



# **Bangladesh Garments Accessories and Packaging Manufacturers & Exporters Association (BGAPMEA)**

## **Final Report**

**on**

**“Feasibility Study of Establishing Training Institute of BGAPMEA”**

**under Bangladesh INSPIRED Programme**

**SME Competitiveness Grant Scheme**

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# **Feasibility Study of Establishing a Training Institute under Bangladesh Garment Accessories & Packaging Manufacturers & Exporters Association (BGAPMEA)**

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# Chapter-1

## INTRODUCTION

### 1.1 Background

The RMG sector of Bangladesh has exhibited phenomenal growth during last two decades. Due to its extraordinary performance, Bangladesh has earned the position of second largest garment exporters of the world with 5% global market share only; next to China enjoying 31% of the share of total global market of US\$ 450 billion. Thus, although Bangladesh occupies the second largest position, its market share is only one sixth of China, allowing a very wide gap.

Until the early 1960s, the apparel industry in the developed countries like the US and UK relied on domestic subcontracting; cutting and stitching operations were subcontracted to small garment factories which mostly used cheap female labour, while large-scale merchandising was undertaken by larger firms. Subsequently, as industrial wages began to rise, the apparel retailers in the developed countries found it more profitable to relocate production to lower-wage developing countries; in most cases, such out-sourcing took the form of subcontracting arrangements between the retailer in the developed country and the garment manufacturer in the developing country. The retailers in the developed countries placed work-orders to the offshore garment manufacturers, often through buying agents, and they also helped the garment makers in various ways to produce and ship the merchandise. Such sub-contracting reduced the risk of doing business with foreign partners since it did not require any foreign direct investment. In essence it was a triangular trade between the garment manufacturers and the foreign buying agent on the one hand, and the retailer and the buying agent on the other.

Packaging and Garments accessories constitute the most crucial determinants of quality, of products. As a result, accessories & packaging provides underpinnings to the growth and expansion of each of the sector of the economy. A high degree of potential exists for almost all the user segments which are expanding appreciably. Fabrics and garments, consumer goods and other durables, processed foods, hard and soft drinks, fruit and marine products, cosmetics and personal care, office stationary and accessories, electrical appliances and equipments, entertainment and other electronics, shoes and leather ware, gems and jewellery, toys and sports goods, chemicals and fertilizers, etc. are the important sectors using large quantity of accessories and packaging materials. Due to lower manufacturing costs, Bangladesh is fast becoming a preferred hub for accessories and packaging production. So garment accessories & packaging although constitute insignificant percentage of cost of the products, occupies most important position in production economics. These add aesthetic value to the garments products which justifies to claim: **accessories and packaging qualify the products.**

In the export market, contribution of packaging & accessories is very important. In many cases, these units are located within the mainstream industrial units; for instance packaging & accessories of medicine is an integral part of pharmaceutical industry, many garment factories have their manufacturing facilities of poly, sticker etc. In Bangladesh, there are large numbers of small, medium and cottage-based independent packaging and accessories industrial units scattered all over the country.

Bangladesh is aiming at exporting RMG for US\$ 30 billion by the year 2015 and US\$ 50 billion by the year 2021. Export oriented garments accessories and packaging sector earned USD 4.75 billion during last fiscal year and is likely to be exported USD 12.0 billion by the end of 2018 and USD 18.0 billion by the end of 2025. If the packaging and accessories could be exported directly together with deemed exports the figure may even assume much higher figure and may stand as a parallel industry sector with RMG in terms of earning.

In order to cater to the demands of the garments sector, capacity of the GAP sector should be scaled up through increasing operational capacity and efficacy of the existing industrial units and also developing new enterprises. The key interventions which are essential to foster growth and development of GAP industries include among others:

- Proper utilization of plant and machineries of GAP industries;
- Recruitment of appropriate human resources;
- Training of newly recruited human resources of these industries to enhance the volume of production and productivity;
- Capacity development of existing human resources through training and skill development

Establishment of a Training Institute under Bangladesh Garment Accessories & Packaging Manufacturers & Exporters Association (BGAPMEA) would be a capacity and skill development outlet for the GAP sector.

This study has been conducted to determine the imperatives of establishing a Training Institute embedding technically, economically and financially viable/ feasible propositions. The training institute will provide quality training to the workers and employees of Garment Accessories & Packaging Industries on the basis of assessment of their needs. The study also made an inventory of available training facilities in the country in order to develop a policy document.

## **1.2 Objectives and Scope**

The objective of the study is to factually determine whether establishment of the proposed Training Institute for Garment Accessories & Packaging (GAP) Sector would be technically, economically and financially viable/ feasible proposition.

Scope of the study has been identified to cover the following areas:

1. Study of the types of products, industrial units, size and level of total manpower engaged in the GAP Sector;
2. Assessing country-wide annual demand for operational/technical and managerial skill training needs under the GAP Sector;
3. Analysis of the available training facilities in the country (both institutional and non-institutional) to cope with the present training needs of the manpower under GAP Sector;

4. Estimating the need for development of training facilities (both physical and professional) to cope with present and future training needs in the country under this Sector;
5. Preparation of the Project (Accessories and Packaging Institute) describing its physical infrastructure (such as land, building, class rooms, conference room, laboratory, along with equipment, training equipment, teachers' room, furniture and fixture etc.), requirement of faculty and support personnel and cost estimation of all these items;
6. Assessing the technical viability of the proposed training institute covering the market potential, physical infrastructure development, location and relevant other issues;
7. Assessing financial feasibility of the proposed training institute, including such issues as cost estimate (both fixed and variable), financial cost/benefit analysis, economic feasibility, and so on; and
8. Undertaking of economic cost/benefit analysis, such as cost effectiveness analysis with the help of acceptable methods.

### 1.3 Methodologies and Instruments

#### 1.3.1 Study Methodology Adopted

The study has evolved collection of relevant data and information from both primary and secondary sources. The **secondary sources** were Bangladesh Garment Accessories & Packaging Manufacturers & Exporters Association (BGAPMEA), BGMEA, BKMEA, Chamber of Commerce & Industries etc.; while the **primary sources** were the industrial units of BGAPMEA.

The principal activities/tasks and corresponding methodology of carrying out various tasks under the study are presented below:

Sl. No.	Tasks/Activities	Methodology	Study Instruments/Tools Used
01	Study of the types of products, industrial units, size and level of total manpower engaged in the GAP Sector;	Exploring secondary sources and analyzing data received from these sources	Pre-designed Checklist to collect short profile of GAP Units
02	Assessing country-wide annual training needs for operational/technical and managerial manpower under GAP Sector;	Exploring both primary and secondary sources and consultation and review of data collected from these sources	i) Pre-designed Checklist to collect short profile of GAP Units ii) Pre-designed Questionnaire for (collecting data on training needs) from the sample GAP Units iii) Pre-designed Checklist for discussion with Key Informants (KIs) from Association Offices
03	Analysis of the available training facilities in the country (both institutional and non-institutional) to cater the current	Exploring both primary and secondary sources for collecting information on existing training facilities and consultation and	i) Pre-designed Checklist to collect short profile of the Training Institutes ii) Pre-designed Questionnaire for

	training needs of the manpower under GAP Sector;	review of data collected from these sources on training offered	use at the sample Training Institutes
04	Estimating the need for development of training facilities (both physical and professional) to cope with present and prospective training needs in the country under GAP Sector.	Review and analysis of data outcome derived from Sl. 02 and Sl. 03 above, particularly through brain storming, forming and forming process among consultants.	Standard practice, keeping in view prospective needs
05	Preparation of the Project, Accessories and Packaging Institute (APTI), describing its physical infrastructure (such as land, building, class rooms, conference room, library, laboratory, along with equipment, training equipment, teachers' room, furniture and fixture etc.), requirement of faculty and support personnel and cost estimation of all these items.	Continuous discussion among the consultants	Standard practice, keeping in view the existing and prospective needs
06	Assessing the technical viability of the proposed training institute covering the market potential, physical infrastructure development, location and relevant other issues;	Continuous discussion among the consultants	Standard practice, keeping in view the existing and prospective needs
07	Assessing financial feasibility of the proposed training institute, including such issues as, cost estimate (both fixed and variable) financial cost/benefit analysis, economic feasibility etc.	Up-to-date methods of financial cost benefit analysis applicable to training project, such as cost-effectiveness analysis.	Standard practice, keeping in view the existing and prospective needs
08	Undertaking of economic cost/benefit analysis, such as cost effectiveness analysis through acceptable methods.	Up-to-date method of cost effectiveness analysis.	Standard practice, keeping in view the existing and prospective needs

### 1.3.2 Study Instruments/Tools used in the Study:

The following Instruments/Tools were used in the study:

1. Checklist to collect short profile of GAP Units
2. Questionnaire on training needs analysis (TNA) for use at the sample GAP Units
3. Checklist of aspects for discussion with Key Informants (KIs) from Association Offices
4. Checklist to collect short profile of the Training Institutes
5. Questionnaire for use at the sample Training Institutes

Copies of Questionnaires and Checklists have been given in the Annexure

### 1.3.3 Sample Size and Sampling Design

The sampling techniques applied for selection of sample units for the study are summed up below:

- All the units under GAP Sector were first divided into 19 (Nineteen) identifiable categories based on product specifications;
- Sample size of the GAP has been determined on the basis of number of units under each category;
- In case of small number of units, 100% units have been taken as sample units;
- In the case of categories with large number of units of each category of products( Accessories and Packaging products ), 10% units have been taken as representative units;
- In some cases, applying rational sense of sampling, less than 10% have taken as representative sample units.

The sample size of the units selected through the application of population proportionate to size (PPS) technique, are presented below in tabular form:

Sl. No.	Entity/Unit	Total No. of Units/Entities	No. of Sample Units/Nos.	Remarks
01	GAP Units	1,232	55	
02	Training Institute	4	1	
03	Different Association	3 (BGAPMEA, BGMEA & BKMEA)	(BGAPMEA, BGMEA & BKMEA)	



**A. Selected sample units from different categories of industries:**

Since the GAP Sector includes 19 categories of industrial units, the study has selected sample units from each category following PPS method. The selected units belonging to different categories of industries are shown below:

<b>Sl. No.</b>	<b>Name of Accessories and Packaging</b>	<b>No. of Units</b>	<b>No. of Sample Units for Study (Average 10%)</b>
01	Button (Button & Elastic Button)	24	03
02	Chemical	01	01
03	Corrugated Carton	632	08
04	Elastic & Drawstring	103	05
05	Embroidery	02	02
06	Gum Tape & Twill Tape	02	02
07	Hanger	06	02
08	Interlining	07	02
09	Multi Items	166	04
10	Packaging	23	03
11	Padding	03	02
12	Poly Bag	133	05
13	PP Band	01	01
14	Labels	37	04
15	Quilting & Padding	01	01
16	Resin	01	01
17	Sewing Thread	67	03
18	Screen Print	03	02
19	Zipper	20	04
	<b>Total:</b>	<b>1,232</b>	<b>55 Nos.</b>

## **B. Distribution of Sample Units by Administrative Divisions:**

While selecting the sample units, special attention was given to geographical location. The geographical dispersion of the sample units are given below:

<b>Administrative Divisions</b>	<b>Total No. of Units under GAP sector</b>	<b>Sample Size (No.)</b>
Dhaka	996	40
Chittagong	222	14
Khulna	11	01
Rajshahi	02	0
Sylhet	0	0
Barisal	01	0
Rangpur	0	0
<b>Total</b>	<b>1,232</b>	<b>55</b>

## **C. Existing Training Institute**

The Secondary source reveals that currently there are 4 (four) sectoral training institutes, namely, Small and Cottage Industries Training Institute (SCITI) under BSCIC, BGMEA Training Institute, BKMEA Training Institute and National Institute of Textile Engineering and Research (NITER) under M/O Textiles. Each of this training institute caters the training needs of its specific subsector. In view of this, the study has selected SCITI as sample unit to study the different aspects for necessary details.

### **1.4 Limitations**

BGAPMEA authority has extended best cooperation to the study team in collecting relevant data and information from both primary and secondary sources but data collection was done during the month of Ramadan which was not convenient time to the Field Investigators as well as to the factory staffs. In spite of the limitation, the investigators collected data with sincere efforts and tried to maintain accuracy and reliability of data. On the basis of data base, this feasibility study report has been prepared.

## **Chapter-2**

### **REVIEW AND ANALYSIS OF THE GAP SECTOR, ITS MANPOWER AND TRAINING NEEDS**

#### **2.1 Garment Accessories & Packaging Industries in Bangladesh**

As has stated in the earlier section, the RMG Sector of Bangladesh currently occupies around 5(five) percent global market share. It is the second largest garments exporters of the world but the market share is only one sixth of China, the largest supplier. The Garment Accessories and Packaging (GAP) sector is a backward linkage industrial sector and as such the demand for accessories and packaging is derived demand which changes with the change in demand for RMG exports.

Garments accessories and packaging are essential ingredients for manufacturing and marketing of **garments**. These ingredients establish the identity of a product and also help increase the demand for the products. Moreover packaging protects both the products and target market. Packaging is intended to provide an optimum protection and quality preservation of exportable products. Besides this, packaging enables the products to be adapted to the means of transportation, storage, and distribution. At retail level, integrated marketing/merchandizing, advertising and communication strategies are implemented with the latest concept of packaging through structural and graphic design. However, accessories & packaging are expected to abide by the laws and regulations of the target markets. All these integrated functions need a thorough knowledge and understanding of accessories packaging - a necessity in today's global trade. In export trade special emphasis is given on excellent packaging system and high quality accessories. Economic status, population dynamics, design and fashion, climate, safety (specialized garments- protective clothing, heat resistance clothing etc.) are found to have perceptible influence on the determination of demand for textiles/garments vis-a-vis accessories and packaging.

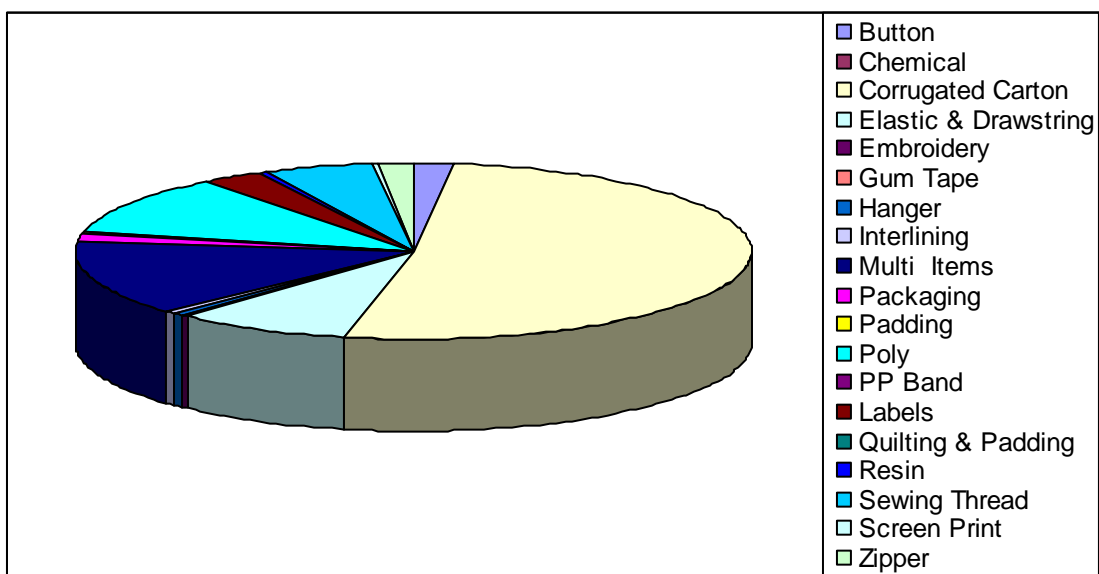
Currently, as many as 1232 ( 1300 units up to October, 2014) industrial units are in operation in the GAP sector. Export oriented garments accessories and packaging sector earned USD 4.75 billion during last fiscal year and is likely to be increased to USD 12.0 billion by the end of 2018 and USD 18.0 billion by the end of 2025.

GAP industries cover a wide range of products and units. A close look at the information given in Table-2.1 shows the composition of members of BGAPMEA. There are as many as 19 categories of industrial units representing a total of 1232 units under BGAPMEA. The Association started with only 19 member units in the year 1991. This means the number of member units of BGAPMEA grew at the rate of 55 units per year!

The following table exhibits the typical category of Accessories & Packaging Industries in Bangladesh

**Table-2.1 (a) : Number and Categories of Accessories & Packaging Manufacturing Units under BGAPMEA.**

Sl. No.	Categories of Industries	No. of Units
01.	Button	24
02.	Chemical	01
03.	Corrugated Carton	632
04.	Elastic & Drawstring	103
05.	Embroidery	02
06.	Gum Tape	02
07.	Hanger	06
08.	Interlining	07
09.	Multi Items	166
10.	Packaging	23
11.	Padding	03
12.	Poly	133
13.	PP Band	01
14.	Labels	37
15.	Quilting & Padding	01
16.	Resin	01
17.	Sewing Thread	67
18.	Screen Print	03
19.	Zipper	20
<b>Total</b>		<b>Total : 1232</b>



**Graph-2.1 (b) : Graphical view of Accessories & Packaging Industries by Type**

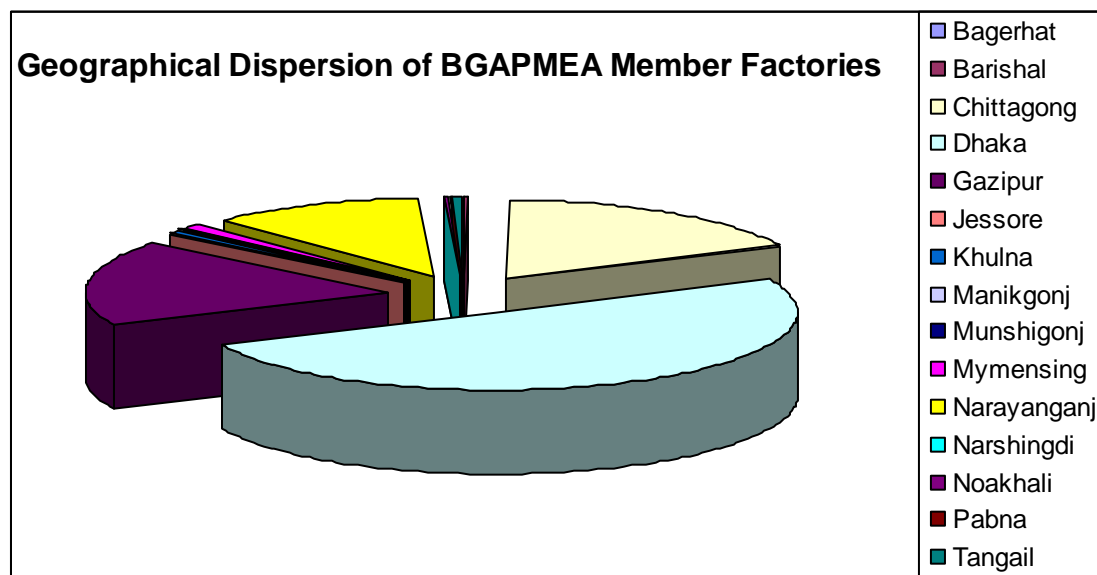
**2.1.1 Geographical Dispersal:** Although the member units of GAP Sector are located throughout the country, their concentration is dominated by the location of RMG factories. Information on geographical dispersion of member units of GAP Sector is given in table 2.2.

**Table-2.1 (c) : Geographical Dispersion of Garments Accessories and Packaging Industries**

Sl. No.	Area	No. of Unit
01.	Bagerhat	01
02.	Barisal	01
03.	Chittagong	221
04.	Dhaka	615
05.	Gazipur	218
06.	Jessore	02
07.	Khulna	08
08.	Manikgonj	02
09.	Munshigonj	01
10.	Mymensing	11
11.	Narayanganj	142
12.	Narshingdi	01
13.	Noakhali	01
14.	Pabna	02
15.	Tangail	06

Geographical dispersal of the GAP units shows the highest concentration in Dhaka (584), followed by Gazipur (204), Chittagong (189) and Narayanganj (141)

**Graph-2.1(d) : Graphical View of Dispersal of BPAPMEA Factories**



As stated earlier, the cause of concentration of these industries in and around Dhaka and Chittagong are attributed to the concentration of garment and other industries in around Dhaka and Chittagong.

## 2.2 Growth Trend

Bangladesh, with its outstanding efforts, would be able to export RMG for US\$ 30 billion by the year 2015 and US\$ 50 billion by the year 2021. Apparel export to non-traditional markets rose to US\$ 3.5 billion in 2013 from merely US\$ 800 million in 2008. This is a dramatic increase in last 6 years time, the result of serious entrepreneurial initiative and concomitant government's incentive package to exporters for exploring new destinations for their products. Under this corollary and assumption the Garments accessories and packaging export earnings were found to increase from US\$1.8 billion in 2008-09 to US\$ 4.75 billion in 2013-14. If packaging and accessories could be exported directly together with deemed exports the figure would assume greater dimension and would stand as a parallel industry sector with RMG in terms of earnings.

