

Importance of Implementing Quality and Safety Standards- Case Study of a Lubricants Manufacturing Company

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Comments by the Faculty

Quality and standards go hand in hand as the very purpose of developing, implementing and maintaining standards related to any product or production activity ensures uniformity in quality characteristics. Along with quality, industries normally look for safety in the organization as safe working conditions happen to be a morale booster. Further these standards enable meeting of the customers' requirements in terms of performance leading to more satisfaction of the customers. From the manufacturer's point of view, the standards enable better and safe working practices inside the plant and help to project the products in the international arena. Also concern towards environment was demonstrated by the company by appropriately referring to the environmental requirements.

This project was carried out at a lubricants manufacturing company located in Mysore, India and having its headquarters in Germany. The company well known for the high quality of its products ensures that the products meet the global standards and thus enjoys better customer patronage. Considering the prime importance given to quality and safety the company wanted to implement standard procedures and adherence to those standards. The main objective of the project was to develop safe working procedures so that the employees feel safe in a very demanding atmosphere considering the nature of the product which is highly inflammable.

Four different projects were carried out which involved developing safety procedures and ensuring that the workers do not feel that unsafe conditions exist. While going through the projects, one can understand the importance of standardization. In addition legal obligation on the company to follow the quality and safety standards was also explored. The legal standards that should be followed to ensure environment safety were also examined and procedures were developed. Each project carried out shows in one way or the other the importance of quality and safety standards to be followed in an international company.

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Introduction

Quality has become a primary order winning dimension for organizations. Companies perceived as producing products of poor quality have either failed or are struggling for survival while those recognised for quality have generally flourished. Much of the credit for creating this awareness for product quality and customer service goes to the Japanese manufacturers in automotive, electronics and machinery industries. As a result of this initiative customers expressed great satisfaction with their products which gave these Japanese companies an edge over their competitors. (Martinich, 1999).

Products with superior quality are more attractive to customers and therefore will experience greater sales. Product quality has become important due to three important reasons. Firstly, customers who purchase a product based on quality have greater product loyalty than those who purchase based on price. Secondly, poor quality is more expensive than good quality (Martinich, 1999). The methods used to improve quality simultaneously increases productivity, reduce material usage and reduce cost. Finally, organizations can be exposed to considerable financial liability when defective products cause injuries or death to users. Improved product quality reduces the exposure to financial and moral risks.

Safety is another dimension that companies nowadays pay attention to. The growth of the company can be guaranteed only if their workforce is happy. It is necessary to ensure that the employees work in a safe environment and to recognize that workers have the right to work in a safe environment. The Occupational Health and Safety Act in USA passed in 1970 aims to prevent workers from being killed or seriously harmed at work. This Act requires the management to provide working conditions free of known dangers. There are many articles related to the different requirements of the employees that should be provided by the employer. The Environment Health and Safety (EHS) guidelines are technical reference documents with general and industry specific examples of good international industry practice. In India, the ministry of labour and employment has laid down well defined acts and rules for industrial safety and health. Some of them include The Dock Workers (Safety, Health and Welfare) Act 1986, The Mines Act 1952 and The Factories Act 1948 (Industrial Safety & Health, n.d.) which are related to working hours, conditions of services and employment. Some of the guidelines include general facility design and operation, communication and training, physical hazards, chemical hazards, biological hazards, radiological hazards, personal protective equipment, special hazard environments, monitoring etc.

Safety is not restricted to the employees. Safety of environment must also be ensured. Many companies have come up with initiatives to go green. These initiatives are proving to reap benefits as they become a part of brand building. Some of the guidelines for environment safety

include air emissions and ambient air quality, energy conservation, waste water and ambient water quality, water conservation, hazardous materials management, waste management, noise, contaminated land and remediation etc. (Environmental health and safety guidelines, n.d.)

Objectives and Scope of the Project

The main objective and scope is to understand the importance of meeting quality and safety standards which includes environment safety. The project also tries to understand the efforts taken by the company in maintaining these standards covering quality, safety and environment. However this paper doesn't cover all the aspects of standards as applied to typical manufacturing companies.

About the Company

As part of Summer Internship Project, the work was carried out at Klüber Lubrication India Private Limited located in Mysore, India. Klüber is a subsidiary of the German giant Freudenberg. Klüber is actively engaged in the manufacture and marketing of Speciality lubricants, Gear lubricants, Maintenance products and Corrosion Protection products. The company offers tribological (friction, lubrication and wear) solutions. The company's tailor made speciality lubricants are mainly sold directly to almost all industries and markets.

