History department research paper examples

Business, Marketing

Summary overview:

The manufacture of beers has been in existence for quite a long while. Similarly, Keg beer has also been around for decades, although it has gone through a series of evolution to make it more desirable to consumers. In the process of all the evolution, the keg has become cost efficient and significantly reduced in its weight. From its initial manufacture, kegs were stored in wooden materials. This later changed as technology advanced, to usage of synthetic kegs which can withhold high pressures.

The assembly of keg is simply a process of few steps such as collection of the keg components, sanitizing the collected components, sliding the ring on the deep tube and inserting it into the keg, sliding the ring on the deep tube into the ‘ in port’, installing O-rings on the posts, screwing the plugs and the valves onto the tanks using the thick tubes and lastly, the large O-ring should be screwed using the pressure valve.

In the process of manufacturing, it is quite essential to consider cost minimization, in order to maximize the profits. In the cost reduction, few techniques were to be applied to ensure the final product is both friendly to the user, as well as the manufacturer. Reduction of capital requirement, costs of operation, taking new opportunities, observing demand responses, and taking new branding of opportunities are the few processes that were involved to favour the overall output of keg beer.

Keg manufacturing

Kegs are a type of beers that have been around for several centuries. Even though their manufacturing appears to be simple, the processes involved

have evolved over the years. Their packaging have shifted from wooden containers to stainless steel. Through this evolution, they have become cost efficient while significantly reducing their weight. Their durability and protection from environmental factors have also significantly improved. The following research paper will thus describe the modern process of manufacturing the keg, its economic implications to the society, its significance and a summary of the whole process. (Fergus, p. 142-166)

Brief history

Brewing became an art highly developed in the 20th century. For the past 2000 years, beers were stored in wooden barrels. Such materials were lined with a variety of materials e. g. pitch to help guard against leakages. At the beginning of time, beer was produced to meet the small needs of the society. However, as time went by, more productions became evident as its demand also grew. Since they were taken to more distant points of sale, the transportable casks were also made of wood. (Blainey, 63).

Eventually, with the emergence of industrial brewing, metallic materials were taken up for the packaging needs. This essentially was because of their strength and tenacity. These materials were lined with lead and were corrosion-resistant. Stainless steel came into play in the 1950s. This introduction mimicked the oak barrels that were earlier used.

Later on then 1960s, usage of aluminium alloys became prevalent. This is because they offered more advantages such as they were thirty percent light in weight. They also had great strength and could withhold high amount of weight.

Materials

In the late 1950s, attempts were made to develop barrels that were stronger and cheaper in the production of keg. This is because they needed more hygienic materials that were suitable to the barrel timber. A number of materials which include the following were tried out;

- A wooden cask encased with a stainless steel. This presented a more hygienic condition of brewing the beer. However, the wood still broke down during handling which in essence dented the inner liner.
- A stainless steel body was longitudinally bolted together. This had a great strength but at the same time very heavy. This limited mobility.
- Under developed synthetic kegs that were manufactured from plastics could withhold high pressures, however, high steam that sterilised the kegs tainted the beer’s flavour.

The two most prevalent materials that came into play were, however, aluminium and stainless steel. Aluminium alloys have the advantage of high strength but the disadvantage of high initial costing. The material requires high maintenance and repair to deter corrosion of the beer. A series of expensive processes including, iodization and spraying are coordinated to provide a barrier between the alloy and beer. (Fergus, 43)

Stainless steel are formed and welded to make them robust and inert. This makes them impervious to both external and internal detergents. Stainless steel have the advantage of being light and easy to repair.

It is important to note the compatibility of materials within the extractors and the component of the stainless steel. This is to ensure that chemical compositions and surface topographies are specified correctly. (Rice, 65)

Forming and drawing

In forming keg packages, as generally carried out in the material after properly treating it, the mechanical action is beaten with a large supply of water. The materials are thus reduced to a keg condition. The keg is pumped to a machine that moulds it to a desired shape i. e. either cylindrical or hexagonally shaped. It is then cut to the desired length and put in the holding place. Forming allows keg to dry and reach a stage that can permit easy handling. The process however leads to undesired cementations thus make the process inefficient. (Fergus, p. 54).

