ISSN: 2319-5967
ISO 9001:2008 Certified
International Journal of Engineering Science and Innovative Technology (IJESIT)
Volume 5, Issue 3, May 2016

Design modeling and simulation of block moulding machine: management approach

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Abstract:* For sometimes now, there has been series of incidence of collapsed building in this Country. The reason behind this is as a result of the poor quality of material used for the construction. The introduction of block moulding Machine will help to produce more solid blocks of high quality within a short time which invariably will help reduce this problem of collapse buildings in our Country, Nigeria. Usually, blocks can be molded by hand but the need for machine cannot be over emphasized because it will allow for easier, faster and cheaper means of producing blocks. Block moulding machine comes in different designs, types, shapes and sizes. No other idea or device has impacted manufacturing as compute. All engineering disciplines routinely use computers for Calculation, Analysis, and Design. and Simulation. In the Manufacturing phase of the product's lifecycle, product manufacturers need to consider manufacturing two products: the physical products that they have always produced and the virtual product that is the information about the physical product. This virtual product can provide manufacturers with a new of value. The scope of this project was. to Design,modelling,Simulation and to use gantt chart in scheduling in manufacturing of a more efficent and versatile block moulding machine. The Block Moulding machine was designed to operate 151.8rad/s which compacted with the strenght of 0.99n/mm^2 the production rate was 500 blocks in 8 hours working day.The machine was designed to be versatile in operation manually or to be power driven either by an electric,petrol or desel. Provision was made for mould sliding plates to be introduced into the mould holes so that 6 inches blocks are produced when required,instead of the regular 9 inches blocks. After thoroughly researching,designing and experimenting with soft ware's final machine was developed optimizing the process, the product time was successfully reduced from several hours to 5 minute. All other engineering and customer design requirement were met,through the success of the design.

I. INTRODUCTION

Property development and building construction have been at the increase in Nigeria as far back as 1970, when the civil war between Nigeria and Biafra came to an end. It was an era which marked the crude oil boom which still financed over 90% of Nigeria's Capital projects (Olusegun, 2009). The Nigerian cities have experienced transformation by way of infrastructure in urban and rural areas. The areas of interest for this work was how to develop machine that is cheaper than the conventional sand crete block making machine so that the cost of block will be reduced. The semi-automatic sand crete block moulding machines that are found in the Nigerian cities, produced about 500 standard blocks per day (8 hours working day). It is singular acting with one operator and two labourers. The designed block moulding machine is one-third the physical size of the conventional semi-automatic block maker found in the urban areas with a cost of less than a half of the conventional block machine. It operates with 1/3 the power of the conventional semi-automatic block maker and produces 500 standard blocks per day, using the same number of three workers (one operator and two labourers). The new machine has the advantage of being smaller and thus moveable to remote interior rural areas. The block moulding machine has the added advantage that it can be operated manually or driven either electrically or by petrol engine or diesel engine. Blocks were first known to have been in use at the river basin region of those of ancient Egypt and Greece. So instead of using stones and marble, clay, mud, silt, and straw were used to make blocks that were baked before use (Swamy, 1986). However, the durability became possible when blocks were fired in kilns. Excavations have uncovered perfectly fired blocks as far back as 5000BC. Clay, silt and stave mix blocks, fired in kilns were used for a very long period up till 3000BC when gypsum and lime mortar were used in the construction of the pyramids in Egypt. Many other similar materials were used, leading to the discovery

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ISO 9001:2008 Certified
International Journal of Engineering Science and Innovative Technology (IJESIT)
Volume 5, Issue 3, May 2016

of Portland cement and Mesopotamia as early as about 10,000BC. The region had no stone or marble as the production of concrete, (Encarta, 2004).Computer-based design analysis is nowadays a common activity in most development projects. When new software and manufacturing processes are introduced, traditional empirical knowledge is unavailable and considerable effort is required to find starting design concepts. The ability to create something out of nothing makes design one of the most exciting aspects of engineering as well operations management. Computer technology has touched all areas of today's life, impacting how we obtain railway tickets, shop online and receive medical advice from remote location. CAD began as an electronic drafting board, a replacement of the traditional paper and pencil drafting method. Over the years it has evolved into a sophisticated surface and solid modeling tool. Not only can products be represented precisely as solid models, factory shop floors can also be modeled and simulated in 3D. It is an indispensable tool to modern engineers.