The company is very particular in providing safe working conditions to the employees and wants the employees to be part of the company's success. There is a strong motivation factor in the employees to work and also a noticeable factor is the importance given to quality assurance. Klüber delivers quality products to its customers without any compromise. The company is also keen not to pollute the environment. The company follows ISO standards- ISO 9001 related to quality, ISO 14001 related to environment protection and OHSAS 18001 related to occupational health and safety. The work carried out at the company is illustrated below to appreciate the importance given by the company to follow quality and safety standards at the workplace.

Projects Carriedout at Kluber

Project 1– Work Instructions for The Repacking Section

The products are manufactured in bulk quantities and based on customer orders these products have to be packed into smaller quantities. This is where the repacking section plays a major role. Work instructions are available at the repacking section but a detailed instruction was not available. As a part of this project a detailed work instruction for some of the process/ activities in the repacking area was prepared. Work instructions are the steps or procedure that should be followed for any activity. It is similar to an operating manual. Work instructions are a standard work process flow that is available for almost all products and services. For example, when we purchase an electronic device, we get a user manual which helps us to operate the device properly.

A proper work instruction helps the worker to perform his job easier. Therefore, the work instructions have to be accurate because the worker does his job according to the work instructions. Any visual aid helps the worker to understand better. The work instructions have to be in simple language i.e. the choice of words and the sentences should be simple enough for a layman to understand. Work instructions helps to save time which is spent by a worker to understand the work flow. Once the procedure is known, a layman can do his job quickly and with ease. A layman finds his job easier when the work instructions are available to him.

To prepare the work instructions, the first step would be to observe and understand the work flow in the repacking section. The different activities like tube filling, sachet filling, grease filling etc. should be carefully observed. Every minute detail should be understood before making a work instruction. Work instructions should be made as perfect as possible. While observing, the jobs/steps that can be done in a better way than currently done should be identified. Lead time can be reduced if an optimum procedure is identified.

The work instructions should be a standard. All the factors and situations that are bound to happen should be taken into consideration. In certain cases, one will have to imagine that so and so situations can occur and corresponding actions that have to be taken should be mentioned in the work instructions. The different operational activities in the repacking section include grease filling, tube filling, sachet filling, and oil filling as well as filling of water based emulsions and solvent based products. Work instruction for relabeling process was also prepared.

Project 2- Kettle Cleaning Matrix

Kettles are the vessels in which the lubricants are made. There are a total of ten kettles in the company which are named from K1 to K10. Kettles K1, K3 and K9 are cooking kettles where the saponification process (soap formation) takes place. The kettles K2, K4 and K8 are cooling kettles. Majority of the grease products are made in K1-K2, K3-K4. In K5, K6 oil products are made. In K7 emulsions are produced.

The objective of this project is to identify the different cleaning processes that should be adopted after manufacturing a particular batch of products. Kettles have to be cleaned to manufacture pure and quality products. This project helps to understand the cleaning processes adopted like man entry and flushing. In man entry, workers enter into the kettle and using suitable cleaning materials cleans the kettles. In flushing, the kettles are cleaned by using liquids which clean the surfaces of the kettles. A proper kettle cleaning matrix helps to save time, effort and cost.

There are a lot of factors that should be considered while making a cleaning matrix. First of all, the compatibility of the different products should be considered. For example a lithium based product is compatible with another lithium based product.

**Table 1 :
Compatibility Matrix**

		Al	Ca	Li	Na	Al	Ba	Ca	Li	Na nto -nite	Be -urea	Poly	PT FE
Metal Soaps	Al	+	+/-	+	+/-	+	+/-	+	+	+/-	+	+	+
	Ca	+/-	+	+	+	+	+	+	+/-	+	+	+	+
	Li	+	+	+	-	+	+	+	+	-	+/-	+/-	+
	Na	+/-	+	-	+	+	+	+/-	+/-	+	-	+	+
Complex Soaps	Al	+	+	+	+	+	+	+/-	+	+/-	+/-	+/-	+
	Ba	+/-	+	+	+	+	+	+/-	+/-	+	+	+/-	+
	Ca	+	+	+	+/-	+/-	+/-	+	+	+	+/-	+	+
	Li	+	+/-	+	+/-	+	+/-	+	+	+/-	+	+/-	+
	Na	+/-	+	-	+	+/-	+	+	+/-	+	-	+	+
Other thickener	Bento -nite	+	+	+/-	-	+/-	+	+/-	+	-	+	+	+
	Poly- urea	+	+	+/-	+	+/-	+/-	+	+/-	+	+	+	+
	PTFE	++	+	+	+	+	+	+	+	+	+	+	+

