

GOVERNMENT OF THE PUNJAB

**TECHNICAL EDUCATION & VOCATIONAL
TRAINING AUTHORITY**



CURRICULUM FOR
Corrugator Machine Operator

(3-Months Customized Course)
(1-Month Curriculum Delivery + 2-Months OJT)
in collaboration with APCCMA

CURRICULUM SECTION
ACADEMICS DEPARTMENT

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TRAINING OBJECTIVES

The curriculum has been designed to train the persons to make their livelihood as Corrugator machine operator and this will also help to reduce unemployment and poverty in the society.

This training program will provide opportunities to those who want to equip themselves with such knowledge and skills which are helpful in their employment within the period of 3 months instead of working as helper for years.

Further this curriculum is developed by considering the requirements of local market/industry and need of the area which will enable the pass outs to get the job in market.

At the end of the course the participant would have:-

1. Attained the knowledge of the basic principles of Corrugator machines and operation.
2. Learned to make different kind of Packaging cartons.
3. The capability to understand the basics of Carton making, defects, their causes and remedies.

CURRICULUM SALIENT

Entry Level	:	Matric
Duration of course	:	3-Months (1-Month Curriculum Delivery + 2-Months on Job Training) 4Hours / day; 6-Days a week 25 hours/week
Total training hours	:	300 Hours
Training Methodology	:	Practical 80% Theory 20%
Medium of Instructions	:	Urdu / English

- **One hour per week for Work-Ethics**
- **Examination Body: PBTE / TTB Lahore**

SKILL COMPETENCY DETAILS

On successful completion of this course, the trainee should be able to:

1. Demonstrate about different units of corrugator and converting machines and their usage.
2. Prepare and implement the Quality and process Parameters of different operations.
3. Prepare and implement the general safety issues regarding production floor and machines.
4. Apply different techniques to make different products having different sizes and Paper recipe
5. Produce products, its operations and specifications.
6. Solve troubleshooting regarding malfunctions of different parts.
7. Solve the causes of Sheet defects i.e. Delamination, Warpage, Washbarding blistering etc.
8. Solve the causes of Carton defects i.e. Misprinting, registration out, fishtail, squaring out etc.
9. Implement the “Acceptance Quality Level” (AQL) System.
10. Play key role in Enhancing Machine Availability, productivity and efficiency.

KNOWLEDGE PROFICIENCY DETAILS

On successful completion of this course, the trainee should be able to:

1. Identify different machine types and their needs.
2. Explain the functions of different machine parts.
3. Explain different types of products.
4. Define Operations break down causes
5. Recognize different techniques to make different products having different sizes and Paper recipe
6. interpret & identify Specification for different Paper Recipes
7. Explain the controlling techniques of Corrugated Sheet and carton
8. Identify the causes of different Sheet defects i.e. Delamination, Warpage, Washbarding blistering etc.
9. Identify the causes of Carton defects i.e. Misprinting, registration out, fishtail, squaring out etc.
10. Explain the “Acceptance Quality Level” (AQL) System.

SCHEME OF STUDIES

Corrugator Machine Operator

3-Months Course (1-Months Curriculum Delivery + 2-Months on Job Training)

S. No	Main Topics (Institutional Training); 100 Hrs.	Total Hours
1.	Introduction of corrugator plant and its component.	4
2.	Wet End	20
3.	Dry End	20
4.	Glue preparation	8
5.	Types of paper, properties and its tests and recycling of waste material.	16
6.	Utilities	08
7.	Sheet Size Calculation and tests	12
8.	Understanding of production documents	08
9.	Health and safety and environment.	04
Total		100

S. No	Main Topics (Institutional Training); 100 Hrs.	Total Hours
1	Introduction of corrugator plant and its component.	04
2	Wet End 2.1-Mill Role Stand Liner / Fluting • Paper reel trolley 2.2- Single Facers (Different types of Flutes) • Pre heater liner/ fluting • Pre conditioner • Corrugator rollers • Glue roller • Doctor roller • Glue scraping blade • Take up conveyor. 2.3- upper bridge 2.4- Single Facer • Lower Bridge 2.5- Auto Splicer 2.6- Double Facer • Pre Heater • Web Break • Web Guide • Triplex Heater • Gluing Machine 2.7- Heating/ cooling Section • Steam chest / hot plates • Upper felt. • Blasting rollers / press shoes/ plates • Lower Felt • Felt driving Drums • Felt tensioner and tracker	20
3	Dry End 1-Rotary Share • Pull rollers • Blades • Board waste removal system 2-Slitter scorer • Creasing Wheels upper • Creasing Wheel lower • Slitting Blades • Grinding Stone wheel • Oiling system	20