II. DESIGNER'S OBLIGATION

The designer or manufacturer of any product—consumer product, industrial machinery, tool, system, etc.—has a major obligation to make this product safe, that is, to reduce the risks associated with the product to an acceptable level. In this context, safe means a product with an irreducible minimum of danger (as defined in the legal sense); that is, the product is safe with regard not only to its intended use (or uses) but also to all unintended but foreseeable uses. For example, consider the common flat-tang screwdriver. Its intended use is well known. Can anyone say that he or she has never used such a screwdriver for any other purpose? It must be designed and manufactured to be safe in all these uses. It can be done. There are three aspects, or stages, in designing for safety.

1. Make the product safe; that is, design all hazards out of the product.
2. If it is impossible to design out all hazards, provide guards which eliminate the danger.
3. If it is impossible to provide proper and complete guarding, provide appropriate directions and warnings.

III. MAKE IT SAFE

In designing any product, the designer is concerned with many aspects, such as function, safety, reliability, reducibility, maintainability, environmental impact, quality, unit cost, etc. With regard to safety, consideration of hazards and their elimination must start with the first concept of the design of the product. This consideration must be carried through the entire life cycle. This must include hazards which occur during the process of making the product, the hazards which occur during the expected use of the product, the hazards which occur during foreseeable misuse and abuse of the product, hazards occurring during the servicing of the product, and the hazards connected with the disposal of the product after it has worn out. Since each design is different, the designer needs to give full consideration to safety aspects of the product, even if it is a modification of an existing product. There is no fixed, universal set of rules which tells the designer how to proceed. There are, however, some general considerations and guidelines Machine design is the decision-making process by which specifications for machines are created. It is from these specifications that materials are ordered and machines are manufactured. The process includes

- Inventing the concept and connectivity
- Decisions on size, material, and method of manufacture
- Secondary decisions
- Adequacy assessment
- Documentation of the design
- Construction and testing of prototype(s)
- Final design

IV. MANAGEMENT

Management is the art, or science, of achieving goals through people. Since managers also supervise, management can be interpreted to mean literally "looking over" – i.e., making sure people do what they are supposed to do. Managers are, therefore, expected to ensure greater productivity or, using the current jargon, 'continuous improvement'. More broadly, management is the process of designing and maintaining an environment in which individuals, working together in groups, efficiently accomplish selected aims (Koontz and Weihrich 1990: 4). In its expanded form, this basic definition means several things. First, as people carry out the managerial functions of planning, organizing, staffing, leading, and controlling. Second, management applies to any kind of organization. Third, management applies to managers at all organizational levels. Fourth, the aim of all managers is the same – to create surplus. Finally, managing is concerned with productivity – this

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ISO 9001:2008 Certified
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Volume 5, Issue 3, May 2016

implies effectiveness and efficiency. Thus, management refers to the development of bureaucracy that derives its importance from the need for strategic planning, co-ordination, directing and controlling of large and complex decision-making processes. Essentially, therefore, management entails the acquisition of managerial competence, and effectiveness in the following key areas: problem solving, administration, human resource management, and organizational leadership.

V. COMPONENT AND MATERIAL SELECTION

Most machine and tools are constructed from metallic and non-metallic materials. The metals are divided into two groups' ferrous metals: are those which have the iron as their main constituent such as cast iron, wrought iron and steel. Non-ferrous metals: are those which have a metal other than iron as their main constituent such as copper, aluminum, brass, tin, zinc etc.

The selection of a proper material, for engineering purposes, is one of the most difficult problems for the designer. The best material is one which serves the desired objective at the minimum cost. The following factors are considered while selecting the material:

- Availability of the materials.
- Suitability of the materials for the working conditions in service.
- The cost of the materials.

VI. DESCRIPTION OF PARTS OF THE MACHINE

MOULD BOXES: These are of two types; the nine and six inches mould boxes respectively.

PRESSING STRIPPER BEARING FRAME: This positions the partial hopper and the stripper at a fixed position and also helps in obtaining the quantity of Mixture of Greensand required, depending on the size of the block to be produced, the actual Stripper can be changed, with the aid of its grades. It slides along its Guides and it is operated manually shown in fig 2

PRESSING STRIPPER: Vertical Component used for pressing the sand Aggregate Mixture and also for stripping the blocks.