- Where + indicates it is compatible
 - Indicates it is not compatible
 +/- indicates it is neutral.
 ++ Highly compatible

Considering the compatibility matrix, kettle cleaning matrix is prepared. It means that to make another product, after making a particular product it is necessary to clean the kettles. This is the information we get from a kettle cleaning matrix. The kettle cleaning matrix is crucial because if it is not made correctly, it can affect the quality, increase the lead time and other related problems can occur. Cost is another important factor in kettle cleaning matrix. Suppose if two products are compatible and kettle cleaning is not required, and if flushing process is what the matrix says, then the time, effort and cost incurred in flushing is a waste. Therefore the compatibility factors should be carefully studied.

Project 3 Kluber Standard 28 (Blocking Areas Below The Kettle And Safety Gloves)

The purpose of this project is to ensure that safety precautions are taken and followed in the work place. Safety gloves are meant to be used wherever it is required. Neglect of which can lead to incidents which further leads to accidents. Another instruction includes blocking areas below cooking kettles- K1, K3, K9 and K10. The temperature generated at the cooking kettles is very high and in rare but not impossible cases, the company faced an overcooking kettle. To prevent accidents due to overcooking kettles, operators are not supposed to stand below the kettle during cooking phase. Therefore it is a necessity to block the areas below the kettle.

A major issue at hand while blocking the area is the space constraint. The workers might find it difficult to move about if the blockage is built. This would further add to the space woes of the employees. For kettle K1, the measurements are taken and poles and chains were decided as the blockages to be used. For kettle K3 and K10 poles and chains are used with appropriate measurements (quantity of chain required). For kettle K9, only chains are used due to the space constraints.

Safety first, production next being the guiding principle of the company, safety at the workplace is important. In addition responsible managers/the heads of a particular department must make sure that all the employees follow safety precautions wherever necessary.

Project 4 Kluber Standard 13 (Identification of Contamination And Cross Contamination Areas)

Figure 1 shows a value stream map of the company. It shows the direction of flow of goods once the shipment enters the company.

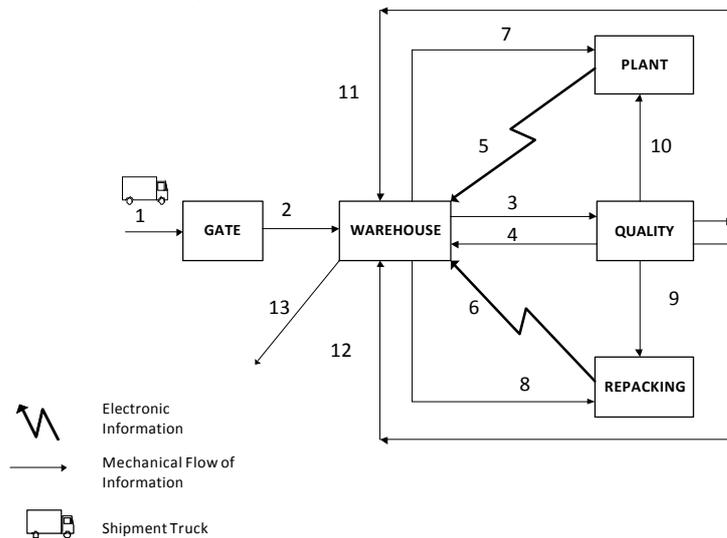


Figure 1: Mapping of the Plant

The processes are as follows:

- 1 The shipment reaches the gate. The security personnel calls the warehouse personnel
- 2 Once the shipment is inside the premises, it is taken to the warehouse using forklift
- 3 Warehouse personnel calls quality department to check whether the materials (raw materials and packing) are of good quality
- 4 If the materials are of good quality, the materials are stored in warehouse. If the materials are of bad quality these are sent back
- 5 The materials are stored in the warehouse. Upon requirement, the production department issues a process order to release the materials
- 6 The materials are stored in the warehouse. Upon requirement, the repacking section issues a process order to release the materials
- 7 After receiving the process order, warehouse releases the materials to the plant. Using forklift materials are sent to the plant
- 8 After receiving the process order, warehouse releases the materials to the repacking section. Using forklift materials are sent to the repacking section
- 9 After the repacking process is done, quality personnel are called upon for Q.A
- 10 After production, quality personnel are called upon for Q.A
- 11 If the batch produced is of good quality, it is sent to the warehouse for storage. Semi-Finished Goods are stored in the warehouse. Finished Goods are stored in Bonded Storage Room. Fork lift is used to send the material to the warehouse. If the products are of bad quality, they are rejected
- 12 After quality check, if it is of good quality, the repacked materials are sent to the BSR section of warehouse. The repacked materials are rejected if found to be of bad quality.
- 13 The materials are stored in the Bonded Storage Room section of warehouse, ready to be despatched.