**Table-2.2 (a) : Export Performance of Garments Accessories & Packaging Industries  
during last 5 yrs. (2008-09 to 2013-14)**

<b>Fiscal Year</b>	<b>Total Export Earning (in mn US\$)</b>	<b>RMG Export Earning (in mn US\$)</b>	<b>Share of RMG as % of Total Export</b>	<b>Export of Accessories &amp; Packaging (in mn US\$)</b>
2005-06	10526.16	7900.80	75.06	1185.12
2006-07	12177.86	9211.23	75.64	1381.68
2007-08	14110.80	10699.80	75.83	1604.97
2008-09	15565.19	12347.77	79.33	1852.17
2009-10	16204.65	12796.72	77.12	1919.51
2010-11	20628.73	18340.89	78.10	2751.13
2011-12	23704.19	20360.05	78.80	3075.00
2012-13	27027.36	21515.73	79.61	4100.00
2013-14	30186.62	24491.88	81.14	4750.00

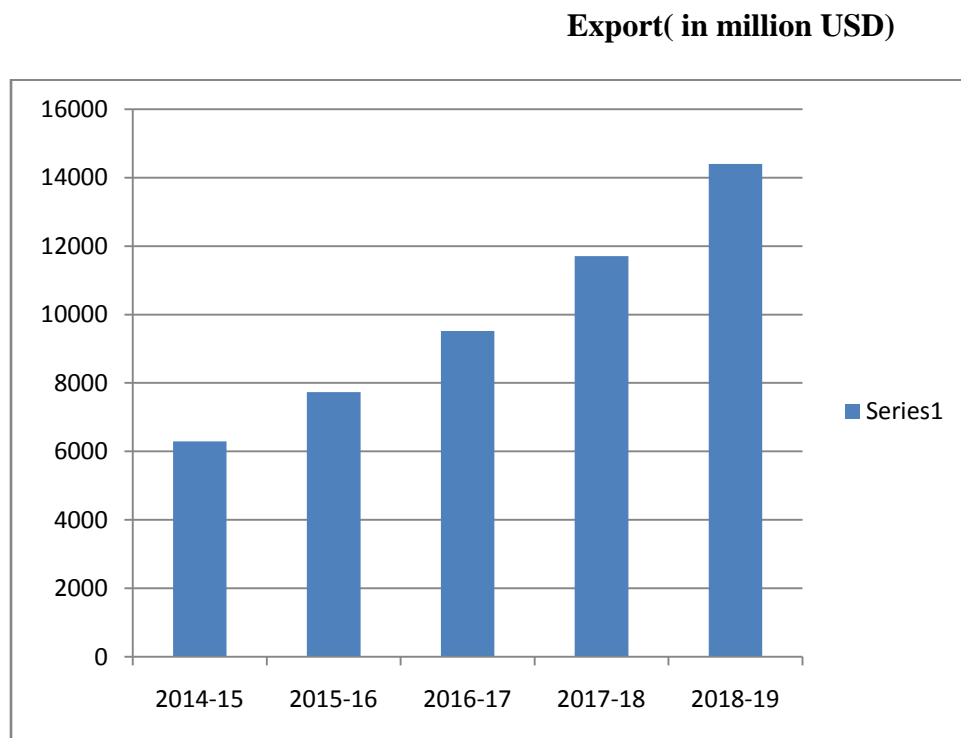
(Data source : Export Promotion Bureau)

Considering the RMG garments accessories and packaging products the export and domestic demand, GAP industries are estimated to grow at the rate of 23% and above . Export earnings of garments accessories and packaging sector is likely to be increased to USD 12.0 billion by the end of 2018 and USD 18.0 billion by the end of 2025. The following table 2.2(a) shows the projected growth trend of garments accessories & packaging industries.

**Table: 2.2 (b): Projected Trend of Export of Garments Accessories & Packaging Industries during 5 years (2014-15 to 2018-19)**

<b>Year</b>	<b>Export (in million US\$)</b>
2014-15	6291
2015-16	7738
2016-17	9518
2017-18	11707
2018-19	14399
<b>Average</b>	<b>9,931</b>

**Graph-2.2 (c) : Graphical view of the Trend of Export of Garments Accessories & Packaging Industries (2014-15 to 2018-19)**



With this estimate, growth trend of accessories & packaging industries by type has been shown in the following table.

**Table-2.2 (d) : Projected Growth Trend of Accessories & Packaging Industries by Type during 5 years (2013-14 to 2017-18)**

Sl. No.	Item Name	2013-2014 (No. of Units)	2014-2015 (No. of Units)	2015-2016 (No. of Units)	2016-2017 (No. of Units)	2017-2018 (No. of Units)
01.	Button	24	26	29	32	35
02.	Chemical	01	02	03	04	04
03.	Corrugated Carton	632	695	765	841	925
04.	Elastic & Drawstring	103	113	124	136	149
05.	Embroidery	02	03	04	05	06
06.	Gum Tape	02	03	05	05	06
07.	Hanger	06	07	08	09	10
08.	Interlining	07	07	08	09	10
09.	Multi Items	166	183	201	220	242
10.	Packaging	23	25	28	31	34
11.	Padding	03	04	05	05	06
12.	Poly	133	146	160	176	193
13.	PP Band	01	02	03	04	04



14.	Labels	37	41	45	50	55
15.	Quilting & Padding	01	02	03	04	04
16.	Resin	01	02	02	03	03
17.	Sewing Thread	67	74	81	89	98
18.	Screen Print	03	04	05	06	07
19.	Zipper	20	22	24	27	30
	<b>Total</b>	<b>1232</b>	<b>1361</b>	<b>1503</b>	<b>1656</b>	<b>1822</b>

## 2.3 Existing Manpower

Manpower is the most crucial factor of production. Performance improvement of any manufacturing unit is critically dependent on the efficiency of its manpower. Training and development provide crucial underpinnings to efficient manpower.

Training is a process of improving knowledge, skill and attitude (KSA). It is an integral part of human resource management. The principal objective of training and development is to make sure the availability of a skilled and willing workforce to an organization. Employees need training for achieving their personal goals, which in turn, enhances the individual contribution to an organization.

In short, training attributes to :

- Encourage growth and career development of employees;
- Improve skills and knowledge that can be immediately applied at work;
- Increase motivation and job satisfaction;
- Create a network of colleagues for problem-solving and support.

Since training is a systematic efforts aimed at improving employee's knowledge, skills and attitude, it is essential to assess training needs before undertaking any initiative towards arrangement of institutional training.

Assessment of Training needs depends largely on the analysis of the existing manpower, particularly their academic qualifications, level of skills and training received. Currently, the total manpower of GAP sector stands at 2,98,136. Distribution of this manpower by qualifications, skills and training is given in the following sections.

### 2.3.1 Academic Qualifications of Existing Manpower

The employees of GAP sector have different academic and training background. According to the findings of the survey, as many as 47% of the employees have studied upto S.S.C. level, while 27% are totally illiterate. Almost equal percentages of them are graduates (11.48%) and H.S.C. passed (11%), while 2% and 1.52% are vocationally qualified and Diploma Engineers respectively.

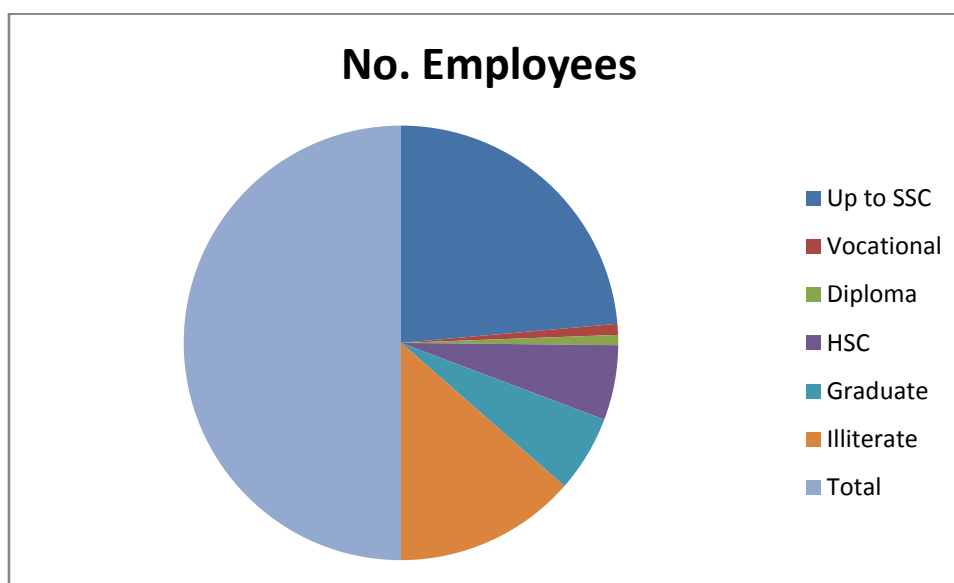
**Table-2.3.1 : Distribution of Existing Manpower under survey by Academic Levels/Qualifications**

<b>Academic Levels / Qualifications</b>	<b>No. of Employees</b>	<b>Percentage</b>
Upto SSC	5126	47
Vocational	176	2
Diploma	165	1.52
HSC	1210	11
Graduate	1240	11.48
Illiterate	2942	27
Total	10859	100

Based on the survey findings, the distribution of total manpower of GAP sector according to the level of academic qualifications has been extrapolated and presented in table 2.3.1(a).

**Table - 2.3.1 (a) : Distribution of Existing Manpower of GAP Sector by Academic Levels (Extrapolated)**

<b>Academic Levels of Qualifications</b>	<b>No. of Employees</b>	<b>Percentage</b>
Upto SSC	1,40,124	47
Vocational	5,963	2
Diploma	4,532	1.52
HSC	32,795	11
Graduate	34,226	11.48
Illiterate	80,496	27
Total	2,98,136	100



**Graph-2.3.1(b) : Graphical Presentation of the Distribution of Existing Manpower by Academic Levels/Qualifications**

### 2.3.2 Distribution of Existing Manpower by Level of Skills

The survey findings reveal the existing distribution of manpower by level of skills which indicates that 26 % of the manpower engaged in the GAP sector are unskilled, while 40% and 9% are skilled and professionally qualified respectively. If skilled and professionals are counted combinedly then professional manpower will be 49%. From the analysis of skill / professional category of manpower, conclusion may be derived that the garments accessories and packaging industries recruit skilled and technically qualified manpower only for jobs of technical nature. For other jobs, they recruit unskilled work force with presumption that the workers/ manpower will learn their jobs by doing under the guidance of their seniors and will gradually be skilled in course of time.

**Table-2.3.2 : Distribution of Existing Manpower by Level of Skills (Sample Units)**

Category of Manpower	No. of Employees	Percentage
Unskilled	2,803	26
Semi- Skilled	2,673	25
Skilled	4,371	40
Professional	1,012	9
Total	10,859	100

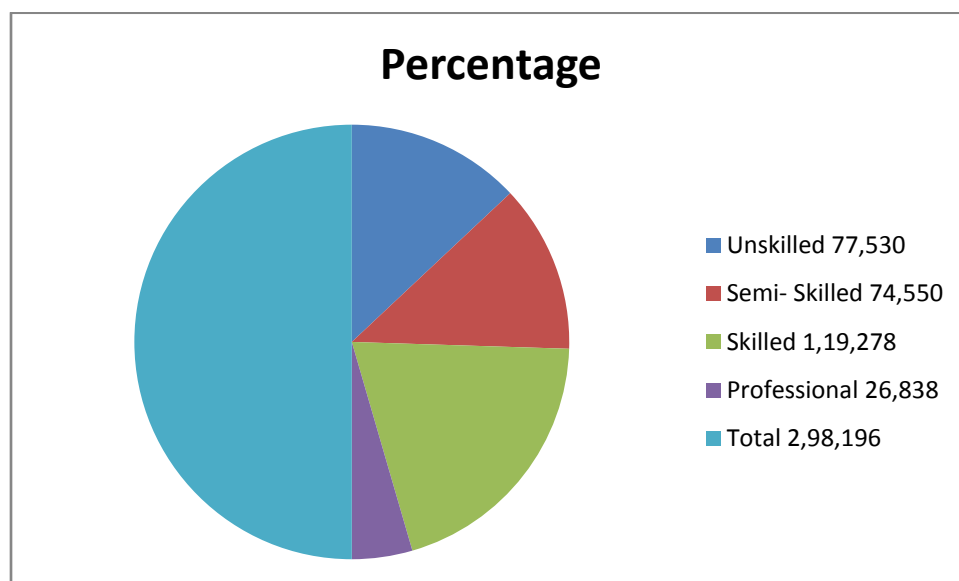
Based on the findings of the distributions of manpower by level of skills in the sample units, the total manpower of the GAP sector has been extrapolated and presented in Table: 2.3.2(a).

Data appended in Table 2.3.2(a) show that 51% of the employees of the GAP sector numbering around 152080 are unskilled and semi skilled, while the rest are either skilled or professionally

qualified. This breakdown indicates that the target group for training efforts constitutes directly 152080 (i.e. 51%) and the rest 49% (i.e. 146116) need retraining and advanced training.

**Table-2.3.2(a) : Distribution of Existing Manpower level of Skill (Extrapolated)**

Category of Manpower	No. of Employees	Percentage
Unskilled	77,530	26
Semi- Skilled	74,550	25
Skilled	1,19,278	40
Professional	26,838	9
Total	2,98,196	100



**Graph-2.3.2(b) : Geographical Presentation of the Category of Existing Manpower by Skill/ Profession**

### 2.3.3 Projection of Future Manpower

Based on the growth rate of last few years the manpower of the GAP sector has been projected for future 5 years (2014 to 2018). As per this projection the total current manpower of the GAP sector stands 2,98,196 which will increase to 3,63,726 in 2016 and 4,40,924 in 2018.

**Table-2.3.3: Projection of Employment in Accessories & Packaging Industries**

Year	No. of Units ( at 10% growth rate)	Manpower
2014	1232	2,98,196
2015	1361	3,29,362
2016	1503	3,63,726
2017	1656	4,00,752
2018	1822	4,40,924

### 2.3.4 Status of Training of the Employees of GAP Sector

The survey covered the status of training received by the employees of GAP sector. Findings of the survey show that around 10% of the employees of GAP sector were reported to have received training on the areas of their work. On the contrary, around 90% of the total employees numbering around 2,67,661 employees had never received any training meaning they need training for development of their knowledge and job skill. At the terminal year of projection (2018) this number will increase to 3,95,773.

In order have more clear idea about the type of training received, the survey findings show that as many 9 (nine) types of training were received by the employees of GAP sector (see data appended in Table 2.3.4).

**Table-2.3.4 : Training Courses attended by the employees of the units under survey**

Sl. No.	Name of the Course	No. of Employees who attended Training Courses (10.25 %)	Percentage
01.	Merchandising	38	3
02.	Inspection	41	4
03.	Accounts and Costing	20	2
04.	Repair and Maintenance	14	1
05.	Human Resource Management	13	1
07.	Fire Fighting	850	77
08.	Quality Control	58	5
09.	Oekotex	44	4
10.	Supervision	6	0.50
11.	Marketing	29	2.50
	Total	1,113	100

**Table-2.3.4(a): Training Courses attended by the employees of the Accessories & Packaging Industries (Extrapolated)**

Sl. No.	Name of the Course	No. of Employees who attended Training Courses (10.25 %)	Percentage
01.	Merchandising	917	3
02.	Quality Inspection	1,223	4
03.	Accounts and Costing	611	2
04.	Repair and Maintenance	306	1
05.	Human Resource Management	307	1
07.	Fire Fighting	23,533	77
08.	Quality Control	1,528	5
09.	Oekotex	1,222	4
10.	Supervisory Techniques	153	0.50
11.	Marketing	764	2.50
	Total	30,564	100

A closer look at the information appended in Table: 2.3.4 (a) shows that the most common issue of training was on Fire Fighting (77%), followed by Quality Control (5%), Oekotex (4%), Quality Inspection (4%), Merchandising (3%), Marketing (2.5%). This exhibits a dismal picture of training status, which points to serious need for training outfit for this sector. Summing up analysis, the following factors may be attributed to the cause of frustrated status.

- Absence of exclusive training institute for development of human resources of garment accessories and packaging industries;
- Owners of the industrial units think that the workers/ employees would get practical training through learning by doing the jobs in the factory. They, sometimes, think that training is a costly event and in the name of training, production is being hampered. On the other hand, it is difficult to bear the cost of training by the workers;
- The training institutes which are providing training are not located in the area where GAP units are concentrated. This location factor also debars the workers/employees from getting training/ enrolment with existing training institutes.

### 2.3.5 Assessment of Training Needs

Currently the total employee strength of the GAP sector stands at 2,98,136. In 2018, manpower of the GAP sector will rise to 4,40,924 (Table-2.2.3). The study assessed the training needs of the employees of the GAP sector. An analysis of the data appended in Table: 2.2.5 shows that 8.71% of the employees (922 out of 10589) of the GAP units surveyed need as many 12 (twelve) types of training. Findings of the data analysis show that 24.90% of the responded employees need training on Quality Control followed by Merchandising (12.02%), Oekotex (10.95%), Repair and Maintenance (9.86%), Supervision (9.85%), Inspection (7.58%), Security (5.75%), Accounts (5.42%) etc. Data appended in Table : 2.3.5 show the immediate training needs of the employees engaged in the industrial units under survey.

**Table-2.3.5 : Assessment of Immediate Training Needs of the Employees of the GAP Units under Survey.**

<b>Name of the Course</b>	<b>No. of Employees who need Training</b>	<b>Percentage</b>
Quality Control	226	24.90
Repair and Maintenance	91	9.86
Inspection	70	7.58
Oekotex	101	10.95
Human Resource Management	49	5.00
Supervision	91	9.85
Merchandising	111	12.02
Costing	12	1.30
Store Keeping	18	1.95
Machine Maintenance	25	2.71
Security	53	5.75
Accounts	50	5.42
Marketing	25	2.71
<b>Total</b>	<b>922</b>	<b>100</b>

Based on the training needs of the employees of surveyed units, the total sectoral training needs have been assessed and it was found that as many as 25,973 (i.e. 8.71% of the total manpower 2,98,196) are in need of training. In effect, these employees (25,973) constitute the immediate clients of the proposed GAPTI.

Based on the projected manpower of GAP sector appended in Table : 2.3.2 and the information on current training needs collected during survey and appended in Table : 2.3.5, the training needs of the employees of GAP sector have been projected for coming 5 (five) years from 2014 to 2018 and presented in Table : 2.3.5 (a).

**Table - 2.3.5 (a) : Projected Training Needs of the Employees of GAP Sector for the years (2014-2018)**

<b>Year</b>	<b>Total Manpower</b>	<b>Employees Needing Training</b>
2014	2,98,196	25,973
2015	329,362	28,687
2016	363,726	31,680
2017	400,752	34,905
2018	4,40,924	38,404
<b>Total :</b>		<b>1,59,649</b>

It is interesting to note that a total of 1,59,649 employees will constitute the total target client group of APTI for the coming 5 years (2014-2018). This constitutes approximately 36% of the total projected manpower of GAP sector during the terminal year (2018).

### **2.3.6 Existing Training Facilities**

The previous sections, highlighted the employee strength of GAP sector, status of training received and similar other issues. All these indicate that training has remained as one of the most neglected issues in GAP sector. The situation has been aggravated by the absence of any training institution to cater the needs of GAP sector. Moreover the study has covered the issue of existing training facilities in other sectors. A review of the existing training facilities reveals the following scenario:

- The existing institutions of offers two types of programmes, namely, educational, and training. Under Textile Sector, there are a number of such educational and training institutions, namely, Bangladesh Textile University (BUTEX), National Institute of Textile Engineering & Research (NITER), Textile Institutes under DOT as well as private textile institutes, etc. The major emphasis of these institutions is to offer educational programmes.
- There are a considerable number of vocational training outfits under Bureau of Manpower Employment & Training (BMET), which offers vocational educational programmes. These programmes are good for the new entrants into labour market. In the RMG sector, BGMEA University of Fashion and Technology are conducting degree courses, while BGMEA and

BKMEA Training Institutes are providing training exclusively on garments/ apparels and each of these training institutes caters to the training needs of their specific subsectors.

A review of these educational institutions shows that the academic programs are found to equip the employees of GAP sector with entry level qualifications while the programmes of the training centres are specially designed for the employees of the own subsectors and do not at all match the need for the employees of GAP sector.



## **Chapter-3**

### **PROPOSED TRAINING INSTITUTE FOR GARMENTS ACCESSORIES & PACKAGING (GAP) SECTOR**

#### **3.1 Introduction**

As has been discussed in the earlier sections, the current employee strength of GAP sector stands at 2,98,196. These employees belong to various vocational and professional categories. Two thirds of them have studied up to SSC level. A portion of them has vocational training. Others are Diploma holders, HSC passed and Graduates. Most of these employees of GAP sector are found to have on-the-job training. Our survey confirms two important findings, namely, most of the employees of GAP sector belong to poor academic background and very few (10%) of them received any training during their lifetime. A further investigation into the issue reveals that there is no institutional arrangement for training of the manpower of GAP sector. Whatever training facilities are available in the country, the employees of the GAP sector are not allowed to enter or they do not find the training programs of those institutions suitable for their trades. Moreover, GAP sector covers a wide range of products involving most modern and unconventional technology and machines. To match the ever-changing market demand, the units under GAP sector are found to regularly update and modernize their plant by acquiring new and latest technology. In view of the situation and realities, the units under GAP sector need continuous supply of skilled manpower with facilities for further training for updating their skills. Thus the manpower training scenario may be summed up as follows:

- a) The GAP sector employs a large number of employees, which is increasing year after year;
- b) The employees of GAP sector are with poor academic and training background;
- c) The units under GAP sector manufacture large number of products, requiring manpower with wide range of specialized trades and skills;
- d) The manufacturing units under GAP sector are found to change and update their technologies and machineries very frequently to match changing demand pattern of the market. In order to adopt new technology and machinery, the units under GAP sector require continuous supply of skilled manpower and facilities for training and retraining of their employees to upgrade their skills;
- e) There is no training institute in the country to cater to the training needs spelt out above. Whatever training facilities are available under other sectors (i.e. BGMEA, BKMEA) are not suitable to meet the specific training needs. All these circumstances and realities lead to the justification of establishing a separate training institute for GAP sector. The following section of this chapter elaborates the various aspects of the proposed training institute.

From the survey, it is revealed that Employees of the GAP sector need training on Supervisory Management, Quality Control, Repair and Maintenance, Inspection, Oekotex, Merchandising, Machine Maintenance, Security Management, HR Management, Costing, Store keeping, Accounts, Marketing ,etc. In order to cater the needs of the GAP sector, the proposed institute will:

- Organize institutional regular training program for all categories of employees of the GAP sector namely Supervisory personnel, Technicians, Lab. Assistant, Merchandisers,

Quality Controller, Machine Operators, Inspectors, Store keepers, Accountants, Marketing and Sales Executive, etc.;

- Arrange pre-service and functional training for new entrants;
- Conduct special training courses for the officials of BGAPMEA and other similar organizations;
- Provide consultancy services to the member units of BGAPMEA;
- Conduct Certificate, Diploma, and similar professional programs on various vocational fields;
- Facilitate dissemination of knowledge and experience through publications, documentation services, seminars and workshops;
- Conduct research and evaluation studies on the issues of BGAPMEA and GAP sector development;
- Maintain liaison with similar other organizations at home and abroad.