DRIVING LEVER: A short lever for the compressing system (Automatic return).

SLIDING GUIDES: Used for guiding the horizontal movement of the Pressing Stripper.

HAND LEVER: A longer lever used for the displacing the mould box upwardly and downwardly during production.

BRAKETS: A Metal Block used for Centering and Fixing the Pallet.

WOODEN BEARING PALLET: For universal application.

PRESSING STRIPPER LOCKING DEVICES: This is used for granting the exact height of the blocks and making the stripping operation easier.

ELECTRIC MOTOR: Used for vibration. Shown in fig 6

BEARING PLATE: For Vibrating the Block.

TERMINAL BOX: For connection of power and earthing

CURRENT BREAKER: For the unidirectional vibration.

SPRING CUSHING; this amplifies the vibration transmitted to the Vibrator via the filled mould box on the top of the Base Plate, for adequate compact of Green Sand. Shown in fig 10

UPRIGHTS SHAFT (RIGHT AND LEFT): They form the axes on which the Mould Box, the Upper Beam which directs the vertical movement of the Stripper travel. Shown in fig 13

BEARING BUSHING: It lifts up the Mould box.

SIDE BARS: They link the counter lever and the bearing Bushing and effects the movement of the Mould Box.

UPPER BEAM: It houses the pressing device and helps in the balancing of the Machine.

COUNTER LEVER: It houses the continuous Shaft, links the side springs and forms Base for the lever.

LOCK NUTS: Used to open and lock the upper beam

VII. OPERATION

The main features of the vibrator-compactor block making machine (VCM) was the increased vibration of the die cavity or mould that was achieved through the attachment of an eccentric weight to the compactor drive shaft (CDS). This caused the rotation of the (CDS) to be irregular, and the mould to vibrate excessively as required for sand crete compacting. The length of CDS inclusive of pulley is 25cm. The pulley is connected through a belt drive to a one horse power electric motor which drives the system. The eccentric weight and CDS are made from mild steel material. . The diameter and length of the CDS are 2.5cm and 25cm respectively. The

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Volume 5, Issue 3, May 2016

EW and CDS are permanently fastened with a weld. The two flange ends of the CDS are fitted into bearings housed in a disc 9cm diameter and 2cm wide. The (EW) and (CDS) are encased by the barrel made from mild steel sheet. The barrel is filled with SAE 40 oil for lubrication and cooling, The EW and CDS thus rotate eccentrically in an encased environment of lobe oil, sealed by oil gasket which prevent leakage. The vibration caused by the out-of-balance rotation when the EW and CDS rotate is transmitted to the bottom plate of the mould of the VCM. The bottom plate rests on two springs on the top of which the lower platform of block mould rests. Nine rods are used to connect the lower platform to the block mould. Each of the rods are 48cm long and 1.27cm in diameter. The block mould was fabricated from a mild steel plate of thickness 1.27cm. The plate of same thickness was used to fabricate a cover for the block mould. A hook is used to lock the block mould cover when the VCM is being operated. Mild steel frames are used to secure the block mould firmly in position in all its sides. The lower platform of the block mould is design to move upwards along the inside of the mould to facilitate the ejection of moulded block. A lever is attached for ejecting the moulded blocks. To operate the VCM, a wooden palet is placed at the bottom of the mould or die cavity. The wet sand cote mix which consist of 20% of binders (cement and water) and 80% of fillers (fine aggregates) are mixed and shoveled into the mould until it is filled(Asafa ,2006). The top is leveled with a scraper and the cover of the mould is applied to effect initial compacting. The cover is opened and additional brick mix is applied to refill the mould. The mould cover is then applied and properly secured with the hook lock

VIII. GENERAL MAINTENANCE

The effects of mechanical vibrations are checked in the machine through carefully designed techniques using anti-vibration mountings, shake-proof washer and locknuts. Efforts should be made to reduce as much as possible anything that could lead to expensive mechanical vibration which will result to component failure due to fatigue. All moving parts have to be cleaned thoroughly daily to avoid incrustation which could be detrimental to the Machine. Always check the condition of the springs of the Vibrating plate, Mould box, Elect Motor, Grease in the vibratory box and finally the locking devices on the two uprights shaft to ensure absolute efficiency. The shafts, the groove rails of the pressing frame must be properly lubricated. To ensure the longevity of the machine, the range of operation should be between 20-30 after which vibrating frame, lower face of the pressing devices and other parts should be properly cleaned and lubricated.

