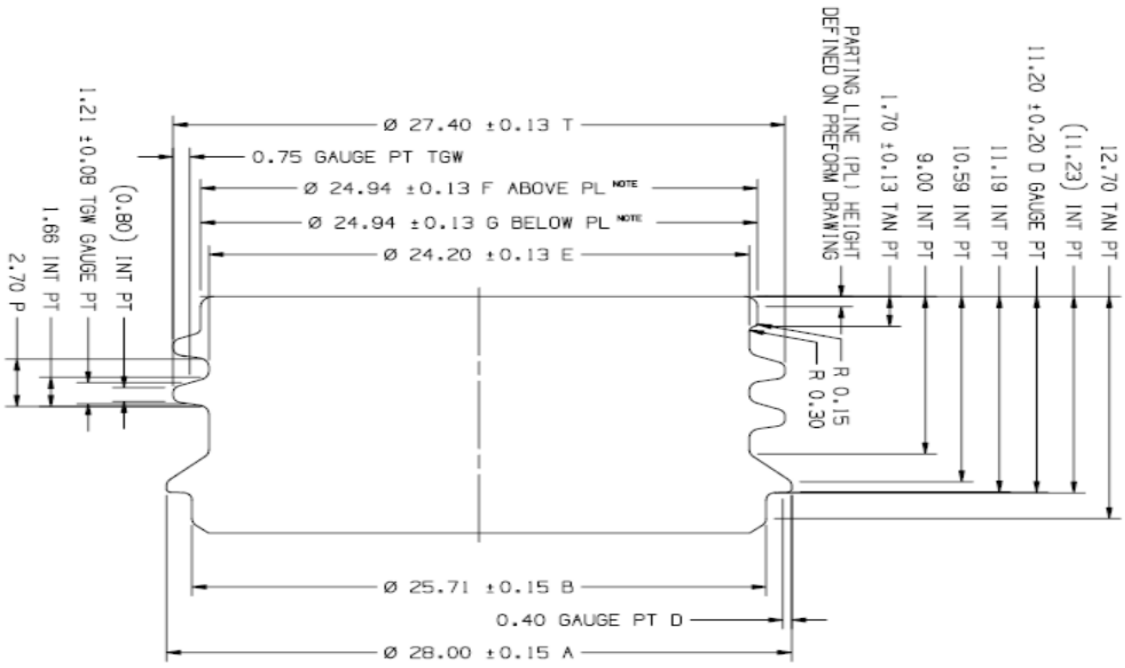


Fig 4.2: Neck Finish of 15.17 grm preform

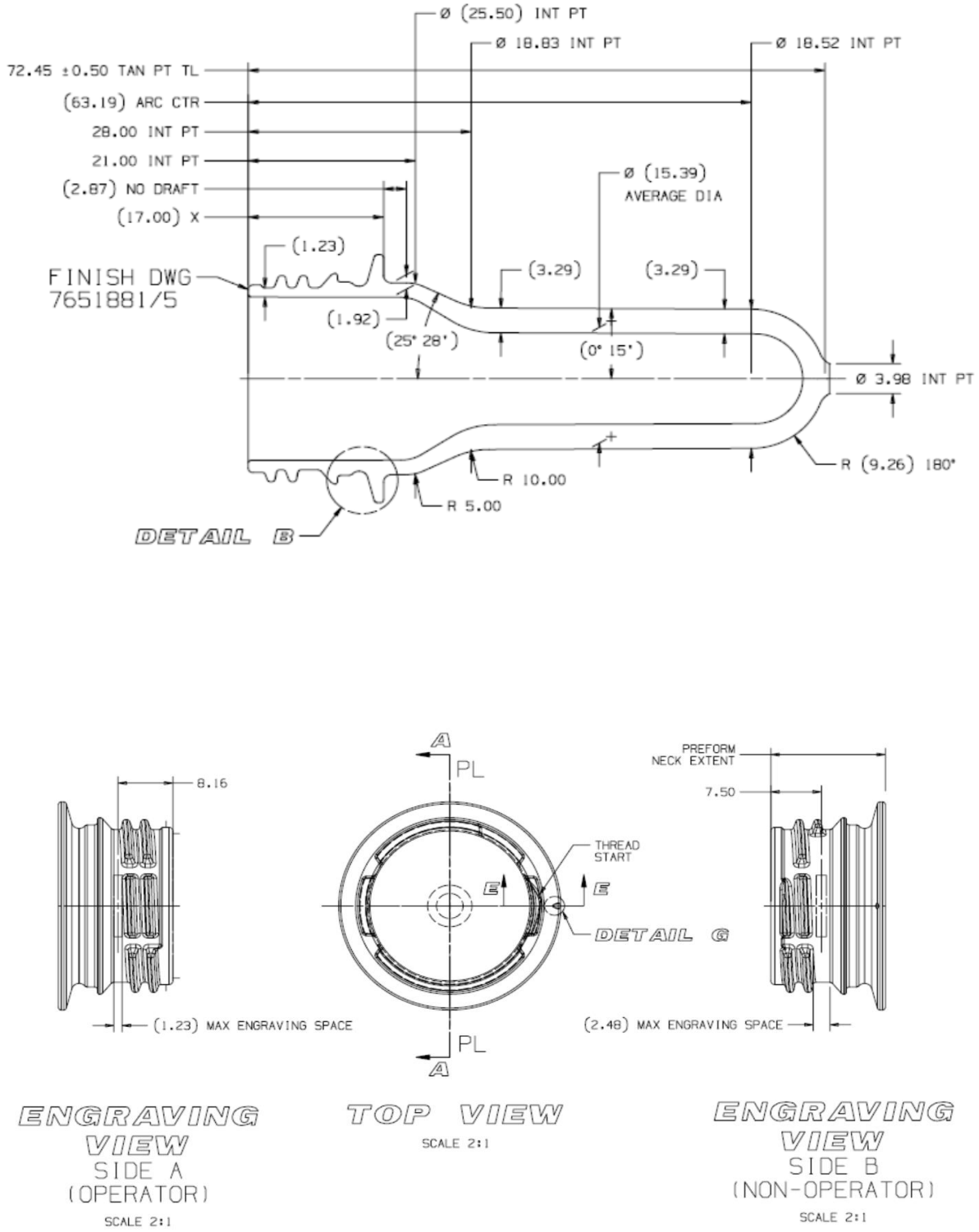


Fig 4.3: Preform Drawing 15.17 grm for 250 ml

4.4 Perform new preform evaluation test

4.4.1 Transverse Stretching

Very high: Preform may be overstretched, bottle turns whitish (pearlescent), increased C02 loss, even loss of product is possible**.**

Very low: For a petaloid base, the shape of the feet may not form completely or may become whitish. Compensation is possible to some degree, using a higher preform temperature - but this gives a high risk of crystallinity or thermal degradation (depending on raw material). Furthermore, the higher the temperature is, the more variation in material distribution will be seen (bad process stability). Adequate material distribution becomes difficult. Small process window (material touches mould wall too early). Strain hardening of material is insufficient. Higher tendency to creep (container diameter grows above normal amounts).

4.4.2 Longitudinal stretching

Very High: Preform may be overstretched, bottle turns whitish (pearlescent), increased C02 loss, even loss of product is possible. Concerning the base, the shape of the feet may not form completely or may become whitish. Compensation is possible to some degree, using a higher preform temperature - but this gives a high risk of crystallinity or thermal degradation (depending on raw material). Furthermore, the higher the temperature is, the more variation in material distribution will be seen (bad process stability).

Very Low: Adequate material distribution becomes difficult. Small process window. Risk of high base weight, leading to a machine output reduction (as more cooling time is required in the blow molding process). Strain hardening of material is insufficient. Higher tendency to creep (container height grows above normal amounts). Not acceptable for bottles which require exceptional quality of appearance.

4.4.3 Wall thickness

Very high: High material consumption -> expensive. Heavier preforms may restrict the machine output (as more cooling time is required in the blow moulding process).

Very Low: Bad barrier properties (C02, 02). Feel of the bottle is too weak (this highly depends on the bottle design also). Thermal stability (for product containing C02) becomes worse, tendency of the material to creep is higher (bottle grows above average in diameter and height).

4.4.4 Overall evaluations

Preform and container are satisfactory suitable for each other concerning stretch ratios. Preform can be used, but small process window as well as negative impact on bottle quality possible.

