KWARA STATE POLYTECHNIC

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A TECHNICAL REPORT OF STUDENTS' INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES) REPORT

HELD AT:

EASY PLASTIC VENTURE

(Shop 3, Magaji Aare Idiape, Oja-Oba, Ilorin Kwara State)

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SUBMITTED TO:

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FROM
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PREFACE

This contain a written report of the work done by me during the four-month industrial attachment with one of the best Organization in Ilorin, which is Easy Plastic Venture.

This work goes further to share the experience I had in the station.

This summarize all the things I learnt and the problems encountered by me, my recommendation and conclusion of all my work.

DEDICATION

This report is dedicated to Almighty Allah for his mercy and protection on me throughout the program.

ACKNOWLEDGMENT

All glory, honor and adoration goes to the Almighty Allah for mercy received during the course of my study and when undergirding my Industrial Training.

My appreciation also goes to my industrial based lecturer, whose accessibility, untiring effort, patients and guidance and suggestions fabulously contributed to the Completion of this report, may God continue to guide and protect them and their family.

My special thanks also go to my families (THE SPECIAL ABDULLAHI'S) for their support, both morally and financially, before and during my SIWES program, I shall forever be grateful. May you live long enough to reap the fruit of your labour (Amin)

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CHAPTER ONE

1.1 BACKGROUND OF THE STUDY

SIWES was established by ITF (Industrial Training Fund) in the year 1973 to solve the problem created by lack of adequate skills for employment of university graduates by Nigerian industries. Employers noticed that graduates from various Nigerian institutions Universities, Monotechnic and Polytechnics alike were lacking in training or in the practical aspect of their courses thereby making it hard for them to perform their duties after being employed. This was a problem until 1973 when SIWES was created, the program was officially approved by the Federal government in 1974.The SIWES scheme is designed to exposes students and prepares them for the work situation they are likely to encounter after graduation.

1.2 DEFINATION OF SIWES AND BRIEF HISTORY

The Students Industrial Work Experience Scheme (SIWES) is a skills training programme designed to expose and prepare students of universities and other tertiary institutions for the Industrial Work situation they are likely to meet after graduation. The scheme is aimed at bridging the existing gap between theory and practice of Sciences, Agriculture, Medical Sciences (including Nursing), Engineering and Technology, Management, and Information and Communication Technology and other professional educational programmes in the Nigerian tertiary institutions. It is also a planned and structured programme based on stated and specific career objectives which are geared towards developing the occupational competencies of participants (Mafe, 2009). Consequently, the SIWES programme is part of the approved Minimum Academic Standard in the various degree programmes for all Nigerian Universities.

The history of SIWES starts off with the recognition of the shortcomings and weakness in the formation of SET (Science, Education and Technology) graduates, particularly with respect to acquisition of relevant production skills (RPSs), the Industrial Training Fund (which was itself established in 1971 by decree 47) initiated the Students' Industrial Work experience Scheme (SIWES) in 1973. The scheme was designed to expose students to the industrial environment and enable them develop occupational competencies so that they can readily contribute their quota to national economic and technological development after graduation. Consequently, SIWES is a planned and structured programme based on stated and specific career objectives which are geared toward developing the occupational competencies of participants. It is therefore, not in doubt that SIWES is a veritable means or tool for National Economic Development.

The main thrust of ITF programmes and services is to stimulate human performance, improve productivity, and induce value-added production in industry and commerce. Through its SIWES and Vocational and Apprentice

Training Programmes, the Fund also builds capacity for graduates and youth self-employment, in the context of Small-Scale Industrialization, in the economy. The Industrial Training Fund is a grade ‘A’ parasternal operating under the aegis of the Federal Ministry of Industry, Trade and Investment. It has been operating for 42 years as a specialist agency that promotes and encourages the acquisition of industrial and commercial skills required for national economic development.

1.2.1 BODIES INVOLVED IN THE MANAGEMENT OF SIWES.

The bodies involved in the management of SIWES are:

- Federal government
- Industrial Training Fund

While other supervising agencies include:

- National University Commission (NUC)
- National Board for Technical Education (NBTE)
- National Council for Colleges of Education (NCCE).

The functions of these agencies are as follows;

- To ensure adequate funding of the scheme.