IX. MODELING OF MACHINE AND SECTIONS

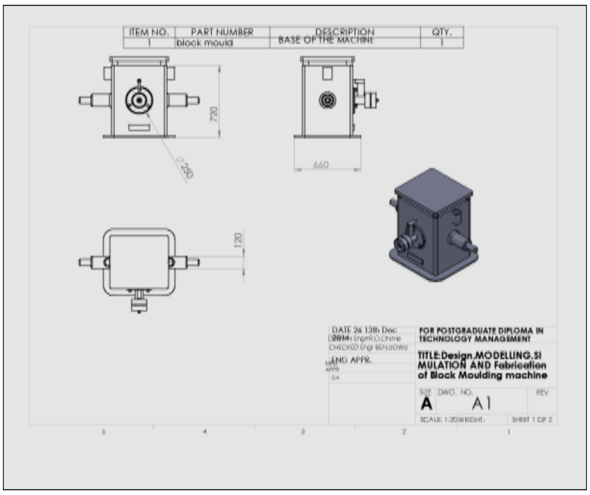

Fig 1; Machine Base Unit

ISSN: 2319-5967
ISO 9001:2008 Certified
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Volume 5, Issue 3, May 2016

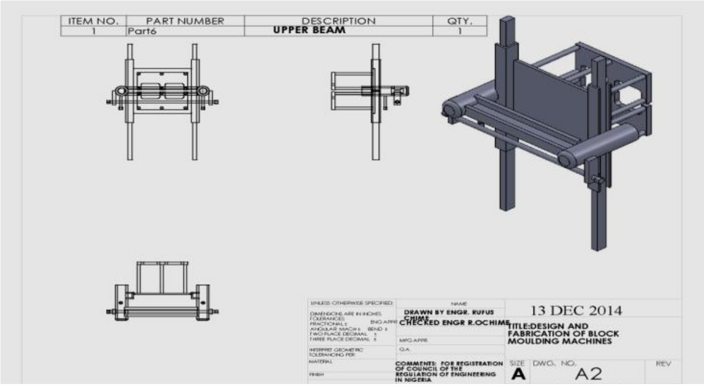
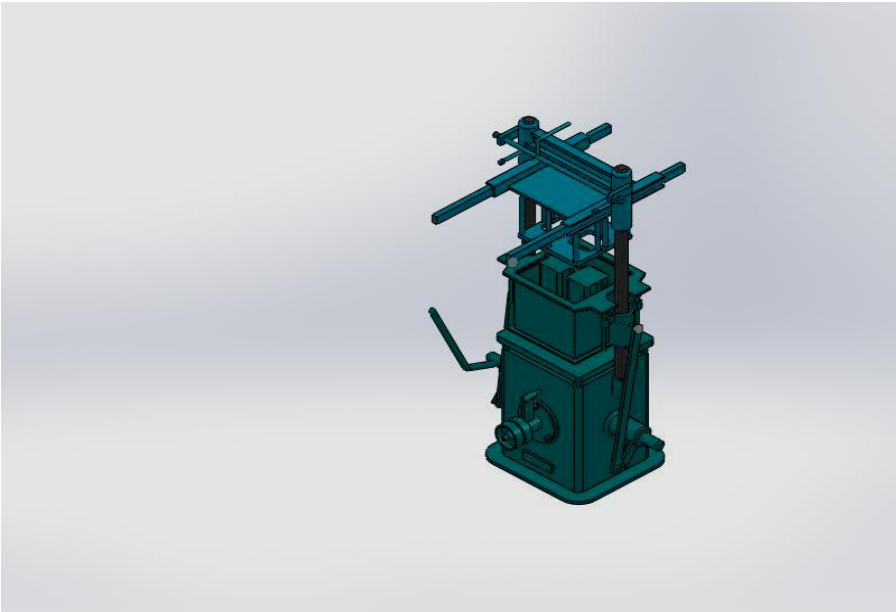
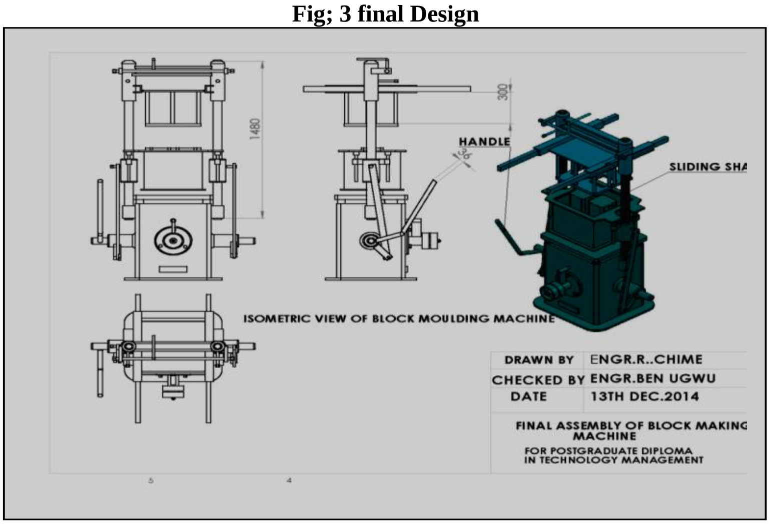