	• Trim Suction System 3-N.C Cutter upper and Lower • Measuring Wheel • Non crushing board sheet pulling rollers • Upper and lower drum • Upper and lower helix Blade • Non crushing wheel to pull out the sheet. • Strips • Upper Stacker bridge • Lower Stacker bridge • Sheets pile stacking / pile out system	
4	Glue preparation • Weighing Scale to weight ingredient of glue. Like • Starch / caustic soda/ Borax to control the exact proportion of ingredients. • Water flow meter / marks to measure the required water ratio • Primary Tank with agitator • Secondary Tank with agitator • Glue transfer pump to transfer Glue in plant supply glue tank. • Training of safety precaution. Effect of glue parameters on sheet quality • Cleaning of Glue Lines / Glue storage tank /single facer scraping blade/ Glue rollers /Doctor Roller to avoid the microbial growth.	08
5	Types of paper , Properties & its tests • Liner types • Fluting types • Understanding of paper testing and results • Paper defects • Paper reel defects • Recycling of waste material.	16
6	Utilities • Steam / Gas / Electricity • Compressed Air • Water	08
7	Sheet Size Calculation. • Sheet Length & width calculation for S/W and D/W sheet • Creasing size calculation • Deckle Selection	12

8	Understanding of production documents • Planning sheet • Job card • Shift production report • Check list	08
9.	Health safety and environment • Usage of PPE (personal protective equipment) • Personal and Machine safety • Firefighting equipment • Work ethics	04
	Total	100

SCHEME OF STUDIES
Corrugator Machine Operator

On-Job Training: 2-Months (i-e 200 Hrs.)

3-Months Course (1-Months Curriculum Delivery + 2-Months on Job Training)

S. No	Main Topics (OJT); 100 Hrs.	Total Hours
1.	Introduction of corrugator plant and its component.	04
2.	Operation of Wet End section	48
3.	Operation of Dry End section	48
4.	Visit of Glue preparation machine	08
5.	Understanding types of paper, properties and its tests.	20
6.	Understanding Utilities.	16
7.	Calculating different Sheet Sizes and understanding different tests and recycling of waste material.	24
8.	Understanding of production documents	16
9.	Knowhow of Health and safety and environment.	16
Total		200

SCHEME OF STUDIES

Corrugator Machine Operator

=3-Months Course (1-Months Curriculum Delivery + 2-Months on Job Training)

S. No	Main Topics (On Job Training)	Total Hours
1	Wet End Loading of paper on Mill role stand Liner and Fluting Side • Paper trolley • Operation of Hydraulic/ Motor operated up/ down. • Down System of both arms • Hydraulic/ motor operated system left and right system. • Paper reel Jaws • Paper tension breaks types and control. Pre heater Liner side and Fluting Side • Temperature control / Purging / siphon /steam trap. • Wrapping adjustment on pre heater for moisture and heat control. • Even and smooth running of paper web on heater for uniform heating. • Importance of cleaning • Paper web even tension control dancing/Inclination roller liner and fluting side Function. Single Facer • Operation of single facer • Corrugator rollers types • Types of flutes. A , C, B, E .F • Take up factor of different Flutes • Pitch of corrugator rollers / Flutes • Pressure roller temperature and pneumatic / spring force controls and adjustments • Corrugator rollers alignment • Carbon Test • Glue roller cell types and LPI • Gap adjustment of corrugator and glue roller. • Doctor roller function and adjustment with glue roller. • Paper path Liner side and fluting side Single Facer for Double Wall. Take up conveyor • Gap adjustment • Synchronization with single facer	

2		
3	Upper and lower bridge to carry single facer web Glue preparation.	
4	• Weighing Scale to weight ingredient of glue. Like • Starch / caustic soda/ Borax to control the exact proportion of ingredients.	
5	• Water flow meter / marks to measure the required water ratio	
6	• Primary Tank with agitator • Secondary Tank with agitator • Glue transfer pump to transfer Glue in plant supply glue tank. • Training of safety precaution. Effect of glue parameters on sheet quality • Cleaning of Glue Lines / Glue storage tank /single facer scraping blade/ Glue rollers /Doctor Roller to avoid the microbial growth. 1-Upper and Lower bridge control 2- Paper Web Alignment control Web break adjustment 3-Triplex Heater Wrap / Temperature control. Double Glue Machine • Paper alignment • Glue and doctor roller gap adjustment to control glue application • LPI of Glue rollers • Speed synchronization of glue rollers with heating section speed • Uniform thickness along the roller • Pressure roller/ shoe press/ contact bar adjustment to avoid delamination and crushing of Flutes • Iodine testing	
7	Heating Section • Paper single facers web feeding • Adjustment of upper felt pressure through Blasting rollers /press shoes/ air bond etc. • Auto / manual lifting of felt • Temperature controlling of heating plates • Steam traps inspection • Felt tension control • Felt tracking control • Felt cleaning Rotary Shear • Cutting of sheet • Waste removal	