- To establish and accredit SIWES in the approved institutions.
- To formulate policies and guidelines for the participating bodies to follow.
- To supervise the students participating and sign their required documents.
- To ensure payment of allowance for the students etc.

1.2.2 ROLES OF THE INDUSTRIAL TRAINING FUND (ITF).

This agency is dedicated to performing the following roles:

- Formulate policies and guidelines on SIWES for distribution to all the SIWES participating bodies;
- Provide logistic material needed to administer the scheme;
- Organize orientation programmes for students prior to attachment;
- Provide information on companies for attachment and assist in industrial placement of students;
- Supervise students on Industrial attachment;
- Accept and process Master and Placement lists from institutions and supervising agencies;
- Vet and process students' logbooks and ITF Form 8.

1.3 AIM AND OBJECTIVES OF SIWES

The Industrial Training Fund's policy Document No. 1 of 1973 which established SIWES outlined the aims and objectives of the scheme. The aims and objectives of the scheme are as follows:

- It provides an avenue for students in institutions of higher learning to acquire industrial skills and experience during their course of study.
- It exposes Students to work methods and techniques in handling equipment and machinery that may not be available in their institutions.
- It makes the transition from school to the world of work easier and enhance students' contact for later job placements and a chance to evaluate companies for which they might wish to work.
- It provides students with the opportunities to apply their educational knowledge in real work and industrial situations, there by bridging the gap between theory and practice.
- The programme teaches the students on how to interact effectively with other workers and supervisors under various conditions in the organization.

1.4 BRIEF HISTORY OF THE ORGANIZATION

Easy Plastics Venture is a company founded in May 2010 by Mr. Ishaq Aremu. Initially, the business focused on distributing various plastic products to local retailers. However, due to growing demand and increased capital investment, Easy Plastics transitioned to manufacturing in 2011. The company relocated to its current facility at Shop 3, Magaji Aare Idiape, Oja-Oba, Ilorin Kwara State, Nigeria, to accommodate its expanding operations. Today, Easy Plastics Venture specializes in the production and marketing of a wide range of high-quality plastic items. As a small-scale enterprise, it remains dedicated to serving its customers with innovative products and reliable service.

The company is managed by a team of selected industrial professionals who combine to produce high quality plastic that meets customer's specifications. The company produces two type of products which include:

- Plastic comb
- Plastic mirror case

1.4.1 ESTABLISHMENT IDEALS

- Philosophy:

To build enduring relationships and bonds that rest on the solid foundation of mutual trust and understanding and to adhere to the highest standards of quality and excellence.

- Vision:

To delight customers and satisfy all other stakeholders by continual development and nurture of people, products, process and environment.

- Mission:

- To be the customers preferred choice for quality, service, new product development and collaboration

1.4.2 ESTABLISHMENT OBJECTIVES/SCOPE OF SERVICE

Easy Plastic Venture enterprise is committed to:

- Providing the plastic industry with outstanding products and services of reliable and consistent quality.

- Producing quality products with a view to establishing itself as the most reliable supplier in the industry.

- Ensuring complete customer satisfaction.

- Bringing in continuous improvement and improved organizational effectiveness.

- Improving the quality of work through continuous training.

- Establishing and reviewing quality objectives periodically.

1.4.3 ORGANIZATION CHART

1.4.4 QUALITY ASSURANCE

This concept covers a wide range which as an individual or collectively favours the quality of manufactured product, it is the overall arrangement made in order to achieve consistencies in production and standardised quality which is appropriate for it intended usage. It looks vividly into what happens yesterday, today and tomorrow so as to appropriate and ensure quality final product.

1.4.5 QUALITY CONTROL

Quality control is used to describe all measures designed to ensure the uniform output of batches of products that conform to the establishment specification. It is that part that organises, documents and release or hold product in order to ensure that the necessary and relevant tests are actually carried out and that the starting material, intermediate and finished product are not accepted for use, sale or supplied to the customer until their quality has been judged to be satisfactory.

However, quality control serve as a medium by which the manufacturer measures the actual quality performance in regard to the standard and takes necessary steps on the courses of the variation from specification (if there is any) to ensure good quality product.