Fig 2; Upper Beam Unit

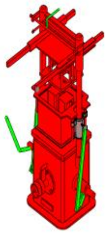


Fig; 3 final Design

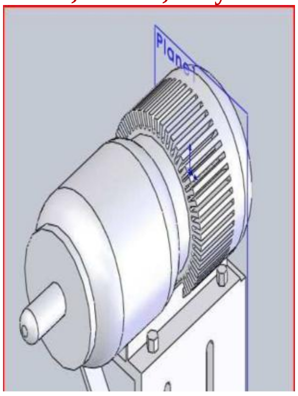


Fig; 4 ISO views

ISSN: 2319-5967
ISO 9001:2008 Certified
International Journal of Engineering Science and Innovative Technology (IJESIT)
Volume 5, Issue 3, May 2016



Fig; 5 sustainability



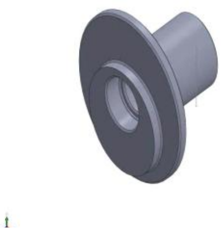
Fig; 6 Electric motor

Fig; 7 pulley

Fig 8; Eccentric weight

Fig;9 vibrator shaft

Fig;10 spring



Fig; 11 eccentric flange

Fig; 12 V-pulley

Fig;13 Upright shaft

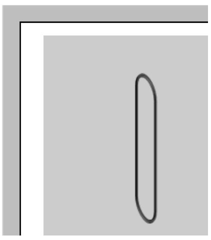


Fig 14.square Shaft

Fig 15.belt

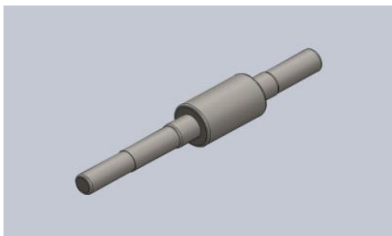


Fig 16 shaft

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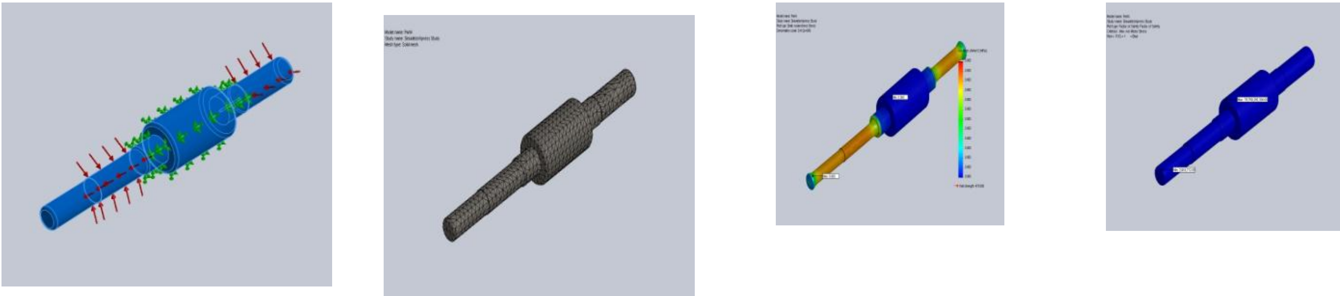
ISO 9001:2008 Certified
International Journal of Engineering Science and Innovative Technology (IJESIT)
Volume 5, Issue 3, May 2016



