

MGT550: Managing Operations



EUROPEAN
INTERNATIONAL
UNIVERSITY



COVER PAGE AND DECLARATION

	Master of Business Administration (M.B.A.)
Specialisation:	Supply Chain
Affiliated Center:	CEO
Module Code & Module Title:	MGT550: Managing Operations
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Word Count:	3965
Date of Submission:	28-11-2022

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MGT550: Managing Operations

Table of Contents

Table of Contents 1

Introduction.....2-4

Operational industrial streamline procedural guide that will help the Big Green Tractor from start to finish with their productions.....5-15

Develop a socially responsible operational guide for the Big Green Tractor for their pollutants.....16-22

Conclusion.....23

References.....24

MGT550: Managing Operations

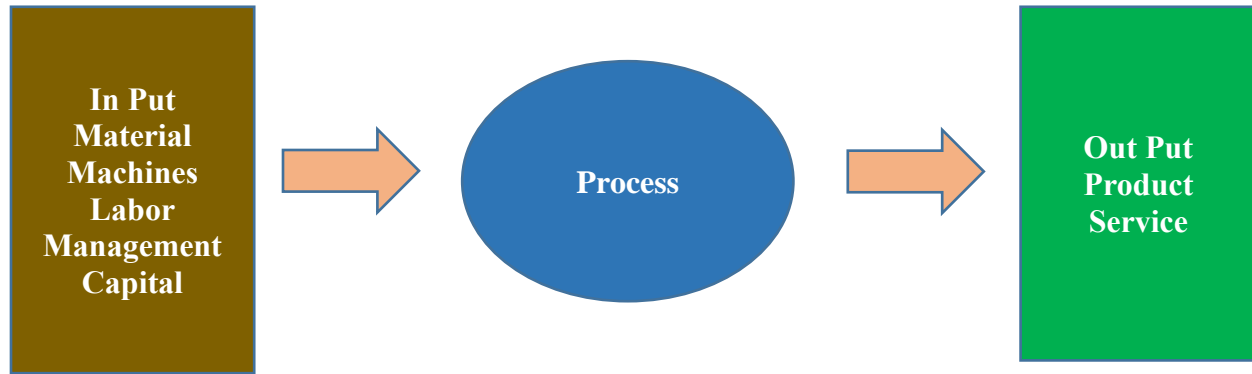
Introduction

Operation management means how any company or organization can create or implement the process for delivering the product or service to the customer within a high level of following to achieve the maximum benefit for the company /organization and a high level of quality and price it will submit to the customer.

Operation management focuses on the practice and creates the highest level of efficiency possible within an organization /company. Also, how can convert the material and labor into a product or service with a high level of benefit and make the best practice in all processes in the operation. the operation management is interested in how can use all resources in the company to achieve the goals and develop the product or service as per the customer needs. Operation management is interested in the challenges in the organization will face in the manufacturing plants, project management, information technology network, inventory level, work in process (WIP), material handling, quality control, last mile process, maintenance process, and forecasting. Operation management organized the daily activities in the organization and defines the objective and action plan and makes sure all factors in the process will achieve the objectives.

The objective of operation management such as efficiency, quality, and cost (these is the internal objective and it has other objectives (external objectives) such as customer satisfaction, social responsibility, environmental impact, and preservation of the environment. the operation management describe the methods, process, tools, product, service and how can manage people in the process. The operation management includes the following process

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The operation management included many functions such as the following: -



The operation management focuses on how making decisions in operation because the decisions will effect on the profit and quality .so that the operation decisions process included the following: -

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- A. Who: Who will do the work?**
- B. What: What tools are needed, and in what objective or goal?**
- C. When: - When will receive the resource be needed? When should the work be Scheduled? When should materials and other supplies be ordered?**
- D. Why: -Why need to do it?**
- E. Where: Where will the work be done?**
- F. How: How will he product or service be designed? How will the work be done? How will resources be allocated?**

The operation management drive by the operation manager. he is involved on coordinating and developing new process while re-evaluating current process in the organization. primary function of the operations manager is to guide the system by decision making. System design decisions and system operation decisions. operations management is the process, which combines and transforms various resources used in the operations subsystem of the organization into value added product/services in a controlled manner as per the policies of the organization. (Anil S Kumar & Suresh N 2008).