**The proposed training institute will carry out the above functions and is proposed to be named as Garments Accessories and Packaging Training Institute (GAPTI).\***

### **3.2 Physical and other Facilities for the Training Institute**

In keeping with the various pre-test of objectives and functions, the institute will have facilities and manpower to organize multi disciplinary training programs. The institute will be housed in a five storied building on a piece of land. The institute will have class rooms, conference room, teachers room, library, laboratory building. A brief description of the various aspects of the proposed Training Institute for GAP Sector is presented in the following paras.

#### **3.2.1 Land and Building**

Assessment of the space adequate for class rooms, library, conference room, laboratory, office space, etc. has been carried out meticulously. It has been found that initially a total of 30,000 sft of floor space is required to accommodate all the facilities. A multistoried building should be constructed on a piece of land covering around 50.0 (fifty) decimal land.

#### **3.2.2 Class Rooms**

The institute will have 10 (ten) rooms for classes. Each room will be of 600 sft. Class rooms will be furnished with chairs, tables and white boards, etc. Each class room will also have Multimedia Projector and Movie Projector.

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**\*Note: The name ‘GAPTI’ is just a suggestion which the BGAPMEA authority may accept or change.**

### **3.2.3 Conference Room**

**It will have the following in-built facilities:**

- Capacity : It will cover 3000 sft floor space and accommodate 150 participants
- Setting: Modern and comfortable setting
- Sound system : It should have high performance equipment: two projectors, an electronic whiteboard and a new state of art sound and wireless microphone system
- Refreshment Facilities: It should have easy access to canteen for refreshment.
- Car-Parking: There should be free of charge car park
- Wide Lobby: There should be large lobby beside the conference room to organize catering, cocktails and coffee break.

### **3.2.4 Teacher Rooms**

The Institute should have adequate number of comfortable teacher rooms.

### **3.2.5 Library**

A specialized functional library with a reasonable collection books, periodicals journals, and research reports will be set for the benefits of trainees and faculty members. The institute will be in the mailing list of various local and foreign training institutes. The library will have reasonable budget provision for procurement of books and other useful publications from the local market.

The library will provide support services to trainees by:

- providing relevant information related to the training programmers
- offering course participants complementary information to training
- providing related training bibliography to the GAP members;
- the library database contains more than 10,000 documents (books, dictionaries, cd-roms, reports, magazines dedicated to garment accessories and packaging materials.

### **3.2.6 Laboratory**

In the institute , a laboratory will be established covering 3000 sft floor space with modern facilities which can be used by industries (at minimum cost) as well as by all trainees. The laboratory should have adequate number of rooms, furnitures, fixtures etc. so that the teachers and trainees can utilize these facilities for practical training.

### 3.2.7 Laboratory Equipments

The proposed Institute will have a laboratory with modern equipments for shrinkage, abrasion, colour fastness testing, etc. It will have equipments for box compression test, crush test, AZO test, chemical test, paroling test, yellowing test, yarn strength, adhesive strength, color test, fusing test, moisture test, pool test, GSM test, yarn test, impact test, bonding test, etc. These equipment facilities will increase operational efficacy of the training institute. Names of the equipments will be as under:

<b>Bursting strength tester</b>
<b>GSM tester &amp; Balance</b>
<b>Moisture testing</b>
<b>Box compression tester</b>
<b>Cobb sizing tester</b>
<b>Crush tester</b>
<b>i. Edgewise crush test of board(ECT)</b>
<b>ii. Ring crush test of paper(RCT)</b>
<b>iii. Flat crush test of</b>
<b>iv. Corrugated board(FCT)</b>
<b>v. Corrugating medium test(CMT)</b>
<b>vi. Pin adhesion test board(PAT)</b>
<b>vii. Corrugated crush test(CCT)</b>
<b>Universal strength tester (Titan<sup>4</sup>) Fabric, Yarn , Seam, Lea, Zipper</b>
<b>GCMS</b>
<b>HPLC</b>
<b>UV VIS Spectrophotometer</b>
<b>Light Fastness Machine</b>
<b>Washing Fastness</b>
<b>Rubbing Fastness</b>
<b>Martindale</b>
<b>Pilling Tester</b>

<b>Crease Recovery Tester</b>
<b>Wascator &amp; Dryer</b>
<b>Dynawash</b>
<b>Light Box</b>
<b>Persperometer</b>
<b>Twist Tester</b>
<b>Yarn count Balance</b>
<b>Hardness Tester</b>
<b>Wrap Reel</b>
<b>Button Pull Tester</b>
<b>Ph Meter</b>
<b>Balance : 0.0001g -210G</b>
<b>Hygrometer</b>
<b>Microscope</b>
<b>Mufel Furness &amp; Incubator</b>

### **3.2.8 Training Aids**

The institute will have facilities for running several courses simultaneously. Training aids will include Computer lab. Video Camera, Video Projector, TV& Video, Multimedia Projectors, Movie Projector, Duplicators, Copier, Plain Paper Copier, etc.

## **3.3 Manpower**

### **3.3.1 Faculty Members**

#### **Administrative Staff**

1. Principal
2. Vice Principal
3. Chief Faculty Member
- 3.Sr. Faculty Member
4. Faculty Member
5. Training Assistant

#### **Faculty**

##### **a) Management Division (CFM-1, SFM-1, FM-1)**

Personnel Management

Labor Management

Supervisory Management  
Security Management  
Factory Management  
Operations Management

**b) Production Engineering and Maintenance Management Division CFM-1, SFM-1, Instructor-8)**

Production Management  
Quality Control  
Stores and Inventory Control  
Procurement Management  
Repair and Maintenance Management:  
i. Mechanical Maintenance  
ii. Electrical Maintenance  
ii. Electronic Maintenance  
iii. Boiler Maintenance  
iv. Generator Maintenance  
v. Waste Control

**c) Dyeing, Printing, Finishing and Packaging Division (FM-3, Instructor-8, Dyeing Master-2)**

Accessories and Packaging

**Dyeing:**

- i. Yarn dyeing
- ii. Tape dyeing and Fabric dyeing

**Printing**

- i. Tape
- ii. Label
- iii. Carton

**Finishing & Packaging:**

Waste Control

- a) Management of Finishing & Packaging (F&P)
- b) Supervision of Finishing & Packaging

**d) Merchandising and Marketing Management/Divisions (CFM-1, SFM-1, FM-2)**

- i. Merchandising
- ii. Marketing
- iii. Procurement

**e) Accounts and Finance (CFM-1, SFM-1, FM-2)**

**f) Banking and Commercial (CFM-1, SFM-1, FM-2)**

**3.3.2 Support Personnel**

- i. Accounts Officer-1
- ii. Administrative Officer-1
- iii. Office Superintendent-1
- iv. Dormitory Superintendent-1
- v. Personal Officer-1
- vi. Accountant-1
- vii. Computer Operator-6
- viii. Dormitory Boy-2
- ix. Driver-2
- x. Electrician-1
- xi. Cook-1
- xii. Cooking Assistant-2
- xiii. MLSS-6
- xiv. Security Guard-3
- xv. Cleaner-2

## **Chapter-4**

### **TECHNICAL VIABILITY**

#### **4.1 Market Potentials - Imperative Analysis**

The proposed institution will be a multidisciplinary and need-based training outfit. It will be established and managed by BGAPMEA and will meet the exclusive training need of the GAP Sector. Since there exists huge gap between demand for and supply of trained manpower in GAP sector, the proposed training institute would be ideally suitable to cater the needs of training of the manpower. Other attributes of the proposed training institute are:

- Since the institute will be established under the sponsorship of BGAPMEA, member units will send participants to scale up skills of their manpower;
- Manpower of the GAP sector will increase with the growth of GAP sector and it will create demand for training of the manpower.

#### **4.2 Location Analysis**

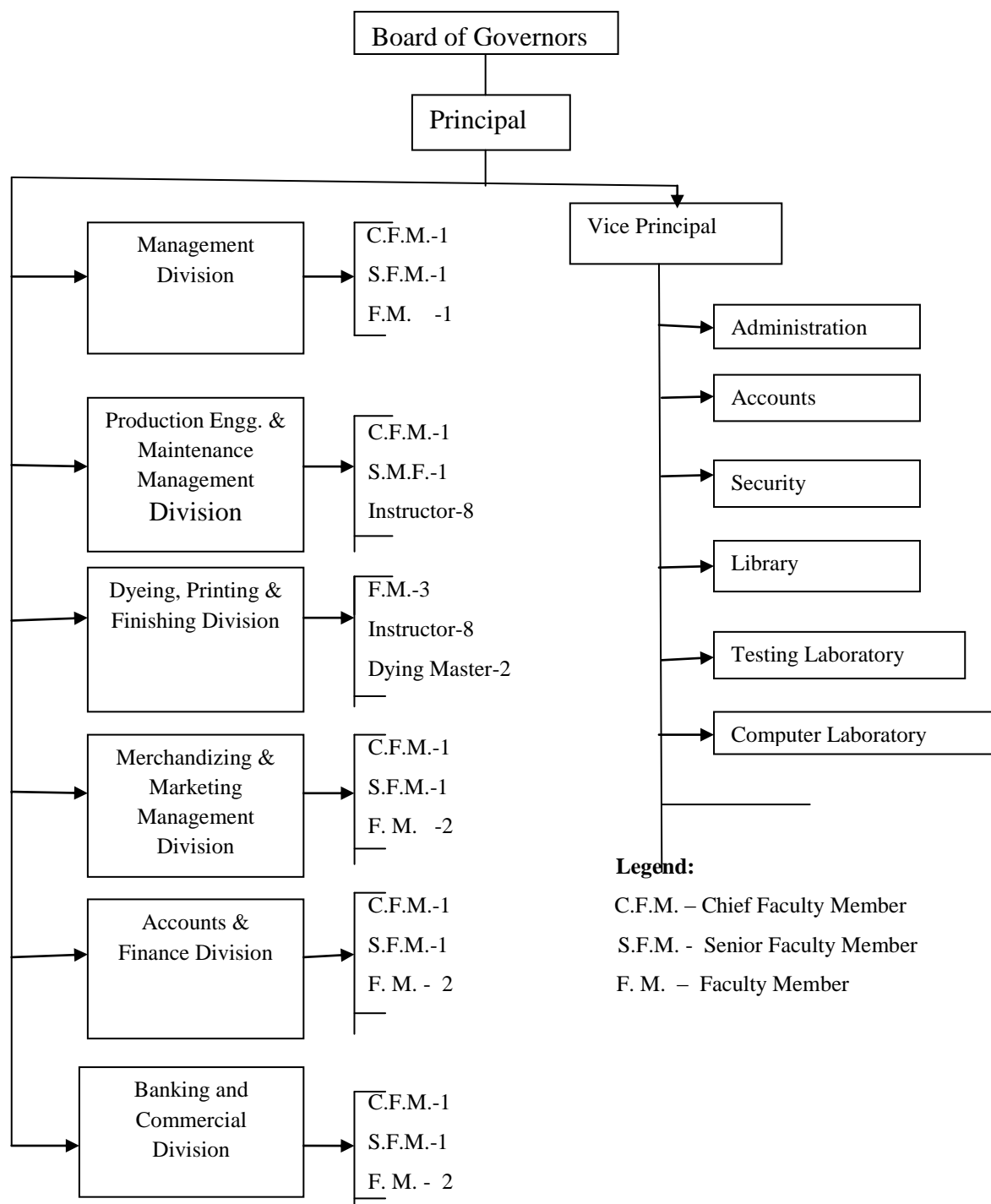
Ideally the location of any organization is dependent on a number of important factors namely (a) Nearness to the clients (demand side); (b) Availability of the physical facilities and manpower (supply side); (c) Developed infrastructure and connectivity and (d) Availability of support services, like- environmental support, availability of schools, colleges, houses, hostels etc. In consideration of the above four categories of factors, it seems logical and justified that the proposed training institute should be located at Dhaka which will ensure:

- (i) Nearness to the client organizations i.e. large number of member industrial units of BGAPMEA are located at and around Dhaka city.
- (ii) Accessibility and connectivity of Dhaka city are also very favourable for the client of the training institute;
- (iii) Dhaka also has environmental advantages, such as hostels/ living facilities of the faculty and trainees, available schools, hospitals and other factors. However, in making the exact location in Dhaka city, the above factors should be taken into consideration.



### 4.3 Organization and Management of GAPTI.

The proposed training institute, GAPTI, should have appropriate modern organization structure so that it can function effectively and efficiently. A tentative organogram for APTI is presented below:



### Salient Features of the Organization of GAPTI

At the top of the organogram, there will be a **Board of Governors** (BOG) with the representatives of BGAPMEA, GAPTI and selected training specialists with national repute. The BOG will provide policy guidance to GAPTI, deal with hiring and firing of the Principal, frame and approve management systems and rules such as, service rules, financial rules, procurement rules etc, approve budgets and monitor the performance of the institute.

**The Principal** will work as the Chief Executive Officer (CEO) of GAPTI and will be responsible to run the organization with optimum utilization of its resources and manpower under the overall guidance of the BOG. He will directly supervise the activities of the training divisions and indirectly the other support divisions.

**The Vice Principal** will be responsible mainly for effective operation of all the support departments, such as Administration, Accounts & Finance, Security, Laboratory, Library etc.

There will be as many as six training divisions, namely, Management Division, Production, Engineering & Maintenance Management Division, Dyeing, Printing and Finishing Division, Merchandizing & Marketing Division, Accounts and Finance Division, Banking and Commercial Division. Each Division will be headed by one Chief Faculty Member, supported by adequate number of Senior Faculty Member, Faculty Member and Instructor.

The proposed GAPTI should be run efficiently as a modern training institute. Effective and efficient management system should be developed in this regard. Training curriculum should be developed on the basis of systematic training needs assessment, appropriate training materials should be developed for conducting training programmes. The training programmes and modules once developed, should be evaluated periodically and updated and improved as per evaluation results. Course outline of some general and chemical courses have been given in Annexure-A. Outline of some courses have been prepared in consultation with Experts of Indian Institute Packaging (IIP), Philippine Textile Research Institute and Industrial Technology Development Institute while visited these institutes by the consultants and BGAPMEA Council Members.

Effective management of training institute greatly depends on a well-trained and motivated team of trainers. To ensure this three critical issues must be ensured, namely, a) recruitment of trainers with brilliant academic background; b) systematic and periodical training of trainers (ToT) both at home and abroad and c) attractive salary and incentive schemes.

Technical assistance from the donor agencies may be useful in this respect.

#### 4.4 Estimated Salary Statement of the Employees

Sl. No.	Name of the Post	No. of the Posts	Monthly Pay	Yearly Pay
	<b><u>Academic Staff</u></b>			
1.	<b>Principal</b>	<b>01</b>	<b>80,000</b>	<b>9,60,000</b>
2.	<b>Vice Principal</b>	<b>01</b>	<b>75,000</b>	<b>9,00,000</b>
3.	<b>Chief Faculty Member</b>	<b>05</b>	<b>75,000x5</b>	<b>45,00,000</b>

4.	<b>Sr. Faculty Member</b>	<b>05</b>	<b>65,000x5</b>	<b>39,00,000</b>
5.	<b>Faculty Member</b>	<b>10</b>	<b>55,000x10</b>	<b>66,00,000</b>
6.	<b>Instructor/ Dyeing Master</b>	<b>18</b>	<b>40,000x18</b>	<b>86,40,000</b>
	<b>Sub- Total</b>	<b>40</b>		<b>2,55,00,000</b>
	<b><u>Support Staff</u></b>			
1.	<b>Accounts Officer</b>	<b>01</b>	<b>55,000</b>	<b>6,60,000</b>
2.	<b>Administrative Officer</b>	<b>01</b>	<b>55,000</b>	<b>6,60,000</b>
3.	<b>Office Superintendent</b>	<b>01</b>	<b>45,000</b>	<b>5,40,000</b>
4.	<b>Personal Officer</b>	<b>01</b>	<b>45,000</b>	<b>5,40,000</b>
5.	<b>Dormitory Superintendent</b>	<b>01</b>	<b>45,000</b>	<b>5,40,000</b>
6.	<b>Accountant</b>	<b>01</b>	<b>42,000</b>	<b>5,04,000</b>
7.	<b>Driver</b>	<b>02</b>	<b>30,000x2</b>	<b>7,20,000</b>
8.	<b>Computer Operator</b>	<b>06</b>	<b>32,000x6</b>	<b>23,04,000</b>
9.	<b>Electrician</b>	<b>01</b>	<b>30,000</b>	<b>3,60,000</b>
10.	<b>Dormitory Boy</b>	<b>02</b>	<b>25,000x2</b>	<b>6,00,000</b>
11.	<b>Cook</b>	<b>01</b>	<b>27,000</b>	<b>3,24,000</b>
12.	<b>Cooking Assistant</b>	<b>02</b>	<b>25,000x2</b>	<b>6,00,000</b>
13.	<b>MLSS</b>	<b>06</b>	<b>25,000x6</b>	<b>18,00,000</b>
14.	<b>Security Guard</b>	<b>03</b>	<b>25,000x3</b>	<b>9,00,000</b>
15.	<b>Cleaner</b>	<b>02</b>	<b>25,000x2</b>	<b>6,00,000</b>
	<b>Sub-Total</b>	<b>31</b>		<b>1,16,52,000</b>
	<b>Total</b>	<b>71</b>		<b>3,71,52,000</b>

## Chapter-5

### FINANCIAL ASPECTS

#### 5.1 Introduction

Financial appraisal of a training project depends on the accurate and pragmatic cost-estimates to implement and operate the project effectively and efficiently. On the benefit side, sources of income and income flow analysis are also important. But instead of cost-benefit analysis, cost-effective analysis is given priority in appraising training project.

#### 5.2 Estimated Cost of the Project

Cost estimates of a GAPTI have been carried out depending on the current market price. These estimates comprise two major components, **fixed cost** (such as, cost of land, building, equipment, books, computers etc.) and **operating cost** (such as, salaries & wages for manpower, utilities, such as electricity, water, raw materials, fuels for vehicles, communication, telephone, e-mail etc., advertisement and so on). A brief cost-estimate of the GAPTI Project is given below:

**Table : 5.2 Estimated Costs**

Sl. No.	Cost Elements	Taka (in million)
1.	Land (50decimal*Tk. 2.00 million per decimal)	100.00
2.	Building( 30,000 sft.) as per PWD rate	60.00
3.	Electric substation, <u>generator</u> etc.	8.00
4.	Lab. Equipments	12.00
5.	Training Equipments	3.00
6.	Furniture and Office Equipments	8.00
7.	Electrification and Installation	1.00
8.	Vehicle	10.00
9.	Operational Costs	62.39
	Total	264.39

( For expansion, the institute will require additional 50.0 decimal land, cost of which will be added later on)

### 5.2.1 Fixed Cost and Operating Cost

The total cost of the proposed project is estimated at Tk. 264.39 million of which Operating cost stands at Tk. 62.39 million and fixed cost amounts to Tk. 202.00 million . Components of fixed cost are – Land, Building’ Electric Sub-station, Generator, Laboratory Equipments, Training Equipments, Furniture and Office Equipments, Electrification and Installation, Vehicle etc., while operating cost includes Salaries, Overhead Expenditure, Miscellaneous Expenditures, etc.

In order to make the financial analysis of GAPTI, a set of financial statements have been prepared and included in the report, such as, Balance Sheet, Income Statement and Calculation of Depreciation on Fixed Assets for 5 years. A brief description of each of these statements are presented in the following pages.

<b>Sl. No.</b>	<b>Items of Fixed Cost</b>	<b>Taka (in million)</b>
1.	Land (50decimal*Tk. 2.00 million per decimal)	100.00
2.	Building ( 30,000 sft.) as per PWD rate	60.00
3.	Electric substation, generator, etc.	8.00
4.	Lab. Equipments	12.00
5.	Training Equipments	3.00
6.	Furniture and Office Equipments	8.00
7.	Electrification and Installation	1.00
8.	Vehicle	10.00
	<b>Sub-Total / Fixed Cost</b>	<b>202.00</b>
	<b>Items of Operating cost</b>	
1.	Salaries	37.15
2.	Overhead Expenses (admin office)	17.24
3.	Miscellaneous Expenses	8.00
	<b>Sub-Total / Operating Cost</b>	<b>62.39</b>
	<b>Grand Total</b>	<b>264.39</b>

### 5.2.2 Balance Sheet

Balance Sheet shows the Sources and Applications of funds. Endowment fund for capital expenditures will amount to Tk. 202.00 million. The institute will spend this fund for purchasing of land, construction of building and electric substation, procurement of laboratory equipments, training equipments, furniture and office equipments, vehicle etc.

(in million Tk.)

Sources of Funds	Pre-operational	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year	4 <sup>th</sup> year	5 <sup>th</sup> year
<b>Endowment Fund</b>	<b>20,20,00,000</b>	<b>20,20,00,000</b>	<b>20,20,00,000</b>	<b>20,20,00,000</b>	<b>20,20,00,000</b>	<b>20,20,00,000</b>
<b>Excess of Expenditure over Income</b>	-	4,73,00,000	4,41,15,000	3,95,60,750	3,63,45,288	3,32,82,452
<b>Total Sources of Fund</b>	<b>20,20,00,000</b>	<b>24,93,00,000</b>	<b>24,61,15,000</b>	<b>24,15,60,750</b>	<b>23,83,45,288</b>	<b>23,52,82,452</b>
<b>Application of Funds</b>						
<b>Fixed Assets at Cost</b>	<b>20,20,00,000</b>	<b>20,20,00,000</b>	<b>20,20,00,000</b>	<b>20,20,00,000</b>	<b>20,20,00,000</b>	<b>20,20,00,000</b>
<b>Less depreciation</b>	-	1,07,00,000	2,02,60,000	2,84,30,000	3,61,10,000	4,27,20,000
<b>Total Net Fixed Assets</b>	<b>20,20,00,000</b>	<b>19,13,00,000</b>	<b>18,17,40,000</b>	<b>17,35,70,000</b>	<b>16,58,90,000</b>	<b>15,92,80,000</b>
<b>Current Assets</b>						
<b>Cash</b>		10,000	15,000	15,000	20,000	20,000
<b>Bank</b>		6,99,90,000	8,43,60,000	8,29,75,000	8,24,35,288	8,59,82,452
<b>Current Liabilities</b>		1,20,00,000	2,00,00,000	1,49,99,250	1,00,00,000	1,00,00,000
<b>Net Current Assets</b>		5,80,00,000	6,43,75,000	6,79,90,750	7,24,55,288	7,60,02,452
<b>Application of Funds</b>	<b>20,20,00,000</b>	<b>24,93,00,000</b>	<b>24,61,15,000</b>	<b>24,15,60,750</b>	<b>23,83,45,288</b>	<b>23,52,82,452</b>

### 5.2.3 Income Statement

The Income Statement shows the total earnings and total expenses of APTI. Sources of income will include earning from short term and long term training programs and consultancy services. Expenses will be incurred on such items as payment of salary, overhead and other expenses. In the initial years, expenditures will outstrip income. However, the gap between income and expenditure will decrease in course of time.