The preferred method, therefore, became the deep drawing method. It involved drawing two blanks of stainless steel or even aluminium into the halves of the keg. Deep drawing gives an excellent condition to the keg as a result of the cold situation of the working metal. The process starts with the chimps on both the top and bottom manufacturing. A strip of sheet metal is rolled and welded into a ring and butt. Over ally, two patterns are cut off from chimp’s top so as to form the handles. 3 circumferential welds are used to put the 4 components together. (Blainey, 43).

The next step is installing the racer and extractor. This majorly comprises of a valve which is spring loaded. A tube leading to the bottom is used to pump the keg and beer using the pumping of gas.

Assembly

The assembly of keg can be summarised as a 9-step process as outlined below;

- Collection of the keg components.
- Cleaning and sanitizing the collected components.

- Carefully sliding the ring on the deep tube and inserting it into the keg the “ out port”.

- Sliding the ring on the deep tube into the ‘ in port’.

- Installing O-rings on the posts if there were not already in place. The small valves should be placed on the liquid and gas posts.

- Securely screwing the plugs and the valves onto the tanks using the thick tubes.

- Lastly, the large O-ring should be screwed using the pressure realise valve.

A metal inert gas is used to weld the aluminium alloys. The process uses a filler wire. Tungsten inert gas are used to weld the stainless steel kegs. Several things need to be controlled during the process of welding. One such control measure is the alignments components which are especially important in butt welding. Penetration of welding has to be continuously monitored due to the formation of crevices which cause a hygienic hazard. Porosity should also be monitored as well. This is because it is a major factor in determining the strength of the keg. Air at 40 psi. Is filled with the kegs, and immersed in water to test them for any leakages. (Rice, 45-78).

Filling

During this process, the beer is injected with the use of a washer on top of the keg while they are turned upside down. Meanwhile, a tube that runs through the middle of the keg pushes out air. This results in a fast and a turbulence free filling. The process is no different from a transfer to secondary. The only difference exists in the connection of the keg where a modified head is required. (Rice, 324)

Having cleaned and sanitized the keg, the process is set up for a regular

transfer. A notable factor here is that the beer at this stage is freezing. This is because it has been chilled for a duration of time which may be extended depending on the process. Beer in this form carbonates faster and promotes workability. A siphon line fitted with a racking tube is filled with a sanitizer. The setup is then made easier by separating line transfers with the tailpiece. The beer is then let to flow freely in a holding section. A small sample is taken before immediately relinking the line.

Once the keg has been filled, it is carbonated and served depending on the system in use. For other systems, the keg is taken directly to the fridge for carbonating and tapping purposes.

Economics

Using the deep drawing techniques, half barrels costing approximately 60 dollars were produced. The old manufacturing process earlier used, produced kegs that cost nearly half of this. This just shows the importance of effectively costing in the manufacturing process. Both methods produced the same product. (Blainey, 63). However, since deep drawing had few steps, it costs significantly less to produce the kegs. High heat treatment and coating makes the production of kegs using aluminium alloys to be highly expensive. They also have high operating costs associated with them.

The labour intensive process earlier used cost twice as much as the deep drawing method used today.

In a broader sense, the following can be said to be the economic benefits accrued from keg production;

- Capital cost reduction
- Operating cost reduction

- New market opportunities
- Easier demand response
- New branding opportunities
- Product protection and improved quality

They have been deeply looked into below;

Capital cost reduction

Potentially significant capital savings have been made by the elimination of the need to maintain several fleets of kegs. This removal releases substantial sums tied up in this asset and end the expenditures of always replacing damaged and stolen kegs. It has been confirmed that there exists no need for maintaining expensive tracking systems. When kegs are produced on demand, the working capital can be significantly reduced. Costly keg cleaning equipment can be eliminated for capital savings. Efficiencies arising from effective use of space can be improved by eliminating the need to store up the kegs for the peak season. Only the kegs required for the available demand should be stored. This would in turn culminate to low warehousing costs. (Blainey, 65)

Operating cost reduction

Kegs are not only the most affordable packages in the market but also have other cost advantages. Elimination of the need to re-use kegs eliminates the cost of having to clean them with the intention of putting them back into use. The spear and fittings are one way thus zero-return costs and cleaning expenses. (Rice, 24)

Savings can be done in logistics by eliminating the return costs and cutting

on the costs of delivering filed kegs. Pertained kegs are lighter than the metal ones which do carry the same amount of liquid. More kegs can, therefore, be fitted on the outbound vehicles. This will gradually reduce the logistics costs by 20-30 percent. Kegs are only one-way and thus this reduces the return costs

New market opportunities

Kegs have managed to open up a whole range of new and existing markets. Sales have thus shorted up with lower cost.