MGT550: Managing Operations

1-Operational industrial streamline procedural guide that will help the Big Green Tractor from start to finish with their productions

First of all, in organization needs to achieve the goals through the submitting the high quality of good or service until it can make customer satisfaction after that it can make highly profit.

Any organization needs to have procedural guide to support for achieving the goals and in this case, we can create the procedural guide that will help the Big Green Tractor to achieve the goals from start to finish their production .first thing the Big Green Tractor needs to streamline the manufacture operation because No two companies are the same, and the same thing in their manufacturing: each company has its own multi-step production process. For a company to increase profits, and improve quality, it needs to streamline manufacturing operations and reduce production time. Big Green Tractor should have process Map for all process and SOP of all things in operation. we can recommend the Big Green Tractor as per the following: -

a. The recommendation should include more cost-efficient manufacturing processes
the Big Green Tractor can achieve the best of the manufacturing process through more cost efficiency when it focuses on the following: -

1. Reducing the error rate in forecasts: -

When the company reduces the error rate in forecasts and reaches the optimal in the forecast it can reduce the rate of change over in machines then it can reduce the cost of manufacturing because the many changes over in the machine need more many because it reduces the total working hours and productivity but when the company has a good forecast it can make streamline of manufacturing because the machine work with the same

MGT550: Managing Operations

master production schedule, weekly plan and monthly plan. also, to avoid impact in another process after products produce. But we must know that there is no 100% correct Forecast, but there is a good forecast. Some forecasts are accurate. We know exactly what time the Sun will rise at any given (slack nigel & Jones alistair Brandon& Johnston Robert 2013)

place on Earth tomorrow or one day next month or even next year.

2. Reducing inventory cost: -

The Big Green Tractor can reduce cost by using many ways as the following: -

- Use MRP (material requirement planning) when it focuses on this concept

MRP is concerned with both production scheduling and inventory control.

The objectives of the MRP system are:

- I. Ensure the availability of materials and tools needed, components, and products for planned production and for customer delivery,
- II. Maintain the lowest possible level of inventory, without reducing the customer service
- III. Plan manufacturing activities, delivery schedules, and purchasing activities.

This is the MRP record example

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Week Number	1	2	3	4	5	6
Gross Requirements						
Scheduled Receipts						
Projected on hand						
Net requirements						
Planned-order-receipt						
Planned-order release						

With the MRP system the Big Green Tractor can reduce the inventor cost because it has the inventory for only business requirements. Everyday thousands of people come into contact with inventory or participate in a supply chain in their homes, at work and in their leisure time. Most of the time they give very little thought to this fact because the roles they play and the actions they perform are so commonplace as to be virtually transparent.

(Wheller Sean 2004)

- Use Just in Time inventory (JIT)

It can reduce the inventory by using JIT if possible. just in time is the strategy for minimizing inventory and increasing efficiency .it also known as the Toyota production system

This strategy reduces the inventory cost because the manufacturer receives the material when needed without storage cost with the process the company can reduce the investment in inventory and the production can move from one product to another smoothly because no issue with materials (it will receive when need) also it does not need more warehouses spaces by using this concept

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3. Reduce the labor cost: -

The Big Green Tractor can reduce the labor cost when it has process flow and standard operation procedure (SOP) and all laborers know what will do in the operation, and there are many ways to reduce the cost of laborers such as: -

- I. Using computers and the internet of things when using the things automation, it can reduce cost of laborers**
- II. Safety interest: when the Big Green Tractor focuses on the safety of the process and laborer it will be safe for the laborer and avoid accidents so the laborer can work with the streamline without any conflict in the time process or reduce the productivity**
- III. Continuous training: when it is interested in the laborer training it can improve the efficiency of laborer and reduce the daily problems**
- IV. Utilizing part-time labor (if possible) this process can reduce labor cost more than full-time work because it put the laborer on-call process when the company needs him /his to work and the laborer can work when he /she need the money.**

4. Using new machines: -

When the Big Green Tractor uses the new machines and delisted the old design machines it can reduce the production cost because the efficiency of new machines is more than the old machines, for example, the old machine can produce 10 parts in 8 hours and the new machine can produce 20 parts in 8 hours.

