

LOGISTIC FLOW DESIGN FOR SME`S

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Abstract:

This article describes a system of bottling lines of a solution often used by the population, namely acetone. This system is created virtually, from the introduction of glass used on the production line until it is being put on the palatial packaging, using CATIA software. Bottling line is particularly suitable for the development of SMEs in the economic market.

Key words: material flows, flux of raw materials, SWOT analyze

JEL classification codes: L23, L65

1. The study substantiating the management of material flows in realizing a product

The bottling process

A bottling line represents a series of production machines made to work together in order to bottle liquids in bottles. These lines can be found as facilities like making drinks, including wine producers and refreshments, like companies that produce drugs and cleaning products. Each bottling line can count on a personalized design to satisfy the needs of each specifiv product.

A bottling line can include human work at one or more points along the line, or it can be completed automated with the help of robots and logistic equipments from the start to til the end of the process.

The working cycle of the bottling lines: while the bottling lines differ based on the product and producer, many lines include the same positions or basic components. Each station is responsible for one or more steps during the bottling process. The majority start in a station where the empty bottles are loaded onto a conveyor belt or another machine. From here, the bottles begin a cleaning process and are subjected to suction to eliminate the air inside so that the bottle can e filled. After that, the bottles go into a filling station, which can include a rotation device or a in-line filling system.

Once the bottles are filled with liquid, some can be sucked one more time to eliminate the excessive air. This step is extremely important, with things like wine, where the oxygen remained in the bottle can have a huge impact on the taste and quality. Then the bottles go through a machine that applies a cap or cork to seal it. Then they go through a labeling machine only if the bottle requires a label or a stamp. Finally the bottles are packaged and wrapped on a palette to prepare them for transportation.

The display of these machines may vary, the equipment producers usually arrange the bottling line based on the specific objectives of production. The machines should be arranged to minimize the errors and to increase the productivity or debit.

Systems that perform the transfer function in the bottling flows are conveyors. These can be with or without gravitational action, their purpose being transportation with a controlled continuous motion the objects found in between the machines from the flow. Without bottling equipment, these companies would have it impossible to satisfy the demand of famous drinks and othe liquids. Automated lines also help reduce the need for human work which helps with cutting into production costs.

That being said the equipment for bottling lines can't withstand a small beer factory or other smaller companies. These machines need a substantial investment in advance and can be more expensive than a simple bottling line with small lots.

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2. The specifying characters of products made in the flow

It is proposed to achieve an automated system of bottling the acetone in plastic bottles, integrated within a flow logistic for the development of a SME.

The activity represent the designe, development production and delivery of cosmetics products and products for clean in Romania.

In the flow made by me, a logistic flow of bottling, I used boxes for delivery the plastic bottles which are filled with acetone with a maximum volume admitted in the box of 2210 ml. To highlight the achievement of the bottling operation an automatic line a product will pass successively throught a certain number of operations, so finally showing a stack composed with number of packed products. For this reason it will achieve a automatic line for achieving the bottling acetone, these with the following characteristics:

- Acetone (CH_3COCH_3) it is an organic solvent of meaning industrial and chemicals
- It's a colourless liquid with a characteristics smell. It is part of the aliphatic ketones.
- It is easy flammable, forming with the air an explosive mixture, also it is dissolves in water and in most solvents

Packing operation:

- ✓Primary packaging (the acetone will be bottle in a plastic bottle);
- ✓Secondary packaging;
- ✓Tertiary packaging.

Primary packaging will do in a plastic bottle which are the following charactestics:

- specific underrezistenta la mediuweight ;
- humidity resistance;
- acid and alkalin-proof;

Distinctive characteristics of the bottle:

Figure 1 - Primary bottle packing



Secondary packing will be made in cardboard boxes wich have to follow next requests:

- assuring products sorting and their integrity;
- keeping the product from extern factors;
- really good rigidity and mechanical resistance for keeping the products;
- assuring a plain surface to be labeled.

3. Establishing the flux of raw materials for creating the product

Producers of automatic bottling sistems are many and come with all sorts of bottling machines, machines wich correspond to different types of logic fluxes.

Automatic bottling line AFS 1000-4 from WURSCHUM is a constructive example with acetone bottling equipment. This line is equipped with an electric servo filling machine with the control unit and cylinder unit, the filling station with up to four heads and anti-leak valve, safe case and touchscreen for machine.