4.5 Develop Bottle drawing

After preform evaluation need to make bottle drawing with 15.17 grm preform. New bottle drawing has been made with the help of PepsiCo R & D and bottle manufacturing machine OEM from Germany

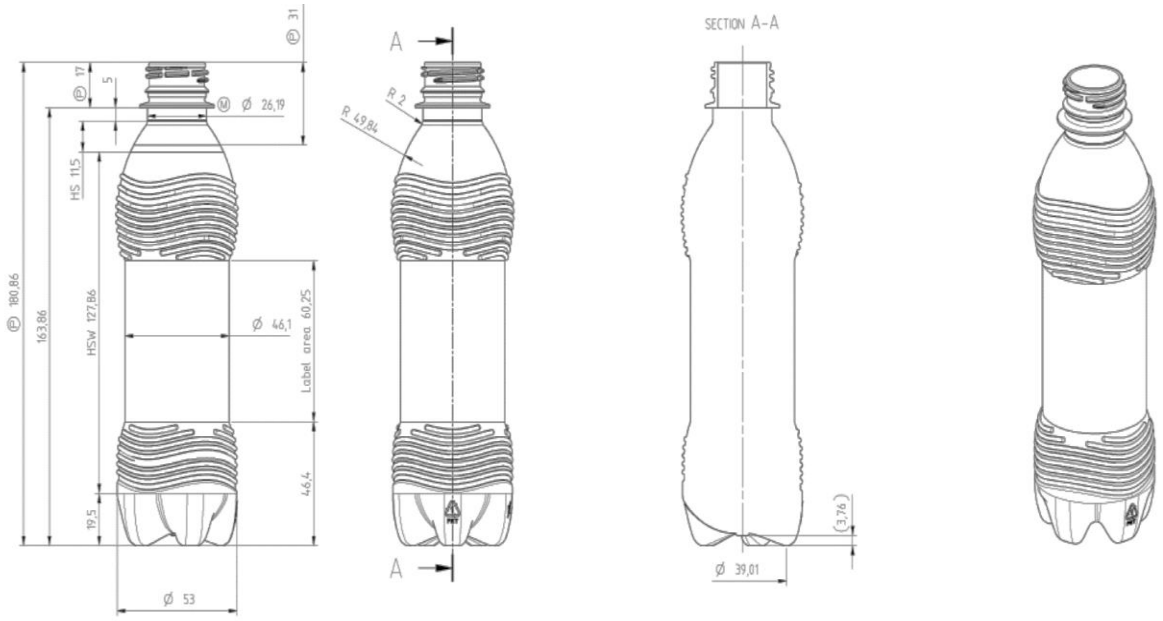


Fig 4.4: 250 ml Carolina bottle drawing with 15.17 grm preform

4.6 Develop Pilot cavity & evaluation new bottle

To evaluate new bottle with 15.17 grm preform firstly made pilot mold which is prototype of new bottle. If pilot mold passes all the qualification criteria than only we go for commercial mold production for new bottle. This pilot mold test was done in Germany, OEM of bottle manufacturing machine.

Table 4.2: Empty Bottle Dimension (0.3 h Old)

Mm or stated other	@mm from base	nominal	min	max	avg	Spec		status
						min	max	
Height		180.86	180.48	180.65	180.56	180.32	181.40	Pass
Upper Bumper Diam.	125		52.24	52.52	52.35			
Upper Label Diam	93.95	46.10	45.81	45.86	45.83	45.87	46.33	Fail
Mid Label Diam	76.525	46.10	45.82	45.88	45.85	45.87	46.33	Fail
Lower Label Diam	59.1	46.10	45.84	45.91	45.87	45.87	46.33	Fail
Lower Bumper Diam	18	53.00	52.85	53.01	52.93	52.74	53.27	
Perpendicularity			0.65	2.79	1.83		3.80	Pass
Base clearance			2.41	2.81	2.56	0.00		Pass
Neck Diam. T			27.3	27.6	27.5			Pass
Neck Diam. E			24.0	24.3	24.2			
Neck Height X			17.1	17.4	17.2			
Neck Diam. .I			21.7	21.09	21.8			
Neck Ovality E			0.01	0.48	0.13		0.25	Fail