Fig; 17 simulation processes

X. ENGINEERING MANAGEMENT

Engineering managers oversee 4-P's – people, projects, products, and processes. Overseeing manufacturing and production standards, working with creative engineers, and generating technical documentation are just some of the responsibilities. Specialized knowledge and management practices geared toward the engineering environment help to enrich an engineering managers' toolbox to deal with the 4-P's with as much savvy as technical issues

Project

Every project has people in several different roles. The central person is the project manager. He or she plans the project, pulls the team together, communicates with everyone, and makes sure that the job gets done right. Part of the project manager's job is to explain to everyone else what his or her role on the project is and how it is crucial to project success. The project manager must communicate with everyone and persuade each person to do his or her part

PROJECT MANAGEMENT

Project management Tasks for the project were divided equally among the four team members. Modeling and Simulation was completed by Engr.Chime and Engr.Ukwuaba while, Engr .Chuka, Prof.Toyi managed the tasks and deadlines of the project. Many of the experiments were conducted with at least two members present and each team member was responsible for taking observations and developing design ideas. Online Regular team meetings were held to discuss shortcomings and progress of the project. A Gantt chart can be found in Appendix displaying the Individual task assignments and deadlines. This chart was used to guide the team and assure timely completion of the project. Each experiment provided insight for the project and so Gantt chart was updated regularly with new tasks to accomplish.

DESIGN PROCESS

Engineers use CAD to create two− and three−dimensional drawings, such as those for automobile and airplane parts, floor plans, and maps and machine assembly. While it may be faster for an engineer to create an initial drawing by hand, it is much more efficient to change and adjust drawings by computer. In the design stage, drafting and computer graphics techniques are combined to produce models of different machines. Using a computer to perform the six−step'art−to−part' process: The first two steps in this process are the use of sketching software to capture the initial design ideas and to produce accurate engineering drawings. The third step is rendering an accurate image of what the part will look like. Next, engineers use analysis software to ensure that the part is strong enough figure 16 .Step five is the production of a prototype, or model figures 1-3 shown the modeling of machine and sections

XI. MODELLING

Modeling is the process of producing a model; a model is a representation of the construction and of interest .A model is similar to but simpler then the system it represent. One purpose of a model is to enable the analyst to predict the effect of change to the system. On the other hand, a model should be a close approximation to the real system and incorporate most of its salient features Fig;6 -15 shown the process. On the other hand, it should not be so complex that it is impossible to understand and experiment with it. A good model is a judicious tradeoff between realism and simplicity. In the final step the CAM software controls that part. During the design of the machine, the drafting software was used.

ISSN: 2319-5967
ISO 9001:2008 Certified
International Journal of Engineering Science and Innovative Technology (IJESIT)
Volume 5, Issue 3, May 2016

XII. SIMULATION

Simulation technology can provide a highly effective means for evaluating the design of a new manufacturing system or proposed modifications to existing systems. This technology can be especially useful in supporting agility, sustainability, supply chain integration, as well as the development of new advanced processes. Manufacturing simulations are often used as measurement tools that predict the behavior and performance of systems that have not yet been implemented, or to determine theoretical capabilities of existing systems. Simulations are essentially experiments. As defined in Jerry Banks Handbook of Simulation, a simulation is: ‘‘...the imitation of the operation of a real-world process or system over time. Simulation involves the generation of an artificial history of the system and the observation of that artificial history to draw inferences concerning the operational characteristics of the real system that is represented. Simulation is an indispensable problem-solving methodology for the solution of many real-world problems. Simulation is used to describe and analyze the behavior of a system, ask what-if questions about the real system, and aid in the design of real systems. Both existing and conceptual systems can be modeled with simulation.” figure 16.