As on last date of each years' operation

(in millionTk.)

<b>Earnings</b>	<b>Year-1</b>	<b>Year-2</b>	<b>Year-3</b>	<b>Year-4</b>	<b>Year-5</b>
Training capacity (Persons)	5,000	5,000	5,000	5,000	5,000
Capacity utilization	36%	40%	50%	60%	70%
Actual Training ( Persons)	1800	2,000	2,500	3,000	3,500
Training Fees (per person)	5,000	6,000	6,500	7,000	8,000
Earnings from Short Training	90,00,000	1,20,00,000	1,62,50,000	2,10,00,000	2,60,00,000
Earnings from long course	-	-	27,00,000	42,00,000	60,00,000
Earnings from consultancy	40,00,000	80,00,000	1,20,00,000	1,60,00,000	2,00,00,000
<b>Total Earnings</b>	<b>1,30,00,000</b>	<b>2,00,00,000</b>	<b>3,09,50,000</b>	<b>4,12,00,000</b>	<b>5,20,00,000</b>
<b>Cost of Training</b>					
Training Materials	3,00,000	3,15,000	3,30,750	3,47,288	3,64,652
Overhead Expenses (Administrative expenses and Office expenses) including depreciation.	5,80,00,000	6,16,00,000	6,77,60,000	7,45,36,000	8,19,89,600
Misc. Expenses	20,00,000	22,00,000	24,20,000	26,62,000	29,28,200
<b>Total Cost</b>	<b>6,03,00,000</b>	<b>6,41,15,000</b>	<b>7,05,10,750</b>	<b>7,75,45,288</b>	<b>8,52,82,452</b>
Excess of Expenditure over Revenue earned (This will be met by the BGAPMEA)	4,73,00,000	4,41,15000	3,95,60,750	3,63,45,288	3,32,82,452

#### 5.2.4 Calculation of Depreciation on Fixed Assets

Depreciation has been calculated following the Reduced Balanced Method. Depreciation on all assets except Vehicle has been calculated @ 10%. For Vehicle, it is 15%.

(in million Tk.)

**1<sup>st</sup> Year**  
Fixed assets  
For the Year ended 1<sup>st</sup> year

Particulars		Original Cost				Depreciation		Written down Value
	Balance	Addition	Total Cost	Rate (%)	Balance	Charge	Total	
Land(50decimal* Tk. 2.00 million per decimal)		100.00	100.00	0	0	0	0	100.00
Building( 30,000 sft.) as per PWD rate		60.00	60.00	10		6.00	6.00	54.00
Electric substation, Generator etc.		8.00	8.00	10		0.80	0.80	7.20
Lab. Equipments		12.00	12.00	10		1.20	1.20	10.80
Training Equipments		3.00	3.00	10		0.30	0.30	2.70
Furniture and Office Equipments		8.00	8.00	10		0.80	0.80	7.20
Electrification and Installation		1.00	1.00	10		0.10	0.10	0.90
Vehicle		10.00	10.00	15		1.50	1.50	8.50
<b>Total</b>		<b>202.00</b>	<b>202.00</b>			<b>10.70</b>	<b>10.70</b>	<b>191.30</b>



### 5.2.4 (b) : Calculation of Depreciation on Fixed Assets

(in million Tk.)

**2<sup>nd</sup> Year**  
Fixed assets  
For the Year ended 2<sup>nd</sup> year

Particulars		Original Cost				Depreciation		Written down Value
	Balance	Addition	Total Cost	Rate	Balance	Charge	Total	
Land(50decimal* Tk. 2.00 million per decimal)	100.00		100.00	0	0	0	0	100.00
Building( 30,000 sft.) as per PWD rate	60.00		60.00	10	6.00	5.40	11.40	48.60
Electric substation, generator etc.	8.00		8.00	10	0.80	0.72	1.52	6.48
Lab. Equipments	12.00		12.00	10	1.20	1.08	2.28	9.72
Training Equipments	3.00		3.00	10	0.30	0.27	0.57	2.43
Furniture and Office Equipments	8.00		8.00	10	0.80	0.72	1.52	6.48
Electrification and Installation	1.00		1.00	10	0.10	0.09	0.19	0.81
Vehicle	10.00		10.00	15	1.50	1.28	2.78	7.23
<b>Total</b>	<b>202.00</b>		<b>202.00</b>		<b>10.70</b>	<b>9.56</b>	<b>20.26</b>	<b>181.75</b>

### 5.2.4 (c) : Calculation of Depreciation in Fixed Assets

(in million Tk.)

**3<sup>rd</sup> Year**  
Fixed assets  
For the Year ended 3<sup>rd</sup> year

Particulars		Original Cost				Depreciation		Written down Value
	Balance	Addition	Total Cost	Rate	Balance	Charge	Total	
Land(50decimal* Tk. 2.00 million per decimal)	100.00		100.00	0	0	0	0	100.00
Building( 30,000 sft.) as per PWD rate	60.00		60.00	10	11.40	4.86	16.26	43.74
Electric substation, generator etc.	8.00		8.00	10	1.52	0.65	2.17	5.83
Lab. Equipments	12.00		12.00	10	2.28	0.97	3.25	8.75
Training Equipments	3.00		3.00	10	0.57	0.24	0.81	2.19
Furniture and Office Equipments	8.00		8.00	10	1.52	0.65	2.17	5.83
Electrification and Installation	1.00		1.00	10	0.19	0.08	0.27	0.73
Vehicle	10.00		10.00	15	2.78	0.72	3.50	6.50
<b>Total</b>	<b>202.00</b>		<b>202.00</b>		<b>20.26</b>	<b>8.17</b>	<b>28.43</b>	<b>173.57</b>

#### 5.2.4 (d) : Calculation of Depreciation on Fixed Assets

(in million Tk.)

**4<sup>th</sup> Year**  
Fixed assets  
For the Year ended 4<sup>th</sup> year

Particulars		Original Cost				Depreciation		Written down Value
	Balance	Addition	Total Cost	Rate	Balance	Charge	Total	
Land(50decimal* Tk. 2.00 million per decimal)	100.00		100.00	0	0	0	0	100.00
Building( 30,000 sft.) as per PWD rate	60.00		60.00	10	16.26	4.37	20.63	39.37
Electric substation, generator etc.	8.00		8.00	10	2.17	0.58	2.75	5.25
Lab. Equipments	12.00		12.00	10	3.25	0.88	4.13	7.87
Training Equipments	3.00		3.00	10	0.81	0.22	1.03	1.97
Furniture and Office Equipments	8.00		8.00	10	2.17	0.58	2.75	5.25
Electrification and Installation	1.00		1.00	10	0.27	0.07	0.34	0.66
Vehicle	10.00		10.00	15	3.50	0.98	4.48	5.52
<b>Total</b>	<b>202.00</b>		<b>202.00</b>		<b>28.43</b>	<b>7.68</b>	<b>36.11</b>	<b>165.89</b>

#### 5.2.4 (e) : Calculation of Depreciation on Fixed Assets

(in million Tk.)

**5<sup>th</sup> Year**  
Fixed assets  
For the Year ended 5<sup>th</sup> year

Particulars		Original Cost				Depreciation		Written down Value
	Balance	Addition	Total Cost	Rate	Balance	Charge	Total	
Land(50decimal* Tk. 2.00 million per decimal)	100.00		100.00	0	0			100.00
Building( 30,000 sft.) as per PWD rate	60.00		60.00	10	20.63	3.94	24.57	35.43
Electric substation, generator etc.	8.00		8.00	10	2.75	0.53	3.28	4.72
Lab. Equipments	12.00		12.00	10	4.13	0.79	4.92	7.08
Training Equipments	3.00		3.00	10	1.03	0.20	1.23	1.77
Furniture and Office Equipments	8.00		8.00	10	2.75	0.53	3.28	4.72
Electrification and Installation	1.00		1.00	10	0.34	0.07	0.41	0.59
Vehicle	10.00		10.00	15	4.48	0.55	5.03	4.97
<b>Total</b>	<b>202.00</b>		<b>202.00</b>		<b>36.11</b>	<b>6.61</b>	<b>42.72</b>	<b>159.28</b>

## **Chapter - 6**

### **COST EFFECTIVENESS ANALYSIS OF THE PROJECT**

#### **6.1 Comparative Cost Analysis : Existing and Proposed Training Facilities**

As has been stated earlier, training and research do not bring profit directly, rather benefits here are long-term and felt indirectly. Since the benefits are indirect (such as, contribution of trained supervisor is felt through higher productivity, lower rate of waste, reduced rate of machinery breakage etc.), so instead of cost benefit analysis, cost effectiveness analysis is carried out. In this case, the cost-structure of Small and Cottage Industries Training Institute (SCITI) has been accepted for comparison with that of the GAPTI. Such comparison has been done on the following criteria:

- i) Gross Annual Cost Per Trainee
- ii) Total Cost Per training day (6 hours duration)
- iii) Annual Fixed Cost Per Trainee
- iv) Variable Cost Per Trainee.

##### **6.1.1 Operating Cost of SCITI**

SCITI is a training outfit of BSCIC established in 1985. It is a management training institute to develop entrepreneurial and managerial skills of the entrepreneurs and the manpower working in the small, medium and cottage industries (SMCI) sector. The institute has 6 faculties, namely – Entrepreneurship Development, Financial Management, General Management, Industrial Management, Marketing Management, Research and Consultancy. To illustrate the comparative cost analysis of SCITI and GAPTI both the institutions, basic data concerning operational costs are presented below.

##### **a) Data on Operational Costs of SCITI**

- i) Total Fixed Cost : Not available;
- ii) Yearly Operational Costs : Tk. 30.00 million;  
(Operating costs include staff salary, overhead expenditures and misc. expenses)
- iii) Total No. of Trainees (Annual) : 3,000;
- iv) No. of Programs : 100;
- v) Cost per Training Program : Tk. 3,00,000;
- vi) No. of Trainees in each Program : 30;
- vii) Cost of Training per Trainee : 10,000;
- viii) Duration of each Training Program : 5 to 10 days  
(on average 7 days per training program)
- ix) Cost of Training per day : Tk. 42,857.

**6.1.2** As a training institute GAPTI will cater to the training needs of employees of the GAP sector. The proposed institute will provide training on Quality Control, Repair and Maintenance, Inspection, Oekotex, Merchandising, Machine Maintenance, Security, HR Management, Costing, Store Keeping, Accounts, Marketing etc. The proposed institute will organize institutional regular training program for all categories of employees of the GAP sector namely, Supervisory personnel, Technicians, Laboratory Assistant, Merchandisers, Quality Controller, Machine Operators, Inspectors, Store Keepers, Accountants, Marketing and Sales Executive etc.

**a) Data on Operational Costs of GAPTI**

- i) Total Fixed Cost : Tk. 202.00 million;
- ii) Yearly Operational Costs : About Tk. 62.39 million;  
(Operating costs include staff salary, overhead expenditures and misc. expenses)
- iii) Total No. of Trainees (Annual) : 7,800;
- iv) No. of Programs : 260;
- v) Operating Cost per Training Program : Tk. 2,40,000;
- vi) No. of Trainees in each Program : 30;
- vii) Cost of Training per Trainee : 8,000;
- viii) Duration of each Training Program : 5 to 10 days  
(on average 7 days per training program)
- ix) Cost of Training per day : Tk. 34,286.

Data on Analysis of Comparative Costs of GAPTI and SCITI are given in Table – 6.1

**Table – 6.1 : Comparative Cost Analysis of SCITI & GAPTI**

Sl. No.	Elements of Costs	SCITI	GAPTI	Difference (%)	
1.	Yearly Operational Costs	Tk. 30.00 million	Tk. 62.39million		
2.	Average Cost per Training Program	Tk. 3,00,000	Tk. 2,40,000	Tk. 60,000 (-25%)	
3.	Cost of Training (per Trainee)	Tk. 10,000	Tk. 8,000	Tk. 2,000 (-25%)	
4.	Cost of Training (per day)	Tk. 42,857	Tk. 34,286	Tk. 8,571 (-25%)	

## **6.2 Cost Effectiveness Analysis of the Proposed Institute**

SCITI is a management training institute to develop entrepreneurial and managerial skills of SMCI entrepreneurs and the manpower working in the SMCI sector. While GAPTI will be a specialized training institute and centre of excellence to provide training to the employees of GAP sector. It will recruit technically educated, experienced and skilled manpower which will be its strategic advantage over SCIT. Because of this specially, cost of training by GAPTI will be lower than SCITI. Attributes of cost effectiveness are:

1. Annual operating cost of SCITI and GAPTI have been found to be same.
2. Average cost per training program has been found to be Tk. 3,00,000 for SCITI as against Tk. 2,40,000 for GAPTI. Thus the average cost per training program at GATPI is 25% lower than same at SCITI.
3. Cost of Training (per Trainee) has been found to be Tk. 10,000 in SCITI as against Tk. 8,000 in GAPTI. Thus the cost per trainee in GAPTI has been found to be 25% lower than that of SCITI.
4. Cost of Training per training day has been found to be Tk. 42,857 as against Tk. 34,286 for GAPTI. The cost per training day of SCITI is about 25% higher than that of GAPTI.

All these lead to the conclusion that training activities of the proposed GAPTI will be more cost effective compared to one of the leading existing training institute in the small, medium and cottage industries (SMCI) sector. In consideration of the above benefits and effectiveness, GAPTI appears to be financially viable and more cost-effective.

## **Chapter – 7**

### **SUMMARY OF FINDINGS, CONCLUSIONS & RECOMMENDATIONS**

#### **7.1 Findings**

**7.1.1.** Human resource is the most crucial factor of production and as such training and development of manpower has been accepted by BGAPMEA as the most effective means to achieve efficiency, productivity and profitability of this sector. But how to develop the human resources of GAP sector which employs around 300,000 employees of different professions and trades. The prevailing academic and training institutions belonging to different other sectors were found grossly inadequate to meet the existing huge demand – supply gap, which is growing very fast in view of very fast growth and expansion of GAP sector. In this backdrop it appears logical and timely step on behalf of BGAPMEA to launch this study on the establishment of Accessories and Packaging Training Institute. To meet these objectives of BGAPMEA study has covered such issues as assessment of training needs of GAP sector, designing of the Garment Accessories and Packaging Training Institute (GAPTI) Project with identification of its physical infrastructure, manpower requirement, cost estimation (both fixed and operational), analysis of financial viability and social desirability;

**7.1.2** The GAP sector currently has 1232 industrial units with total manpower of 2,98,196, divided into 19 industrial subsectors. In order to make an in-depth assessment of training needs, the study has selected sample units (55) based on multi-stage cluster sampling technique. Data were collected both from primary (from sample units) and secondary sources (BGAPMEA and other stakeholders etc.). The data and information so collected, were tabulated and analyzed to establish the various aspects of training needs of the target group (i.e. number of employees needing training); types and duration of training programs and so on;

**7.1.3.** The study reveals that the current manpower of GAP sector stands at 2,98,196, which will increase to 4,40,924 by the year 2018 showing a modest growth rate of 10%;

**7.1.4.** The survey of the sample units shows that 23% of the total manpower are illiterate, 47% have studied up to SSC Level, 11.8% are Graduates, 11% are HSC, 2% have vocational qualification and 1.52% are Diploma Engineers. This data indicates two important findings namely, the employees of GAP sector have a poor academic background at entry level and most of the employees have learnt their job after joining the factory;

**7.1.5.** The status of skill of the manpower of GAP sector also shows a disappointing picture. As many as 51% of the employees of GAP Sector are unskilled (26%) or semi skilled (25%), another 40% are skilled while only 9% are professionals. This skill mapping indicates that there is a serious deficiency in the level of skill of the employees of GAP sector;



**7.1.6.** Our investigation also shows the training background of the employees of GAP sector. Only 10% of the employees of GAP sector have received training in their life; while the remaining 90% have never attended any training programmes. Whatever training they received are on Fire Fighting (77%), Quality Control (51%), Oekotex (4%), Inspection (4%) Merchandizing (5%) and Marketing (2.5%);

**7.1.7** The study has undertaken an assessment of training needs of the industrial units under survey. It was found that as many as 922 employees out of the total employees (10,589) under survey were in need of training. This, in other words, means that 8.71% of the employees need immediate training. Taking this as basis, of this assumption the sectoral training needs have been extrapolated and was found that a total number of 25,973 employees need training during 2014, which will increase to 31,680 in 2016 and to 38,404 in the year 2018. Thus, according to the 5-year projection of the study, **a total of 1,59,649 employees will need training during coming 5 years (2014-2018) and they constitute the target group of GAPTI!**

**7.1.8** The study has included an overview of the existing training facilities. It shows that there are two types of institutions in this field, namely, a) educational institutions and b) training institutions. The first category, which deals with education, includes amongst others, Bangladesh Textile University, National Institute of Textile Engineering and Research (NITER), Textile Institutes under Dept. of Textiles, BGMEA University and Private Polytechnic Institutes; while the second category of institutions which deals mainly with training includes BKMEA Training Institute, Small and Cottage Industries Training Institute (SCITI) and so on. Although the main focus of the First and Second Category centres around education and training respectively, however all of them were found to provide both training and education. A further investigation shows that none of the education and training institutes, listed above, are capable nor suitable to meet the training needs of the manpower of GAP sector. These institutions are found to provide only the entry-level qualification to the employees.

## **7.2 Conclusions**

**7.2.1** The findings, stated in the earlier section (i.e. 7.1), confirm the following:

- a) The GAP sector employs a large number of employees (2,98,196) which is projected to increase to 4,40,924 in the year 2018;
- b) Of this total number of employees, 8.71% (i.e. 25,973) employees need training in the current year; and this number will assume 1,59,649 during 5 years (2014-2018) as per the projection of the study;
- c) The employees of GAP sector were found to have poor academic and training background;
- d) The units under GAP sector manufacture large number of products which require manpower with knowledge and skills on a wide range of specialized trades;
- e) The manufacturing units under GAP sector are found to change and update their technologies and machineries very frequently to match changing demand pattern of the market; and

- f) There is no training institute in the country to cater the training needs of such as huge number of manpower of GAP sector.

Analysis of these findings and discussion between the consultants and the BGAPMEA officials as well as the selected employers of sample units lead to the following conclusions:

- i) A separate training institute entitled Accessories and Packaging Training Institute (GAPTI) should be established under BGAPMEA to cater to the specific training needs of the existing manpower, which is continuously increasing;
- ii) The proposed training institute (i.e. GAPTI) should have adequate physical infrastructure, manpower, library, laboratory etc, suitable to organize regular training programmes of different durations;
- iii) The current list of training areas, which should be changed with change in requirement over time, should cover such area as Supervisory Management, Quality Control, Repair and Maintenance, Inspection, Oekotex, Merchandizing, Machine Maintenance, Security Management, Human Resource Management, Costing, Store Keeping, Accounts, Marketing etc;
- iv) The GAPTI should be managed by BGAPMEA through a Governing Body consisting of representatives from BGAPMEA, faculty of GAPTI and some independent training specialists with national repute. Appropriate management systems should be developed in keeping with the systems and procedures prevailing in similar training institutes at home and abroad;
- v) In addition to arrangement of regular training programmes, the GAPTI should offer certificate /Diploma level educational courses on related fields. Such programmes will help prepare the manpower to meet future manpower needs of GAP sector;
- vi) The GAPTI should conduct research on various relevant fields and render consultancy services on social and environmental compliance, quality improvement and arrange seminars and symposium to disseminated research findings amongst member units. Thus the GAPTI should work as the think tank for GAP sector.

### **7.3 Recommendations**

**7.3.1** On the basis of the meticulous analysis and discussion of the findings and conclusions of the study briefly presented in the previous sections, a number of recommendations relating to physical, technical, managerial and financial feasibility have been developed and briefly presented below:

- i) The proposed GAPTI should have all the required physical facilities, such as, sufficient space for class rooms, trainer's office accommodation, conference room, laboratory, library, etc. It has been estimated that a built in area of 60,000 sft. is recommended for GAPTI with scope for further expansion based on needs;
- ii) An area of one acre of land located at any prime area of Dhaka city should be selected for GAPTI. Issues which should be taken into consideration for identification of appropriate location include amongst others are: nearness to the clients (demand side), availability of physical facilities and manpower supply (supply side), developed infrastructure and connectivity and availability of support services;

- iii) The GAPTI should be organized as one of the most modern training outfit in the country. The class rooms should be equipped all necessary audio-visual and digital training aids; the library should be enriched with latest version of relevant books, journals, periodicals and e-library connectivity. The library should be equipped with modern testing equipments for training the participants and rendering testing services to member industrial units of BGAPMEA, and the Conference Room should be equipped with modern audio-visual facilities and sound system;
- iv) The GAPTI should be implemented with an estimated total cost of Tk. 264.39 million of which fixed cost will be Tk. 202.00 million and variable cost will assume Tk. 62.39 million. Financial analysis, such as sources & application of fund, income and expenditure statements for 5 years cash flow analysis etc. confirms the viability of the project. It should be mentioned here that training and research projects are not usually found to be financially profitable, although it generates some income. In view of this, instead of financial cost-benefit analysis, cost-effectiveness analysis has been carried out by comparing with a similar training institute (namely, SCITI). Such cost-effectiveness analysis confirms the viability of the GAPTI Project;
- iv) The study recommends the training courses which will help to increase knowledge of the employees and enhance their capacity to perform the tasks associated with their positions within the system of the organization;
- v) The study recommends to explore the possibility of offering Diploma/Degree programmes on Textile; garment accessories and packaging & related subjects under affiliation with BUTEX/ any other University in Bangladesh or outside.
- vi) It recommends to introduce the following 52 courses. Some of the courses have been recommended in consultation with Experts of Indian Institute Packaging (IIP) , Philippine Textile Research Institute and Industrial Technology Development Institute while visited these institutes by the consultants and BGAPMEA Council Members. Details of the courses have been given in **Annexure-A**.