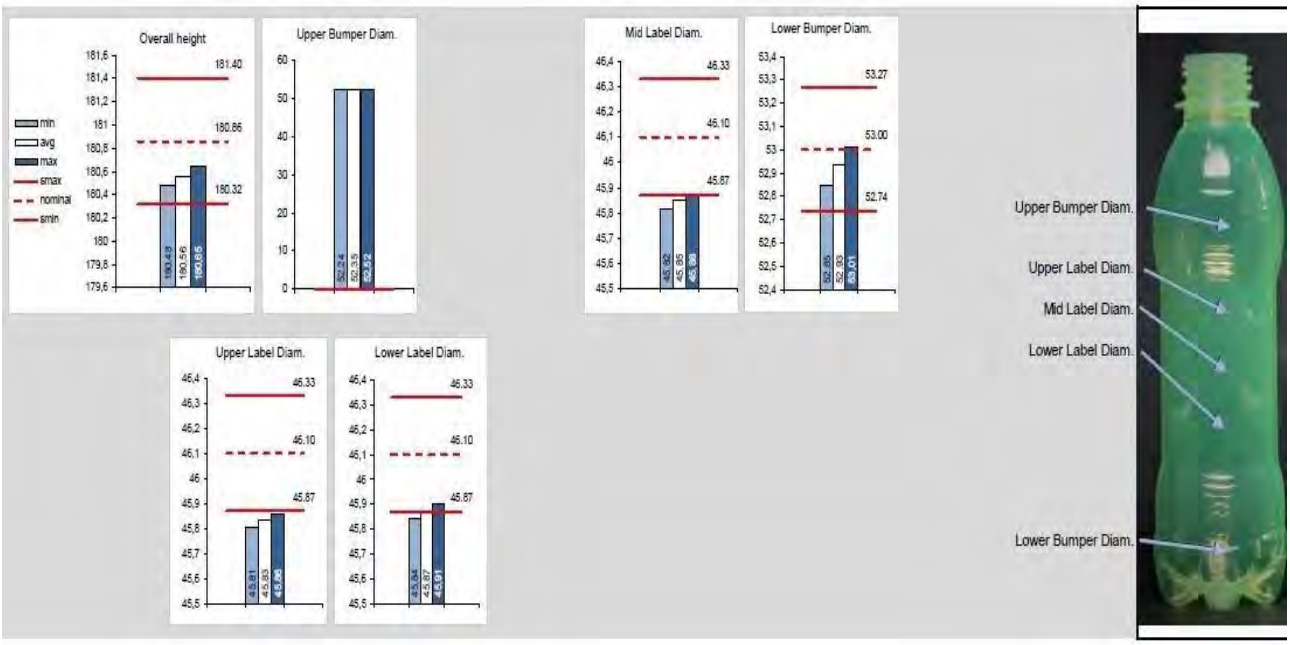


Fig 4.5: Empty Bottle Dimension Test result

Table 4.3: Filled Bottle Dimension Test

(mm) or sated other	Measurement			Spec		satatus
	min	max	avg	smin	smax	
Height	180.35	181.63	180.52			
Upper umper dia	52.45	52.59	52.50			
Upper Label Diam	46.08	46.14	46.10			
Mid Label Diam	46.07	46.14	46.10			
Lower Label Diam	46.08	46.14	46.10			
Lower Bumper Diam.	52.90	53.20	53.00			
Perpendicularity	0.73	2.56	1.79		3.80	Pass
Base clearance	1.45	1.85	1.66			
Fillpoint drop	35.52	38.23	36.88			