Examples of such opportunities include;

- Export markets
- New market introductions
- Retail sales in case of limited space
- Low cost entry in the beverage keg productions
- New productions such as wines and waters

The larger the distance covered in transporting the kegs the more benefits accrued. Losses and damages to kegs further increase their travels. Foreign markets have become difficult to deal with using the returnable kegs. Eliminating the need to return the kegs reduces costs. This opens up opportunities to manufacturers to test and break into markets that were earlier uneconomical viable.

Easy response to demand

The amount of keg produced should be large enough to sustain the demand especially during the summer. However, this means that for a better part of the year, the kegs would be expensive. Kegs are produced in demand to

allow the peaks and troughs of the market to be cost effective. This enables the unreasonable tying of unwanted containers. (Blainey, 57).

New branding opportunities

The cartons holding kegs can be branded to suit the user’s specifications thus promoting new opportunities in the field of branding and publicity.

Product protection and quality

Anderson wrote that Kegs have been proven to deliver a 100 per cent in both taste and quality. This is attributed to the fact that sophisticated technology is used for the manufacturing process. The blending technique restricts oxygen ingression and reduces carbon’s losses. This is achieved by periodically removing oxygen from the keg’s interior. The brown pigmentation in the box provides protection from UV rays. The materials used in keg manufacturing have been approved for use by the European Union. They are produced under appropriate hygienic conditions. (Rice, 224)

Problems of staining and poor washing methods have also been completely been eliminated.

Employment creation

This is a major boost in the economy that cannot be underestimated. From the foregoing, it was stated that the production of keg is labour intensive. Those who are employed, therefore, receive income that improves their living standards.

They are thus enabled take care of their families and meet their various needs.

Relevance

One of the major significance of this topic to a beginning engineer is the ability to of using simple materials in the manufacturing processes of various products. The new engineer being a newbie can identify the tools for improvement in the keg production process. (Shannon, 343). The engineer can thus improve his performance over time due to the interactions with the otherwise matured and experienced engineers. Some of the weakness of the new engineer is the inability to understand the manufacturing process and lack of surety in handling tasks.

The major significant to a more mature engineer is his ability to realise that just because the process has been used for decades, it doesn’t qualify as 100 per cent effective. He should be able to realise that other production techniques that cut costs into half can be used. The

Engineer should be able to identify areas of defects in the production process and suggest possible solutions. The matured engineer’s input will be realised as a result of a minimized variability in the process. (Fergus, p. 100). The ability to explore new ways doing things can also be said to be a reliance to a matured engineer.

However, the keg manufacturing process can be said to be of relevance to both engineers in the following ways;

- Learning the skill of coordination and communication at the same time
- Using their engineering back grounds to design the most cost effective systems

- Communicating with contractors to ensure that the quotas, cost targets, as well as, production time frames are met.

- Learning both administrative and paper work procedures

- Knowledge in how machines work and how to operate them

Learning

In conclusion, it is important to note the significance of the above manufacturing process. It has enabled in determining the strength of the material workability in producing keg e. g. work-hardening in deep drawing. It has helped in my under stability of not just how the keg is shaped, but also how it affects the shapes of materials in it.

It has given me great insights in the processes involved in the production process such as forming, cutting, as well as, joining. It has helped to review the different aspects on the surface by examining the optimal engineering materials.

I have also learned various challenges in the keg manufacturing. Some of them include;

- Warehousing liability i. e. keg can be damaged or even stolen while in the warehouse.

- Costing surprises. At times, the production of keg can be highly expensive thereby taking the manufacturer by surprise

- Inability to monitor the quality. At times, due to hasty productions, the quality of the keg with respect to that of competitors is compromised.

- In ability in appropriately establish product changes

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