	Slitter Scorer • Control panels understanding to load the job as per job card / planning • Inspection of creasing condition and alignment before the job setting • Understanding of crease profile and creasing pressure for soft folding of flap and avoid creaking • Alignment of slitter scorer as per sheet web • Inspection of slitting blades and grinding stone. • Oiling system of blades & grinding stone • FRL unit oil drop setting • Waste removal system N.C Cutter / Duplex • Understanding of control panel • Job setting as per Job card / planning sheet • Measuring wheel pressure setting • Non crushing infeed and out feed roller pressure setting • Waste removal and recycling system Upper and Lower Stacker • Detail operational method Corrugated Sheets handling. • Bad / waste sheets removal • Palletization • Pile card insertion for traceability	
Total		200
Institutional Training + On Job Training (1+2 =3months)		

LIST OF PRACTICAL

1.	Paper loading on Mill roll stands.
2.	Single facer unit operation
3.	Double baker unit operation
4.	Heating section operation
5.	Slitter scorer and NC cut operation.
6.	Feeding, printing, slotting, squaring and bundling operation (IN line)
7.	Bursting Test
8.	BCT TEST

LIST OF LABS.

- 1- QA/QC lab (Industry)

LIST OF TOOLS AND EQUIPMENT
(FOR CLASS OF 25)

Name of Trade	Corrugator Machine Operator
Duration of Course	(3-Months)

S. No	Nomenclature of Equipment /Tools	Quantity
1	Single facer units	2 Nos.
2	Double Baking unit	1 No.
3	Heating Section	1 No.
4	Slitter Scorer	1 Nos
5	NC cutter	1 No.
6	Printing machine	1 No.
7	Vernier caliper	05
8	Measuring tapes	25
9	Temperature guns	10
10	Viscosity Stair Hall / D-cup/Love cup.	10
11	Gel point apparatus	02

12	LCD 60”	01
13	Computer System with all Accessories	02
14	White Board	01
15	LASER Jet printer	01

LIST OF CONSUMABLE MATERIALS

FOR CLASS OF 25

**Corrugator Machine Operator
(3-Months)**

S. No	Material	Quantity
1.	Papers for paper exercises.	As per requirement
2.	Glue (Starch + water)	As per requirement
3.	Hydraulic Oil	As per requirement
4.	Lubricant Oil	As per requirement
5.	Greases	As per requirement
6.	Fire Extinguisher	05
7.	PPEs	As per requirement

MINIMUM QUALIFICATION OF TEACHER/ INSTRUCTOR

- B.Sc. Engg./ B.Sc. Tech. in relevant technology with 1-year related teaching / Industry experience in relevant field.
OR
- Three year Diploma in relevant technology with 2-years' related teaching/ Industry experience in relevant field.
OR
- 2-Years' Skilled trade Certificate course with atleast 3-Years' related teaching/ Industry experience in relevant field.
OR
- 1-Year's Semi-Skilled trade Certificate course with atleast 5-Years' related teaching/ Industry experience in relevant field.

REFERENCE BOOKS

- 1- Corrugated cartons making. Production and converting of corrugated Board
By Osmo laakso and Taisto Rintamaki

EMPLOYABILITY OF PASS OUTS

The pass outs of this course may find job / employment opportunities in the following areas / sectors: -

- Self-Employment.
- Corrugated cartons industries
- Packaging developments

Job Occupations & Positions:-

- Machine Operator
- Production Supervisor

Curriculum Development Committee

- | | | |
|----|---|-----------------|
| 1. | Dr.Ahmad Raza
Ex- HOD (P&GA) Lahore | Convener |
| 2. | Mobeen Akhtar
Ex- Head of Manufacturing Corrugator
Packaging Solution (Treet Group) Lahore | Member |
| 3. | Engr. Muhammad Waseem
Manager Quality &EHS
Roshan Packages Ltd | Member |
| 4. | Mr. Muhammad Ali
Ex- Chief Instructor (P&GA)
GCT-PGA Lahore | Member |