DIAGNOSTIC SKILLS IN ENGINEERING PROCEDURES

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Abstract

This paper examined Diagnostic skills in engineering procedures. 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 x-rayed common area which engineering product encounters difficulties. This includes diagnostic procedures and approaches, maintainability and reliability, inferior, substandard and low quality products. The paper recommends efficient ways that will help 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, constraint.

1.0 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 designing, constructing 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 our academics and engineers today in engineering design is how to design quality, efficient and reliable engineering products. An important key to this problem lies in realization that the quality of an engineering design is directly associated to the image and quality of the design engineer. Mixed feeling have been expressed by both qualified and unqualified person that most engineering component lacks the required standard for global use. Clearly, engineering products design seems to lacks seductive, exquisite and robust qualities that redefines a product in a global setting.

Engineering designs strikes balance between analysis and laboratory experimentation that provides analytical background, experiences, sophisticated instrumentation, sensors and computers. (Eyibe, 2016). Engineering design should have a system diagram, schematic diagram, layout diagram and wiring diagram. Additionally, it is explicitly asserted that the survival and success of an industrial design depends upon the dynamic qualities of continued and intensive research. 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 be analysis or avenue to improve product performances, features, efficiency and durability (Eilianry 2005).

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

Based on the backdrop, the following considerations for explaining diagnostic skills in engineering procedures were discussed.

1. Engineering design and improvements
2. Diagnostic engineering approach
3. Reliability maintainability and engineering design
4. Recommendations
5. Conclusion

1.1 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, method with technical 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 interconnectedness with global economy (Eyibe, 2016). There is need to reduce, eliminate and correct faults, error, inconsistencies in engineering components. The goals and reason of obtaining analysis, improvement varies widely from every day or socially beneficial action. Engineering design components should be analyzed thoroughly before manufacturing.

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 pride and image all over the world. U.S. and other innovative countries will keep leading in mind boggling design while developing nation focus on lower skills and products.

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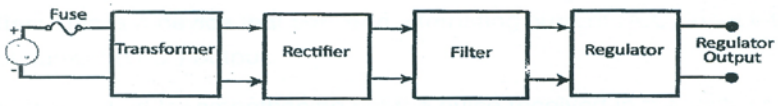


Figure 1-1 Block diagram of a power supply

fig 1.1 shows the block diagram of a power supply unit

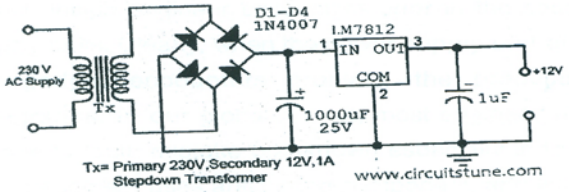


fig 1.2 shows the circuit diagram of power supply unit (P.S.U)

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 Constance irrespective of change in LC main input voltage and of change in load current. Its main functions are called 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 engineer encounters error in the setup and wiring of power supply units. Clearly, when the power supply unit of any electronic electrical gadget encounters problem, the products performance always degrades. In our global market, most engineered components are always prone to fault, mistake breakdown especially in the power supply. Most design engineer uses antiquated component, 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 engineer experience errors in winding of transformer or in the soldering of rectifier. There is need for improvement in design process in order explore new avenue 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. (W^ must improve in our design process in order to bring transformation and integrity in the engineering sector.

1.2 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 component. 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 redefined an object in a global view. The ultimate goal of engineering design is the ability of being free from ambiguity, when an engineered-components, product breaks down and cannot be repair, it shows that the design engineer need to retrace his step. The quality of an engineering design is in terms of robustness.