XIII. PRODUCT

All products start out as virtual products fig1. That is ideas and information about what the physical product should be . These virtual products are then realized in physical form through the manufacturing process. The manufacturing of products can be divided into three phases: making the first one, ramp-up, and making the rest. “Making the first one” entailed getting a physical product that embodied the ideas of what the virtual product was required to accomplish. Ramp-up and production (“making the rest”) relied on the premise that these products would be close enough to the first one so as to be functionally and physically equivalent. The accuracy of that premise varies widely even today, which is why expensive quality audit inspection processes are required of the actual product instances themselves.

VIRTUAL PRODUCTS

The Value of Virtual Products

There are a myriad number of uses that can be made of the virtual product created through PSM(Product Specification Management consists).. In the manufacturing or build phase, the “as-built” virtual product is immediately available and can be transmitted to customers and other parties in the supply chain who need the information about the product to assure themselves that the product is actually being created to the required specifications and Customer requirements see Fig1-3.

SUSTAINABILITY –

Simulation technology has been a significant tool for improving manufacturing operations in the past; but its focus has been on lowering costs, improving productivity and quality, and reducing time to market for new products. Sustainable manufacturing includes the integration of processes, decision-making and the environmental concerns of an active industrial system to achieve economic growth, without destroying precious resources or the environment. Sustainability applies to the entire life cycle of a product fig:5 also detailed component environment impact. It involves selection of materials, extraction of those materials, of parts, assembly methods, retailing, product use, recycling, recovery, and disposal will need to occur if simulation is to be applied successfully to sustainability. Manufacturers will need to focus on issues that they have not been concerned with before

PRODUCTIVITY

Business Managers, see productivity not only as a measure of efficiency, but also connotes effectiveness and performance of individual organizations. For them, productivity would incorporate quality of output, workmanship, adherence to standards, absence of complaints, customer satisfaction, etc (Udo-Aka, 1983). The administrator is more concerned with organizational effectiveness, while the industrial engineer focuses more on those factors which are more operational and quantifiable, work measurement and performance standards (Adekoya, 1989). Productivity can be computed for a firm, industrial group, the entire industrial sector or the economy as a whole. It measures the level of efficiency at which scarce resources are being utilized. Higher or increasing productivity will, therefore, mean either getting more output with the same level of input or the same level of output with less input. Let us look at the sub-concepts.

TOTAL-FACTOR PRODUCTIVITY

This is the ratio of output to the aggregate measure of the inputs of all the factors of production. Theoretically, this is the true measure of productivity as it incorporates the contribution of all the factor inputs.

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Volume 5, Issue 3, May 2016

MANUFACTURING

Manufacturing is the means by which the technical and industrial capability of a nation is harnessed to transform innovative designs into well-made products that meet customer needs. This activity occurs through the action of an integrated network that links many different participants with the goals of developing, making, and selling useful things. Manufacturing is the conversion of raw materials into desired end products. The word derives from two Latin roots meaning **hand and make**. Manufacturing, in the broad sense, begins during the design phase when judgments are made concerning part geometry, tolerances, material choices, and so on. Manufacturing operations start with manufacturing planning activities and with the acquisition of required resources, such as process equipment and raw materials. The manufacturing function extends throughout a number of activities of design and production to the distribution of the end product and, as necessary, life cycle support. Modern manufacturing operations can be viewed as having six principal components: materials being processed, process equipment (machines), manufacturing methods, equipment calibration and maintenance, skilled workers and technicians, and enabling resources. There are three distinct categories of manufacturing:

• Discrete item manufacturing, which encompasses the many different processes that bestow physical shape and structure to materials as they are fashioned into products. These processes can be grouped into families, known as unit manufacturing processes, which are used throughout manufacturing.

• **Continuous materials processing,** which is characterized by a continuous production of materials for use in other manufacturing processes or products. Typical processes include base metals production, chemical processing, and web handing. Continuous materials processing will not be further discussed in this chapter.

• **Micro- and nano-fabrication,** which refers to the creation of small physical structures with a characteristic scale size of microns (millionths of a meter) or less. This category of manufacturing is essential to the semiconductor and mechatronics industry. It is emerging as very important for the next-generation manufacturing processes.