CHAPTER TWO

LITERATURE REVIEW

2.1 BRIEF BACKGROUND OF PLASTICS

Plastics are a wide range of synthetic or semi-synthetic materials that use polymers as a main ingredient. Their plasticity makes it possible for plastics to be moulded, extruded or pressed into solid objects of various shapes. This adaptability, plus a wide range of other properties, such as being lightweight, durable, flexible, and inexpensive to produce, has led to its widespread use.

Plastics typically are made through human industrial systems. Most modern plastics are derived from fossil fuel-based chemicals like natural gas or petroleum; however, recent industrial methods use variants made from renewable materials, such as corn or cotton derivatives.

In developed economies, about a third of plastic is used in packaging and roughly the same in buildings in applications such as piping, plumbing or vinyl siding. Other uses include automobiles (up to 20% plastic), furniture, and toys. In the developing world, the applications of plastic may differ.

2.1.1 BRIEF HISTORY OF PLASTICS

The world's first fully synthetic plastic was Bakelite, invented in New York in 1907, by Leo Baekeland, who coined the term "plastics". Dozens of different types of plastics are produced today, such as polyethylene, which is widely used in product packaging, and polyvinyl chloride, used in construction and pipes because of its strength and durability. Many chemists have contributed to the materials science of plastics, including Nobel laureate Hermann Staudinger, who has been called "the father of polymer chemistry" and Herman Mark, known as "the father of polymer physics".

The success and dominance of plastics starting in the early 20th century has caused widespread environmental problems, due to their slow decomposition rate in natural ecosystems. Toward the end of the 20th century, the plastics industry promoted recycling in order to assuage environmental concerns while continuing to produce virgin plastic. The main companies producing plastics doubted the economic viability of recycling at the time, and this is reflected in

Contemporary plastic collection. Plastic collection and recycling is largely ineffective because of the complexity of cleaning and sorting post-consumer plastics. Most plastic produced has not been reused, either being captured in landfills or persisting in the environment as plastic pollution. Plastic pollution can be found in the entire world's major water bodies, for example, creating garbage patches in all of the world's oceans and contaminating terrestrial ecosystems.

2.1.2 STRUCTURE OF PLASTICS

Most plastics contain organic polymers. The vast majority of these polymers are formed from chains of carbon atoms, with or without the attachment of oxygen, nitrogen or sulfur atoms.

These chains comprise many repeating units formed from monomers. Each polymer chain consists of several thousand repeating units. The backbone is the part of the chain that is on the *main path*, linking together a large number of repeat units. To customize the properties of a plastic, different molecular groups called side chains hang from this backbone; they are usually hung from the monomers before the monomers themselves are linked together to form the polymer chain. The structure of these side chains influences the properties of the polymer.

2.2 COMMON PLASTICS

This includes both commodity (standard) plastics and engineering plastics.

- Polyamides (PA) or (nylons): fibers, toothbrush bristles, tubing, fishing line, and low-strength machine parts, such as engine parts or gun frames
- Polycarbonate (PC): compact discs, eyeglasses, riot shields, security windows, traffic lights, and lenses
- Polyester (PES): fibers and textiles

- Polyethylene (PE): a wide range of inexpensive uses including supermarket bags and plastic bottles
- High-density polyethylene (HDPE): detergent bottles, milk jugs, and molded plastic cases
- Low-density polyethylene (LDPE): outdoor furniture, siding, floor tiles, shower curtains, and clamshell packaging
- Polyethylene terephthalate (PET): carbonated drink bottles, peanut butter jars, plastic film, and microwavable packaging
- Polystyrene (PS): foam peanuts, food containers, plastic tableware, disposable cups, plates, cutlery, compact disc (CD) and cassette boxes
- High impact polystyrene (HIPS): refrigerator liners, food packaging and vending cups
- Polyurethanes (PU): cushioning foams, thermal insulation foams, surface coatings and printing rollers: currently the sixth or seventh most commonly-used plastic and, for instance, the most commonly used plastic in cars
- Polyvinyl chloride (PVC): plumbing pipes and guttering, electrical wire/cable insulation, shower curtains, window frames and flooring
- Polyvinylidene chloride (PVDC): food packaging, such as Saran
- Acrylonitrile butadiene styrene (ABS): electronic equipment cases (e.g. computer monitors, printers, keyboards) and drainage pipe.