### **General Courses**

1. Job Analysis;
2. Recruitment & Selection Process;
3. Performance Appraisal/Evaluation;
4. Motivating the Employees;
5. Incentive Schemes & Rewards;
6. Disciplining of Employees;
7. Industrial Dispute;
8. Quality Control;
9. Store Management and Inventory Control;
10. Procurement Management;
11. Repair and Maintenance Management;
12. Waste Control Management of Finishing & Packaging (F&P);
13. Merchandising;

14. Shop Floor Management;
15. Export-Import Trade Regulations, Customs and Standards;
16. LC Opening - Export Document Submission, Bank Acceptance, etc.;
17. Yarn Manufacturing Technology;
18. Knitting and Fabrics Technology;
19. Textile and Garment Quality Management;
20. Apparel Manufacturing Technology;
21. Apparel Manufacturing Technology-Lab
22. Packaging;
23. Packaging Technology;
24. Packaging Technology-I;
25. Packaging Technology-II – Cellulose Technology;
26. Packaging Technology-III - Fibre board and Glass Technology;
27. Packaging Technology-IV - Plastic Technology;
28. Packaging Technology-V – Lamination/Coating etc.;
29. Packaging Technology-VI - Metal Containers;
30. Packaging Technology VII – Cushioning, Wooden Containers etc.;
31. Packaging Technology VIII –Food, Pharmaceuticals, Cosmetics and Chemicals;
32. Package Printing Technology;
33. Package Design using Computer;
34. Electrical Technology;
35. Applied Mechanics-I;
36. Mechanical Technology;
37. Accounts and Finance;
38. Marketing and Materials Management;

### **Courses on Chemical Test**

39. Color Fastness to water;
40. Color Fastness to Perspiration;
41. Color Fastness to Rubbing/Crocking;
42. Color Fastness to Washing;
43. Color Fastness to Light;
44. Determination of pH;
45. Quantitative Chemical Analysis of Fiber;
46. Dimensional Stability/Appearance after Washing;
47. Bursting properties of fabrics;
48. Tensile properties of fabrics;
49. Determination of Fabric Propensity to Surface Fuzzing and to Pilling;
50. Determination of the Slippage Resistance of yarns & Seam Strength;
51. Determination of Mass/Unit Length Mass/Unit Area;
52. Determination of Count of Yarn.

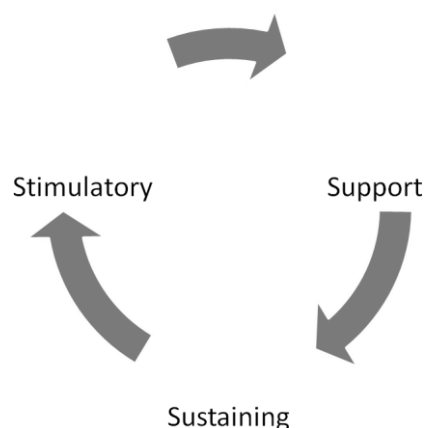
## Course Outline

Training and development refers to the practice of providing training, workshops, coaching, mentoring, or other learning opportunities to employees to inspire, challenge, and motivate them to perform the functions of their position to the best of their ability and within standards set by organization guidelines. Training helps increase knowledge of the employees and build their capacity to perform the tasks associated with their positions within the system of the organization.

The principal objective of training and development of human resources the GAP sector is to make sure the availability of a skilled and willing workforce to the sector.

The Garments Accessories and Packaging Training Institute(GAPTI) will be established with the aim to provide training facilities to the employees of the GAP industrial units. It will be managed and administered by BGAPMEA. It will be a social venture to help increase productivity and improve quality and marketing of garment accessories and packaging products.

This training institute will support the GAP sector through development of its human resources. The institute will follow 3-stage cycle of human resource development consisting of stimulatory, support and sustenance as exhibited in the following figure:



## **Approach and Methodology**

In order to cater the needs of the GAP sector, the institute will follow appropriate approach and methodology to ensure effectiveness of transfer of knowledge and skill. The institute will virtually attribute to the development of resource management model for the GAP sector.

### **Approach**

Approach and delivery system of training will have the following attribute and objectives :

- Improve attitude of human resources of the GAP sector;
- Impart knowledge to employees of the GAP sector;
- Meet training needs of the employees
- Increase their skills
- Uphold their group interest
- Create their group involvement
- Improve employees' morality; etc.

### **Methodology**

This training program will be conducted through appropriate methods and media which will be relevant to the objective. The most common methods to be selected for training will include among others lecture, group discussion, demonstration and case study. The trainer will apply techniques like questioning, conferencing and practice, etc.

The aids and devices to be used in the presentation are chalk board, marker pen, multimedia projector, laptop, training manual, flip board etc. Instructional strategy will be group discussion, class room exercise, presentation etc.

## **Key Fields of Training**

### **I. Course Title: Job Analysis**

#### **Objectives**

Objective of this training course is to scale up knowledge and skill of the Managers, Personnel Officers, Supervisors, Line Supervisors, etc. This course will impart knowledge about techniques of designing job, job descriptions, job analysis, etc. It will look at the challenges that face Managers, Personnel Officers, Supervisors, Line Supervisors, etc. and will give sustainable solutions in respect of analyzing jobs, writing job descriptions and job specifications.

## **Participants**

This course is suitable for the Manager, Personnel Officer, Supervisor, Line Supervisor, etc.

## **Outline of the Course**

This Course will cover following topics:

- i. Meaning of Job Analysis (JA);
- ii. Job Terminology;
- iii. Difference between Job Analysis, Job Descriptions and Job Specifications;
- iv. Importance of Job Analysis;
- v. Objectives of Job Analysis;
- vi. Techniques for Designing Jobs;
- vii. Process of Job Analysis;
- viii. Accurate Job Analysis;
- ix. Techniques and Methods of Job Analysis;
- x. Writing Job Descriptions and Job Specifications;
- xi. Job Analysis Scenario in Bangladesh, etc.
- xii. Uses of Job Analysis in Management.

## **II. Course Title: Recruitment & Selection Process**

### **Objectives**

Objective of this training course is to enhance knowledge and skill of the Managers, Human Resource Officers about recruitment and selection of various types of employees including workers and technicians of garments accessories and packaging industries. This course will impart knowledge about assessment of human resource, requirements of the garments accessories and packaging industries.

### **Participants**

This course is suitable for the Owners, Managers and Human Resource Officers of garments and packaging industries.

## **Outline of the Course**

This Course will cover the following topics :

- i. Recruitment Concept; difference between Recruitment, Testing, Selection and Placement;
- ii. Forecasting Recruitment Needs;
- iii. Sources of Recruitment- Internal and External Sources of Recruitment;
- iv. Processes, steps and types of Recruitment;
- v. Testing Process, namely, Interviewing, Written Tests, Skill Test etc.;
- vi. Practical Demonstration, Case Studies and Role Play;
- vii. Advantages and Disadvantage of Recruitment from within the Organization and Outside;
- viii. Alternatives to Recruitment & Selection;
- ix. Constraints of Recruitment Efforts;
- x. Recruitment and Selection Scenario in Bangladesh.

## **III. Course Title: Performance Appraisal/Evaluation**

### **Objectives**

Objective of this training course is to scale up knowledge and capacity of the Managers, Human Resource officer Production Officers, Supervisors, Line Supervisors, etc about Performance Appraisal/Evaluation of jobs of the workers/ employees of garments accessories and packaging industries. It will look at the challenges that face Managers, Human Resource officer Production Officers, Supervisors, Line Supervisors, etc in appraising performances of the employees/ workers and will help to design effective appraisal method.

### **Participants**

Managers, Human Resource officer Production Officers, Supervisors, Line Supervisors, etc of the GAP sector will be the participants.

### **Course Outline**

This Course will cover the following topics :

- I. Concept and Features of Performance Appraisal;



- ii. Objectives of Performance Appraisal;
- iii. What is to be Appraised? Who will Appraise? When to Appraise? ;
- iv. Supervisors' Role in Performance Appraisal;
- v. Process of Performance Appraisal;
- vi. Ensuring Effective Performance Appraisal;
- vii. Methods of Performance Appraisal;
- viii. Methods of Performance Appraisal using Absolute Standards;
- ix. Methods of Performance Appraisal using Relative Standards;
- x. Modern Methods of Performance Appraisal;
- xi. Features of an Effective Appraisal System;
- xii. Factors that can Distort Appraisal,etc.

#### **IV. Course Title: Motivating the Employees**

##### **Objectives**

Objective of this training course is to enhance capacity of the Managers, Human Resource officer Production Officers, Supervisors, Line Supervisors, etc about how to motivate the workers/ employees of garments accessories and packaging industries.

##### **Participants**

This course is suitable for the Managers, Human Resource Officers, Production Officers, Supervisors, Line Supervisors of garments accessories and packaging industries, etc.

##### **Outline of the Course**

This Course will cover the following topics ;

- i. Motivation: Concepts, Nature and Scope;
- ii. Features of Motivation;
- iii. Motivation and Motivating;
- iv. Motivation Process;
- v. Sources of Motivation/Employee's Wants/Satisfaction;
- vi. Benefits and Services for Motivation;

- vii. Maslow's Need-hierarchy Theory of Motivation;
- viii. Herzberg's Two-Factor Theory of Motivation;
- ix. Alderfer's ERG (Existence, Relatedness Growth) Theory;
- x. Equity Theory of Motivation;
- xi. Reinforcement Theory of Motivation;
- xii. Special Motivation Techniques, Case Study, etc.

## **V. Course Title: Incentive Schemes & Rewards**

### **Objectives**

Objective of this training course is to scale up knowledge of the Managers, Human Resource officer Production Officers, Supervisors, Line Supervisors about Incentive Schemes & rewards, types of rewards, effective reward system, criteria on which rewards can be distributed to motivate the workers/employees of garments accessories and packaging industries .

### **Participants**

This course is suitable for the Owners, Managers, Human Resource Officers, Production Officers, Supervisors, Line Supervisors, etc.

### **Outline of the Course**

This Course will cover the following topics:

- i. Incentive Schemes and Rewards : Concepts, Nature and Scope;
- ii. Types of Incentive Schemes and Rewards;
- iii. Eligibility and Coverage of Incentive Scheme;
- iv. Types of Incentive Schemes;
- v. Process of measuring work;
- vi. Administration of Incentive Scheme;

## **VI. Course Title: Disciplining of Employees**

### **Objectives**

Objective of this training course is to enhance capacity of the Managers, Human Resource officer, Production Officers, Supervisors, Line Supervisors in formulating disciplinary procedure and taking disciplinary action against the accused workers of garment accessories and packaging industries.

### **Participants**

Owners ,Managers, Human Resource Officers, Production Officers, Supervisors, Line Supervisors, etc. will be benefitted from this course.

### **Outline of the Course**

This Course will cover the following topics:

- i. Concept and Nature of Discipline;
- ii. Types of Discipline: Disciplining in Workplace;
- iii. Nature and Types of Disciplining Problems;
- iv. Legal Framework for Disciplining the Employees;
- v. Causes of Indiscipline;
- vi. Disciplining Procedures;
- vii. Principles in Administering Discipline;
- viii. Factors to be considered in taking Disciplinary Action, etc.

## **VII. Course Title: Industrial Dispute**

### **Objectives**

This training course will enhance capacity of the Manager, Human Resource officer, Production Officer, Supervisors, Line Supervisors in settling industrial disputes and building Union-Management Co-operation to give sustainable solutions to industrial disputes.

### **Participants**

This course is suitable for the Owners ,Managers, Human Resource Officers, Production Officers, Supervisors, Line Supervisors, etc.

## **Outline of the Course**

This Course will cover the following topics:

- i. Industrial Dispute- Nature and Concept;
- ii. Forms of Industrial Disputes- Strikes, Lock-outs, Gheraos;
- iii. Laws relating to handling industrial disputes;
- iv. Causes of Industrial Disputes;
- v. Unfair Labor Practices by Management;
- vi. Unfair Labor Practices by Trade Union;
- vii. Methods of Building Union-Management Co-operation;
- viii. Procedures of Settling of Industrial Disputes, etc.

## **VIII. Course Title: Quality Control**

### **Objectives**

This course is designed to provide a comprehensive coverage of quality control and management. Emphasis will be placed on both theory and implementation of quality control management. It will look at the challenges that face Managers, Quality Control Officers, Production Officers, Quality Control Supervisors, Chemists, Laboratory Technicians, Supervisors, Line Supervisors, etc. in respect of Quality Control.

### **Level of the Participants**

This course is suitable for Managers, Quality Control Officers, Production Officers, Quality Control Supervisors, Chemists, Laboratory Technicians, Supervisors, Line Supervisors, etc.

## **Outline of the Course**

This Course will cover the following topics:

- i. Preparation Flow Chart(s) of Production Processes;
- ii. Critical Control Points in Processes;
- iii. How to Achieve Benefits from Performance of Internal Quality Control (IQC);
- iv. Internal Quality Assessment (IQA) and External Quality Assessment (EQA);
- v. Statistical Techniques of Q.C.
- vi. Process Control System;

- vii. Total Quality Management;
- viii. Cost of Quality Control;
- ix. Quality of Design;
- x. Supplier's Quality Control;
- xi. Acceptance Sampling;
- xii. Quality Planning and Improvement;
- xiii. Reliability;
- xiv. Variable Control Charts; etc.

## **IX. Course Title: Store Management and Inventory Control**

### **Objectives**

This course is designed to provide a comprehensive coverage of Stores and Inventory Control with objectives to ensure continuous supply of raw materials to facilitate uninterrupted production. Emphasis will be placed on both theory and implementation of stores and inventory management and control.

### **Level of Participants**

Managers, Store Officers, Production Officers, Store Supervisors, Store Assistants, etc. will be benefitted from this course.

### **Outline of the Course**

This Course will cover following topics:

- i. Store Management and Inventory Control- Concept;
- ii. Need for Stores and Inventory Control System;
- iii. Techniques of Inventory and Stores Management;
- iv. Stock Requisition (SR) (Pre-Encumbrance);
- v. Needs Assessment of Stock – EOQ Analysis, ABC Analysis
- vi. Pick and Issue (PI) ;
- vii. Stock Issue Confirmation (CI) (Buyer Expenditure, Seller Revenue);

- viii. Over the Counter (OC) (Buyer Expenditure, Seller Revenue);
- ix. Stock Return (SN) (Revised Accounting at Issue);
- x. Inventory Adjustment (IA) (Seller Expense);
- xi. Physical Inventory Purchase Input (IP);
- xii. Determination of Types of Control required;
- xiii. Calculation of Economic Order Quantity;
- xiv. Calculation of Reorder Point;
- xv. Safety Stock;
- xvi. Stock Transfer Receipt (TR)
- xvii. Transfer Expenditure),etc.

## **X. Course Title: Procurement Management**

### **Objectives**

This course is intended to cover the management of the procurement process which involves purchasing and also management of expediting, transportation, delivery, storage and handover of materials and equipments for installation. A typical procurement cycle starts with an order of request and then moves through a predetermined procurement cycle within the organization until an order is placed.

### **Level of Participants**

This course is suitable for Managers, Procurement Officers, Production Officers, Procurement Supervisors, Store Supervisors, Store Assistants.

### **Brief Outline of the Course**

This Course will cover the following topics :

- i. Assessment of Procurement Needs;
- ii. Procurement Principles and Techniques;
- iii. Procurement Committee;
- iv. Assessment of Requirements;
- v. Procurement Procedure;

- vi. Competitive Bidding and Others;
- vii. Supplier Selection Options;
- viii. Evaluation/Clarification of Bids;
- ix. Selection of Type of Purchasing Agreement;
- x. Local and foreign procurement;
- xi. Negotiation and Award of Contract;
- xii. Import Procedure, Opening L/C, L/C Retirement etc.
- xiii. Administration of Award, Expediting, Progress Measurement and Interim Payments;
- xiv. Delivery and Receiving Goods; Closing of Contract, etc.;
- xv. Management of Supplier Relationships.

## **XI. Course Title: Repair and Maintenance Management**

### **Objectives**

Objective of this training course is to scale up knowledge and skill of Maintenance Engineer( Mechanical, Electrical), Foreman( Mechanical, Electrical), Technicians( Mechanical, Electrical), Boiler Supervisors about mechanical and electrical repair and maintenance to ensure uninterrupted operations of machines and factory production. Emphasis will be given on both theoretical and practical orientation.

### **Participants of the Course**

This course is suitable for Maintenance Engineer (Mechanical, Electrical), Foreman (Mechanical, Electrical), Technicians ( Mechanical, Electrical), Boiler Supervisor, etc.

### **Brief Outline of the Course**

This Course will cover the following topics:

- i. Maintenance Servicing and Repair Principles;
- ii. Repair and Maintenance Management;
- iii. Maintenance Management and Plant Maintenance Organizations;
- iv. Preventive Maintenance and Predictive Maintenance;

- v. Total Quality Maintenance Program;
- vi. General Trouble shooting and Maintenance Practices;
- vii. Need of Interpersonal Skills in Maintenance;
- viii. Safety in Maintenance Program and Maintenance Management;
- ix. Electrical Systems and Maintenance;
- xi. Maintenance in Electronics and Programmable Controllers;
- xii. Refrigeration Systems and Maintenance;
- xiii. Boiler Maintenance;
- xiv. Fluid Power Maintenance;
- xv. Heating, Ventilating, and Air Conditioning - HVAC – Maintenance, etc.
- xvi. Practical Workshop Practice for all types of Repair & Maintenance.

## **XII. Course Title: Waste Control Management of Finishing & Packaging (F&P)**

### **Objectives**

This course is designed to provide a comprehensive knowledge on General background of waste, MFA; Sources, quantities and composition of waste; Waste composition and stabilisation behaviour; waste reuse and recycling; Recycling technologies; Waste management behaviour (people); Legislation and regulation waste control, etc . Emphasis will be placed on both theory and implementation waste management and Control.

### **Participants of the Course**

This course is suitable for Managers, Shop Managers, Floor Managers, Production Officers, Supervisors, Assistants Maintenance Engineers (Mechanical, Electrical), Foreman(Mechanical, Electrical), Technicians( Mechanical, Electrical), Supervisors, etc.

### **Brief Outline of the Course**

This course will cover the following issues :

- i. General Background (waste, MFA, economics);
- ii. Legislation, Regulation and Control;



- iii. Anaerobic Digestion;
- iv. Anaerobic Digestion of MSW;
- v. Composting;
- vi. Incineration;
- vii. Reuse and Recycling;
- viii. Recycling Technologies;
- ix. Waste Management Behavior (people);
- x. Industrial Solid Waste (Audits, Minimization);
- xi. Waste Composition and Stabilisation Behaviour;
- xii. Leachate Fate, Attenuation and Treatment;
- xiii. Industrial Waste Strategies;
- xiv. Decision Support Systems (DSS) for Waste;
- xv. Liquid waste from dyeing(Yarn dyeing, Tape dyeing and Fabric dyeing);  
Printing (Tape, Label, Carton);
- xvi. Solid waste from printing, packaging and others.

### **XIII. Course Title: Merchandising**

#### **Objectives**

This course is designed to provide a comprehensive knowledge on Merchandising, Outlining and Developing a Display Strategy, Basic Principles of Merchandising ,Details of Pattern, Sophistication in Visual Display. Emphasis will be placed on both theory and practical orientation.

#### **Participants of the Course**

This course is suitable for Managers, Merchandiser, Production Officers, Supervisors, Assistants working in the GAP sector.

#### **Brief Outline of the Course**

This course will cover the following issues :

- i. Merchandising- Concept;

- ii. Outlining and Developing a Display Strategy;
- iii. Strategic Planning-Basic Principles;
- iv. Details of Pattern (Weaves, Stripes, Checks Plaids, Geometric, Dots Floral Figures, Fantasies & other Patterns, Importance of Backdrop Presentation);
- v. Visual Merchandising(approaching clients, developing according to client requirements. handling client objections, developing them and idea for client presentation) ;
- vi. Finalization of Display(motive & marketing consideration for every merchandise display. estimation & finalizations of the contract, assignments& evaluation, planning & inventory control system);
- vii. Strategies of a Visual Merchandise ( strategies of a visual merchandise, development of creative designs, merchandising skills, technique & strategies of presentation);
- viii. Costing and Merchandizing;
- ix. Sourcing of Raw Materials, Product Costing and Cost Control;
- x. Production, Quality Control and Merchandizing;
- xi. Fashion Designing and Merchandizing.

#### **XIV. Course Title: Shop Floor Management**

##### **Objectives**

This course is designed to provide a comprehensive knowledge on the key areas of shop floor management with objectives to ensure uninterrupted production. Emphasis will be placed on both theory and practical issues work place maintenance and cleaning management;

##### **Participants of the Course**

This course is suitable for Managers, Floor Managers, Production Officers, Supervisors, Line Supervisors ,etc. working in the GAP sector.

##### **Brief Outline of the Course**

This course will cover the following topics:

- i. Production Planning, Order Sorting and Work Organization;
- ii. Production Scheduling and Management;
- iii. Supervision Techniques;
- iv. Floor Management;
- v. Production Reporting;

- vi. Work Place Maintenance Management;
- vii. Work Place Cleaning Management;
- viii. Dyeing Treatment/ETP (Chemical);
- ix. Waste Management ( all floor);
- x. Counting and Packaging;
- xi. Raw Materials Supply;
- xii. Work in Process management;
- xiii. Floor Checking; etc.

## **XV. Course Title: Export-Import Trade Regulations, Customs and Standards**

### **Objectives**

Objective of this training course is to enhance knowledge of the Managers, Commercial Officers, Marketing Officers, Export Officers, Bank Officers, of garment accessories and packaging industries about Import Tariffs, Trade Barriers, Import Requirements and Documentation, U.S. Export Controls, Temporary Entry, Labeling and Marking Requirements, Prohibited and Restricted Imports, Customs Regulations and Contact Information, etc.