There are many benefit for using new machines as the following: -

- ✓ Involved in new technology because every day we see new things in technology**
- ✓ Improved Efficiency because by using the new machine the efficiency of operation**

MGT550: Managing Operations

will improve

- ✓ **Saving time when using the new machine because the productivity of the new machine is more than the old machine**
- ✓ **Fewer Safety Concerns: in the new machine the safety is better than the old machine and the machine operator can do anything easily through the safety.**

5. Reduce cost of Design Changes: -

The Big Green Tractor can reduce the cost by reduce cost of the design changes because Any change in product design need more money .it can reduce the cost of design by suing the following: -

- + Avoid any complexity in the product design because if the product has complex things in design, it will need much time for change until it reaches the final condition and needs high expensive material to produce it**
- + Determine the product design as per the sales area (local, regional, national, international) because the sales area will determine the product value, and based on the sales price of the product we can determine the value of the product design**
- + Choosing the Right Designer, merely choosing a Designer that works best for your business can help tremendously in keeping costs low. Getting samples beforehand can assist in selecting the right design for the product.**
- + Consider the Materials because the material options are vastly varied, and each has many characteristics worth keeping in mind as your product is designed.**

6. Choose the production strategy: -

There are many production strategies it can the Big Green Tractor use in the business and by one or two of these strategies it can reduce the manufacturing cost such as the following:

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- ❖ Make to stock (MTS)
 - ❖ Make to order (MTO)
 - ❖ Engineer to order (ETO)
 - ❖ Assemble to order (ATO)
-

b. plan to minimise defects throughout the manufacturing process

there are many ways can the Big Green Tractor use it to minimise the defect in the manufacturing process as per the following: -

I. **Inspection:** when the Big Green Tractor focuses on inspecting material received from suppliers and making sure all material received is in good conation and has the same specific requirements it can avoid any issue in manufacturing and will reduce the effect that appeared through the material used. Also, making inspect during the manufacturing and check random samples from the product to avoid an effect on the final product and solve the problem if faced

II. **Using SIX sigma method:** A business process for improving quality, reducing costs, and increasing customer satisfaction. Six Sigma is a leadership strategy guided by evidence utilizing particular methods .and six Sigma is a Method to reduce defects and variation because its method based on The DMAIC (Define–Measure–Analyze–Improve–Control) as the following: -

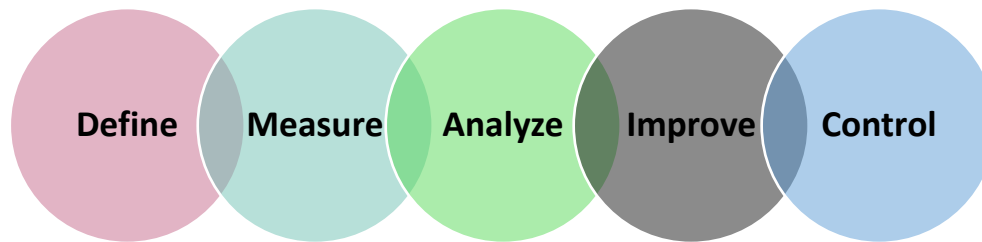
- **Define:** Define the problem through the Voice of the customer to understand the feedback or value stream map to provide the overview of an entire process
- **Measure:** - Measure process performance through the Process map for recording the activities performed as part of a process

MGT550: Managing Operations

- **Analyze:** - Analyze the process to determine the root causes of variation and poor performance (defects) in the manufacturing or the product
- **Improve:** - Improve process performance by eliminating the root causes. and solving problems from complex processes or systems where there are many factors it can help us to improve the processes
- **Control:** - Control the improved process and future performance in the manufacturing

Through the Six sigma method the Big Green Tractor can reduce the defects in the process because its method included the five step to reduce the defects as the above explain

Six sigma in the manufacturing



Lean thinking focuses on enhancing value for the customer by improving and smoothing the process flow (Morgan John& Brenig- Jones Martin 2012)