- Polycarbonate + acrylonitrile butadiene styrene (PC + ABS): a blend of PC and ABS that creates a stronger plastic used in car interior and exterior parts, and in mobile phone bodies
- Polyethylene + acrylonitrile butadiene styrene (PE + ABS): a slippery blend of PE and ABSused in low-duty dry bearings
- Polypropylene (PP): bottle caps, drinking straws, yogurt containers, appliances, car fenders and bumpers, and plastic pressure pipe systems. At Ugobest plastic enterprise polypropylene is the major raw material for the production of plastic comb and mirror frame; polypropylene will be discussed extensively in the next chapter.

CHAPTER THREE

THE WORK EXPERIENCE PROCESS

3.1 DEPARTMENT OF ATTACHMENT AND PRIMARY FUNCTION

During my industrial attachment at Easy Plastic Venture I was assigned to the Production department of the Organization. This part of the organization is tasked with meeting all the production demands of the organization as a whole. The department is directly involved in the manufacturing of products.

3.1.1 FUNCTIONS OF THE PRODUCTION DEPARTMENT

The functions of the production section of the company include the following;

- The production section is responsible manufacturing of goods which are then sold in order to generate revenue for the company.

- The production section is responsible for the designing of goods/products which are sold to the public and general public.

- To maintain efficiency in the use of raw materials and labour for production of goods

- The department is responsible for maintenance of quality of items produced.

- The maintenance/servicing of the equipment and machineries used in production.

3.2 COMPONENTS OF THE PLASTIC COMB/MIRROR FRAME

The raw major used in the production of the plastic comb/mirror frame are:

- Polypropylene
- Master batch
- Recycled material

3.2.1 POLYPROPYLENE

Polypropylene (PP) is a thermoplastic "addition polymer" made from the combination of propylene monomers. It is used in a variety of applications to include packaging for consumer products, plastic parts for various industries including the automotive industry, special devices like living hinges, and textiles. Polypropylene was first polymerized in 1951 by a pair of Phillips petroleum scientists named Paul Hogan and Robert Banks and later by Italian and German scientists Natta and Rehn. It became prominent extremely fast, as commercial production began barely three years after Italian chemist, Professor Giulio Natta, first polymerized it. Natta perfected and synthesized the first polypropylene resin in Spain in 1954, and the ability of polypropylene to crystallize created a lot of excitement. By 1957, its popularity had exploded and widespread commercial production began across Europe. Today it is one of the most commonly produced plastics in the world.

According to some reports, the current global demand for the material generates an annual market of about 45 million metric tons and it is estimated that the demand will rise to approximately 62 million metric tons by 2020. The major end users of polypropylene are the packaging industry, which consumes about 30% of the total, followed by the electrical and equipment manufacturing, which uses about 13% each. Household appliances and automotive industries both consume 10% each and construction materials follows with 5% of the market. Other applications together make up the rest of the global polypropylene consumption.

Polypropylene has a relatively slippery surface which can make it a possible substitute for plastics like Acetal (POM) in low friction applications like gears or for use as a contact point for furniture. Perhaps a negative aspect of this quality is that it can be difficult to bond Polypropylene to other surfaces (i.e. it does not adhere well to certain glues that work fine with other plastics and sometimes has to be welded in the event that forming a joint is required). Although polypropylene is slippery at the molecular level, it does have a relatively high coefficient of friction - which is why acetal, nylon, or PTFE would be used instead. Polypropylene also has a low density relative to other common plastics which translates to weight savings for manufacturers and distributors of injection molded Polypropylene parts. It has exceptional resistance at room temperature to organic solvents like fats but is subject to oxidation at higher temperatures (a potential issue during injection moulding).

One of the major benefits of Polypropylene is that it can be manufactured (either through CNC or injection molding, thermoforming, or crimping) into a living hinge. Living hinges are extremely thin pieces of plastic that bend without breaking (even over extreme ranges of motion nearing 360 degrees). They are not particularly useful for structural applications like holding up a heavy door but are exceptionally useful for non load-bearing applications such as the lid on a bottle of ketchup or shampoo. Polypropylene is uniquely adept for living hinges because it does not break when repeatedly bent. One of the other advantages is that polypropylene can be CNC machined to include a living hinge which allows for faster prototype development and is less expensive than other prototyping methods. Creative Mechanisms is unique in our ability to machine living hinges from a single piece of polypropylene.