### **Participants of the Course**

This course is suitable for Managers, Commercial Officers, Marketing Officers, Export Officers, Bank Officers, etc. working in the GAP sector.

### **Brief Outline of the Course**

This course will cover the following topics:

- i. Concepts and Nature of Export, Import, Customs etc.
- ii. Import Tariffs, Trade Barriers;
- iii. Import Requirements and Documentation;
- iv. U.S. Export Controls ;
- v. Temporary Entry, Labeling and Marking Requirements;
- vi. Prohibited and Restricted Imports;
- vii. Customs Regulations and Contact Information , Standards,etc.;
- viii. Commercial- Bond license Renewal;
- ix. UP/UD, Export Bond, Import Bond, Bond Audit,etc.
- x. Warehouse & Inventory;

- xi. General Provisions for Import, Provisions Regarding Import Fees, etc.;
- xii. Provisions for Import by Commercial Importers;
- xiii. General Provisions for Industrial Imports;
- xiv. Import by Public Sector Importers;
- xv. Compulsory Membership of Recognized Chamber of Commerce and Industry and Trade Association;
- xvi. Procedures and formalities in import documentation;
- xvii. C&F clearance, Goods release, etc.;
- xviii. Import Trade Control (ITC);
- xix. Disadvantages to Importer for a consignment under Letter of Credit, VAT, Income Tax, etc.

## **XVI. Course Title: LC Opening-Export Document Submission, Bank Acceptance, etc.**

### **Objectives**

Objective of this training course is to enhance knowledge about export-import trade, regulations, customs and standards, etc. of the Managers, Commercial Officers, Marketing Officers, Export Officers, Bank Officers, of garment accessories and packaging industries.

### **Participants of the Course**

This course is suitable for Managers, Commercial Officers, Marketing Officers, Export Officers, Bank Officers, etc. working in the GAP sector.

### **Brief Course Outline**

This course will cover the following topics:

- i. Concept of Letter of Credit (LC), Types of L/C, Master L/C, Back-to-Back L/C, L/C Retirement, Encashment;
- ii. Procedures and Formalities to Open a Letter of Credit;
- iii. Margin Amount in Letter of Credit;
- iv. Proforma Invoice, H.S. Code, Insurance etc;
- v. Benefits of LC to the Exporter;
- vi. Benefits of LC to the Importer ;
- vii. Disadvantages to Importer for a Consignment under Letter of Credit;
- viii. Disadvantages of LC to an Exporter;
- ix. Parties involved in LC; Authenticity of LC; Ad-Confirmation etc.

## **XVII. Course Title: Yarn Manufacturing Technology**

### **Objectives**

Objective of this training course is to enhance knowledge of the Managers, Production Officers, Supervisors, Line Supervisors Commercial Officers of garment and accessories industries about yarn manufacturing technology as a whole. Emphasis will be given on theoretical and practical issues of yarn manufacturing technology.

### **Participants of the Course**

This course will be suitable for Managers, Production Officers, Supervisors, Line Supervisors Commercial Officers of garment and accessories industries.

### **Brief Course Outline**

**Short Staple:** Assessment, Calculation and Control of Mixing Cost and Quality. Study of modern trends and development in a ring spinning mill from Blow room to bailing, Automation in all sector of spinning industry for Creeling, Doffing, Piecing, Cleaning, Materials handling and linking of machines, Data processing, relationship of automation with quality and productivity and its relevance in the Bangladesh Textile Industry. Processing parameters such as hanks, ?Speeds, Settings, Waste, Cleaning efficiencies, Nep content, Productions and CV% for mass per unit length at all stages of processing, Suitable settings values for the material processed and machine conditions, Waste control at all stages of manufacture, centralized waste collection. Dust filtration bags and setting chambers, Theoretical considerations of fiber individualization during carding and formation of fiber hooked ends, Reduction of fiber hooks during drafting. Theory of ring spinning and ballooning causes of end breaks. Evaluation of properties and characteristics of spun yarns, Processing of soft waste, hard waste, Lab-equipments used in a modern spinning.

**Long Staple:** Study of modern trends and developments of batching, Softening, Carding, Drawing, Drafting Systems and flyer spinning, Processing parameters of different qualities and counts of jute yarns, Yarn faults, causes of end Breakage, Waste recovery, dust extraction and utilization of waste. Evaluation of properties and characteristics of jute yarns.

## **XVIII. Course Title: Knitting and Fabrics Technology**

### **Objectives**

Objective of this training course is to enhance knowledge of the Managers, Production Officers, Supervisors, Line Supervisors of knitting and accessories industries about knitting technology as a whole. Emphasis will be given on theoretical and practical issues of knitting technology.

## Participants of the Course

This course will be suitable for Managers, Production Officers, Supervisors, Line Supervisors of Knitting and accessories industries.

## Brief Course Outline

**Colored stitch designs in weft knitting:** weft knitted jacquard e.g. single jersey jacquard, Rib jacquard.

**Pattern and selection devices:** Butt position, Multi-step butt set-out, Element selection Full Jacquard mechanical and electronic needle selection, Pattern wheel, Pattern area calculations.

**Non-jacquard double jersey fabric:** Production of non-jacquard double jersey fabric, Double jersey inlay.

**Loop transfer stitches:** plain loop, fancy lacing, Rib loop, eyelet, Welts, Garment sequences and knitting to shape calculation of fashioning frequencies.

**Laying in warp knitting:** General rules, Fall plate patterning, Full width weft insertion, Cut presser and Miss-press structures.

**Aspects of knitting science:** loop shape and loop length control, yarn let-off, weft knitted fabric relaxation, knitted fabric geometry, Tightness factor, Robbing back.

**Straight bar frame:** Fully fashioned article, knitting action of straight bar frame, Rib to plain machine.

**Tricot two fullest guides bar machine and its product:** Rules for locknit, Tricot, sharkskin etc fabric production.

**Crochet warp knitting machine:** Feature, Knitting action, End-use etc. Multiple guide bar.

**Warp knitting machines:** Feature, Knitting action and their products.

**Specialty weft knitted fabrics and machines:** loop wheel frame, production of fleecy on sinker top m/c, Fleecy interlock, sinker wheel m/c, plush in sinker top latch needle m/c sliver or high pile knitting.

**Knitted fabric faults:** Causes and their remedies.

**Multi-axial knitting:** Fabric construction and Multi-axial Raschel machine.

## Non-woven:

Definition and classification, methods of web formation, Conventional method of non-woven fabric formation, Modern techniques for the production of non-woven, Properties and uses of non-woven fabrics, Fault and remedies of non-woven fabrics, Environmental problems caused by non-woven fabrics.

## XIX. Course Title: Textile and Garment Quality Management

### Objectives:

Objective of this training course is to enhance knowledge of the Managers, Quality Control Officers, Production Officers, Supervisors, Line Supervisors of textile, garments and accessories industries about quality management and control as a whole. Emphasis will be given on theoretical and practical issues of quality management and control.

## **Participants of the Course**

This course will be suitable for Managers, Production Officers, Supervisors, Line Supervisors Commercial Officers of garment and accessories industries.

## **Brief Course Outline**

Definition and purpose of Q.C., S.Q.C., A.A., T.Q.M. Introduction and Administration of Quality Control Department, Duties and responsibilities of quality control officers. Use of standards BSTI, ISO, ASTM, British, Pakistan and Indian standards. Quality Control and Inspection Planning. Quality control charts use of charts and setting of limits. Analysis of variance, acceptance sampling, correlation analysis to determine relationship between various factors, tests of significance. Acceptance tests and inspection of raw materials for each sector of the industry. Yarn manufacturing raw cotton/jute/chemical fibers. Fabric manufacturing: Yarns. Wet Processing: Yarn and fabric, Dyes and auxiliaries, Garment manufacturing finish fabric, sewing thread. Process and finished goods control for each sector of the industry. Effects of process control on costs and quality. Parameters measured, Sample sizes, Tests made, Results expected at each stage of processing from fiber to finished garment production. Study of USTER statistics.

## **XX. Course Title: Apparel Manufacturing Technology**

### **Objectives**

Objective of this training course is to enhance knowledge of the Managers, Quality Control Officers, Production Officers, Supervisors, Line Supervisors of garment industries about apparel manufacturing technology as a whole. Emphasis will be given on theoretical and practical issues of apparel technology .

### **Participants of the Course**

This course will be suitable for Managers, Production Officers, Supervisors, Line Supervisors Commercial Officers of garment industries.

### **Brief Course Outline**

**Sewing:** Seam properties, types & usages, Stitch types, properties & usages, Principles of lock stitch & chain stitch formation, Sewing machine feed mechanism, needles, Sewing threads, Sewing problem and remedies, Sewing machines, Work aids in sewing, Simple automatic machines.

**Alternative methods of joining fabrics:** Welding, adhesives, Fusing, Moulding and their comparison.

**Trimings & Accessories:** Discussion on label and motifs, zippers, Buttons, lining, Hook & loop fastening, shoulder pad, lace braid & elastic, performance of trimmings.

**Pressing and Finishing:** Objects, types, methods, & International care labeling codes.

**Folding & Packing:** Types, methods, equipment, symbol and markings.

## **XXI. Course Title: Apparel Manufacturing Technology-Lab**

### **Objectives**

Objective of this training course is to enhance knowledge of the Managers, Quality Control Officers, Production Officers, Supervisors, Line Supervisors of garment industries about apparel manufacturing technology and quality issues as a whole. Emphasis will be given on theoretical and practical issues of apparel technology and quality issues .

### **Participants of the Course**

This course will be suitable for Managers, Production Officers, Quality Control Officers, Supervisors, Line Supervisors of garment industries.

### **Brief Course Outline**

Different components of a basic pant / trouser; pattern making of pant / trouser's front part, back part, pocket, waist band, fly piece; fusing of garments parts & testing of fuse quality; production of different types of seam and stitch; study on sewing problems & their remedies; seam strength analysis.

## **Packaging Courses**

## **XXII. Course Title: Packaging**

Objective of this training course is to enhance knowledge of the Managers, Production Officers, Supervisors, Line Supervisors, Commercial Officers of Packaging industries about packaging industry as a whole. Emphasis will be given on theoretical and practical issues of packaging.

### **Participants of the Course**

This course is suitable for Managers, Production Officers, Supervisors, Line Supervisors Commercial Officers of packaging industries and will increase operational efficacy of the packaging industries.

### **Brief Course Outline**

This course will cover the following topics:

- i. Concepts of Packaging;
- ii. Colligative Properties of Packaging;
- iii. Gas Laws, Surface Tension, Dialysis, Diffusion, Packaging Components, Cushioning,
- iv. Packaging Characteristics;
- v. Packaging Materials;
- vi. Ancillary Materials;
- vii. Test Procedures;
- viii. Methods of Storage;
- ix. Logistics and Physical Distribution;



- x. Standard and Quality Control;
- xi. Packaging Process;
- xii. Machinery and Equipments;
- xiii. Packing Embellishment and Printing;
- xiv. Packaging and Marketing;
- xv. Packaging Economics;
- xvi. Packaging Laws and Regulations
- xvii. Packaging Management etc.

### **XXIII. Course Title: Packaging Technology**

Objective of this training course is to enhance knowledge of the Managers, Production Officers, Supervisors, Line Supervisors, Packaging Technologists about technology in packaging industries as a whole. Emphasis will be given on theoretical and practical issues of packaging technology.

#### **Participants of the Course**

This course is suitable for Managers, Production Officers, Supervisors, Line Supervisors Commercial Officers of packaging industries and will increase operational efficacy of the packaging industries.

### **XXIV. Course Title: Packaging Technology-I**

- i. Introduction;
- ii. Components;
- iii. Permeability;
- iv. Mechanisms of Spoilage;
- v. Corrosion and Prevention of Corrosion;
- vi. Designing and making of Cartons and Fiber board Boxes, Heat Sealing, Strapping ;
- vii. Package Evaluation;
- viii. Ecological Aspects;
- ix. Bar-coding Applications in Packaging.

**XXV. Course Title: Packaging Technology-II – Cellulose Technology**

- i. Cellulosic Materials;
- ii. Processes in Cellulose Industries;
- iii. Paper and Board Manufacture;
- iv. Testing of Cellulose and Paper Materials;
- v. Specialty of Papers, Folding Cartons, Multiwall Paper Sacks, Composite Containers.

**XXVI. Course Title: Packaging Technology-III - Fibre board and Glass Technology**

- i. Fibreboard Cartons;
- ii. Drums;
- iii. Glass Containers: Manufacture, Properties, Applications and Testing.

**XXVII. Course Title: Packaging Technology-IV - Plastics Technology**

- i. Polymer Chemistry;
- ii. Classification of Polymers, Properties;
- iii. Processing of Plastics, Special Plastics and their Applications.

**XXVIII. Course Title: Packaging Technology-V – Lamination/Coating etc.**

- i. Seals;
- ii. Coatings;
- iii. Laminates;
- iv. Adhesives, Reinforcements.

**XXIX. Course Title: Packaging Technology-VI - Metal Containers**

- i. Tins, Cans, Formed Containers;
- ii. Steel Drums, Aluminum Foil / Collapsible Tube /Containers.

**XXX. Course Title: Packaging Technology-VII – Cushioning, Wooden Containers etc.**

- i. Cushioning : Mechanism, Fragility Assessment, Cushion Design, Testing, Wooden Containers,
- ii. Textile Bags;
- iii. Containerization, Palletisation and Cargo Marking.

**XXXI. Course Title: Packaging Technology-VIII –Food, Pharmaceuticals, Cosmetics and Chemicals**

Introduction to Food Preservation/Packaging Technology, Method of Storage, Packaging of Food, Pharmaceuticals, Cosmetics, Chemicals and other products.

**XXXII. Course Title: Package Printing Technology**

- i. Process of Communication;
- ii. Printing Processes and Methods;
- iii. Layout & Paste-up;
- iv. Composition for Printing;
- v. Theory of Full Colour Graphic Arts;
- vi. Photography, Printing Image& Carriers;
- vii. Printing Presses, Paper and other Printing Stocks, Printing Inks.

**XXXIII. Course Title: Package Design using Computer**

- i. Setting & drawing requirement;
- ii. Commands and systems variables to co-ordinate a system;
- iii. Creating objects,;
- iv. Editing methods, Layers and object properties, Creating 3D objects etc.

**XXXIV. Course Title: Electrical Technology**

Objective of this training course is to enhance knowledge of the Managers, Production Officers, Supervisors, Line Supervisors Electrical Technologists of packaging industries about electrical technology as a whole. Emphasis will be given on theoretical and practical issues of electrical technology.

### **Participants of the Course**

This course is suitable for Managers, Production Officers, Electrical Technologists, Supervisors, Line Supervisors of packaging industries and will increase operational efficacy of the packaging industries.

#### **Brief Course Outline**

- i. Circuits;
- ii. Generators;
- iii. Motors;
- iv. Transformers;
- v. Measuring Instruments;
- vi. Distribution.

### **XXXV. Course Title: Applied Mechanics-I**

Objective of this training course is to enhance knowledge of the Managers, Production Officers, Supervisors, Line Supervisors, Mechanics about mechanical technology as a whole. Emphasis will be given on theoretical and practical issues of instruments and technology.

### **Participants of the Course**

This course is suitable for Managers, Production Officers, Supervisors, Line Supervisors, Mechanics to their increase operational efficacy.

#### **Brief Course Outline**

- i. Scalars and Vectors;
- ii. Centre of Gravity;
- iii. Friction;
- iv. Moment of Inertia;
- v. Stress-Strain Theory;
- vi. Load Distribution;
- vii. Bending Deflections;
- viii. Torsion Analysis, Columns& Joints.

### **XXXVI. Course Title: Mechanical Technology**

Objective of this training course is to enhance knowledge of the Managers, Production Officers, Supervisors, Line Supervisors Mechanical Technologists about mechanical technology as a whole. Emphasis will be given on theoretical and practical issues of technology.

#### **Participants of the Course**

This course is suitable for Managers, Production Officers, Supervisors, Line Supervisors Mechanical Technologists, Mechanics, etc. to their increase operational efficacy.

#### **Brief Course Outline**

- i. Workshop Processes and their Appraisal;
- ii. Use of Hand Tools, Measuring Instruments;
- iii. Hydraulic and Pneumatic Machines;
- iv. Rotary Pumps, Centrifugal Pumps, Constant and Variable Delivery Pumps.

### **XXXVII. Course Title: Accounts and Finance**

This course is designed to provide a comprehensive knowledge on accounts and finance to the Managers, Accounts Officers, Accountants, Finance Officers, Budget Officers, Audit Officers of GAP industries.

#### **Participants of the Course**

This course is suitable for Managers, Accounts Officers, Accountants, Finance Officers, Budget Officers, Audit Officers, Auditors, etc of GAP industries.

#### **Brief Course Outline**

This course will cover the following topics:

- i. Concepts of Accounting;
- ii. Principles and Applications;
- iii. Financial Reports;
- iv. Needs for Financial Reports;
- v. Income Statement;
- vi. Balance Sheet;
- vii. Methods of Charging Depreciation;
- viii. Preparation of budget;
- ix. Preparation of Cash flow Statement;;

- x. Preparation of Fund flow Statement;
- xi. Financial Governance;
- xii. Financial Management of GAP units;
- xiii. Accounts Forms/Formats-using the GAP unit;
- xiv. Accounting & Auditing Standards & Applicable Laws, etc.

## **XXXVIII. Course Title: Marketing and Materials Management**

This course is designed to provide a comprehensive knowledge on marketing and materials management to the Managers, Objective of this training course is to enhance knowledge of the Managers, Marketing Officers, Purchase Officers, Production Officers, Store Officers, Engineers, Supervisors, Line Supervisors. Emphasis will be given on theoretical and practical issues of marketing and materials management .

### **Participants of the Course**

This course is suitable for Managers, Marketing Officers, Purchase Officers, Production Officers, Store Officers, Engineers, Supervisors, Line Supervisors,etc.

### **Outline of the Course**

- i. Market Structure;
- ii. Models;
- iii. Market Research;
- iv. Materials Management;
- v. Demand Forecasting;
- vi. Physical Distribution.

## **Training Course on Chemical Test**

### **XXXIX. Course Title: Colour Fastness to water**

**Standards: ISO 105-E01: 2013, AATCC 107: 2013**

#### **ISO Description: ISO 105 – E01: 2013(E)**

Specimen Size	: Length: 10cm $\pm$ 0.2cm, Width: 4cm $\pm$ 0.2cm.
Specimen Size	: Length: 10cm $\pm$ 0.2cm, Width: 4cm $\pm$ 0.2cm.
Test Temperature	: 37°C $\pm$ 2°C
Test Time	: 4 h
Weight-piece of mass	: Approximately 5 kg
Reagents	: Grade 3 Water
Apparatus	: Perspirometer, acrylic plate, stop watch, Oven, grey scale, staining assessment scale, color assessment cabinet.

#### **Laboratory Procedure:**

1. Attach the specimen with multifibre at wool side.
2. Place the specimen in a Petri dish with covering grade 3 water at liquor ratio 50:1.
3. Allow it to remain for 30 min, press and move it from time to time to ensure good penetration.
4. Wipe the excess liquor off the specimen between two glass rods.
5. Place the composite specimen between the two acrylic plates under nominal pressure of (12.5  $\pm$  0.9) kPa.
6. Place the test device containing the composite specimen in the oven for 4 h at (37  $\pm$  2)°C.
7. Remove the perspirometer once finishing the time and dry the specimen by hanging it in at temperature not exceeding 60°C.
8. Assess the change in colour of each specimen and the staining of the adjacent fabric/multifiber.

## **AATCC 107: 2013**

Specimen Size	: Length: 6cm $\pm$ 0.2cm, Width: 6cm $\pm$ 0.2cm
Multifiber/Adjacent Size	: Length: 5cm $\pm$ 0.2cm, Width: 5cm $\pm$ 0.2cm
Test Temperature	: 38°C $\pm$ 1°C
Test Time	: 18 h
Weight-piece of mass	: 4.5 kg
Reagents	: Distilled water or deionized water from an ion-exchange device.
Apparatus	: Perspirometer, acrylic plate, stop watch, Oven, grey scale, staining assessment scale, color assessment cabinet.

### **Laboratory Procedure**

1. Attach the specimen with multifibre at wool side.
2. Immerse the specimen in the water for minutes.
3. Remove excess water. The wet weight should be 2.5-3.0 times of dry weight.
4. Place the test device containing the composite specimen in the oven for 18 h at (38  $\pm$  1)°C.
5. Remove the tester from the oven and place the multifiber and test fabric specimens separately on a wire screen in conditioned atmosphere 21  $\pm$  1°C and 65  $\pm$  2% relative humidity over night.
6. Assess the change in colour of each specimen and the staining of the adjacent fabric/multifiber.

### **Results/ Outcome**

1. Assess the change of color comparing with original species.
2. Assess cross/self staining in case of multicolor specimen.
3. Assess the staining on multifibre or on adjacent fabric.



## **XL. Course Title: Colour Fastness to Perspiration**

**Standards: ISO 105-E04: 2013, AATCC 15: 2013**

### **ISO Description: ISO 105 – E04: 2013(E)**

Specimen Size	: Length: 10cm $\pm$ 0.2cm, Width: 4cm $\pm$ 0.2cm.
Multifiber/Adjacent Size	: Length: 10cm $\pm$ 0.2cm, Width: 4cm $\pm$ 0.2cm
Test Temperature	: 37°C $\pm$ 2°C
Test Time	: 4 h
Weight-piece of mass	: Approximately 5 kg
Apparatus	: Perspirometer, acrylic plate, stop watch, Oven, grey scale, staining assessment scale, color assessment cabinet.