Figure 2 - Automatic bottling line

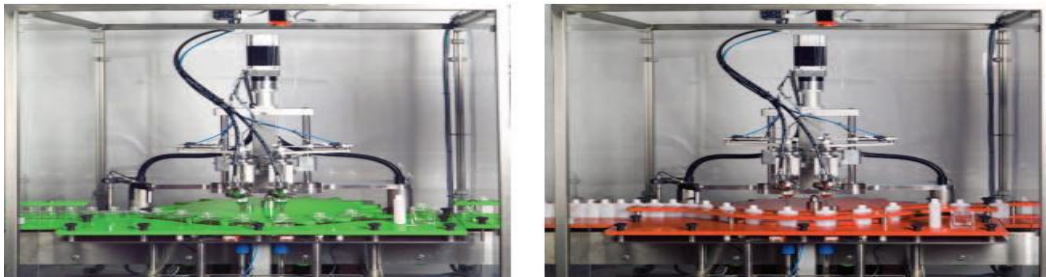


Acetone bottling line consists of:

- ✓filling system;
 - ✓capping system;
 - ✓labelling system;
- Filling system:

- Nozzles are firmly mounted at a certain distance from filling station and don't need to be moved.
- Transport is done in a star shape, moving the bottle from conveyor band to the transfer place, and after filling they're transported outside on conveyor band.
- While the bottles are being filled they're not in contact with the conveyor band

Figure 3 - Filling System



Capping system: caps are placed on bottle with a system. Afterward every bottle has a cap on it. The cap will be positioned and softly pressed. The capping system is going down and when the cap is touched this fits it. When the couple cap is touched, the machine automatically stops, and the capping system returns to it's initial position.

Figure 4 - Capping System



Labeling machines are solid, made from inoxidable steel, equipped with step by step motors and servo, machines TADBIK are made in conformity with EU regulations, in a production unit ISO 9001:2000. Labeling machines Tabdik Shrink Sleeve apply termoconducting label on just a part of the surface or on all of it, at speeds of 24.000 bottles/hour.

These machines are versatile and can be integrated in the actual production line. Using a rotating cutting system, labeling machine SLV – 50100200400 will offer a correct cut and will extend cutting blades's life span. SLV-line is capable to utilize a variety of materials like PET, PVC and OPS, with width from 40 to 60 microns. With the color touchscreen interface, the operator can easily change parameters.

4. Developing an SME

With a production of 4 million 50ml plastic bottles per year and 12 employees, an SME can be one of the newest producers and merchants from Romania and Sud-East Europe.

Products portofolio

- oAcetone 50 ml – Used as solvent for nail polish.
- oAcetone is bottled in 50ml glass containers and are labeled according with regulations
- oTransport will be done covered according with legal regulations
- oThe product will not pe exposed to solar radioation.
- oStoring will be done in dry, well aired, safe, away from fire, solar radiatons. And freez places.
- oStoring/transporting tempeperature: 5-30 C Humidity: 0-80%
- oUnlimited valability in original packing, respecting the storing

Domain analyse – product market

SME carries out annually on average over 4 million products annually. The most known brands are Farmec, Farmax, Madin, Promax, Cien. The focus should be on expanding the market, the volume, but also on product diversity.

Market size evaluation involves aspects such as:

- Market capacity: Acetone market in Romania is estimated at 7-10 million euros, increasing by over 5% annually due to the diversification of product lines offered and the growing demand of its customers;
- Market dynamics: the market is evolving over time, its structure and size being in a continuous dynamic movement. Market size is characterized by a degree of mobility and relativity.
- Market structure: consists in global market segmentation in a number of distinct, uniform and different from other groups;
- Market segmentation: the two important segments are the products of care, known as “Care”, generally comprising face creams, and the cleaning products “Cleansing” comprising solvents, cleansers, tones, scrub or mask products. On the two market segments the situation is different due to factors such as purchasing power and the level of education of some customer segments.

SWOT Analysis

In a professional context, SWOT analysis is used to measure the profitability of a business or project.

An SME strengths are characteristic or distinctive competencies that it possesses at a higher level compared to other companies, particularly competitors, which ensures a certain advantage to them. In others words, strengths, are activities that the company performed better than competitors, or resources that they possess and which exceed those of other companies.

The weaknesses of an SME are feature of it that determines a lower level of performance in comparison with the competing companies Weaknesses are activities that the company do not realize at own or resources that it needs, but it doesn't have.

Opportunities are positive external environmental factors for the company,in other words opportunities offered by the environment to the company, to establish a new strategy or to reconsider the existent strategy in order to exploit profitable arising opportunities.

Threats are negative external environmental factors for the company, in other words circumstances or events that can adversely affect, in a significant measure, the company's ability to fully achieve the objectives set causing the reduction of its economic and financial performance. As with opportunities, "threats" of various natures and causes, permanent lurk the company, their timely referral anticipation allowing the company to reconsider its strategic plans so as to avoid or minimize its impact.