Another advantage of Polypropylene is that it can be easily copolymerized (essentially combined into a composite plastic) with other polymers like polyethylene. Copolymerization changes the material properties significantly, allowing for more robust engineering applications than are possible with pure polypropylene (more of a commodity plastic on its own).

The characteristics mentioned above and below mean that polypropylene is used in a variety of applications: dishwasher safe plates, trays, cups, etc, opaque to-go containers, and many toys.

CHARACTERISTICS OF POLYPROPYLENE

Some of the most significant properties of polypropylene are:

- Chemical Resistance: Diluted bases and acids don’t react readily with polypropylene, which makes it a good choice for containers of such liquids, such as cleaning agents, first-aid products, and more.
- Elasticity and Toughness: Polypropylene will act with elasticity over a certain range of deflection (like all materials), but it will also experience plastic deformation early on in the deformation process, so it is generally considered a "tough" material. Toughness is an engineering term which is defined as a material's ability to deform (plastically, not elastically) without breaking..
- Fatigue Resistance: Polypropylene retains its shape after a lot of torsion, bending, and/or flexing. This property is especially valuable for making living hinges.
- Insulation: polypropylene has a very high resistance to electricity and is very useful for electronic components.
- Transmissivity: Although Polypropylene can be made transparent, it is normally produced to be naturally opaque in color. Polypropylene can be

used for applications where some transfer of light is important or where it is of aesthetic value. If high transmissivity is desired then plastics like Acrylic or Polycarbonate are better choices

Polypropylene is classified as a “thermoplastic” (as opposed to “thermoset”) material which has to do with the way the plastic responds to heat. Thermoplastic materials become liquid at their melting point (roughly 130 degrees Celsius in the case of polypropylene). A major useful attribute about thermoplastics is that they can be heated to their melting point, cooled, and reheated again without significant degradation. Instead of burning, thermoplastics like polypropylene liquefy, which allows them to be easily injection molded and then subsequently recycled. By contrast, thermoset plastics can only be heated once (typically during the injection molding process). The first heating causes thermoset materials to set (similar to a 2-part epoxy) resulting in a chemical change that cannot be reversed. If you tried to heat a thermoset plastic to a high temperature a second time it would simply burn. This characteristic makes thermoset materials poor candidates for recycling.

Why Polypropylene is used so often

Polypropylene is used in both household and industrial applications. Its unique properties and ability to adapt to various fabrication techniques make it stand out as an invaluable material for a wide range of uses. Another invaluable characteristic is polypropylene's ability to function as both a plastic material and as a fiber (like those promotional tote bags that are given away at events, races, etc). Polypropylene's unique ability to be manufactured through different methods and into different applications meant it soon started to challenge many of the old alternative materials, notably in the packaging, fiber, and injection molding industries. Its growth has been sustained over the years and it remains a major player in the plastic industry worldwide.

TYPES OF POLYPROPYLENE

There are two main types of polypropylene available: homopolymers and copolymers. The copolymers are further divided into block copolymers and random copolymers. Each category fits certain applications better than the others. Polypropylene is often called the "steel" of the plastic industry because of the various ways in which it can be modified or customized to best serve a particular purpose. This is usually achieved by introducing special additives to it or by manufacturing it in a very particular way. This adaptability is a vital property.

Homopolymer polypropylene is a general-purpose grade. You can think of this like the default state of the polypropylene material. Block copolymer polypropylene has co-monomer units arranged in blocks (that is, in a regular pattern) and contain anywhere between 5% to 15% ethylene. Ethylene improves certain properties, like impact resistance while other additives enhance other properties. Random copolymer polypropylene – as opposed to block copolymer polypropylene – has the co-monomer units arranged in irregular or random patterns along the polypropylene molecule. They are usually incorporated with anywhere between 1% to 7% ethylene and are selected for applications where a more malleable, clearer product is desired.

How Polypropylene is made

Polypropylene, like other plastics, typically starts with the distillation of hydrocarbon fuels into lighter groups called “fractions” some of which are combined with other catalysts to produce plastics (typically via polymerization or polycondensation).

