K.L.N. College of Engineering

Pottapalayam – 630612.(11 km From Madurai City)
Tamil Nadu, India.

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DEPARTMENT OF MECHANICAL ENGINEERING

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VISION

To become a Centre of excellence for Education and Research in Mechanical Engineering.

MISSION

- Attaining academic excellence through effective teaching learning process and state of the art infrastructure.
- Providing research culture through academic and applied research.
- Inculcating social consciousness and ethical values through co-curricular and extra-curricular activities.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO I	Graduates will have successful career in Mechanical Engineering and service industries.
PEO II	Graduates will contribute towards technological development through academic research and industrial practices.
PEO III	Graduates will practice their profession with good communication, leadership, ethics and social responsibility.
PEO IV	Graduates will adapt to evolving technologies through lifelong learning.

PROGRAM SPECIFIC OUTCOMES (PSOs)

Mechanical Engineering Graduates will be able to:

PSO 1	Derive technical knowledge and skills in the design, develop, analyze and manufacture of mechanical systems with sustainable energy, by the use of modern tools and techniques and applying research based knowledge.
PSO 2	Acquire technical competency to face continuous technological changes in the field of mechanical engineering and provide creative, innovative and sustainable solutions to complex engineering problems.
PSO 3	Attain academic and professional skills for successful career and to serve the society needs in local and global environment.

MECASO

MECHANICAL ENGINEERING NEWSLETTER

Principal Message

Education is the investment in Human Resource Development. It is the art of training and equipping the youth to be the builders of future, enabling them to multiply wisely and judiciously the God-given 'Talent'. The future of humanity will be bright only if intellectual, emotional and spiritual evolution is ensured through education. KLN College of Engineering rightly employs the studies in Engineering & Technology as a tool for the same. Let the decades-old endeavour of KLN College of Engineering and Technology in the pursuit of knowledge be ever fruitful, contributing to the enhancement of human dignity.

Principal

Dr. A.V. RAMPRASAD

From the Head of the Department

Science and Technology are ever growing dimensions of human life. To separate it from our daily lives has become virtually impossible. KLN Engineering College has always been dedicated in its efforts in bringing the same dynamism into life of every student. The semester bygone has been an eventful and fruitful one with Sports, Arts and Academics forming a colorful portrait. I am happy to know that Sahrdaya College of Engineering and Technology continues its legacy of meritorious and co-curricular achievements of its staff and students. This magazine has always been true to faithfully documenting all the events and achievements. It stands testimony to KLN Engineering College's dedication to excellence in all aspects of education. I wish the department of Mechanical Engineering the very best in all its endeavours and wish that the department may grow in the years forth into the best of the best.

HOD / Mech

Dr .P. Udayakumar

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Programmable Logic Control (PLC) :

By AntonyLourduGriffin. A(131038) II year A Section

A programmable logic controller (PLC) is a small, dedicated computer used to automate and control mechanical effort, and is most often seen in use in the automotive industry. Factory assembly line machinery is activated and monitored by a single PLC, where in the past hundreds of timers and relays would have been required to do the task.

Programmable logic controllers, sometimes referred to simply as programmable controllers, are microprocessor based units that, in essence, monitor external sensory activity from additional devices. They take in the data, which reports on a wide variety of activity, such as machine performance, energy output, and process impediment. They also control attached motor starters, pilot lights, valves and many other devices. Both functions respond to a custom, user-created program.

Automation of many different processes, such as controlling machines or factory assembly lines, is done through the use of small computers called a programmable logic controller (PLC). This is actually a control device that consists of a programmable microprocessor, and is programmed by using a specialized computer language. Before, a programmable logic controller would have been programmed in ladder logic, which is similar to a schematic of relay logic. A modern programmable logic controller is usually programmed in any one of several languages, ranging from ladder logic to Basic or C. Typically, the program is written in a development environment on a personal computer (PC), and then is downloaded onto the programmable logic controller directly through a cable connection. The program is stored in the programmable logic controller in non-volatile memory.

Programmable logic controllers contain a variable number of Input/Output (I/O) ports, and are typically Reduced Instruction Set Computer (RISC) based. The programmable logic controller circuitry monitors the status of multiple sensor inputs, which control output actuators, which may be things like motor starters, solenoids, lights and displays, or valves.