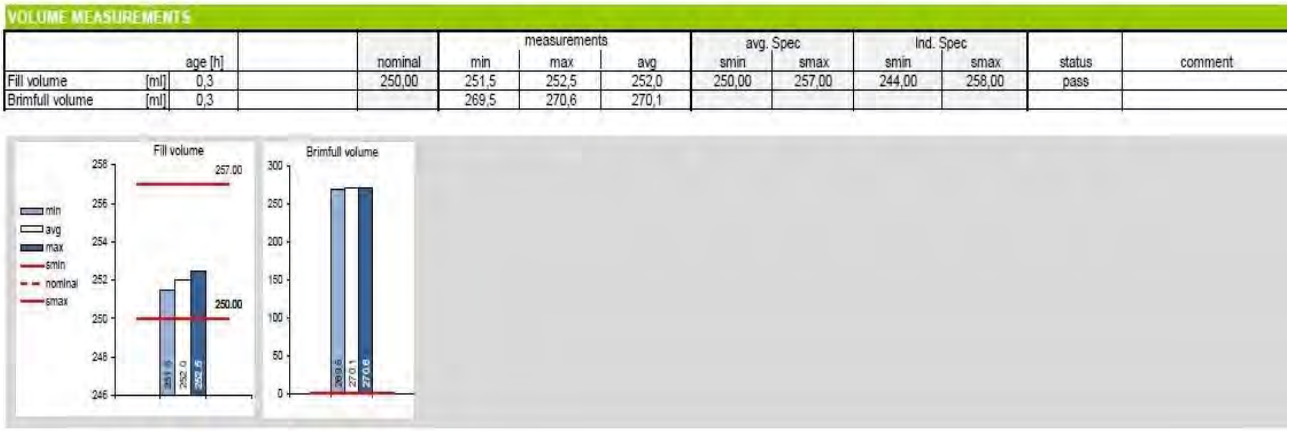
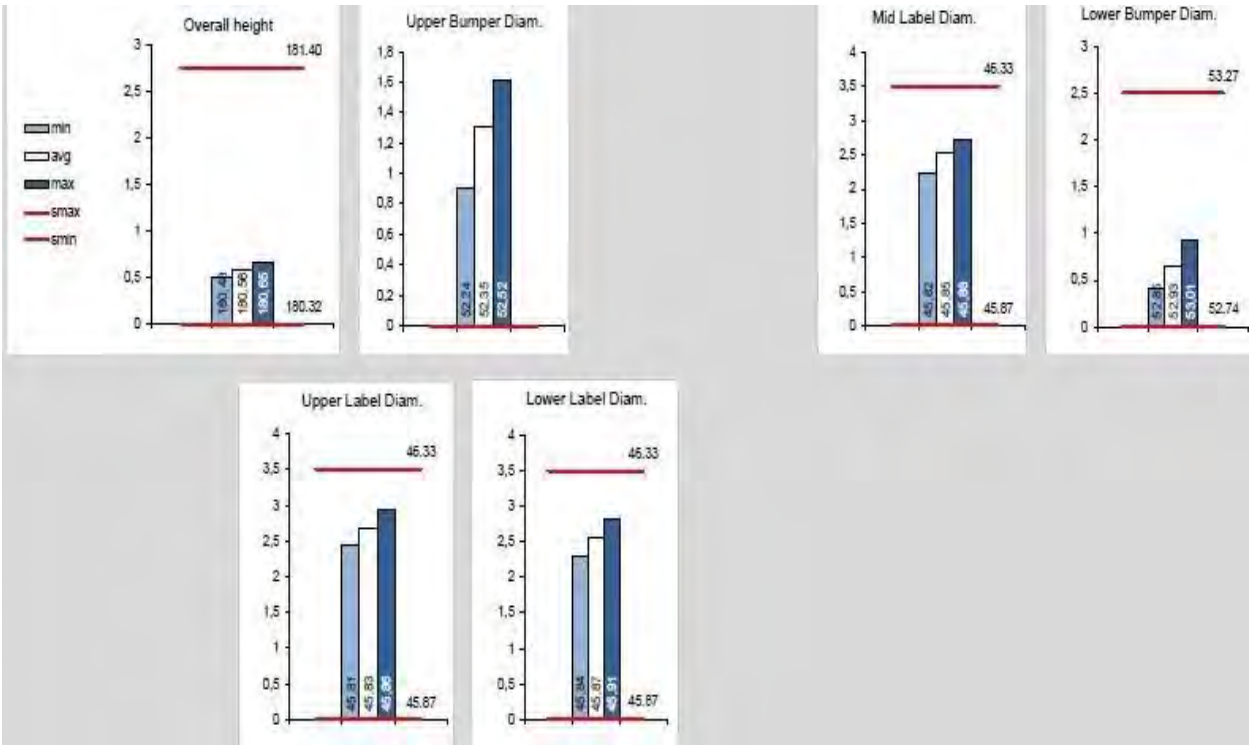


Fig 4.6: Fill Volume and Brimful Volume Test

Table 4.4 : Thermal Stability Test@22 deg@38 deg(99.3 h old)

Mm or stated other	Absolute value	measuremnt			spec	Status
		min	max	avg		
Height %	181.61	0.50	0.65	0.58	2.75	Pass
Upper umper dia %	53.03	0.90	1.61	1.31		
Upper label dia %	47.06	2.43	2.95	2.67	3.50	Pass
Mid label dia %	47.01	2.24	2.73	2.52	3.50	Pass
Lower label dia %	47.05	2.30	2.83	2.56	3.50	Pass
Lower bumppe dia %	53.28	0.42	0.93	0.65	2.50	Pass
Perpendicularity		1.65	3.02	2.38	3.80	Pass
Base clearance		0.80	1.03	0.92		Pass
Fill point drop		26.09	27.87	26.84		



4.7 PepsiCo Global qualification and market launch

After successful qualification of pilot mold test result both huskey and bottle manufacturing mold has been ordered need to perform final test at site. The test was conduct at TBL plant to pass PepsiCo qualification protocol. Below is the PepsiCo qualification test conduct in TBL plant.