- III. **Quality Control:** The Big Green Tractor can reduce the defect in the processes when it has quality control and monitors the production in regular ways and has a dedicated quality control team in the plant, responsible for ensuring the production follow quality procedures at every stage also helps in the reduction of defects and determine the defect when it appear
- IV. **Preventive maintenance:** The Big Green Tractor can reduce manufacturing defects when you perform periodic preventive maintenance for the machines, as this maintenance maintains the machine and makes it work well, which reduces machine

MGT550: Managing Operations

downtime and thus the continuity of the operational process without defects because in the event of machine downtime, defective products will appear, so it is necessary from the presence of periodic maintenance and that there is a maintenance schedule that is followed up by the maintenance manager in order to maintain the machines and reduce the chance of defects in the manufacturing

V. **Communication:** When the Big Green Tractor has communication between the production staff, the design team, and the quality team it can reduce the defects in the products because the teamwork brings greater efficiency to the processes and it can determine the root causes of the problem or defects quickly, work on solving the problem and can help your manufacturing process to continually improve.

VI. **Product design:** It can reduce manufacturing defects when it has a good product design because a bad product design can lead to product defects. It is best if manufacturing engineers are involved in product design so that they can anticipate potential areas of concern. The experience that production engineers have in manufacturing is particularly relevant to the initial development of parts and the reduction of future manufacturing defects that may occur to the product.

Achieving quality of conformance depends on a number of factors, including the design of the production process (distinct from product design),(Russell S Roberta& Taylor III Bernard 2011)

c. The use of 21st century tools to create a greener process

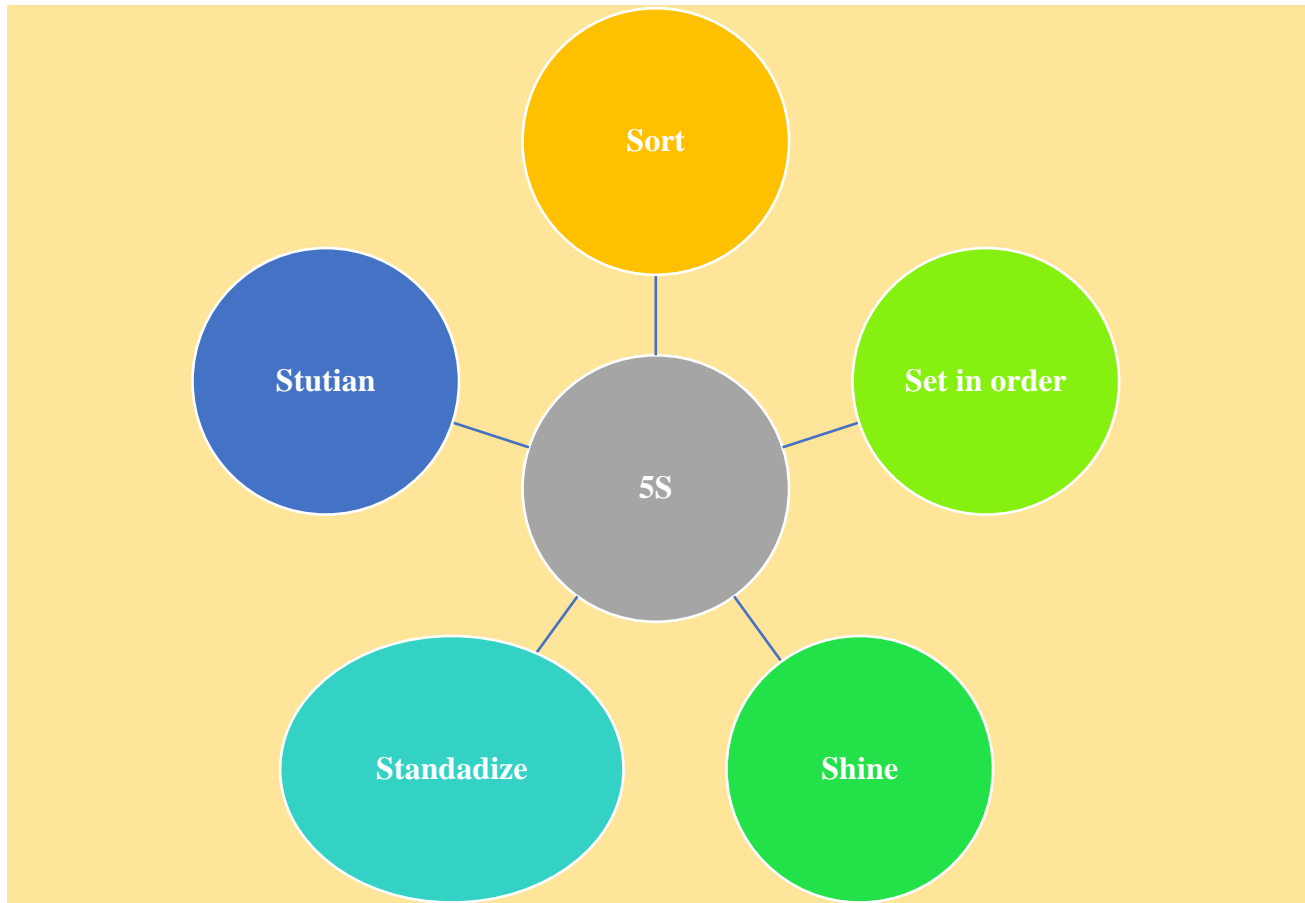
there are many tools in the 21st century can The Big Green Tractor use to create a greener process. Green manufacturing means the renewal of production processes and the