Earlier automation systems had to use thousands of individual relays and cam timers, but all of the relays and timers within a factory system can often be replaced with a single programmable logic controller. Today, programmable logic controllers deliver a wide range of functionality, including basic relay control, motion control, process control, and complex networking, as well as being used in Distributed Control Systems.

Digital signals yield an on or off signal, which the programmable logic controller sees as Boolean values. Analog signals may also be used, from devices such as volume controls, and these analog signals are seen by the programmable logic controller as floating point values.

There are several different types of interfaces that are used when people need to interact with the programmable logic controller to configure it or work with it. This may take the form of simple lights or switches or text displays, or for more complex systems, a computer of Web interface on a computer running a Supervisory Control and Data Acquisition (SCADA) system.

Programmable logic controllers were first created to serve the automobile industry, and the first programmable logic controller project was developed in 1968 for General Motors to replace hard-wired relay systems with an electronic controller.

Supervisory Control and Data Acquisition (SCADA)

By Nirmal Kumar R (131001) II year A Section

Introduction:

With the advent of advances in the communication system, computer systems and instrumentation systems, supervisory control and data acquisition (SCADA) applications are growing more and more. A centrally located master station controls monitoring and control of any process parameters, like pressure and temperature, whose plant installations are more remote or widely scattered. So in the SCADA system one can monitor and control any process by observing the process on a color video graphic display terminals of the operator consoles from master station.

A typical SCADA system comprises of:

1. A master control station, running SCADA and application software
2. A set of RTUs located close of the measuring and control instruments dispersed in the plant.
3. A dedicated communication system linking the MCS and the RTUs

The main features of the SCADA system are:

- Design for unattended operations.
- Field proven for stringent environmental conditions.
- Microprocessor based intelligence.
- Flexibility in configuration to suit specific applications.
- Positions independent I/O modules.
- Low power consumption.
- The typical applications of SCADA system are as follows:
- Remote monitoring and control of Electric traction monitoring.
- Pipeline for transportation of Oil, Water, Gas etc…,
- OFF-shore and ON-shore Oil platforms.
- Cement, Steel, Fertilizers and other process plants.
- Thermal/Hydro/Gas power plants and electric substations.
- Efficient management of electric power transmission and distribution.

Overview of rtu:

Remote Telemetry unit (RTU) is a microprocessor based data acquisition system suitable for telemeter and telecontrol applications .The basic functions performed by the RTU include input scanning, alarm and change of state detection with a high degree of security, reliability and integrity .The RTU is designed to act as a telemetry units to a Master computer and is capable of exchanging information with it.

The RTU employs sophisticated microprogramming techniques to provide a highly secure method of data transmission and being software based, offers a considerable degree of flexibility for incorporation of special application oriented features.

The data transmission link may be Omnibus, Multidrop or radial .The rate of data transmission is determined by the characteristics of the transmission medium and system response times.

The RTUs and the MS are normally filled with Modems or line drivers, which provide an interface to suit the requirements of the transmission network.

Functions of Rtu:

The exact operation of RTU can be broadly categorized as follows

1. Data Acquisition and Control.
2. House Keeping
3. Communication and message security.

Data Acquisition and Control

The RTU scans its inputs at predetermined intervals, compares the readings with previously stored data, thus enabling the detection of any change of state and alarms .This information is kept ready by RTU for onward transmission to the Master Computer when it is called for.

House Keeping

The RTU can initialize itself on switch “on” and restoration of power after interruption in supply. The initialization sequence may also be initiated by hardware reset, by software interrupt from watch-dog etc, watch-dog provides a check on the operation of RTU when watch-dog detects that the microprocessor has jumped out of a program, and it attempts to reinitialize the system.

The self-diagnostic checks run by the RTU include bus checks, ADC checks and I/O module checks. A special address is used to report back to the master station, a wide range of specific RTU faults.

Communication:

The communication from the RTU to the MCs is in different modes such as

1. Interrogation mode
2. Broadcasting mode
3. downlink load mode
4. Report mode

The input and output cards of a typical RTU are as follows:

a. Digital I/p card
b. Digital o/p card
c. Analog I/p card
d. d .Analog o/p card

The digital I/p card Detects whether a contact is open or closed. E.g.: the position of the motor operator valve (MOV) or start/stop status of an engine (close or open), ON/OFF position of a circuit breaker etc.