#### Reagents for Acid Solution Using Grade 3 Water

- a. 0.54 g of L-histidine monohydrochloride monohydrate
- b. 5 g of Sodium chloride
- c. 2.2 g of Sodium, dihydrogen orthophosphate dehydrate

The solution is brought to pH 5.5( $\pm$ 0.2) with 0.1 mol/l sodium hydroxide solution

#### Reagents for Alkaline Solution Using Grade 3 Water

- a. 0.54 g of L-histidine monohydrochloride monohydrate
- b. 5 g of Sodium chloride
- c. 2.2 g of Sodium, dihydrogen orthophosphate dehydrate

### **Laboratory Procedure:**

1. Attach both specimens with multifibre.
2. Place the specimens in separate petry dish with covering solution at liquor ratio 50: 1.
3. Allow it to remain for 30 min, press and move it from time to time to ensure good.
4. Wipe the excess liquor off the specimen between two glass rods.
5. Place the composite specimen between two acrylic plates under nominal pressure of (12  $\pm$  0.9) kPa.
6. Place the test device containing composite specimen in the oven for 4 h at (37  $\pm$  2)°C
7. Dry the specimen by hanging it in air at a temperature not exceeding 60°C.
8. Assess the change in color of each specimen and the staining of the adjacent fabric/multifiber.

## **AATCC 15: 2013**

Specimen Size	: Length; 6cm $\pm$ 0.2cm, Width: 5cm $\pm$ 0.2cm.
Multifiber/Adjacent Size	: Length: 5cm $\pm$ 0.2cm, Width: 5cm $\pm$ 0.2cm.
Test Temperature	: 38°C $\pm$ 1°C
Test Time	: 6 h
Weight-piece of mass	: 4.5 kg
Apparatus	: Perspirometer, acrylic plate, stop watch, Oven, grey scale, staining assessment scale, color assessment cabinet.

Reagents Using 1 L Distilled Water:

- a. 10  $\pm$  0.01 g Sodium chloride
- b. 1  $\pm$  0.01 g Lactic Acid, USP 85%
- c. 1  $\pm$  0.01 g Sodium phosphate, dibasic, anhydrous
- d. 0.25  $\pm$  0.001 g L-histidine monohydrochloride

pH of the solution should be 4.3  $\pm$  0.2

## **Laboratory Procedure**

1. Place the specimen in a 9cm diameter, 2cm deep petry dish and fill the solution to a depth of 1.5cm.
2. Allow it to remain for 30 $\pm$ 2 min, press and move from it from time to time to ensure good penetration.
3. Wipe the excess liquor, the wet weight should be 2.25 $\pm$ 0.05 times the dry weight.
4. Place the test specimen between glass or plastic plates and insert in the specimen unit of the perspiration tester to produce a pressure of 4.54 kg on the test specimen.
5. Place the test device containing the composite specimen in the oven for 6 h  $\pm$  5 min at (38  $\pm$  1)°C.
6. Remove the tester from the oven and place the multifiber and test fabric specimens separately on a wire screen in conditioned atmosphere 21  $\pm$  1°C and 65  $\pm$  2% relative humidity over night.
7. Assess the change in colour of each specimen and the staining of the adjacent fabric/multi-fiber.

## **Result/ Outcome**

1. Assess the change of color comparing with original species.
2. Assess cross/self staining in case multicolor specimen.
3. Assess the staining on multifibre or on adjacent fabric.

## **XLI. Course Title: Colour Fastness to Rubbing/Crocking**

**Standards: ISO 105-X12, AATCC 8**

### **ISO Description: ISO 105-X12: 2001(E)**

Specimen Size	: 2 pcs not less than 50 mm x 140 mm are required for dry rubbing and 2 for wet rubbing finger
Rubbing cloth size	: Desized, bleached, without finish, (50 x 50) mm
Track Length	: $104 \pm 3$ mm
Finger Diameter	: $16 \pm 0.1$ mm
Downward force	: $9 \pm 0.2$ N
Apparatus/materials	: Digital Crockmeter, balance, staining scale and assessment Cabinet, distilled water.

#### **Laboratory Procedure:**

1. Place the conditioned rubbing cloth flat over the end of the finger with the weave parallel to the direction of rubbing finger
2. Rub at a rate of one cycle per second, rub to and fro in straight line 20 times, 10 times to and 10 times fro.
3. For wet rubbing thoroughly soak in distilled water and ensure take-up of 95% to 100% and then follow the instruction as dry rubbing.
4. Air dry the test cloth.
5. Back each tested rubbing cloth with three layers of white rubbing cloth and assess the staining of the cloths with the grey scale for staining.

### **AATCC 8: 2013**

Specimen Size	: Cut specimens at least 50 x 130 mm at 45° angle and position for testing preferably on wales and courses.
Rubbing cloth size	: Desized, bleached, without finish, (50 x 50) mm
Track Length	: $104 \pm 3$ mm
Finger Diameter	: $16 \pm 0.3$ mm
Downward force	: $9 \text{ N} \pm 10\%$

#### **Laboratory Procedure:**

1. Place the conditioned crocking cloth flat over the end of the finger with the weave parallel to the direction of rubbing finger.
2. Rub at a rate of one cycle per second, rub to and fro in straight line 20 times, 10 times, to and 10 times for on the specimen.

3. For wet crocking test, thoroughly soak in distilled water and establish a technique to ensure take-up of  $65\% \pm 5\%$  wet pickup.
4. Air dry test cloth. Back each tested crocking cloth with three layers of white crocking cloth and assesses the staining of the cloths with the grey scale for staining.

## **XLII. Course Title: Color Fastness to Washing**

**Standards: ISO 150 (C06, C08, C09, C10), AATCC 61**

### **ISO Description: ISO 105 C06: 2010**

Specimen Size	: For all tests, Length: $10 \pm 0.2\text{cm}$ , Width: $4 \pm 0.2\text{cm}$ .
Adjacent/Multifiber Size	: For all tests, Length: $10 \pm 0.2\text{cm}$ , Width: $4 \pm 0.2\text{cm}$ .
Test Temperature	: For all "A" tests: $40_0\text{C} \pm 2_0\text{C}$ , for all "B" test: $50_0 \pm 2_0\text{C}$ , for all "C" tests: $60_0 \pm 2_0\text{C}$ , for all "D" tests: $70_0 \pm 2_0\text{C}$ and for all "E" tests: $95_0 \pm 2_0\text{C}$ .
Detergent	: For all tests: ECE (B) 4gm/Ltr. for only: Add A2S B3S, C2S, D2S, E2S 1hgm Sodium Perborate, for all C, D, E tests: adjust the pH by adding approximately 1gm of sodium Hypochlorite solution)
Liquor Ratio	: The A and B tests are carried out in 150ml solution and C, D and E in 50ml solution.
Test Time	: For A1S, A2S B1S, B2S, C1S, C2S, D1S, D2S, E1S, E2S,: 30 min. For A1M, B1M, C1M, D1M, D1M, D3M: 45 min
No. of Steel Balls	: For all "A" tests: 10 pcs. For B1S, B2S, C1S, C2S, D1S, D2S, D3S, E1S, E2S: 25 pcs, for D3M: 100 pcs.

\*\*(For delicate fabrics and articles of wool or silk or blends containing these fibres, steel balls are not used in the test.)\*\*

### **Laboratory Procedures:**

- Attach fabric specimen with multifiber.
- Place the composite into stainless steel container including wash liquor and steel balls as per above.
- Insert the container into the Laundermeter/Gyrowash and operate the machine as per pre set temperature.
- For all tests, remove the composite specimen at the end of the wash and rinse twice for 1 min the parts in contact only at  $40^\circ\text{C}$ .

- For all methods, dry the specimen by hanging it in air at a temp. not exceeding 60°C, with the parts in contact only at line of stitching.
- Assess the change in colour of the specimen and the staining of the adjacent fabric using the grey scales or instrumentally.

### **Result/ Outcome:**

1. Assess the change of color comparing with original species.
2. Assess cross/self staining in case of multicolor specimen.
3. Assess the staining on multifibre or on adjacent fabric.

### **ISO 105 C08**

Specimen Size	: Length: 10 ± 0.2cm, Width: 4 ± 0.2cm
Adjacent/Multifiber	: Length: 10 ± 0.2cm, Width: 4 ± 0.2cm
Test Temperature	: (40 or 50 or 60 or 95)°C
Detergent	: 4g of ECE (A), 0.15g of TAED (At 100% activity), 1g of Sodium perborate tetra hydrate per liter of grade 3 water.
Liquor: Fabric	: 20ml: 1g
Test Time	: 30 min. at required temp.
No. of Steel Balls	: 25 pcs.

\*\* (For delicate fabrics and articles of wool or silk or blends containing these fibers, steel balls are not used in the test.)\*\*

### **Laboratory Procedures:**

- Attach fabric specimen with multifiber.
- Place the composite into stainless steel container at 15 ± 5°C including wash liquor and steel balls as per above.
- Operate the machine until raising the specified temperature.
- Continue run the test for further (30±1) min.
- Remove the composite specimen at the end of the wash and place it in a 4L beaker half filled with grade 3 water at ambient temperature.
- Dry the specimen by hanging it in air a temperature not exceeding 60°C, with the parts in contact only at line of stitching.
- Assess the change in colour of the specimen and the staining of the adjacent fabric comparing with the grey scales or instrumentally.

### **AATCC 61-210 (2A): 2013**

Specimen Size	: Length: 150 ± ± mm, Width: 50 ± 2mm.
Multifiber size	: Length: 50 mm, Width: 50 mm

Test Temperature	: $49 \pm 2^{\circ}\text{C}$
Detergent	: 1.5g/ltr of 1993 AATCC Standard Reference Detergent.
Liquor volume	: 150 ml
Test time	: 45 min
No. of Steel Balls	: 50 pcs

#### **Laboratory Procedure:**

- Attach the specimen with multifiber.
- Place the composite into stainless steel container at  $15 \pm 5^{\circ}\text{C}$  including wash liquor and steel balls as per above.
- Adjust the laundering machine at the temperature  $49 \pm 2^{\circ}$  and insert the canister into the laundermeter.
- Preheat the solution for at least 2min and run the machine for 45 minutes.
- Keeping each test specimen in a separate in a separate beaker. Rinse each test specimen three times, in beakers in distilled or deionized water at  $40 \pm 3^{\circ}$  for 1 min periods with occasional stirring and hand squeezing.
- Dry the specimens in an air circulating oven in which the temperature not exceed  $71^{\circ}\text{C}$ .
- Before evaluation condition the specimen for 1 h.
- Assess the color change of tested specimen and color staining of tested multifiber.

#### **Result/ Outcome:**

1. Assess the change of color comparing with original species.
2. Assess cross/self staining in case of multicolor specimen.
3. Assess the staining on multifibre or on adjacent fabric.

### **XLIII. Course Title: Color Fastness to Light**

**Standards: BS ENB ISO 105 B02: 2013, AATCC 16E:**

#### **ISO Description: BSEN ISO 105 B02**

##### **Blue wool:**

Blue wool textile fading cards or kits typically consist of 8 swatches of blue wool dyed to various levels. They consist of eight strips of wool mounted side by side on a small card; each strip or reference is colored with a blue dye that fades after exposure to known amount of light. The dyes have been chosen so that each reference takes about two to three times longer begin fading as the next lower reference in the scale. (Under normal solar testing conditions, reference 1, the least permanent, will begin to cloud cover and humidity; reference 3 will fade in 5 days to 2 weeks; reference 6 in 16 weeks; and reference 8, the most permanent, in 6 to 15 months). These scales are used for paint light fastness testing under international standard **ISO 105-B**, and

are also used by gallery curators to measure the accumulated amount of light received by museum displays of paintings, textiles or photographic prints. The blue wool scale cards will normally be used conjunction with grey scale cards in order to assess the degree of change.

**Sample card:** The card used should be white and should be free from optical brightener.

**Test condition:** The equipment manual should be followed to confirm the condition of test, like black panel/standard temperature, humidity, times of lamps and filter changes, inner filter/outer filter of light changing time period.

**Humidity control:** Place portion of humidity test control together with grade 5 blue wool, check after how much time the contrast is grey scale rating 4 in color change. If not adjust the humidity and temperature.

Exposure condition: Normal condition: Humidity test control fabric 5, black panel temperature 50°C.

Apparatus: Xenon Arc Fading Lamp Ci3000+or others,

Specimen size: Not less than 45mmx10mm

Blue wool reference: Not less than 45x10mm

#### **Laboratory Procedure** Method 3:

Please the specimen and blue wool on card and cover 1/3 of muddle of the specimens and blue wool.

Expose until BW 3 is exposed similar to grey scale 4. Then cover the unexposed left side and expose until BW 3 is changing to GS 3 as well as BW 4 is changing to GS grade 4.

Assess the change of color comparing with exposed blue wool.

### **XLIV. Course Title: Determination of pH**

**ISO Description: Standards: ISO 3071:2006, AATCC 81:2012**

#### **ISO 3071:2006**

Sample	: Take from the laboratory sample three test samples of $(2 \pm 0.05)$ g each.
Water	: Distilled or deionized water of a t least grade 3 having a pH between 5.0 and 7.5.
Potassium shloride solution	: 0.1 mol/IKCL solution prepared using distilled or deionized water.

Water volume	: 100 ml
Shaking time	: 2 h
Apparatus & materials	: pH meter, buffer solutions, balance, distilled water, conical Flash.

**Laboratory Procedure:**

- Cut the sample (2 gm) of around 0.5 cm size of each piece.
- Place pieces sample and 100 ml of water or potassium chloride solution into stopped flash.
- Shake them mechanically for  $2\text{ h} \pm 5\text{ min}$ .
- Calibrate the pH-meter at the temperature of the extract to be measured.
- Decant the electrode several times in the same solution (water or potassium chloride solution) used to prepare the extract until the indicate pH-value stabilizes.
- Decant the first extract into a beaker, immediately immerse the electrode to a depth of at least 10 mm. (do not record the pH-value of the solution).
- Decant the second extract into another beaker, immediately immersed the electrode, without washing, without stirring until the pH-value stabilizes. Record this value. Same way record the third value.

**AATCC 41: 2012**

Specimens	: Use a $10 \pm 0.1\text{ g}$ specimen of the material to be tested.
Water	: Distilled water.
Water volume	: 250 ml
Boling time	: 10 min before immersing the specimen and 10 min after immersing the specimen.
Apparatus & materials	: pH meter, buffer solutions, balance, distilled water, conical Flash, heating arrangement.

**Procedure:**

- Boil 250 ml of distilled water at a moderate rate for 10 min.
- Immerse the specimen pieces, cover the beaker and boil additional 10 min.
- Allow the covered beaker and contents to cool at room temperature.
- Remove the specimen with tweezers.
- Calibrate the pH-meter at the temperature of the extract to be measured.
- Determine the pH of the extract using a pH meter operated according to manufacturer's instructions.



## **XLV. Course Title: Quantitative Chemical Analysis of Fiber**

**ISO Description: Standers: ISO 1833:2006, AATCC 20, 20A: 2013**

### **Reagents:**

- |   |                                  |
|---|----------------------------------|
| 1. Light petroleum, redistilled, distilling, between 40° and 60°C | 2. Distilled or de-ionized water |
| 3. Acetone, distilling between 55° and 57°C                       | 4. Sodium hypochlorite           |
| 5. Acetic acid  | 6. Zinc chloride anhydrous       |
| 7. Formic acid anhydrous  | 8. Ammonia solution              |
| 9. Dimethylformamide (DMF), boiling point 152° to 142°C           | 10. Ethanol                      |
| 11. Sulfuric acid concentrated (sp. gr. 1.84 g/ml) (DMA)          | 12. Dimethylacetamide            |
| 13. Xylene distilling between 137° and 142°C                      | 14. Phenol                       |
| 15. Cyclohexanone, boiling point 156°C                            | 16. Tetrachloroethane            |

### **Apparatus:**

1. Glass filter crucible, 30 to 40 ml capacity with sealed in sintered disk filter with pore size 90 cm to 150 cm.
2. Vacuum flask
3. Desiccators, containing self indicating silica gel
4. Ventilated oven for drying specimen at (105±3)°C
5. Soxhlet extraction apparatus
6. Conical flask, capacity 250ml & 500ml with stopper.
7. Water bath
8. Heating apparatus
9. Mechanical Shaker
10. Reflux condenser
11. Glass rod
12. Weighing bottle
13. Analytical balance with a resolution of 0.0002 g or better.
14. Hot extraction apparatus.

### **Sampling:**

Take a Laboratory test sample that is representative of laboratory bulk sample and sufficient to provide all the specimens, each of at least 1 g that are required.

### **Pre-treatment of Laboratory test sample:**

Extract the air dry sample in a soxhlet apparatus with light petroleum for 1h at minimum rate of 6 cycles per hour. Allow the light petroleum to evaporate from the sample. Soak the specimen in cold water for 1h and then in water at  $(65 \pm 5)^{\circ}\text{C}$  for a further hour. In both case use a liquor ratio of 100/1 and agitate the liquor time to time. Remove the excess water from the sample by squeezing or suction and the allow the sample to become air dry.

Where non-fibrous matter cannot be extract with light petroleum and water, it shall be removed by a suitable method that does not substantially alter any of the fiber constituents. However for some unbleached, natural vegetable fibers (Jute), it is noted pretreatment with light petroleum and water does not remove all natural non-fibrous substances; nevertheless, additional retreatment is not applied unless the sample the sample contains finishes which are insoluble in both light petroleum and water.

### **Laboratory Procedure:**

1. **Drying:** Conduct all drying operation for not less than 4 hours and not more than 16 hours at  $(105 \pm 3)^{\circ}\text{C}$  in a ventilated oven with the oven door closed throughout.

The specimen should be dried until constant mass is achieved.

2. **Drying of Specimen:** Dry the specimen in a weighing bottle with its stopper beside it. After drying, Stopper the weighing bottle before removing

3. **Drying of crucible and residue:** Dry the filter crucible with its stopper or cover beside it in the oven. After drying, close the crucible and transfer it quickly to desiccators.

4. **Cooling:** Conduct all cooling operation until complete cooling is attained and in any case for not less than 2h with the desiccators beside the balance.

5. **Weighing:** After cooling complete the weighing of weighing bottle or crucible within 2 minutes of its removal from the desiccators. Weight to an accuracy of 0.0002g

**Noted:** Do not handle the crucible, specimen or residue with bare hands during the drying, cooling and weighing operations.

### **Calculation of Result/ Outcome:**

**Method based on clean dry mass with percentage addition for moisture:**

$$P_M = \frac{100P(1 + 0.01a_2)}{P(1 + 0.01a_2) + (100 - P)(1 + 0.01a_1)}$$

Where,

$P_M$  is the percentage of clean insoluble component with percentage additions for moisture

$P$  is the percentage of clean dry insoluble component

$a_1$  is the percentage addition to the soluble component for moisture

$a_2$  is the percentage addition to the insoluble component for moisture

### **Solution Preparation**

#### **Formic Acid and Zinc Chloride Solution: 100 g**

20 g fused anhydrous zinc chloride, 68 g anhydrous formic acid and 12 g water.

Or, 20 g fused anhydrous chloride, 55.7 ml anhydrous formic acid and 12 g water.

#### **80% Formic Acid Solution: (1L)**

SS 780 ml pure (100%) formic acid to 220 ml of water.

Or, Add 7890 ml 90% formic acid to 120 ml of water.

#### **Phenol and Tetrachloroethane Mixture:**

Mix phenol and tetrachloroethane in a mass ratio of 6:4. Or,

For 100 g mixture add 60 g of phenol in 40 g of tetrachloroethane.

#### **Dilute Solution of Ammonia: (1 L)**

a) Add 80 ml of 25% ammonia solution to 920 ml water.

b) Add 20 ml of 25% ammonia solution to 980 ml of water. (for  $ZnCl_2/HCOOH$  use only)

#### **Dilute Solution of Acetic Acid: (1L)**

Add 5 ml of glacial acetic acid to 995 ml of water (for  $NaOCl$  use only)

#### **59.5% Sulfuric Acid Solution: (1L)**

Add 456 ml of 95% sulfuric acid to 524 ml of water. After the solution has cooled to room temperature dilute to 1 liter and adjust density between  $1.4929 \pm 0.0027$

#### **Summary Table:**

Method	Reagent	Soluble component
Part 3	Acetone	Acetate
Part 4	Sodium hypochlorite	Wool and other protein fibre
Part 6	Zinc Chloride and Formic acid solution	Viscose, modal, cupro and lyocell
Part 7	80% Formic Acid	Polyamide
Part 11	75% Sulfuric Acid	Cotton and other cellulose fibre

Part 12	Dimethylformamide (DMF)	Acrylic, modacrylic or chlofibre
Part 16	Xylene	Polypropylene (Olefin)
Partt 18	75% Sulfuric Acid	Silk (with wool)
Part 20	Dimethylacetamide (DMA)	Elastane
Part 21	Cyclohexanone	Elastane, modacrylic, acetate & Chlorofibres
Part 24	Phenol and Tetrachloroethane mixture	Polyester

**Grade 3 water:**

- pH: 5.0-7.5
- Electrical conductivity: 0.5 mS/m at 25°C
- Oxidisable matter: 0.4 mg/l
- Residue after evaporation: 2mg/kg at 110°C

**XLVI. Course Title: Dimensional Stability/Appearance after Washing**

**ISO Description: ISO 6330: 2012, AATCC 0135: 2012, AATCC 150: 2012**

**ISO 6330: 2012, BSEN ISO 6330: 2012**

ISO 6330: 2012 This test standard is for washing and drying procedure only.

ISO 5077: 2007, Determination of dimensional change in washing and drying.

ISO 3759: 2011, Preparation, marking and measuring of fabric and garments.

**Sampling:**

- For fabric: 500x500 mm, benchmark 350 mm between each pair.
- For garments: Each garment will be considered a specimen.

**Apparatus:**

- Automatic washing machine and tumble dryer
- Detergents (ECE phosphate (type B)/non phosphate (type A) and IEC, Sodium perborate, TAED) and ballasts or as per agreement with customers.
- Indelible ink, ruler, template

**Procedure:**

- Condition the test specimen at least 4 hours. Overlock round the specimen to avoid fraying during wash/drying. Place three p[airs of bench mark in each direction on specimen as per above.
- Place the specimen with ballast load of total weight 2 kg into automatic washing equipment. Select the washing program and temperature as per care instruction.

- Take 20 gm of detergent (77% ECE, 20% Sodium perborate, 3% TAED) or as per agreement.
- After completing the wash cycle dry the sample as per care instruction.
- Place the dried sample to condition room for 4 hours. Measure the bench marks distance as per below formula.