MGT550: Managing Operations

establishment of environmentally friendly operations/processes within the manufacturing field. Greening of manufacturing, when workers use fewer natural resources, reduce pollution and waste, reuse materials, and reduce emissions in their operations. New technologies are sought and used to reduce environmental impact, and workers must be trained in the use of technologies that achieve green practices in manufacturing.

The Big Green Tractor can use any tools from the following to achieve green process: -

- ❖ **Muda:** Anything in the manufacturing process that does not add value from the customer's perspective. it can remove from the process
- ❖ **Lean manufacturing-** : provides a systematic approach to reducing waste within the manufacturing process, while remaining within certain controls such as productivity and quality.
- ❖ **5 S:** -this system focuses on organize space for everything and keeping the workplace clean until people to do work by easy way and this process included 5 point hep us to make the green process

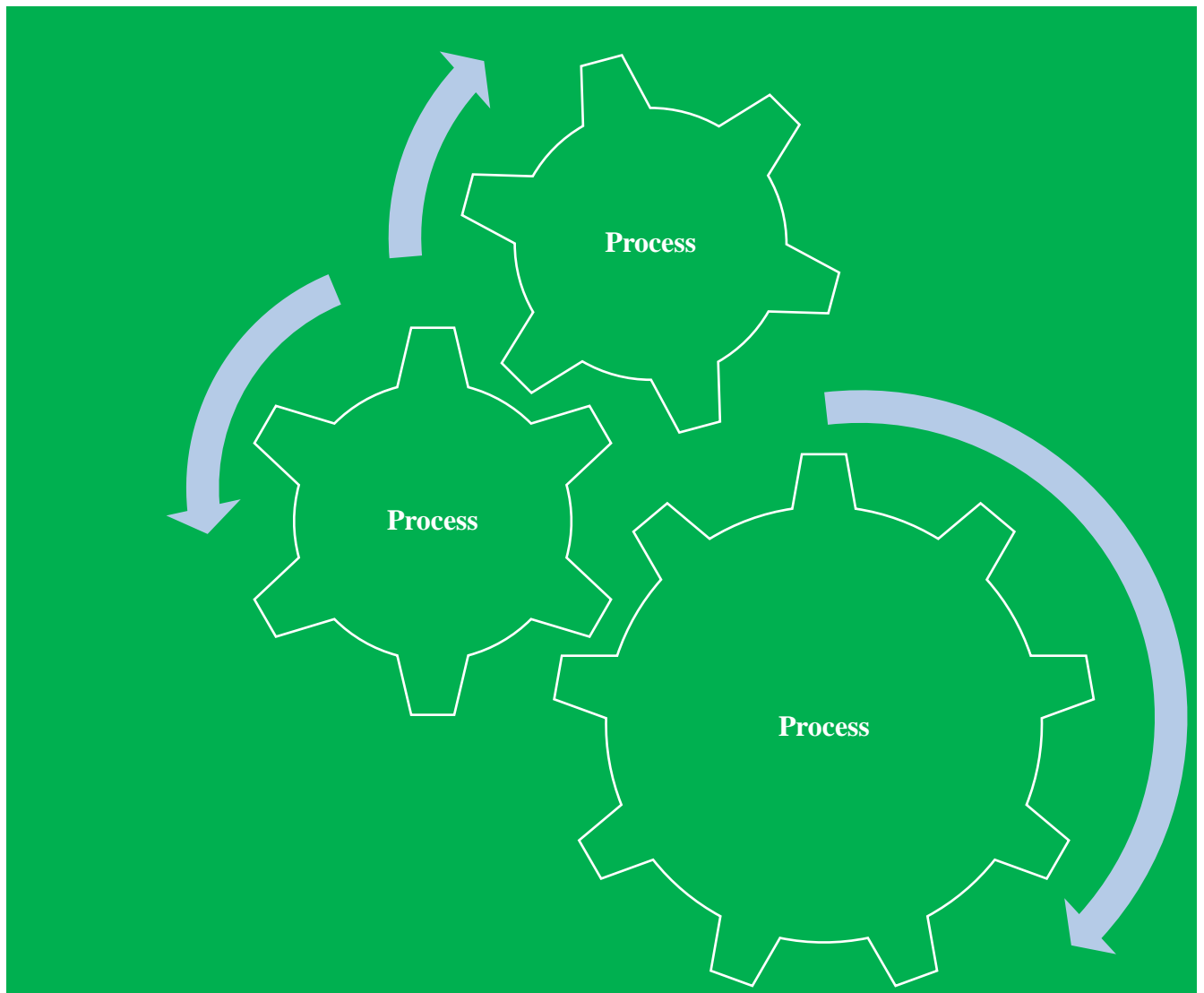


- ❖ **kaizen:** -A modern strategy where employees work together proactively to achieve systematic improvements in the manufacturing process because this strategy brings together the collective talents of the organization to create an engine for the continuous disposal of waste that results from manufacturing processes.
- ❖ **Poka-Yoke:** -it's the process for determining the defects and prevention in the production processes to achieve the goals with zero defects in the production. this is not easy to find all defects in the product as it is more expensive to reach it in all stages of production.
- ❖ **Kanban:** - A process of regulating the flow of materials both within the plant and with outside suppliers and customers. Based on automatic replenishment through

MGT550: Managing Operations