With the digital output card a relay can be driven there by open/close MOV or circuit breaker.

The analog input card will take an input of 4-20 amps or 1-5 V. these electrical signals, which may be an output of a pressure transducer, differential pressure transducer, temperature transducer, flow meter, voltage/current transducer of power station subsystems.

The analog output card is for set point control of analog devices and current of 4-20mAmps can be the o/p of the analog o/p card. This current o/p can be too partially open/close of MOV. In traction applications, the monitoring is done by keeping the RTUs at each substation in which the high values of current and voltage are converted to 4-20mAmps and 1-5 V by current and voltage transducers respectively This serves as an analog I/p for the analog monitoring card. The position ON/OFF of the circuit breakers are taken as 1&0respectively.this serves as a digital I/p for digital input card.

The RTU is controlled by the master station (MS).

Introduction to Small Scale Industry

By Daniel Irudhayaraj .D (121021) III year A Section

THE SSI (SMALL SCALE INDUSTARY) today is immense for the growth of the country. Small scale industries are the industries which are run with the help of theirlabours and which also use some simple machine and power.

The investment scale in this industry from 50 lakh to 1 crore for fixed assets. Irrespective number of worker engaged is small scale industry unit.

In India these type of industries are permuted to meet with the problem of excess population and unemployment so the government of India prate entrepreneur to step up small scale industries by aiding him by giving loans, land ,guidance etc .The strategy adopted by the government is:-

1. Public enterprenship should remain confined only to those industries and sector where private enterprise, individual or cooperate, is generally not attracted. Existing public entrepreneurship be improved through better management and by putting relative greatly emphasis on research and development. There is need to streamline the R&D wing of public sector enterprise.
2. All possible efforts be made very seriously (not casualty) for the development of an industrial culture. It should be realize that the central core of entrepreneurship is the motive force since by its very nature, entrepreneurship implies positive action and individual with the right kind of combination of ability can pursue their goal with unlimited courage and enthusiasms.
3. There is need to development management education and industrial training.
4. The development of backward region / area constitutes a new challenge. Program for their development be drawn up and should be effectivly implemented.
5. Adequate measure is a must for mobilizing & casting the entrepreneurs talent in the country .In this context, it should be realized that entrepreneurs are not the grief of a particular classes.
6. Economic administration by the state should be improved and made more effective so that economic policy may be fully achieve their objective in the overall interest of economy.
7. Financial institute should provide adequate and timely credit and timely create and technical assistance, especially to the small and medium sized enterprise. They may also impart

knowledge about the need of economy and they should file their massive data in term of growth of new entrants or entrepreneurs in the field of industry.

How to Start a Small Scale Industry

The steps involved in starting a small-scale industry are:-

i. Conduct Market Survey and Study the products as regards their demand in the market. Check whether it is a seasonal product or it has demand through out the year.
ii. Study similar products available in the market that can be probable competitors. Analyze them as regards their utility, quality and cost.
iii. Find whether the product can be exported.
iv. Explore the possibility whether some product can be manufactured in collaboration with a foreign country. This provides readymade technical knowledge and save a lot of time and money otherwise wasted in developing a suitable method of manufacture.
v. Decide the product that you are going to manufacture, on the basis of:-
   a. Market Survey
   b. Financial implication involved
   c. Technical knowledge available
   d. Experience in the line, etc.
1. Select a proper site for locating the unit.
2. Take a building for factory on hire or construct your own factory building.
3. Get yourself conversant with the rules and other information available from small-scale industries, Ministry of Industry, New Delhi.
4. Prepare a scheme in detail to manufacture the selected product such a scheme should include the requirement of and the approximate cost of:-

i. Land and building
ii. Machinery, tools and other equipment
iii. Direct labour
iv. Indirect labour
v. Direct material cost
vi. Indirect material cost
vii. Selling and distribution overheads

viii. Working Capital for a unit time

ix. Depreciation

x. Total production cost per unit time

xi. Percentage of profit.