Table 4.5: PepsiCo Qualification Master Summary Result

Dimensions and Weight	PASS / FAIL	COMMENTS
Preform Dimensions	PASS	All parameters are within spec.
Bottle Dimensions	PASS	All parameters are within spec.
Finish Dimensions	PASS	T, E. X, D ,H and S all data are within spec.
Section Weight	PASS	Carolina 250ml 3 section cut. Accepatable
Wall Thickness	PASS	All thickness data are within spec.

Performance Parameters (supplier to conduct testing)	PASS / FAIL	COMMENTS
Appearance & Odor	PASS	Appearance and odor are acceptable.
Weight & Capacity	PASS	N/A
Acetaldehyde Test	PASS	N/A
Drop Impact Resistance	PASS	Bottles tested both horigontally and vertically, all passed.
Burst	PASS	All bottles pass in burst test.
Top Load - Empty & Non-Vented	PASS	N/A
Top Load - Filled & Capped	PASS	Filled and capped top loads are more than 100 kg, every bottle.
Thermal Creep Stability	PASS	Will distribute some material from base to label area in next blowing for uniform expansion.
Perpendicularity	PASS	N/A
Chemical Stress Crack Resistance	PASS	250ml Carolina, no failure after 15 minutes.
Intrinsic Viscosity	PASS	N/A

After all, related qualification protocol PepsiCo global has given final approval for commercial production of 250 ml PET bottle with 15.17 grm preform. Thus TBL lunch a new PET bottle with reduced weight 5.87 grm/bottle.

Chapter 5

Sustainability Impact

5.1 Introduction

To adopt sustainability in bottle manufacturing TBL has taken this project. This chapter overall describe the impact on economic, environmental and social after implementing lower weight bottle.

5.2 Impact on Economy

One of the greatest thing of adopt lower weight bottle is in economic value of it. TBL has introduced this bottle in Jan 2019 and has targeted three years plan of savings huge amount of money from it.

Table 5.1 Economic Impact

Indicator	Year-2019	Year-2020	Year-2021
Volume Plan(Case) 1 case equ= 24 Nos bottle	934,2000	11,683,084	12,851,392
Required Resin with 21.04 grm in MT	4,717	5,899	6,489
Costing in USD (1 MT Resin = 730 USD)	3,443,655	4,306,627	4,737,290
Required Resin with 15.17 grm in MT	3,401	4,253	4,678
Costing in USD (1 MT Resin = 730 USD)	2,482,901	3,105,111	3,415,622
Savings in MM USD	**0.96**	**1.2**	**1.32**

5.3 Environment & Social Impact

Apart from great economic value of lower grams preform it has significant value in social and economic sector. At three years plan TBL can tremendously less down the uses of PET resin while volume growth is almost 10%.