signal cards that indicate when more materials are needed. this process can remove the waste from inventory and overproduction because it focuses on the required material when needs.

The Big Green Tractor can use any tool from the above to achieve the green manufacturing green manufacturing submits benefits for the Big Green Tractor is that it improves the long-term stability of the business. and it needs to align with these trends if it wants to survive in the future. green manufacturing focuses on sustainable production methods that can achieve the better market stability.



MGT550: Managing Operations

2- Develop a socially responsible operational guide for the Big Green Tractor for their pollutants

first thing any industry has waste from the production process and this waste will be effect in the environment or people's health, so any company needs to remove the waste in the correct way to save the environment and people's health. From the waste there are chemical waste and its dangers. any company can remove the waste in the correct way needs to have a guideline for collecting the chemical waste and there are Industrial standards on disposal of chemical waste. The guideline should be focuses on the below points: -

- ✚ Protecting people health and the environment
- ✚ Determining the nature of the waste and the environmental situation in which it is managed, and the presence of analytical tools to conduct any operations on the place
- ✚ Ensure that the guide is approved by the government and that it is suitable for dealing with waste and that it is appropriate to the laws in force in the country
- ✚ Evidence should include a framework that helps stakeholders work together to achieve purposeful environmental outcomes.

In this case the Big Green Tractor can do the following for developing a socially responsible: -

a. Industrial standards on disposal of chemical waste.