5. The scheme after it has been prepared is sent, for approval to the Directorate of Industries of the particular state.

6. A small scale unit has to get itself registered with the Directorate of industries in order to avail various facilities provided by the government, such as:-

i. Financial assistance

ii. Raw materials water and power

iii. Import license

iv. Factory accommodation

v. Government order

Concept of Marketing

By Santhosh Kumar R (121050) III year B Section

Studies reveal that different organizations have different perception of marketing and these different perceptions have led to the promotion of different concept of marketing. It is found that at least 5 distinct concept of marketing have guided and are still guided business terms. They are:

1. Exchange concept.
2. Production concept.
3. Product concept.
4. Sales concept.
5. Marketing concept.

1. Exchange concept:- The exchange concept of marketing as the name indicates hold that the exchange of a product b/w the seller and a buyer is a central idea of marketing. But a proper scrutiny of the marketing would readily reveal that marketing is very much broader than exchange. The other important aspect of marketing such as concern for the customer, the generation of the venue satisfaction, the creative selling and integrated action for service the customer get completely overshadowed in this concept of marketing.
2. Production concept: - According to the production concept marketing is a merely related to production .They believe that marketing can be managed by managing production. The concept hold that consumer would supported as a rule these product which are in a great volume and allow unit cost organization voting for this concept which are influenced by a drive to produce all that they can .They do achieve high production efficiency and a substantial reduction in the unit cost of production. Yet they often do not get customer as they expected. Customers after all are motivated by a verity consideration in their purchases. Easy availability and low cost are not only parameters governing the costumers buying action and the production concept thus fails to drive as the right marketing polices for the enterprise.
3. Product concept: - The product concept is somewhat stiff from the production concept where as the production concept seeks to win markets & profits via high volume of

production and low unit cost of production. The product concept to seek to archive the same results via product excellence, improved product, new products and ideally design and engendered products. It also places emphasis on quality assurance. Origination that subscribes to the product concept of marketing believes that customer goods automatically vote for products of high quality they spent considerable energy. Time and money own research and development brings in a variety of new product. They do not bother to study the market and consumer in depth. They get totally embraced with the product and almost forget the customer for whom the product is actually meant. They fail to find what the customers actually needs and what they would gladly aspect.

4. Sale concept: - The sale concept maintains that a company cannot expect its product to get pick up automatically by the costumer. the company has to consciously promote and push its heavy advertisement, high power personal selling, large scale sale promotion, heavy price discount and strong publicity and public relation are the normal tool used by the organization that relay on the concept. Evidently the sale concepts too generate marketing myopia just as a exchange concept, production concept and product concept. Its lead to wrong or inadequate understanding of the market and consequently a total failure in the market place.

Marketing Concept

By Jeya Chandran G (121028) III year C Section

Importance of marketing to the society:-

a. Marketing helps to achieve and maintain to rise the standard of living. Marketing bring new variety of good to the consumer and better and rigorous marketing gives soon for mass production. Under mass production, the cost of product is low. So, people can have more goods for their money, which results in high standard of living.
b. Marketing increases employment opportunity.
c. Marketing helps to increase national income.
d. Marketing is a connecting link between consumer and producer.
e. Marketing helps to maintain stability:- Economic stability is the sign of any efficient and dynamic economy and economy stability is maintained only when there is balance in supply and demand. If production is more than demand the access goods cannot be sold at acceptable prices then stokes of goods would be picked up and there would be glut all the market in fall in price. Similarly, if production is less then demand price is shooting up resulting in higher price. In such a situation marketing maintains the economic stability by balancing production and consumption.

Steps in Marketing Management:-

1. Product planning
2. Sale Forecasting
3. Pricing Policy
4. Distribution Strategy
5. Role of Advertising (personal selling)
6. Quality

1. Product planning:- Product planning may be defined as "the act of marketing out and supervising the search, screening, development and commercialization of new product, modification of existing line."

Product planning involves three important considerations

a. The development and Induction of new ideas.
b. The modification of exiting lines as may be required in term of changing costumer's need and performance.
c. The discontinuance of elimination of marginal or unprofitable product.

Product can be classified as:-

1. Customer products
2. Industrial products
3. Defense products

1. Customer products:-Goods designed to for use ultimately by the costumer or household and in such form they they can be used without commercial processing.

2. Industrial products:-Goods which are designed to be sold primarily for use in producing goods destined to be sold primarily to the ultimate consumers.

Introduction to 3D Printing

By A. Sikkandhar Basha(111020) IV year A Section

Vignesh N (131327) II year A section

General explanation of 3D Printing:

A method of manufacturing known as 'Additive Manufacturing', due to the fact that instead of removing material to create a part, the process adds material in successive patterns to create the desired shape.