Table 1

SWOT analyze

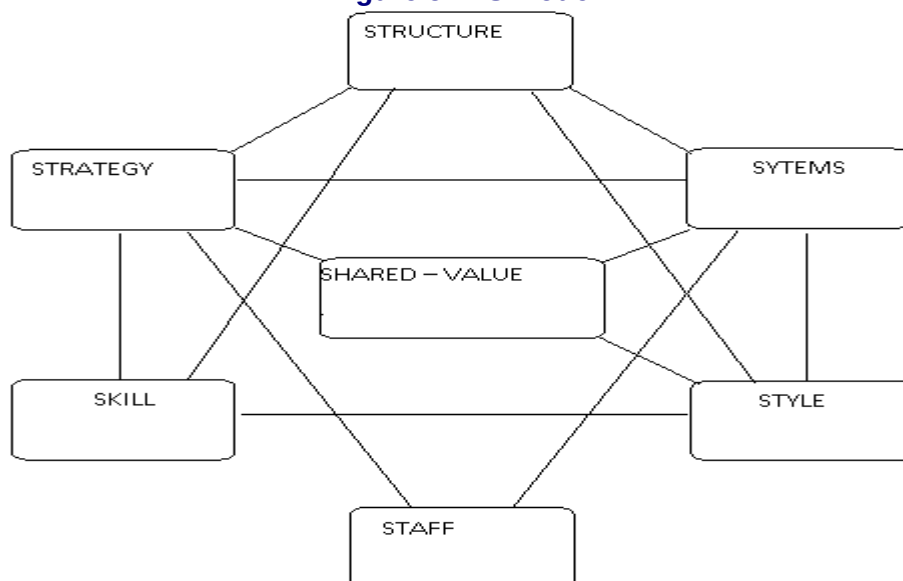
Strong Points	Weak Points
Latest technology Good promoting 99.8% pure acetone Low prices Minimum degree of workforce It holds international quality certificate ISO 9001 Attractive pack Clear organization of departments and hierarchical relationships between them Qualified employees	Company reputation Not covering a wide range of consumers Easy access to credit
Opportunities	Threats
Efficient distribution channels The small number of domestic manufacturers Export growth (for Romania) People perception that due to very good promoting remains with a new image in terms of company	Economic crisis Unemployment rising The education level of the population Increased competitors from imports. Country's political instability

7S Model

7S model represents a model of success guaranted by seven independent variables, but that are interdependent and influences strategical decisions. So named because of variables whose name in English begin with the letter S, the model highlights the fact that there isn't a preferred order or hierarchy between these factors, and the adopted strategy involves reconsideration to the other success factors.

The 7 variables are divided into two categories: the first category called "hard" and includes elements of strategy, structure and systems, and the second category called "soft" and includes the following elements: staff, leadership style, methods and commune values.

Figure 5 - 7S Model



- Strategy: SME mainly uses marketing strategy, which is one of focusing on consumer needs and desires, but also a strategy of cooperation with joint order to achieve goals.
- Structure: The organizational structure is now a functional one.
- The system: The existing system in an SME is functional and quite flexible, able to adapt to the market and current trends in technology.
- The staff: Starting from the top management level to the employees from the factory, the entire staff is highly trained. Each job has associated a job description so that every employee knows exactly what tasks have to accomplish.
- Leadership style: The style of leadership present at the SME level is a modern, well-organized based on a series of well-defined principles.
- The methods: The company is using a modern technology in the manufacturing process using high quality natural ingredients.
- The values: The main values of SME aim the accent on quality in manufacturing products.

Figure 6 - Risk analysis



6. Conclusions

We realized an automated bottling acetone system, integrated in a logistic flow. Bottling logistic flow is represented by a fully automated line, made up of several groups of machines controlled by a central system and equipped with a common transport system, fully automatized, for carrying products in order to achieve the final packaging.

To achieve the logistic flow, we analyzed several constructive variants from different manufacturers. We watched these logistic flows to cover the widest range of fields, from the food industry, to the chemical industry. After choosing the optimal logistic flow reference, we did a market analysis for choosing a software system variant capable of performing management of material flows.

Besides the ability to manage production flow We decided that it can adapt an ERP software system able to plan and organize all logistics activities within the flow.

We realized a project feasibility analysis in an SME case. We analyzed the situation of firms in the market, we developed a new strategy, that after we looked at the domain and the market of the

product, then made the SWOT analysis of the company. I also had to realize the competitive position analysis of the 7S model, so that in the end to draw some conclusions regarding the future of an SME in the Romanian market.

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