Contamination Across Different Stages

- 1 Raw materials and package materials must be tightly insulated so that dust and other foreign particles do not come in contact with it while it is being transported to the plant.
- 2 Quality personnel are called upon to check the quality of the materials.
 - Dedicated and clean containers must be used to handle the sample of raw material.
 - The tools used to take the sample and measure quality of the materials must be cleaned before handling of materials.

- Proper identification of tools must be done.
- 3 The materials must be stored in a closed condition and in a clean, dry and cool environment.
 - 4 Warehouse premises must be regularly cleaned (do not broom).
 - 5 After receiving process order, warehouse has to release the materials to the plant and repacking section respectively:
 - Open the materials carefully. In case of barrels remove the lid without tilting.
 - Operators must use PPE to handle the materials. In any case should not touch the materials with bare hands. Same pair of gloves must not be used for different types of material.
 - Prevent hair from falling into the materials. Use shower caps.
 - Use forearm guard while handling. Do not use the same pair of forearm guard for different batches.
 - Ensure that the pockets are empty so as to not to drop any things into the materials.
 - Mugs used to handle the materials must be cleaned regularly after each batch. Use dedicated mugs.
 - Keep the mugs in protective bags to prevent dust and other foreign particles to come in contact with it.
 - Use dedicated containers to handle oil raw materials. Regularly clean and also change the containers.
 - Proper labelling must be given to the raw materials in order to avoid mix up.
 - Keep the plastic covers used to wrap the materials in a protective baggage to prevent contact with dust.
 - The buckets used for raw materials must be closed after use to prevent contact with dust.
 - Packing materials must also be stored in the warehouse in a dust free environment or in closed condition.
 6. After repacking is done, quality personnel are called. The chances and precautions to be taken while processing are:
 - Open the lid of the barrel without tilting.
 - Operators must take care not to drop any materials into the container into which materials are filled.
 - Operators must use gloves so that they do not touch the materials with bare hands.
 - Use dedicated lids to close the containers.

- Prevent hair from falling into the containers. Use shower caps.
- Use forearm guard. Do not use same forearm guard for different batches
- Funnels and other connecting devices must be cleaned regularly with some solutions rather than just using a piece of cloth. If cloth is used, ensure that the same is not used for other materials.
- Packing materials must be cleaned first before using it to fill the material. Filling must be done in dust free environment.

7. After production, quality personnel are called for Q.C. The chances and precautions to be taken while processing are:

- Before manufacturing a particular batch, ensure that the kettles are clean and free from any debris that collects in the kettles.
- The lines connecting the cooking and cooling kettles must be cleaned properly. Oil flush is usually done to clean the lines.
- Homogenizers must be cleaned before manufacturing
- Ensure that the pumps and filters are clean before starting to fill.
- Funnels and other connecting devices must be cleaned regularly with solutions rather than just using a piece of cloth. If cloth is used, make sure that the same is not used for a different batch.
- Keep the lids of the kettle closed when manufacturing is going on. Only when needed open the lids. When no manufacturing is going on, keep the lids closed.
- All production work must be carried out in a dust free environment.
- Operators must be careful enough to not to drop any materials into the kettles while feeding the charge.
- Under any circumstances, do not touch the material with bare hands. Always wear the appropriate gloves.
- Wear forearm guard. Do not use the same pair of guards for a different batch
- Wear clean clothing
- All packing materials must be cleaned before filling into it. Use fresh cleaning materials. Do not use the same for a different batch.

All the instructions mentioned above, for example wearing gloves and other protective equipment are with respect to the Freudenberg Standards- standards followed by the parent company. In addition, the company has its own standards known as Klüber Standards. Almost all the standards of Freudenberg overlap with Klüber standards.

