Journal of Emerging Trends in Engineering and Applied Sciences (JETEAS) 8(1):54-57

jeteas.scholarlinkresearch.com

Engineering Design and Diagnostic Engineering Procedure

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Abstract
This paper examined engineering design and components. Engineering design combines scientific and engineering knowledge method with technical skills to put engineering design to work in production and manufacturing. Based on research and experience the author's x-rayed common areas which engineering products encounter difficulties. This includes diagnostic procedures and approaches, maintainability and reliability, inferior, substandard and low quality products. The paper recommends efficient ways that will help the design engineer strengthen the good features of their product based on precision, robustness and efficiency. The paper concluded by saying that diagnostic potentiality will help improve dynamism of engineering components

Keywords: engineering, dynamism, products, components, diagnosis, constraints.

INTRODUCTION

Engineering study is an interdisciplinary branch of social science and humanities devoted to engineers and their activities. Engineering is the work that involves practical application of design, construction of engines, machinery, structures, gadgets and components to the solution of real world problems. Engineering design combines scientific and engineering knowledge/method with technical skills to put engineering design to work in production and manufacturing.

One problem facing Engineers today is how to design quality, efficient and reliable engineering products. An important key to this problem lies in the realization that the quality of an engineering design is directly associated with the image and quality of the design engineer. Mixed feelings have been expressed by both qualified and unqualified persons that most engineering components lack the required standard for global use. Clearly, engineering product design seems to need seductive, exquisite and robust qualities that redefine a product in a global setting.

Engineering designs strike balance between analysis and laboratory experimentation that provide analytical background, experiences, sophisticated instrumentation, sensors and computers. Engineering design should have a systemic diagram, layout diagram and wiring diagram. Additionally, it is explicitly asserted that the survival and success of an industrial design depends on the dynamic qualities of continued and intensive researches. Clearly, any research design that does not depend on dynamism will be obsolete, and antiquated. Engineering design should not be based on re-branding, repackaging or changing a previous engineered components, it should rather be the analysis or avenue to improve product performances, features, efficiency and durability (Eiliam 2005).

Most phones in our global markets are bedridden with many problems, which ranges from battery issues, software problems, panel constraints and other critical inefficiencies. There is need for robustness and improvement in the engineering design (Ironbar and Eyibe 2016). Engineering design must work harmoniously with latest application such as automation, sensor, improved design and technologies.

Based on this backdrop, the following considerations for explaining engineering design and diagnostic procedures are discussed.

1. Engineering design and improvement
2. Diagnostic engineering approach
3. Reliability, maintainability and engineering design
4. Recommendation
5. Conclusion

Engineering Design And Improvements

Design can be defined as a general plan, pattern, traits, drawing and modifications that exquisitely redefined a component in a global view. Engineering design combines scientific and engineering knowledge with technical method and skill to put engineering design to work in production and manufacturing. Improvements in engineering design should be more of radical innovation, modifications with a diversified knowledge-based, market driven and stronger inter-connectiveness with global economy. (Eyibe 2016). There is need to reduce, eliminate and correct faults, error, inconsistencies in engineering components. The goals and reason for obtaining analysis and improvement varies widely

from daily or socially beneficial actions. Engineering designed components should be analyzed thoroughly before manufacture.

Design performances are based on robustness, features and efficiency of the products. Industrialization and innovation which requires technical, technological training, skills and design enhances a Nation's pride and image all over the world. The US and other innovative countries will keep leading in mind boggling design while developing nations focus on lower skills and products