#### **Calculation of dimensional change:**

- $\%DC = 100(B-A)/A$
- Where, Dc is Dimensional change, A is Original dimension and B is Dimension after laundering & drying.
- Resulting value (+) sign indicates the extension and minus (-) sign indicates shrinkage

#### **AATCC 135: 2012**

#### **Sampling:**

- Marking Option 1: Specimen size: 380x380 mm, benchmark 250x250 mm
- Marking Option 2 : Specimen size: 610x610 mm, benchmark 460x460 mm

#### **Procedure:**

- Condition the test specimen at least 4//6 hours. Overlock round the specimen to avoid fraying during wash/drying. Place three pairs of bench mark in each direction on specimen as per above.
- Take  $66 \pm 1$  gm of 1993 AATCC standard reference detergent and dissolve in water before adding ballast and specimen.
- Place the specimen with ballast load of total weight 1.8 kg into automatic washing equipment. Select the washing program and temperature as per care instruction.
- After completing the wash cycle dry the sample as per care instruction.
- Place the dried sample to conditioning room for 4 hours. Measure the bench marks distance as per below formula.

#### **Calculation of dimensional change:**

$$\% Dc = 100 (B-A)/A$$

Where, DC is Dimensional change, A is Original dimension and B is Dimension after laundering. Resulting value plus (+) sign indicates the extension and minus (-) sign indicates shrinkage.

Setting symbol of program as per AATCC standard:

<b>Maching cycle procedure</b>	<b>Washing Temp</b>	<b>Drying</b>
<b>Normal/Cotton Sturdy</b>	<b>(ii) 27±3°C</b>	<b>(A) Tumble</b>
<b>Delicate</b>	<b>(iii) 41±3°C</b>	<b>(i) Cotton Study</b>
<b>Permanent Press</b>	<b>(iv) 49±3°C</b>	<b>(ii) Delicate</b>
	<b>(v) 60±3°C</b>	<b>(iii) Permanent press</b>
		<b>(B) Line</b>
		<b>(C) Drip</b>
		<b>(D) Screen</b>

### **Appearance after washing**

- In case of appearance after washing test, follow above procedure unless otherwise agree between seller and buyer.
- Attach appropriate multifibre with test specimen before washing and wash the sample individually.
- After completing all adobe procedure assess the washed specimen with a same control one.
- Check the change of color, cross/self staining, multifibre staining, deterioration print/motif/appliqué etc. pilling/fuzzing, spirality and appearance accessories/ornamentations etc.

## **XLVII. Course Title: Bursting properties of fabrics**

### **ISO Description: ISO 13938-1/2: 2013 and ASTM D3786: 2013**

Test environment : ISO Std-Temp 20±2°C, humidity-65±4%; ASTM Std-Temp 21±1°C, humidity 65±2°C. Condition the specimens at least four hours.

Apparatus : Bursting tester, aluminum foil, rubber diaphragm.

### **ISO Description: ISO 13938-1: 2013, Hydraulic**

- Select the appropriate testing area as per standard or customer request
- Place the specimen over the diaphragm in tensionless condition.
- Clamp it securely to prevent slippage.
- Apply pressure to the test specimen until the fabric bursts
- Note the bursting pressure deducing from the diaphragm pressure in kilopascals determining the bursting strength.
- Repeat the test at least five different places on the fabric.

**Calculation of Results /Outcome:**

- Calculate the Arithmetic mean of bursting pressure in PSO/Kpa or per customer requirement.

**XLVIII. Course Title : Tensile properties of fabrics**

**ISO 13934-1: 2013, ISO 13934-2: 2014, ASTM D5034: 2013, ASTM D5035: 2011**

Test environment : ISO Std-Temp  $20 \pm 2^\circ\text{C}$ , humidity- $65 \pm 4\%$ ; ASTM Std-Temp  $21 \pm 1^\circ\text{C}$ , humidity  $65 \pm 2^\circ\text{C}$ . Condition the specimens for 24 hours as per above temperature and humidity.

Sample size:

ISO 13934-2: 200mmx100mm $\pm$ 2mm

ISO 13934-1: 300mmx60mm (after fraying 50mm $\pm$ 0.5mm)

ASTM D5034: 150mmx100mm

ASTM D5035: 1R Strip: 150mm x 35mm (after reveal 25 mm)

: 1R Strip: 150mm x 65mm (after reveal 50 mm)

: 1C Strip: 150mm x  $25 \pm 1$  mm

: 2C Strip: 150 mm x 50 1mm

Apparatus:

- CRE Machine and its required all accessories.
- Equipment for cutting test specimen.

**Procedure: ISO 13934-2**

- Selected and set appropriate load cell and jaws
- Select the required test standard and its parameters
- Be alert that the gauge length and rate of extension is pre-fixed in specified test standard.
- Moving of test specimen: Clamp a test specimen centrally so that its longitudinal centre line passes through to the edge of the front edges of the jaws and its perpendicular to the edge of jaws.
- After closing the upper jaw, avoid pretension when adjusting the specimen along the guide line in the lower-jaw.
- Start the equipment to extend the specimens in each direction.

**Calculation and Expression of Results:**

- Arithmetic mean of maximum force in Newton/Lbf/Kg for each direction tested.
- Arithmetic means of maximum elongation/extension at breaking force in % or in mm.

**XLIX. Course Title: Determination of Fabric Propensity to Surface Fuzzing and to Pilling**  
**BSEN ISO 12945-1: 2001, BSEN ISO 12945-2: 2001/And 2013,**

Test environment : ISO Std-Temp  $20\pm 2^{\circ}\text{C}$ , humidity- $65\pm 4\%$ ; ASTM Std-Temp  $21\pm 1^{\circ}\text{C}$ , humidity  $65\pm 2^{\circ}\text{C}$ . Condition the specimens for 24 hours as per above temperature and humidity.

**Sample size:**

ISO 12945-1: 04 specimens, each (125x125) mm. Mark back in the fabric and the length direction.

ISO 12945-2: 03 Specimens, each  $140\pm 5$  mm diameter or (150x150mm $\pm 2$ )

**Apparatus for ISO 12945-2:**

- Pill testing box
- Polyurethane specimen tube and PVC tape 19mm wide.
- Mounting jig
- Sewing m/c
- Viewing Cabinet

**Apparatus for ISO 12945-2:**

- Martindale abrasion testing m/c
- Loading piece: the mass of the disc is  $260\pm 1$  g total mass specimen holder  $415\pm 2$  g.
- Viewing cabinet

**Procedure: ISO 12945-1**

- Take four specimens (2 warp and 2 weft). Sew 12mm from the cut edge to form a tube, using a stitch density such that a balanced seam is produced.
- Turn the specimen inside out and cut 6mm off each end of the fabric tube to remove any sewing distortion. Mount the specimen on each polyurethane tube using mounting jig. Apply self adhesive PVC tape around each of the cut ends of the specimen and leaves 6 mm of the polyurethane tube exposed. The length of pvc tape shall not exceed a length 1.5 times.
- Place the four manifold specimens from the sample in the same pill testing box. Tumble the tubes in the box for the agreed no. of revolutions. Remove the specimens from the box and remove the stitching from the seam.

**Assessment:** The viewing cabinet shall be situated in a dark room. Due to the subjective nature of the assessment, it is recommended that more than one observer should assess the specimen.



**Evolution:**

- 5- No change
- 4- Slight surface fuzzing and/or moderate pilling, pilling are varying size and density partially covering the specimen surface.
- 2- Distinct surface fuzzing and/or distinct, pilling, pilling are varying size and density covering a large proportion of the specimen surface.
- 1- Dense surface and/or severe pilling, pills are varying size and density covering the whole of the specimen surface.

**L. Course Title: Determination of the Slippage Resistance of varns & Seam Strength****ISO 13936-1: 2004/And 2010**

- For warp slippage- 100 mm wide in warp x 400 mm long in weft.
- For weft slippage- 10 mm wide in weft x 400 mm long in warp.
- No. of specimens= 05 test specimen for each warp and weft slippage

**ISO 13936-2 : 2004/And 2010:**

- 200x100 mm, Fold the specimen in halfway and stitch at 20 mm from fold. Cut the specimen 12 mm from the sewn line.

**ASTM D1683: 2011a:**

- Five test specimens 350mmx10mm. Fold 100 mm from one end, sew a seam as agreed upon by purchasing and supplier. After seaming cut the folds open.

**ASTMD 434: 1995:**

- Stitch density  $14 \pm \frac{1}{2}$  stitches per inch and plain lock stitch. After seaming, cut the fold open. Draw a line 38 mm from the edge parallel to the long direction.
- 100mx350mm (both warp and weft direction)
- Fold 100 mm from one end. Sew a seam 13 mm from fold (needle 0.76 mm).
- Sew a seam 13 mm from fold (needle 0.76 mm)
- Yarn count white mercerized cotton 39 tex approx. or polyester cotton core thread 36 tex.

**ISO 13935-2: 2014:**

- 250 mm x 100 mm, Draw line 38 mm from one edge. Fold the sample in half sewing. Seams may be seam for testing parallel to warp and weft direction or both.

**Apparatus:**

- Strength testing equipment
- Sewing machine: Electrically operated, single needle, lock stitch, capable of producing stitch type 301.

- Calibrated rule, graduated in 0.5 mm divisions.

#### **Laboratory Procedure: ISO 13936 – 1**

- ISO Std-Temp  $20 \pm 2^\circ\text{C}$ , humidity- $65 \pm 4\%$ ; ASTM Std-Temp  $21 \pm 1^\circ\text{C}$ , humidity  $65 \pm 2^\circ\text{C}$ . Condition the specimens for 24 hours as per above temperature and humidity.
- Set gauge length  $100 \pm 1$  mm
- Set rate of extension  $50 \text{ mm} \pm 5 \text{ mm/min}$
- Clamp the unseamed test specimen until a force of 200 N is exceeded.
- Clamp the seamed test specimen in the jaws ensuring that the seam is midway between and parallel to the jaws.

#### **Calculation and expression of results:**

- Report the mean of the five warp slippage and five weft slippage results separately to the nearest Newton.
- If the required separation between the curves cannot be measured or below a force of 200 N, Report the result as “greater than 200 N”.
- If the fabric tears or seam breaks at a force of 200N or less, and the gap cannot be found report the result as “fabric breakdown” “or seam breakdown” and quote the force at which this occurred.

## **II. Course Title: Determination of Mass/Unit Length Mass/Unit Area**

### **ISO 3801: 1977/And 2011, ASTM D3776/D3776 M: 2009**

Test environment : ISO Std-Temp  $20 \pm 2^\circ\text{C}$ , humidity- $65 \pm 4\%$ ; ASTM Std-Temp  $21 \pm 1^\circ\text{C}$ , humidity  $65 \pm 2^\circ\text{C}$ . Condition the specimens for 24 hours as per above temperature and humidity.

#### **Sampling:**

ISO 3801: For method 5: Five samples from the fabric, each approximately  $15\text{cm} \times 15\text{cm}$  selected so as to avoid any selvages or creased areas and so that they represent the fabric as fully as possible.

ASTM D3776: Option c-small swatch of fabric. This procedure is applicable when a small swatch of fabric sends to laboratory to be used as test specimen.

#### **Apparatus:**

- Cutter (for method 1-4)
- Table (at least 4m in length) Manual GSM cutter (for method 5)
- Cutting board, electronic balance

## **Procedure: ISO 3801**

**Method 5:** Determination of mass/unit area using small specimen.

- Condition the test specimen ISO Std-Temp  $20 \pm 2^\circ\text{C}$ , humidity-  $65 \pm 4\%$ ; ASTM Std-Temp  $21 \pm 1^\circ\text{C}$ , humidity  $65 \pm 2\%$ . Condition the specimens for 24 hours as per above temperature and humidity.
- Take each sample in turn and place it on a surface suitable for cutting. Cut specimen  $10\text{cm} \times 10\text{cm}$  . (or circular of area  $100\text{cm}^2$ ). Weigh them to an accuracy of  $\pm 0.001$  g).

### **Calculation and Expression of Results:**

- From the mass of the specimen calculate the mass per unit area of the fabric from the formula:

$$m_{ua} = m \times 100$$

$$m_{ua} = \text{mass/unit area (gram/meter}^2\text{)}$$

$$m = \text{mass of the specimen (grams)}$$

## **LII. Course Title: Determination of Count of Yarn**

### **ISO 7211-5**

**What is count:** Fineness of yarn. Count value increase if weight of yarn devrease.

**System of count:**

**Direct count:** Weight/unit length

**Indirect count:** Length/unit weight

**Direct count: a) Tex:** Weight in gram of 1000m of yarn = Tex

**b) Denier:** Weight in gram of 9000m of yarn = Denier

$$D = \text{Tex} \times 9$$

**Indirect count: a) English count:** Number of hank in 1lb of yarn

$$01 \text{ hank} = 840 \text{ yds}$$

**b) Metric count:** Number of hank in 1lb of yarn

$$01 \text{ hank} = 560 \text{ yds}$$

$$\text{Tex} = 590.5 / N_e$$

$$\text{English count, } N_e = \frac{L \text{ in inch} \times 0.015}{W \text{ in gm}}$$

Apparatus: a) Balance, b) Apparatus for determining straightened length as per ISO 7211-3.

Weight the thread after conditioning.

Procedure: Fray the threads from fabric and measure the straightened length as per ISO 7211-3.

Weight the thread after conditioning.

Linear density, Tex = Mass of thread in gm X 1000

/Total length of thread in meter.

## Annexure – B

### Feasibility Study on the Establishment of a Training Institute under Bangladesh Garment Accessories & Packaging Manufacturers & Exporters Association (BGAPMEA) for Skill Development of Employees in the Garment Accessories & Packaging (GAP) Sector

#### Questionnaire for the Sample Garment Accessories & Packaging Units

Date of Interview:

Interviewer:

#### 01 Unit's Identification:

1.1 Name of the Unit:

1.2 Contact Address:

1.3 Phone No.:

1.4 Contact Person &

Designation:

1.5 Year of Establishment:

#### 02 Unit Details:

2.1 Name/Type of Accessories/Packaging Materials manufactured – Please furnish data in the following table:

Sl. #	Name/Type of Accessories/Packaging materials manufactured	Quantity
1.	Back Board	
2.	Bar Code	
3.	Butter Fly	
4.	Button (Button & Elastic Button)	
5.	Chemical	
6.	Collar Insert	
7.	Corrugated Carton	
8.	Elastic & Drawstring	
9.	Embroidery	
10.	Gum Tape & Twill Tape	
11.	Hang Tag	
12.	Hanger	
13.	Hook and Loop (Velcro)	
14.	Interlining	

15.	Labels	
16.	Lace	
17.	Multi Items	
18.	Neck Board	
19.	Packaging	
20.	Padding	
21.	Paper Band	
22.	Paper Sticker	
23.	Photo Card	
24.	Poly Bag	
25.	PP Band	
26.	Price Tag	
27.	Quilting & Padding	
28.	Resin	
29.	Screen Print	
30.	Sewing Thread	
31.	Size Tag	
32.	Tissue Paper	
33.	Zipper	
34.	Others	

2.2 Last one year's output by Name/Type of Accessories/Packaging Materials – Pls. furnish data in the following table:

Sl. #	Name/Type of Accessories/Packaging materials manufactured	Quantity	Value of the products
1.	Back Board		
2.	Bar Code		
3.	Butter Fly		
4.	Button (Button & Elastic Button)		
5.	Chemical		
6.	Collar Insert		
7.	Corrugated Carton		
8.	Elastic & Drawstring		
9.	Embroidery		
10.	Gum Tape & Twill Tape		
11.	Hang Tag		
12.	Hanger		
13.	Hook and Loop (Velcro)		
14.	Interlining		
15.	Labels		
16.	Lace		
17.	Multi Items		
18.	Neck Board		
19.	Packaging		
20.	Padding		
21.	Paper Band		
22.	Paper Sticker		
23.	Photo Card		
24.	Poly Bag		
25.	PP Band		
26.	Price Tag		
27.	Quilting & Padding		
28.	Resin		

29.	Screen Print		
30.	Sewing Thread		
31.	Size Tag		
32.	Tissue Paper		
33.	Zipper		
34.	Others		

2.3 who are buyers of your products? - Pls. furnish data in the following table:

Sl. #	Name of the Product(s)	Name of the Buyer(s)
1.	Back Board	
2.	Bar Code	
3.	Butter Fly	
4.	Button (Button & Elastic Button)	
5.	Chemical	
6.	Collar Insert	
7.	Corrugated Carton	
8.	Elastic & Drawstring	
9.	Embroidery	
10.	Gum Tape & Twill Tape	
11.	Hang Tag	
12.	Hanger	
13.	Hook and Loop (Velcro)	
14.	Interlining	
15.	Labels	
16.	Lace	
17.	Multi Items	
18.	Neck Board	
19.	Packaging	
20.	Padding	
21.	Paper Band	
22.	Paper Sticker	
23.	Photo Card	
24.	Poly Bag	
25.	PP Band	
26.	Price Tag	
27.	Quilting & Padding	
28.	Resin	
29.	Screen Print	
30.	Sewing Thread	
31.	Size Tag	
32.	Tissue Paper	
33.	Zipper	
34.	Others	

2.4 Employee Strength. Please furnish data in the following table:

Sl. #	Name of the Post	No. of Posts	Number of Employees working against the Posts
1.	Production Manager/Manager		
2.	Production Officer		
3.	Quality Control Officer		
4.	Quality Controller		
5.	Supervisor		
6.	Finishing		
7.	Machine Operator		
8.	Accountant		
9.	Marketing		
10.	Store Keeper		
11.	Maintenance		
12.	Administrative Staff		
13.	Security		
14.	Boiler Man		
15.	Electrician		
16.	Workers: Skilled (Sr. Operator)		
17.	Workers: Semi-Skilled (Operator)		
18.	Workers: Unskilled/Helper		
19.	Others (Cleaner, Loader, etc.)		
	Total:		

### 03 Information & Views on Skill Training:

3.1 How many employees received formal skill training during last 05 years? Please furnish data in the following table:

Year	Name of the Training Course (Skill training)	Type/Level of employees received training	No. of employees received training
	Merchandising		
	Quality Control		
	Repair and Maintenance (Lab / Machine)		
	Inspection		
	OKEY TEX / ASTM / ISO / BSTI		
	Accounts/Costing,		
	Human Resources Management		
	Supervision		
	Marketing		
	Store Keeper		
	Others		

3.2 What number of employees (by category/ level also) you expect to train up in the next 05 years – Please furnish data in the following table:

Year	Name of the Training/Course	Type/Category of Employees expect to train up	No. of Employees expect to train up
	Merchandising	Production Manager/Manager	
	Quality Control	Production Officer	
	Repair and Maintenance (Lab / Machine)	Quality Control Officer	
	Inspection	Quality Controller	
	OKEY TEX / ASTM / ISO / BSTI	Supervisor	
	Accounts/Costing,	Machine Operator	
	Human Resources Management	Accountant	
	Supervision	Others	
	Marketing		
	Store Keeper		
	Others		

3.3 Where did the employees receive training? Please furnish data in the following table:

Sl. #	Name of the Course/Training the employees received	Duration of the Training/Course	Name of the Institution organized Training/Courses
1.	Merchandising		
2.	Quality Control		
3.	Repair and Maintenance (Lab / Machine)		
4.	Inspection		
5.	OKEY TEX / ASTM / ISO / BSTI		
6.	Accounts/Costing,		
7.	Human Resources Management		
8.	Supervision		
9.	Marketing		
10.	Store Keeper		
11.	Others		

Yes/Sometimes/No  
(Pls. tick appropriate one)

3.4 Do you think, others should also receive training?

3.5 What categories and levels of employee need training? Please furnish data in the following table:

	Category/Level of employees need training	Name of the Course/Training they need	Duration of the Training/ Course
Sl. #	Name of the Post	Merchandising	
1.	Production Manager/Manager	Quality Control	



2.	Production Officer	Repair and Maintenance (Lab / Machine)	
3.	Quality Control Officer	Inspection	
4.	Quality Controller	OKEY TEX / ASTM / ISO / BSTI	
5.	Supervisor	Accounts/Costing,	
6.	Finishing	Human Resources Management	
7.	Machine Operator	Supervision	
8.	Accountant		
9.	Marketing		
10.	Store Keeper		
11.	Maintenance		
12.	Administrative Staff		
13.	Security		
14.	Boiler Man		
15.	Electrician		
16.	Workers: Skilled (Sr. Operator)		
17.	Workers: Semi-Skilled (Operator)		
18.	Workers: Unskilled/Helper		
19.	Others (Cleaner, Loader, etc.)		

3.7 Do you visualize any concrete benefit from skill training?

Yes/Not so much/Apparently no (Pls. tick appropriate one)

3.8 How do you rate the presently available training institutes in the country?

High/Moderate/Low (Pls. tick appropriate one)

3.9 Whether presently available Training Institutes are sufficient to cope with the training needs of the employees under this Sector?

Yes/No/Not at all (Pls. tick appropriate one)

3.10 Do you have any internal training arrangement?

Yes/No (Pls. tick appropriate one)

3.11 If not, do you plan to establish one training section to meet your own needs?

Yes/No (Pls. tick appropriate one)

#### 04 Suggestions of the CEO/ Responsible Person of the Unit:

4.1 Regarding establishment of additional training facilities/Institutes in the country:

4.2 Emphasis on training aspects/subject-matters:

4.3 Quality of Trainers:

4.4 Any other issues:

Thank you.

## Annexure – C

### **Feasibility Study on the Establishment of a Training Institute under Bangladesh Garment Accessories & Packaging Manufacturers & Exporters Association (BGAPMEA) for Skill Development of Employees in the Garment Accessories & Packaging (GAP) Sector**

#### **Checklist of aspects for discussion with Key Informants (KIs) from Association Offices**

Date of Interview:

Interviewer:

#### **01 Association Identification:**

1.1 Name of the Association:

1.2 Contact Address:

1.3 Phone No.:

1.4 Contact Person &  
Designation:

1.5 Year of Establishment:

1.6 No. of Members:

#### **02 Views and Suggestions:**

2.1 Views and suggestions regarding sufficiency of the existing training institutes in terms of coverage by categories training

2.2 Views and suggestions regarding sufficiency of the existing training institutes in terms of number of employees providing training each year

2.3 Views and suggestions regarding sufficiency of the existing training institutes in terms of quality of training (general notion)

2.4 Regarding establishment of a modern training institute under this Sector, who should take the lead?

2.5 Conclusion:

Thank you.