Polypropylene for Injection Molding Machines

Polypropylene is a very useful plastic for injection molding and is typically available for this purpose in the form of pellets. Polypropylene is easy to mold despite its semi-crystalline nature, and it flows very well because of its low melt viscosity. This property significantly enhances the rate at which you can fill up a mold with the material. Shrinkage in polypropylene is about 1-2% but can vary based on a number of factors, including holding pressure, holding time, melt temperature, mold wall thickness, mold temperature, and the percentage and type of additives. This type of polypropylene is used at Ugobest plastic enterprise.

ADVANTAGES OF POLYPROPYLENE

- Polypropylene is readily available and relatively inexpensive.
- Polypropylene has high flexural strength due to its semi-crystalline nature.
- Polypropylene has a relatively slippery surface.
- Polypropylene is very resistant to absorbing moisture.
- Polypropylene has good chemical resistance over a wide range of bases and acids.
- Polypropylene possesses good fatigue resistance.
- Polypropylene has good impact strength.
- Polypropylene is a good electrical insulator.

DISADVANTAGES OF POLYPROPYLENE

- Polypropylene has a high thermal expansion coefficient which limits its high temperature applications.
- Polypropylene is susceptible to UV degradation.
- Polypropylene has poor resistance to chlorinated solvents and aromatics.
- Polypropylene is known to be difficult to paint as it has poor bonding properties.
- Polypropylene is highly flammable.
- Polypropylene is susceptible to oxidation.

Despite its shortcomings, polypropylene is a great material overall. It has a unique blend of qualities that aren't found in any other material which makes it an ideal choice for many projects.

PROPERTIES OF POLYPROPYLENE

PROPERTY	VALUE
Technical name	polypropylene
Chemical formula	$(C_3H_6)_n$
Resin identification code (used for recycling)	
Melt Temperature Typical Injection Mold Temperature	130°C (266°F) 32 - 66 °C (90 - 150 °F)
Heat Deflection Temperature (HDT)	100 °C (212 °F) at 0.46 MPa (66 PSI)
Tensile Strength	32 MPa (4700 PSI)
Flexural Strength	41 MPa (6000 PSI)
Specific Gravity	0.91
Shrink rate	1.5 - 2.0 % (.015 - .02 in/in)

Figure 1: polypropylene

3.2.2 MASTER BATCH

Master batch (**MB**) is a solid additive for plastic used for coloring plastics (**Color Masterbatch**) or imparting other properties to plastics (**Additive Masterbatch**). A liquid dosage form is called liquid color. Masterbatch is a concentrated mixture of pigments and/or additives encapsulated during a heat process into a carrier resin which is then cooled and cut into a granular shape.

Master batch allows the processor to colour raw polymer economically during the plastics process.

The alternatives to using master batches are buying a fully compounded material (which may be more expensive and less open to e.g. color variability of the product), or compounding from raw materials on site (which is prone to issues with achieving full dispersion of the colorants and additives, and prone to preparing more material than what is used for the production run). In comparison with pure pigments, masterbatches require more storage space and their lead times are longer. Another disadvantage is additional exposure of heat ("heat history") to both the carrier and the additive; this may be important e.g. for marginally thermally stable pigments.

As masterbatches are already premixed compositions, their use alleviates the issues with the additive or colorant clumping or insufficient dispersion. The concentration of the additive in the masterbatch is much higher than in the end-use polymer, but the additive is already properly dispersed in the host resin. In a way their use is similar to uses of ferroalloys for adding alloying elements to steels.

The use of masterbatches allows the factory to keep stock of fewer grades of the polymer, and to buy cheaper natural polymer in bulk.

The master batches can be fairly highly concentrated (in comparison with the target composition), with high "let-down ratios"; e.g. one 25 kg bag can be used for a tonne of natural polymer. The relatively dilute nature of masterbatches (in comparison with the raw additives) allows higher accuracy in dosing small amounts of expensive components. The compact nature of the grains of solid masterbatches eliminates problems with dust, otherwise inherent for fine grained solid additives. Solid master batches are also solvent-free; therefore they tend to have longer shelf life as the solvent won't evaporate over time. The masterbatch usually contains 40-65% of the additive, but the range can be as wide as 15-80% in extreme cases.