The guideline for disposal of chemical waste in the Big Green Tractor should include the following: -

- 1) **Definition of chemical waste: -** determine the chemical waste solids, liquids or gases, gas cylinders are non-returnable, flammable solvents, water-reactive

MGT550: Managing Operations

materials, materials including mutagenic and unstable materials

2) **Determine the volume of chemical waste:-** after defining the chemical waste we need

to determine the volume of waste until we can do the process for disposal the waste

also needs to know the volume per each one from waste until we can do easy action

to disposal of it

3) **Packaging :-** any waste from the manufacturing process it will be put in the

packaging through the container without mix between the chemical waste in one

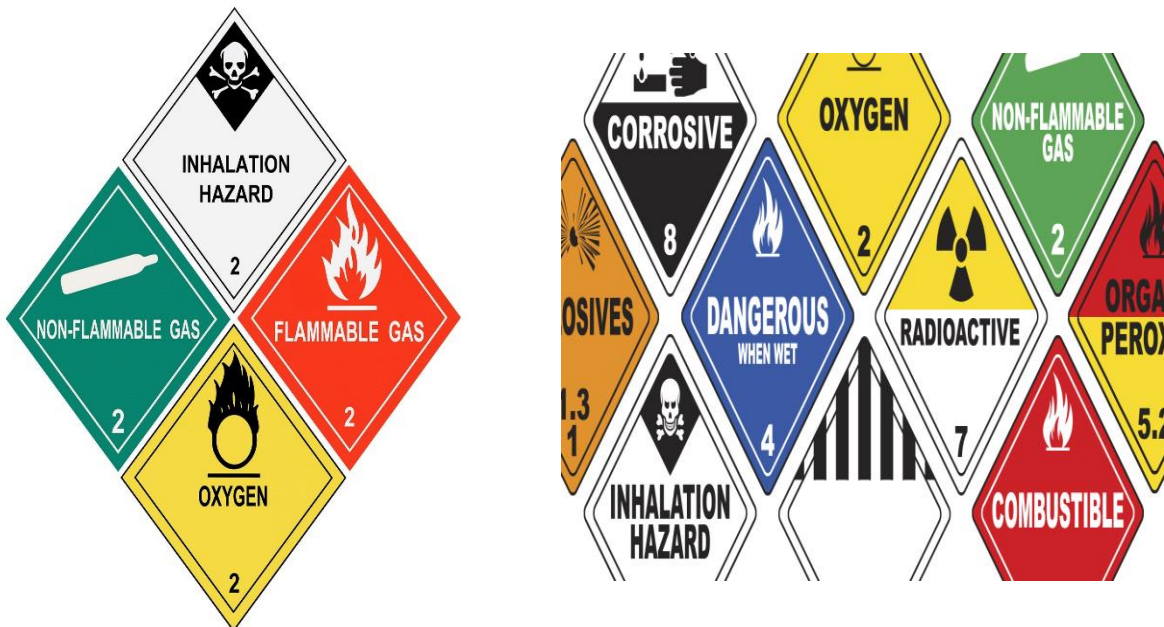
container and the container it should be in a good condition for keeping the waste.

Some photos for container



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- 4) **General labelling:-** the Big Green Tractor needs to put many general labelling to warn the employees about chemical waste for avoiding anyone touching these wastes because they are dangerous and will effect in human health so this labelling or sticker is very important. we can find some photos for the general labelling in the following: -



MGT550: Managing Operations

5) Container labelling.: - it should attach a chemical waste label directly to the waste container and add all information about the item in the labelling and avoid any short name or data not clear for every employee because when using clear labelling and with correct data of chemical waste we can avoid any risk effect in human health or environment. there are some examples for forms can use in the container labelling

HAZARDOUS WASTE

Weill Cornell Medicine

Contact Name:	Contact Number:
Principal Investigator:	

Hazard Characteristics (check all that apply):

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flammable	Corrosive	Toxic	Reactive	Health Hazard	Other

Chemical Name(s):

For assistance, contact Environmental Health and Safety
 646-962-7233 ehs@med.cornell.edu <https://ehs.weill.cornell.edu>