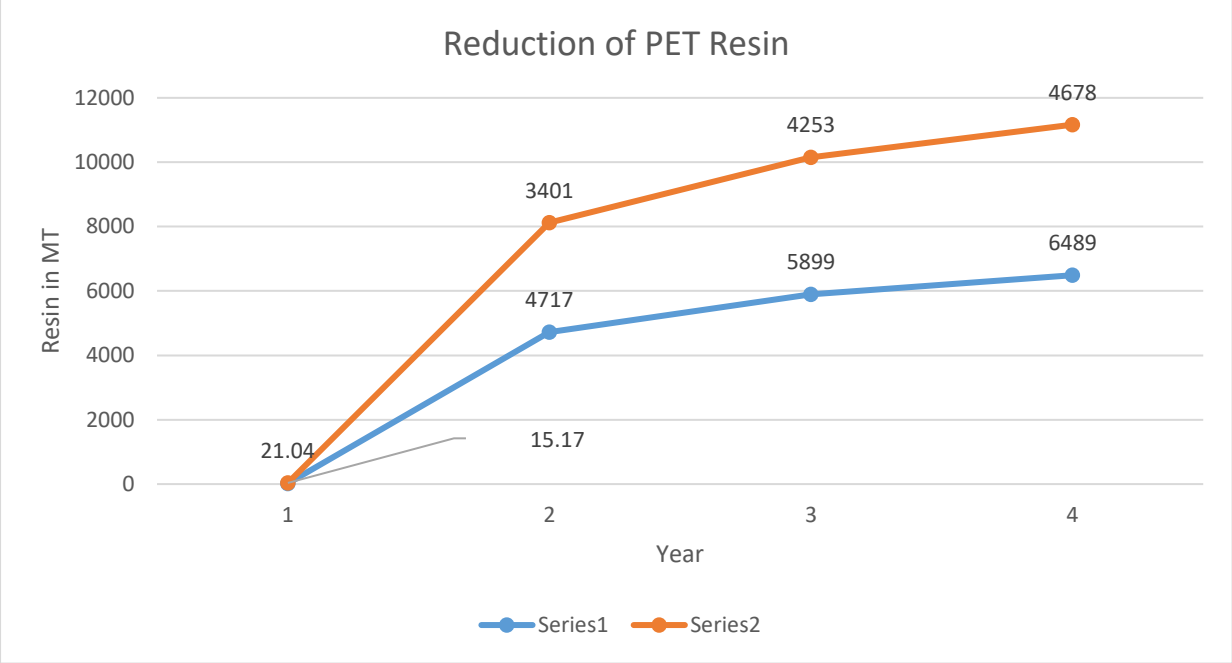


Fig 5.1 Reduction of PET Resin with 15.17 grm preform

Table 5.2: Percentage reduction in PET Resin

Weight	Year-2019	Year-2020	Year-2021
Resin for 21.04(MT)	4,717	5,899	6,489
Resin for 15.17(MT)	3,401	4,253	4,678
% of Reduction	13.16	16.46	18.11

5.4 Energy Reduction in Preform Manufacturing

Due to less weight of preform it is observed that significantly energy savings scope is there during preform manufacturing. Below is the calculation of energy savings based on Huskey Provided data and TBL energy consumption data.

There is a cycle time in Huskey machine is used to determined how fast the machine can produce preform. Based on cycle time we can calculate the preform energy consumption data.

As per Huskey for 21.05 grm cycle time for 72 cavity machine is 11.9 sec

As per Huskey for 15.17 grm, cycle time for 72 cavity machine is 10.1 sec

Now the formula is; production /day of 72 cavity machine

(60 sec/cycle time x cavity x 60 min x 24 hrs x 90% eff.)

Machine Kw consumption/day = 400 Kw x 24 hrs = 9600 Kw

(One 72 Cavity Huskey machine consumption = 400 Kwh)

Total Production with 21.05 grm/day = 60/11.9 x 72 x 60 x 24 x 0.9 = 470,480 pcs

Total Production with 15.17 grm/day = 60/10.1 x 72 x 60 x 24 x 0.9 = 554,328 pcs

Kw/Preform for 21.05 grm = 0.020404693

Kw/Preform for 15.17 grm = 0.017318244

Energy savings/Preform in Kw = 0.003086449

Table 5.3 Energy Savings for 15.17 grm preform

Indicator	Year-2019	Yesr-2020	Year-2021
Volume Plan	224,208,000	280,394,016	308,433,408
Savings/Preform in Kw	**0.003086449**	**0.003086449**	**0.003086449**
Total savings in Kw	692,006	865,421	951,963

Chapter 6

Industry Evaluation on lighter weight – Bangladesh Context

6.1 Introduction

This chapter contain an overview of Bangladesh Beverages Industries while focusing on divert towards using lighter weight preform/bottle. Try to collect all the beverages company present scenario of using bottle weight for 250 ml. In addition, also capture the position TBL in terms of using lower weight PET bottle.

6.2 Beverages Industries Evaluation- Bangladesh Context

In Bangladesh there are many international and national beverages company which are also focusing towards sustainability in PET bottle manufacturing. The main player of the country is Coca-Cola, Pran, RC Cola, Fresh, Akij Group etc. The research is conduct only on 250 ml SKU. All the data are taken after lab test, weight measurement of the bottle in TBL Lab.