The carrier material of the masterbatch can be based on a wax (universal carrier) or on a specificpolymer, identical or compatible with the natural polymer used (polymer-specific). E.g. EVA or LDPE can be used as carriers for polyolefins and nylon, polystyrene can be used for ABS, SAN, and sometimes polycarbonates. When a carrier different than the base plastic is used, the carrier material may modify the resulting plastic's properties; where this could be important, the carrier resin has to be specified. The usual ratio of masterbatch to the base resin is 1 to 5 percent.

Several masterbatches (color and various additives) can be used together.[1] The carrier can also double as a plasticizer (common for liquid masterbatches) or a processing aid.

The machines are usually fed with premixed granules of the host polymer and the master batch.

The final mixing then gets done in the screw and extrusion part of the machine. This is sometimes prone to adverse effects, e.g. separation of the masterbatch and the base material in the machine's hopper. The master batch can be also added directly to the machine's screw, as a free-flowing solid or in case of a liquid masterbatch by e.g. a peristaltic pump. Such use of liquid master batches allows highly accurate dosing and quick change of colour between machine runs.

Masterbatches can be used in most processes, except rotational molding and Plastisol and other liquid resin systems.

Figure 2: masterbatch

3.2.3 RECYCLED MATERIAL

This is polypropylene material collected and grinded into pellet to be used. In other to save cost of production recycled materials are used. At Ugobest plastic enterprise no production is done without in-cooperating recycled polypropylene.


Figure 3: recycled polypropylene

3.3 EQUIPMENT USED IN THE PRODUCTION

The equipments used in the production process are:

- Measuring scale: this is used to measure the quantity of various raw material used.
- Mixing bowl: This is where the polypropylene, recycled polypropylene and master batch are mixed before being fed into the hopper of the

injection plastic moulding machine. The mixing process is done manually at Ugobest plastic enterprise.

- Injection plastic moulding machine: this is a computerized system that that consist of buttons, the mould and where the actual process occur. This is where the raw materials are fed and the product collected.

Figure 4: injection plastic machine

3.4 PRODUCTION PROCESS

The production process involves the series of work done to get to the finished product i.e. the mirror frame and the plastic comb:

- Bringing the raw material from store to the production room.

- Opening of the raw materials
- Mixing of the masterbatch, polypropylene and the recycled polypropylene in a mixing bowl.
- The injection plastic machine is turned on and allowed to heat up for some minutes. To activate the machine to heat up mode, the charge button is clicked on the injection moulding machine.

Figure 5: control button of the injection mould machine

- After some minutes the mixture is poured into the hopper of the machine

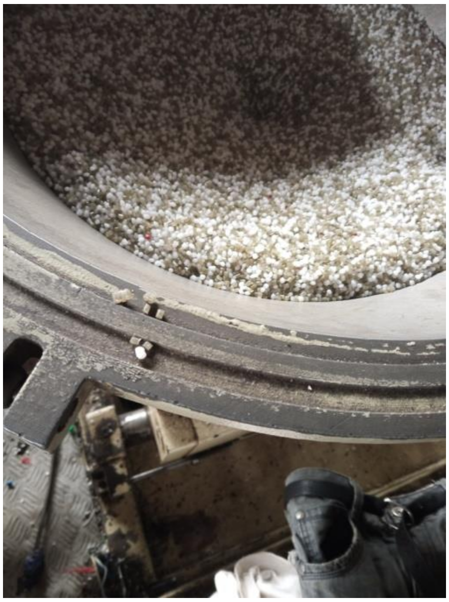

Figure 6: the hopper of the injection mould machine

- The heating and formation of the desired product occurs inside the machine. The output is dependent on the mould in the machine. The machine ejects comb in fours’ and mirror frame in twos.