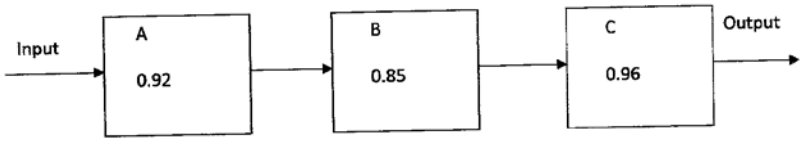
Diagnostic engineering procedure is the process of using evaluation, analytical aspect and laboratory experimentation as an effective tool to identify design problems. It involves selection of proper technique for more improved performance and robustness for global and future use. This process includes 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 product will be error prone and high susceptible to fault. The use of diagnostic engineering procedure is to re-check, reverse-engineer, correct, improve , re-plan, re-evaluate to get an appropriate feedback (Eyibe, 2016). The essence of improvements 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 engineering to the wide range of real world problem. Diagnostic approach will help improve standard and performance of engineering component.

Reliability, Maintainability and Engineering Design

Calculate the reliabilities of these two systems below?

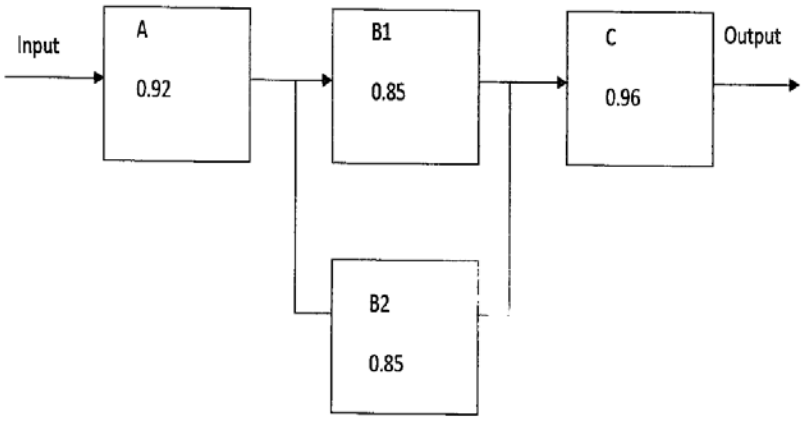
System A



R_A = $R_A \times R_B \times R_C$

$= 0.92 \times 0.85 \times 0.96 = 0.7507$

System B



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

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

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

$R_B = 0.92 \times 0.9775 \times 0.96 = 0.86$

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 acrossthe entire life time of a product or item. It span the entire life time of a product. Reliability comprises from design phase to the stagewhere the product and item is put in use. Maintainability is the up keep of facilities and equipment in a specified operating condition.

The essence of reliability, maintainability is to checkmate useful life, robustness and efficiency of an engineering design. Inany industries the reliability and efficiency of component isdirectly related to its maintenance. It is important that equipmentcontinues to produce the required output without any breakdown. The reliability and maintainability 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. This two forces are the major variable that build up the dominance of any manufacturing nation globally.

Maintainability and reliability are those process sued 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 reliable it becomes. Clearly, it is unfortunate that most engineering design, component does not have high reliability,availability and maintainability (Eyibe &Ironbar, 2016). In our daily market most ear phone last only one day precision and robustness are essential in mass product of engineering product to a certain, ensure reliability of engineering component. Most generator and radio system have high failure rate. It is necessary to ensure that manufacturing equipment and entire 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 maintenance. Additionally, automation help to improve preditionally, automation help 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, reliability and maintainability should work harmoniously for the overall availability of a product.

Recommendations

Based on the above study, the following recommendations are made

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 a previous engineered components, it should be analysis to improve product performance and feature.

Conclusion

Innovative design rules the world and countries that are at the Zenith are strongly marching on to control the outer space.

Engineers need to re-design and design in order to meet up withtechnology advance nation. Engineering design, automation,reliability, and maintainability should work harmoniously with overall availability of a product.

The strength of an engineered design is its ability to withstand test of time. It is imperative to say that the quality of an engineering design is directly associated with image, quality of the design engineer. We must opt for long-lasting and robust electrical gadgets, machine parts and tools, electronic gadget and vehicles parts for the development and transformation of our engineering manufacturing sector and nation.

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