HAZARDOUS WASTE

UNIVERSITY OF WASHINGTON
ENVIRONMENTAL HEALTH AND SAFETY (206) 535-5835 UWV 1127-4000

CHEMICAL COMPOSITION AND ASSOCIATED HAZARDS(S)	%
Acetone	65.0000
Toluene	15.0000

<input type="checkbox"/> Corrosive	<input type="checkbox"/> Reactive	<input type="checkbox"/> Other (explain)
<input type="checkbox"/> Non-Hazardous	<input type="checkbox"/> Toxic	
<input checked="" type="checkbox"/> Ignitable	<input type="checkbox"/> Oxidizer	

WASTE GENERATOR INFORMATION	Labeled by Dr. Disposal	Phone 555-1212
Department Chemistry		Room BB 022
Building Chemistry		

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6) **Storage :-** the Big Green Tractor needs space for storage the wastes . And that the place is far from the work area and that each item is stored in a separate place from the other until the disposal of these wastes

7) **container emptying:-**

The process of emptying the container is based on the type of container, the type of material inside the container, its size, what is the correct way to unload it, and the appropriate environmental standards for disposal of this waste.

By using the above guidelines, the Big Green Tractor can disposal the chemicals waste.

b. Green alternatives to traditional manufacturing process.

There are many ways can the Big Green Tractor use it to achieve the green alternatives to traditional manufacturing process.

- **Manufacturing with a laser:** the Big Green Tractor can use laser manufacturing as it is good for the environment, unlike traditional manufacturing processes that use high-risk resources and produce more emissions. Laser technology helps make a positive impact on the environment by reducing waste during manufacturing processes. In addition, it helps to extend the life of the tool and maintain its efficiency due to its offline nature.
- **Use of new technology: -** Every day there is a technological development in manufacturing processes, where machine learning, artificial intelligence and 3D printing are now available, as well as there are advanced robots that use a substitute for the human element, and the use of these things adds competitive value to products and preserves the environment as it reduces errors in manufacturing

MGT550: Managing Operations

processes. The technology was required in Manufacturing processes.

Advanced technologies such as 3D printing (or additive manufacturing), robotics, or flexible manufacturing systems (FMS) make a wider range of products in a wider range of volumes faster and at a lower cost than using conventional equipment. (Swink Morgan & Melnyk A Steven & Hartley L Janet 2020)

- **Recycling: -** Although this may seem like a simple task, it is actually one of the main activities that you should start with the Big Green Tractor because it helps reduce the costs of waste collection and enhances employee participation in the production process as putting the waste in landfills affects the environment
- **Prepare a green team: -** Where Big Green Tractor must create a team of employees and train them to shape sustainability in the company and find realistic and scientific solutions where part of this team works on recycling and the other part eliminates unnecessary packaging.

- **Alternative Energy: -**

Energy is an appropriate way to create friendship between manufacturing and the environment where the company can correct the energy consumption path reducing losses resulting from energy consumption such as replacing old motors with new ones or changing old lighting such as using LED lighting, which will have an impact on energy costs consumed. Or switching to solar or hydropower, which will have a significant impact on the environment and turn the company into a good environmental friend.

- **Waste reduction: -**

The company can form a committee to review the waste again to ensure that it does not dispose of the valuable materials. Some of the raw materials can be recycled or

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used in new projects and over time the waste will reduce the costs of production

- **Water conservation**

The company can conserve water by using modern methods of water treatment, as well as reducing discharge to sewage and wastewater.

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Conclusion

- 1- Operation process determines the profitability of the company**
- 2- The role of the operations manager is very important in the success and development of operations**
- 3- There are many ways to achieve green manufacturing**
- 4- All companies that focus on applying green manufacturing to preserve the environment must**
- 5- Achieving sustainability in manufacturing processes requires a great effort from all involved in the manufacturing process**
- 6- Operation process means to replay these questions (Who, What, When, why, Where and How?)**
- 7- Manufacturing technology has changes and updates every day, and any company must be aware of these updates and benefit from them**
- 8- Any company needs to focus on What do customers want?**
- 9- The simpler the product design, the lower the cost of change**
- 10- When considering a particular manufacturing process, its environmental impact of it must be considered.**

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