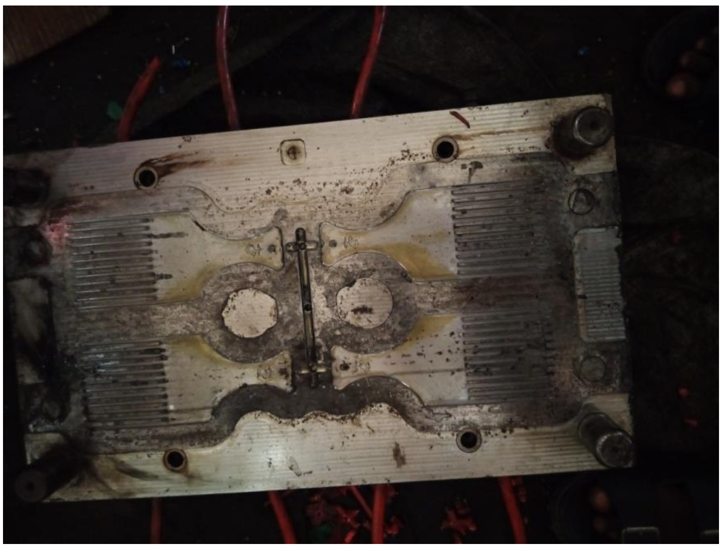

Figure 7: comb mould of the injection mould machine

After the production process the product is sent to the packaging department where it is packaged and ready for sale.

Figure 8: plastic comb

 

Figure 9: mirror frame

3.5 SAFETY MEASURES

- Safety Goggles: Always wear safety goggles to protect your eyes during any activity involving chemical, flame or heating or the possibility of flying objects, particles or substances.
- Lab Apron: Wear a laboratory apron to protect your skin and clothing from injury.
- Breakage Handling: Handle breakable materials and glassware with care. Do not touch broken glass.
- Heat Resistance Gloves: Use heat resistance gloves or other hand protection when handling hot materials.

3.1 PRACTICAL LESSONS LEARNT

During my Industrial Attachment at Easy Plastic Venture I acquired, a strategic understanding of how different businesses operate in real life by interacting with operators and chemical production experts alike. During my training period I discovered that my course of study Business Administration plays an important role in the production process by application of Polymer chemistry; this is because molecular structure is vital in establishing film properties, even the bubble geometry resulting from processing conditions in polymer production. Molecular orientation and crystalline structure – controlled by bubble dimensions – affect properties such as tensile strength, impact toughness, and clarity. As a manufacturing process the training program to understand their core offerings, needs and objectives in order to effectively deliver the overall goal/product. This work experience gave me confidence to know that I am well suited for the profession and combined with my constant efforts to learn more on my own.

CHAPTER FOUR

SUMMARY, CONCLUSION AND RECOMMENDATION

4.1 SUMMARY

Student industrial training scheme (SIWES) provides students with appreciable skills designed to expose or equip them with real life working experience. Students gain increased maturity and understanding of the workplace and a better understanding of your own career goals and for the progress of the nation.

The program is an invaluable and worthwhile venture as such should be encouraged by the federal Government of Nigeria. This implies that more funds facilities and also trained personnel should be made available to help in the realization of the noble aims and objectives of the program.

Again it should be given adequate publicity to enable various establishments appreciate the relevance of (IT) to students and work towards helping the students in achieving their goals.

This report contains and gives a detailed explanation of all the activities carried out at Eazy Plastic Ventures.

4.2 CONCLUSION

The production of plastic is a complex process that involves the application of principles from mathematics, physics, and chemistry to transform raw materials into finished products. Understanding the various stages of production is essential for ensuring the quality and consistency of items like mirror frames and combs, which are primarily made from polypropylene.

In a plastic manufacturing plant, effective quality control is crucial for success. This process begins with a thorough evaluation of incoming raw materials, where various chemical and physical properties such as thickness, appearance, color, and odor are tested. By rigorously monitoring quality from the start of production, manufacturers can significantly enhance the likelihood of delivering a consistent and high-quality finished product.

Overall, effective management of the production process is key to achieving success in the plastic manufacturing industry. Implementing strong quality control measures helps ensure that products meet industry standards and customer expectations, emphasizing the importance of operational efficiency in a competitive market.

4.3 RECCOMENDATION

However, every problem has a solution or remedy and even prevention. Therefore I am recommending the following:-

1. The industrial training fund should compile list of employer’s available training places for industrial attachment and forward the list to the coordinating agencies.
2. The company should be willing to accept and encourage students that are seeking for SIWES placement in the company.
3. The company should also grant access to students to make use of their machines.
4. The company and organization that accepts the (IT) students should be educated on the benefits of paying the attached students no matter the amount so as to encourage them and also to help them in solving some of their problems like transportations.
5. The establishment should provide adequate facilities to make the program enjoyable for students such as accommodation.

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