Main areas of use:

- Prototyping
- Specialized parts – aerospace, military, biomedical engineering, dental
- Hobbies and home use
- Future applications– medical (body parts), buildings and cars

3D Printing uses software that slices the 3D model into layers (0.01mm thick or less in most cases). Each layer is then traced onto the build plate by the printer once the pattern is completed, the build plate is lowered and the next layer is added on top of the previous one.

Typical manufacturing techniques are known as 'Subtractive Manufacturing' because the process is one of removing material from a preformed block. Processes such as Milling and Cutting are subtractive manufacturing techniques. This type of process creates a lot of waste since the material that is cut off generally cannot be used for anything else and is simply sent out as scrap.

3D Printing eliminates such waste since the material is placed in the location that it is needed only, the rest will be left out as empty space.

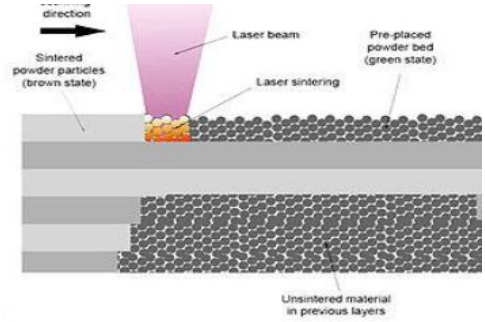
Advantages and Limitations:

Layer by layer production allows for much greater flexibility and creativity in the design process. No longer do designers have to design for manufacturing, but instead they can create a part that is lighter and stronger by means of better design. Parts can be completely re-designed so that they are stronger in the areas that they need to be and lighter overall.

3D Printing significantly speeds up the design and prototyping process. There is no problem with creating one part at a time, and changing the design each time it is produced. Parts

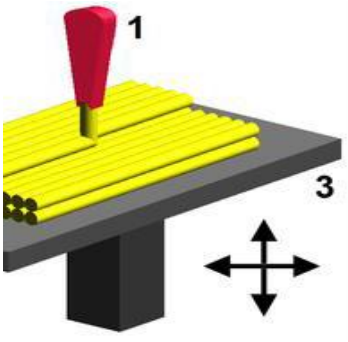
can be created within hours. Bringing the design cycle down to a matter of days or weeks compared to months. Also, since the price of 3D printers has decreased over the years, some 3D printers are now within financial reach of the ordinary consumer or small company.

The limitations of 3D printing in general include expensive hardware and expensive materials. This leads to expensive parts, thus making it hard if you were to compete with mass production. It also requires a CAD designer to create what the customer has in mind, and can be expensive if the part is very intricate.



3D Printing is not the answer to every type of production method; however its advancement helps to accelerate design and engineering more than ever before. Through the use of 3D printers, designers are able to create one of a kind piece of art, intricate building and product designs and also make parts while in space!

We are beginning to see the impact of 3D printing many industries. There have been articles saying that 3D printing will bring about the next industrial revolution, by returning a means of production back within reach of the designer or the consumer.



3D Printer

Lean Manufacturing

By

By A. SikkandharBasha(111020) IV year A Section

A Brief History of Lean Manufacturing

U.S. manufacturers have always searched for efficiency strategies that help to reduce costs, improve output, establish competitive position, and increase market share. Early process oriented, mass production manufacturing methods common before World War II shifted afterwards to the results-oriented, output-focused, production systems that control most of today's manufacturing businesses.

Japanese manufacturers after the Second World War faced problems like declining human, material, and financial resources. The problems they faced in manufacturing were vastly different from their Western counterparts. These circumstances led to the development of new, lower cost, manufacturing practices. Early Japanese leaders such as the Toyota Motor Company's Eiji Toyoda, TaiichiOhno, and Shingeo Shingo developed a disciplined, process-focused production system now known as the "Toyota Production System", or "lean production." The objective of this system was to minimize the consumption of resources that added no value to a product.

The "lean manufacturing" concept was popularized in American factories in large part by the Massachusetts Institute of Technology study of the movement from mass production toward production as described in The Machine That Changed the World, (Womack, Jones &Roos, 1990), which discussed the significant performance gap between Western and Japanese automotive industries. This book described the important elements accounting for superior performance as lean production. The term "lean" was used because Japanese business methods used less human effort, capital investment, floor space, materials, and time in all aspects of operations. The resulting competition among U.S. and Japanese automakers over the last 25 years has lead to the adoption of these principles within all U.S. manufacturing businesses.