Recommendations

Some recommendations were given to the company regarding unsafe conditions that were observed in the company. In the production area, the beams which support the whole structure could be given better protection by installing protective guards to the beams. This is because the pallet trucks and forklift can accidentally hit the beam and can cause problems in future. In production area, near kettle (kettles are huge vessels in which lubricants are made) K 10, there was a structure which was extending outwards. This structure can cause collisions if a forklift comes near the structure. In the repacking section (where bulk breaking is done) after filling the materials, the containers are kept on the ground. This can be avoided by keeping the containers on wooden pallets. This helps to save time and double work can be avoided. Also, this is a quality aspect that the company follows in the sense that the company has a policy not to keep the filled containers on bare ground.

In the company SAP is not used to its potential. Much of the work is documented physically. It would be better if the employees are given proper training on how to use SAP. All the physical activities should match with the SAP process. Currently after filling the materials in the repacking section, the semi filled containers are sent to the warehouse. But in SAP, the semi filled containers are to be kept in the repacking section. If the semi filled containers are stored in repacking, much of the time can be saved in the process of creation of process order and transportation of materials from warehouse to the repacking section. Another suggestion given was the implementation of standard time. A standard time can be set for various operations like aerosol manufacturing which is a repetitive process. This ensures that time is utilized properly and which can help to make the system lean.

Discussion and Conclusion

While going through the projects, one can understand the importance of standardization. Legal obligations are there on the company to follow the quality and safety standards. Also, there are legal standards that should be followed to ensure environment safety. Each project carried out shows in one way or the other the importance of quality and safety standards.

Project 1 which was about work instructions gives one an insight into the importance of a formal structured work flow. All the minute details had to be mentioned assuming all possible situations that can occur. Imagine a situation where the work instruction to operate a complex electronic device is not given to you. One will not even want to touch that device. Availability of a work instruction helps one to study and learn the work process by oneself.

Project 2 was about maintaining quality standards. Special care should be taken while preparing the matrix. Inaccurate matrix can lead to wastage of time, money and effort. If the products manufactured do not meet the required specification, the entire batch is spoilt due to cross contamination. There is a huge loss of money and resources. For example, suppose after making a product C, product B is to be manufactured. The cleaning procedure that is recommended is flushing. But the procedure that has been adopted is man entry. The time, effort and money that is used for man entry is wasted as only flushing was required. In another case if man entry is the required process to be followed, but flushing was used, it can lead to cross contamination. The raw materials (base oils), thickener and other additives used are wasted.

Project 3 was about blocking areas below the cooking kettles and stresses upon providing safe working conditions to the employees. Different options were considered for the blockage like cones, poles, chains etc. The most apt blockage was used for each cooking kettle taking into consideration the space constraints thereby not causing any difficulty to the employees (mobility of the employees).

Project 4 was about identifying the areas where contamination and cross contamination can occur. This project was about maintaining quality standards. The different chances of contamination are identified and necessary precautions are taken to prevent it.

Overall, we can see that good quality products attract the customers. If the customers are attracted, they buy our products. When the customers are satisfied with the quality and application of the product they tell other customers and in turn they buy the product. As a result the company becomes popular in the market which in turn paves the way for the company to be the market leader. Another point that should be understood is that quality isn't usually governed and managed by an organization's centralized quality group. All the individuals in the company should understand the importance of meeting quality standards and work towards it. The collaboration of quality and manufacturing teams to understand and analyse data to improve processes along with the use of technology can help an organization to reduce risk. The different cost of quality components like prevention, appraisal, internal failure and external failure costs should be maintained accordingly. More amount of money should be spent in prevention and appraisal costs. The quality costs incurred due to failure namely internal and external can affect the reputation of the company.

From the safety point of view, providing safe working conditions to the employees motivate them. When the employees are motivated they are willing to give their best for the company which in turn leads to high productivity and efficiency. From the environment point of view, customers prefer companies who respect and protect the environment. Naturally if the customers see that a company which produces products which suit their application and takes steps to not to pollute the environment, they go ahead and buy the company's product.

Another aspect that helps a company to meet/maintain standards is the work culture. Work culture at Klüber is excellent. All the employees are keen to follow the top management. All the instructions which are given by the top management are followed. Any employee can give his suggestion for improvement be it a layman or other employees. Top management acts as a fatherly figure to the employees.

We can conclude that if the company makes sure that they provide quality products and take steps to protect the environment and take care of the employees, they will create an image in the market. It acts like creating a brand image. This facilitates as a value addition to the product that is being sold. Whenever a customer is going to buy a product which suits a particular application, brand recall occurs and hence ends up buying the product.

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