Table 6.1: 250 ml Bottle weight in Bangladesh

Company	SKU	BRAND	Preform weight	Shelf Life
TBL	250 ml	Pepsi,7 UP	15.17 grm	4 months
Coke-IBPL	250 ml	Coke, Sprite	15.5 grm	4 months
Akij	250 ml	Mojo, Speed	15.2 grm	4 months
Partex	250 ml	RC Cola	18 grm	4 months
Fresh	250 ml	Soul up	18.1 grm	4 months
Pran	250 ml	Pran up	15.5	4 months

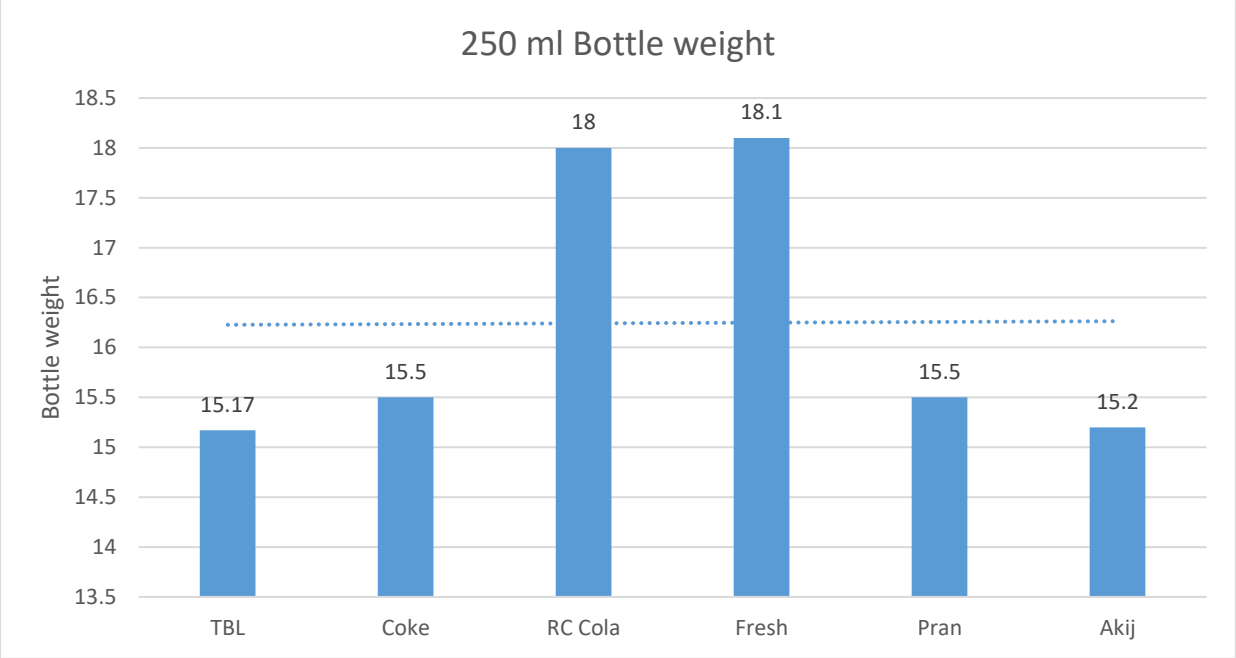


Fig: 6.1: 250 ml Bottle weight in Bangladesh Beverages Industry

From the above data table and Fig, it is observed that most of the company going towards lighter weight 250 ml bottle due to economic and environmental concern issue. Most of the company using 15.17 grm bottle to 15.5 grm bottle. Only Partex Beverages and Fresh Beverages currently using 18 grm and 18.1 grm preform which is higher than industries adopting weight. Among them TBL 250 ml weight is lowest in the industry.

Chapter 7

Conclusion, Limitation and Recommendation

7.1 Conclusion

Sustainability now the growing concern of the world to set clear communication and achieve expectation of stakeholder. All the industries including beverages industries now going ahead to set up his own sustainability goal. PepsiCo global has strong sustainability goal on every corner of the world. To focus on that TBL has also implementing sustainability one of his major commitment towards the future generation. This study conduct on 250 ml SKU PET bottle how to adopt lighter weight in bottle and have significant positive impact on economy, environment and society.

7.2 Limitation

This lower gram's bottle has done only in 250 ml SKU while other SKU need to also consider. Despite significant positive impact on economy and environment due to high initial investment many of the organization may not adopt this. Excessive lower weight of bottle might impact on shelf life of the bottle due to carbon retention time

7.3 Recommendation

This study recommends further evaluation of lower grams' bottle uses for 250 ml SKU. Need to try further reduction on weight considering no shelf life of the product minimize. Need to consider other SKU i.e. 500 ml, 1000 ml,2000 ml also to use lower grams of bottle.

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