WHAT IS LEAN MANUFACTURING?

Lean Manufacturing can be defined as:

"A systematic approach to identify and eliminate waste (non-value-added activities) through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection."

Value

In lean production, the value of a product is defined solely by the customer. The product must meet the customer's needs at both the specific time and price. The thousands of mundane and sophisticated things that manufacturers do to deliver a product are generally of little interest to customers. To view value from the eyes of the customer requires most companies have to undergo comprehensive analysis of all their business processes. Identifying the value in lean production is to understand all the activities required to produce a specific product, and then to optimize the whole process from the view of the customer. This viewpoint is critically important because it helps to identify between the activities that clearly add value, activities that add no value but cannot be avoided, and activities that add no value and can be avoided.

Continuous Improvement

The transition to a lean environment does not occur overnight. A continuous improvement mentality is necessary to reach a company's goals. The term "continuous improvement" refers incremental improvement of products, processes, or services over time, with the goal of reducing waste to improve workplace functionality, customer service, or product performance (Suzaki, 1987). Continuous improvement principles, as practiced by the most devoted manufacturers, result in astonishing improvements in performance that competitors find nearly impossible to achieve.

If the lean production is applied correctly it will results, in the ability of an organization to learn. As in any organization, mistakes will always be made. However, mistakes are not usually repeated because this is a form of waste that the lean production philosophy and its methods seek to eliminate.

Customer Focus

A lean manufacturing enterprise thinks more about its customers than it does about running machines fast to absorb labor and overhead. Ensuring customer input and feedback, it assures quality and customer satisfaction, all of which support sales.

Perfection

The concept of perfection in lean production means that there are endless opportunities for improving the utilization of all types of assets. The systematic elimination of waste will reduce the costs of operating the extended enterprise and fulfills customer's desire for maximum

value at the lowest price. While perfection may never be achieved, its pursuit is a goal worth striving for because it helps to maintain constant vigilance against wasteful practices.

Focus on Waste

The aim of Lean Manufacturing is the elimination of waste in every area of production including customer relations, product design, supplier networks, and factory management. Its goal is to incorporate less human effort, less inventory, less time to develop products, and less space to become highly responsive to customer demand while producing top quality products in the most efficient and economical manner possible.

Essentially, “waste" is anything that the customer is not willing to pay for. Typically the types of waste considered in a lean manufacturing system includes

Overproduction: production more than demanded or before it is needed. It is visible as storage of material. It is the result of producing speculative demand. Overproduction is making more than is required by the next process, making earlier than is required by the next process, or making faster than is required by the next process. Causes for overproduction waste include:

- Just-in-case logic
- Misuse of automation
- Long process setup
- Unlevel scheduling
- Unbalanced work load
- Over engineered
- Redundant inspections

Waiting: for a machine, the process should be eliminated. The principle is to maximize the utilization/efficiency of the worker instead of maximizing the utilization of the machines. Causes of waiting waste include:

1. Unbalanced work load
2. Unplanned maintenance
3. Long process set-up times
4. Misuses of automation
5. Upstream quality problems
6. Unlevel scheduling

Inventory or Work in Process (WIP): is material between operations due to large production or process with long cycle times. Causes of excess inventory include:

i. Protecting the company from inefficiencies and unexpected problems
ii. Product complexity
iii. Unleveled scheduling
iv. Poor market forecast
v. Unbalanced workload
vi. Unreliable shipments by suppliers
vii. Misunderstood communications
viii. Reward systems

Processing waste: should be minimized by asking why a specific processing step is needed and why a specific product is produced. All unnecessary processing steps should be eliminated. Causes for processing waste include:

1. Product changes without process changes
2. Just-in-case logic
3. True customer requirements undefined
4. Over processing to accommodate downtime
5. Lack of communications
6. Redundant approvals
7. Extra copies/excessive information

Transportation: does not add any value to the product. Instead of improving the transportation, it should be minimized or eliminated (e.g. forming cells). Causes of transportation waste includes:

a. Poor plant layout
b. Poor understanding of the process flow for production
c. Large batch sizes, long lead times, and large storage areas