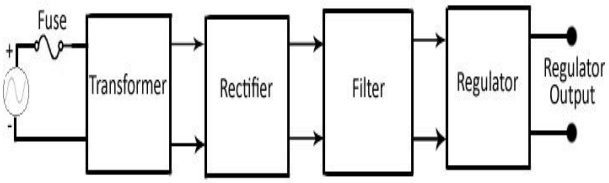


Figure 1-1 Block diagram of a power supply

Fig 1.1 The block diagram of a power supply unit

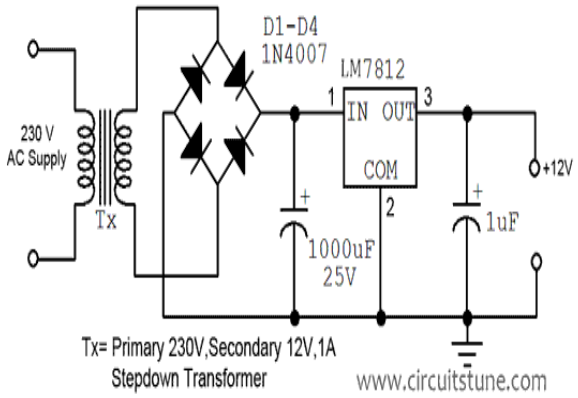


Fig 1.2 The circuit diagram of power supply unit (P.S.U)

Transformer: This is an electrical device used for stepping up and down current voltages.
Rectifier: This is a device that converts alternating current (A.C) input into a direct current (D.C.) output.
Filter: This is used for smoothening out the pulse received in the rectifier.
Regulator: This is used to keep the output voltage constant irrespective of the change in LC main input voltage and of the change in load current. Its main functions are line stabilization and load regulation.

The building block of all electronic/electric components is the power supply unit. The power supply unit helps to circulate power to the whole circuit. Most design engineers encounter error in the setup and wiring of power supply units. Clearly, when the power supply unit of any electronic/electrical gadget encounters problem, the product's performance is always degraded. In our global market, most engineering components are always prone to faults, mistakes, breakdown especially in the power supply. Most design engineers use antiquated components, and inferior part. There is need for high degree of clarity and robustness in engineering design.

Additionally, the main voltage is from 220V AC to 120VAC. To isolate power supply from system device transformer and rectifier must be involved. Most design engineers experience errors in winding of transformer or in the soldering of rectifiers. There is need for improvement in the design process in order to explore new avenues to improve product performance and features. It is imperative for automobile corporations, electrical, electronic industries to update obsolete material or antiquated manufacturing process with more current, less expensive technologies. We must improve in our design process in order to bring transformation and integrity into the engineering sector.

Diagnostic Engineering Procedure And Approach

One urgent problem facing engineering innovative design is how to reduce and correct high susceptibility to faults, failure in engineering components. Innovation is the introduction of new ideas, method, or thing in new improved fashion. Design is the general plan, traits, pattern, drawing and modification that exquisitely redefines an object in a global view. The ultimate goal of engineering design is the ability to being free from ambiguity, when components breaks down and cannot be repaired; it shows that the design engineer needed to retrace his steps. The quality of an engineering design is in terms of robustness.

Diagnostic engineering procedure is the process of using evaluation, analytical aspect and laboratory experimentation as an effective tool to identify design problems. It involves selection of proper technique for improved performance and robustness for global and future use. This process includes using tests, practical, experiments, reversed engineering, probing question and prototypes to identify problems and improvement before quality feedback is achieved. The aim of diagnostic potentiality is to conjure up the identification of the strength, weakness that could be reversed in the interest of engineered products (Warren 2016).

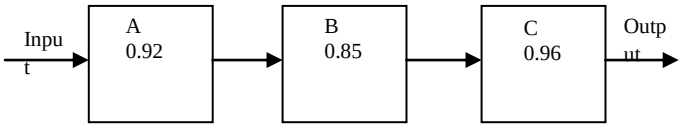
Clearly without a good conception of diagnostic potentiality most engineered products will be error prone and high susceptible to fault. The use of diagnostic engineering procedure is to re-check, reverse-engineer, correct, improved, re-plan, and re-evaluate to get an appropriate feedback (Eyibe 2016). The essence of improvement by design engineer is to improve physical, internal structure utility for accurate precision and efficiency. Engineering is defined as the

practical application of science and nature to the wide range of real world problems. Diagnostic approach will help improve standard and performance of engineering component

Reliability and Engineering Design

Calculate the reliabilities of these two systems below?

