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RECENT TRENDS IN MANUFACTURING

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ABSTRACT

This paper include manufacturing trends in enhancing the productivity and quality of the PVC sheet by using some quality checking techniques. This paper also include the Extrusion process used in making of PVC sheet also caldering process which is used for mainly PVC sheet .it include a GSM techniques and how it is possible to know reason of rejection of PVC sheet.

Keywords:Caldering process, extrusion process, GSM

I.INTRODUCTION

Technology of manufacturing is improving rapidly for increasing the productivity and quality of material. The purpose of this paper is to present the recent trends in manufacturing to enhancing the quality and productivity of material. Paper include the extrusion process which is used in many industries to create a object of fixed cross sectional profile also it is used to increase the strength of the material. Another useful technique is Grams per Square Metre (GSM) it is nothing but measuring unit to measure the strength of material. It is also used to measure the quality of material such as fabrics. Quality of material is based on corrugated fibre board. This Paper also include the polymer calendaring process which is useful to enhance the quality and productivity of material**.**

II.TRENDS IN MANUFACTURING

2.1 EXTRUSION PROCESS

Extrusion is a process used in industry to create objects of a fixed cross-sectional profile. A material is pushed through a die of the desired cross-section. There is two main advantages of extrusion process that it create very complex cross-sections, and also to work materials that are brittle, because the material only encounters compressive and shear stresses. It gives an excellent surface finish parts.Drawing is a similar process, which uses the tensile strength of the material to pull it through the die. This limits the amount of change which can be performed in one step, so it is limited to simpler shapes, and multiple stages are usually needed. Drawing is the main way to produce wire. Metal bars and tubes are also often drawn. Extrusion may be continuous (theoretically producing indefinitely long material) or semi continuous (producing many pieces). The extrusion process can be done with the material hot or cold. Commonly extruded materials include metals, polymers, ceramics, concrete, modelling clay, and foodstuffs. The products of extrusion are generally called "extrudates". Also referred to as "hole flanging", hollow cavities within extruded material cannot be produced using a simple flat extrusion die, because there would be no way to support the centre barrier of the die. Instead, the die assumes the shape of a block with depth, beginning first with a shape profile that supports the center section. The die shape then internally changes along its length into the final shape, with

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the suspended center pieces supported from the back of the die. The material flows around the supports and fuses together to create the desired closed shape. The extrusion process in metals may also increase the strength of the material.

A.Hot extrusion

Hot extrusion is a hot working process, which means it is done above the material's recrystallization temperature to keep the material from work hardening and to make it easier to push the material through the die. Most hot extrusions are done on horizontal hydraulic presses that range from 230 to 11,000 metric tons (250 to 12,130 short tons). Pressures range from 30 to 700 MPa (4,400 to 101,500 psi), therefore lubrication is required, which can be oil or graphite for lower temperature extrusions, or glass powder for higher temperature extrusions. The biggest disadvantage of this process is its cost for machinery and its upkeep.[1]The extrusion process is generally economical when producing between several kilograms (pounds) and many tons, depending on the material being extruded. There is a crossover point where roll formingbecomes more economical. For instance, some steels become more economical to roll if producing more than 20,000 kg (50,000 lb).[2]

2.2GSM of Materials

GSM is the unit to measure the strength of the fabrics, paper, corrugated fibre board, foils, leather, rexine, etc. It stands for Grams per Metre Square or Grams per Square Metre. It is a very simple to perform test but tells a lot about the basic properties of the material which are very important to decide the quality of the fabric. Also, the quality of the fabric is measured with its GSM value. The denser a knitted fabric is the better is the quality. The heavier a corrugated fibre board is, the better is the quality.

GSM for Textiles

In the textile industry, the quality of the fabric is defined in terms of GSM. Higher the Grammage of the material, better is the quality. For rigorous applications, fabrics with high GSM is used, which means the fabric is heavy and densely woven. When a fabric is used for clothing and garment manufacturing, low Grammage is preferred. As it is easy for dyeing, printing, and sewing.

GSM for Paper and Packaging

Corrugated sheets are chosen by estimating the GSM of the sample material. High Grammage defines the strength of the paper. In certain applications where the paper will be subjected to load and harsh working conditions, high Grammage is desired.

Testing Procedure

- The GSM kit comes with a standardised round cutter equipped with sharp blades.
- Places the fabric on the platform
- Remove any crease and cut a circular sample using the cutter.
- Now weigh the sample using the digital balance.
- Determine the GSM using the below mentioned formula

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GSM = (Weight of Sample in Grams X 1000)/ Area of sample in cm2

Presto is the leading manufacturers and suppliers of Grammage checking kit. It includes standardized GSM Round Cutter and Digital GSM Balance for Grammage measurement of the samples. With this advanced Grammage checking kit, it becomes very easy for the manufacturers to determine the GSM of the materials and ensure the best quality of final products.

2.3Polymer calendering

The calender concept is fairly easy to understand. The basic idea of the machine is that squishes a heat softened polymer between two or more rollers (this area is called a nip) to form a continuous sheet. To begin the process the polymer must go through blending and fluxing before it goes through the calender. Blending is a process that creates the desired polymer and fluxing heats and works this blended polymer to make it a consistency easier for the calender to handle.[3]. The polymer is then ready to go through the calender and will leave it at a thickness dependent mainly on the gap between the last two rollers. The last set of rollers also dictate the surface finish; for example, they can influence the glossiness and texture of the surface[1]. One thing about polymers being calendered is that the sheet going through the rollers tends to follow the faster moving roller of the two that it's in contact with and it also sticks more to the hotter rolls. That is why calenders typically end with a smaller roller at a higher speed to peel the sheet off. It is also why the middle roller is normally kept cooler so that the sheet won't stick to the other rollers nor will it split by sticking to both rollers which can happen[4]. This splitting phenomenon has forced calender operators to desire a high friction ratio between two rollers, which ranges from

Types :

L Type

The L type is the same as seen in Figure 2 but mirrored vertically. Both these setups have become popular and because some rollers are at 90^{o} to others their roll separating forces have less effect on subsequent rollers. L type calenders are often used for processing rigid vinyls and inverted L type calenders are normally used for flexible vinyls[8].

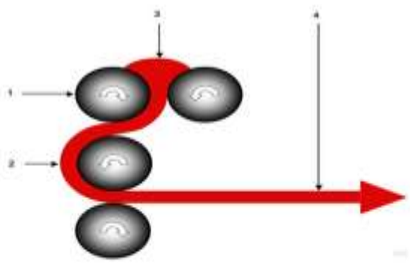

Fig 2.1: Roller setup in a typical inverted 'L' type calendar

III.CONCLUSION

With the aid of quality measurement techniques we can enhance quality and productivity of PVC sheet under the standard conditions. By using using quality thechniqes it is become easy to find the problem affecting quality of product. Action can be taken properly to root out those problems so using recent manufacturing techniques with the use of quality measuring techniques we can enhance the productivity and quality of product.

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