Motion: of the workers, machines, and transport (e.g. due to the inappropriate location of tools and parts) is waste. Instead of automating wasted motion, the operation itself should be improved. Causes of motion waste include:

1. Poor people/machine effectiveness
2. Inconsistent work methods

3. Unfavorable facility or cell layout
4. Poor workplace organization and housekeeping
5. Extra "busy" movements while waiting

Making defective products: are purly waste. Prevent the occurrence of defects instead of finding and repairing defects. Causes of processing waste include:

- Weak process control
- Poor quality
- Unbalanced inventory level
- Deficient planned maintenance
- Inadequate education/training/work instructions
- Product design
- Customer needs not understood

Underutilizing people: not utilizing of people's abilities. Causes of people waste include:

1. Old guard thinking, politics, the business culture
2. Poor hiring practices
3. Low or no investment in training
4. Low pay, high turnover strategy

Nearly every waste in the production process can fit into at least one of these categories. If you understand the concept deeply, waste is the singular enemy that greatly declines business performance and threatens prosperity unless it is relentlessly eliminated over time. Lean manufacturing is an approach that eliminates waste by reducing costs in the overall production process, in operations within that process, and in the utilization of production labor. The focus is on making the entire process flow, not the improvement of one or more individual operations.

Some Basic elements of lean Manufacturing

1. Elimination of waste
2. Equipment reliability
3. Process capability
4. Continuous flow
5. Material flows one part at a time
6. Less inventory required throughout the production process, raw material, WIP, and finished goods
7. Defect reduction
8. Lead time reduction
9. Error proofing
10. Stop the Line quality system
11. Kanban systems
12. Standard work
13. Visual management
14. In station process control
15. Level production
16. Takt Time
17. Quick Changeover
18. Teamwork
19. Point of use storage

Student's Acheivements

Workshop – Participants

Sl. No.	Date	Name of the Participant	Programme and Venue	Event
1	21.2.15	R. Vigneswaran R. Thiruvenkatasamy K.M. Vignesh T. Mohanraj J. Venkatesh V. Palaniappan R. Vigneswaran V. Palaniappan	EXPRO '15 Madras Institute Of Technology, Chennai	Automotive Engine Workshop

STAFF'S ACHEIVEMENTS

Faculty Workshop / FDP Attended / Resource Person / Publication

Seminar / Workshop / FDP / Conference attended

Sl. No	Date	Staff Name	Title	Program	Location
1	28.02.2015	Dr. P. Udhayakumar	Strategic Planning on Institutional Development	Seminar on "Strategic Planning on Institutional Development" organized by Industry Institute Partnership Cell (IIPC)	K.L.N. College of Engineering.
2	06.02.2015 to 07.02.2015	Dr. A. N. Balaji	International Conference on Additive Manufacturing and 3D Printing	International conference	organised by ESCI and VEL Tech University
3	28.02.2015	Mr. D. SatheeshPandian	Strategic Planning on Institutional Developmen	organized by IIPC	K.L.N. College of Engineering.

Guest Lecture – Resource Person

Sl. No	Date	Staff Name	Title	Program	Location
1.	14.02.2015	Mr. G. R. Kathiresan	Blooms Taxonomy for enhancing engineering education	Organized by the staff development cell	KLN college of Engineering

Organized Events in Association with The Institution of Engineers (India)

S. No.	Date	Events	Topic	Resource Person	No. of students benefitted
1.	11.02.15	Campus Drive	Vee Technologies	HR	05
2.	03.02.15	Guest Lecture	Career Opportunities in Dept. of Atomic Energy	Dr. K. Sundararajan, Scientific officer, IGCAR, Chennai	20

PROGRAM OUTCOMES (POs)

Mechanical Engineering Graduates will be able to

1.	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to solution of complex engineering problems.
2.	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3.	Design / development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4.	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5.	Modern tool usage: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6.	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7.	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8.	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9.	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10.	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11.	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.
12.	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

K.L.N. COLLEGE OF ENGINEERING

VISION

To become a Premier Institute of National Repute by Providing Quality Education, Successful Graduation, Potential Employability and Advanced Research & Development through Academic Excellence.

MISSION

To Develop and Make Students Competent Professional in the Dynamic Environment in the field of Engineering, Technology and Management by emphasizing Research, Social Concern and Ethical Values through Quality Education System.

Principal **President** **Secretary & Correspondent**