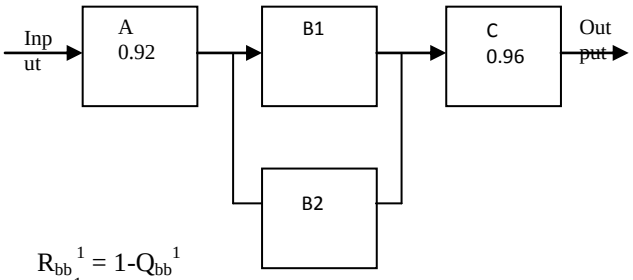
System A



R_A = $R_A \times R_B \times R_C$

= 0.92 x 0.85 x 0.96 = 0.7507

System B



$R_{bb}^{1} = 1-Q_{bb}^{1}$

Q_{bb}^{1} = (1-0.85) (1-0.85) = 0.0225

R_{bb}^{1} = 1-0.0225 = 0.9775

R_B = 0.92 x 0.9775 x 0.96 = 0.86

This shows that system B has high reliability over system A. but overtime, it is identified that system B is highly susceptible to failure

Reliability in Engineering is defined as how reliable a system can be over specified period of time. Reliability issues cuts across the entire life time of a product/item. It span the entire life time of a product. Reliability comprises from design phase to the stage where the product/item is put in use. Maintainability is the up keep of facilities and equipment in a specified operating condition.

The essence of reliability is to checkmate useful life, robustness and efficiency of an engineering design. In any industries the reliability and efficiency of component is directly related to its maintenance. It is important that equipment continues to produce the required output without any breakdown. The reliability contributes, accounts for the overall availability of a system or products. The success and survival of any manufacturing industries, nations depend on the dynamic qualities of long-lasting and robust engineering product. These two forces are the major variable that builds up the dominance of any manufacturing nation globally.

Reliability of engineering design are those process used in order to identify, explore avenue to improve an engineering product availability. Availability is the ability of a system or product to be used at a good working condition at any point in time. It is imperative to say that the more reliable a system, the more available it becomes. Clearly, it is unfortunate that most engineering design, component does not have high reliability and availability (Eyibe and Ironbar 2016). In our daily market most ear phone last only one day. Precision and robustness are essential in mass production of engineering product to ensure consistency of engineering component. Most generator and radio system have high failure rate. It is necessary to ensure that manufacturing equipment and entire manufacturing process are working as expected.

There is need for engineering design to integrate automation to help improve maintenance practice especially in complex system (Eyibe 2016). Automation encompasses all function within the industry from installation, integration and maintenances. Additionally, automation helps to improve engineer design. Automation helps to improve predictability of quality, increase consistency of output and robustness of product (Ashatu 2011). Engineering design should make room for extension of useful life, optimum availability and safety of personnel. Clearly, control feedback through sensor and other automation process helps to report present and anticipated abnormalities. This could help state particular maintenance practice to embark in order to get back the system to its optimal working condition.

Engineering design, automation and reliability should work harmoniously for the overall availability of a product.

RECOMMENDATION

1. Engineering design should be free of ambiguity
2. Consumer should adopt good maintenance culture
3. There is need for diagnostic approach in engineering design to reduce fault and error.
4. The quality of an engineering design is in terms of it robustness and reliability.
5. Engineering design should be an analysis to improve efficiency and precision
6. Engineering design should use automation to help improve maintenance practice.
7. The success and survival of any industrial design depends upon the dynamic of qualities of continued and intensive industrial research.
8. Engineering design, product should not be based on re-branding, re-packaging or changing previous engineered components, it should be the analysis to improve product performance and feature.

CONCLUSION

Innovative designs rule the world and countries that are at the zenith of automation and are strongly marching on to control the outer space. We need to design and re-design in order to meet up with technologically advanced nations. Engineering design, automation, reliability, and maintainability should work harmoniously with overall availability of products. The strength of an engineered design is its ability to withstand the test of time. It is imperative to say that the quality of an engineering design is directly associated with its image and quality of the design engineer. We must opt for long-lasting and robust electrical gadgets, machine parts and tools, electronic gadget as well as vehicle parts for the development and transformation of our engineering manufacturing sector.

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