Modern Manufacturing

Manufacturing technologies address the capabilities to design and to create products, and to manage that overall process. Product quality and reliability, responsiveness to customer demands, increased labor productivity, and efficient use of capital were the primary areas that leading manufacturing companies throughout the world emphasized during the past decade to respond to the challenge of global competitiveness. As a consequence of these trends, leading manufacturing organizations are flexible in management and labor practices, develop and produce virtually defect-free products quickly (supported with global customer service) in response to opportunities, and employ a smaller work force possessing multidisciplinary skills. These companies have an optimal balance of automated and manual operations. To meet these challenges, the manufacturing practices must be continually evaluated and strategically employed. In addition, manufacturing firms must cope with design processes (e.g., using customers' requirements and expectations to develop engineering specifications, and then designing components

XIV. DISCUSSIONS AND CONCLUSION

It is general knowledge that those who are engaged in agriculture are the poor in comparison with those who engaged in other sector of the economy in Nigeria that is to say their standard of living is so low that shortage of funds to enable them facilities has been a major handicap in the development .Investigation shows that the few available small scale processing equipment are not very efficient..This lack of efficiency small scale processing equipment to farmers has increased the inability of their farming activities. Simulation tools enable us to be creative and to quickly test new ideas that would be much more difficult, time-consuming, and expensive to test in the lab. (Jeffrey D. Wilson, Nasa Glenn Research Center) It also helps us reduce cost and time-to-market by testing our designs on the computer rather than in the field. It is against this background that our research theme was derived and the advantages are as following

- **COST EFFECTIVE:** The cost of this machine is very low and can be affordable by both poor and rich, it requires little or no frequent maintenance
- **INCREASE IN PRODUCTIVITY** (level) increased productivity lead to increases in wealth of a nation. Productivity of block mould will help in no small measure to increase in productivity level of a nation which will increase value addition to GDP
- **POVERTY REDUCTION AND JOB CREATION:** It help to create job for people since it is affordable and this reduce in rural –urban migration

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Volume 5, Issue 3, May 2016

- **ENCOURAGE DIRECT AND INDIRECT INVESTMENT:** It will help in the expansion of domestic and international trade. It will equally increase rapid national economic growth and development.

ENCOURAGE INNOVATION THROUGH USAGE AND OBSERVATION BY LOCAL FABRICATORS. Since the machine is fabricated locally, the usage will help local fabricator to innovate or improve in their fabrication. By so doing, it will help in the living standard of rural people

- **REDUCTION IN UNEMPLOYMENT.** The reduction of unemployment is of two fold which includes those fabricating machine and those using the machine will be the beneficiaries
- **ENCOURAGE DIRECT AND INDIRECT INVESTMENT, It will help in no small measure in the creation of industries for block manufacturing and other ventures.** It will equally increase rapid national economic growth and development.
- **ECONOMIC DEVELOPMENT AND INDUSTRIALIZATION.** It will help in economic development and industrialization because it will lead to the creation of a new investment culture, wealth creation and increased economic and social welfare. All these will lead to increased utilization of block

XV.RECOMMENDATION/CONCLUSION

We recommend that the movable parts of this machine like the lifting arm be oiled properly before usage for easy movement since they carry heavy load. That the machine must be properly Installed, balanced before usage to withstand the vibration involved.. The pulley, lifting arm and the viberator should be inspected before usage. The machine must be properly cleaned after the normal daily work to be free from sand and cement which can attack the parts and destroy them or the sand also causing friction in the machine. The combination of human creativity with computer technology provides the design efficiency that has made CAD such as popular design tool.CAD has allowed the designer to bypass much of the normal drafting and analysis that was previously required, making the design process flow more smoothly. In fact, software design should be encouraged in our institution of higher learning base on the following facts, long product development, countless trial and error, and accountability and limited profitability.

REFERENCES

[1] Abdulllahi, M. (2005). Compressive Strength of Sand Crete Blocks in Bosso and Shiroro Area of Minna, Nigeria.

[2] Akinlo, E. A. (1996), Improving the Performance of the Nigerian Manufacturing Sub-Sector after Adjustment, The Nigerian Journal of Economic and Social Studies, Page 9.

[3] Amber B., Nick D and James Z.(2005) Design of a manually operated mixing Machine for Shea Butter application.

[4] Babyak, R.J.(2003).Visionary Design. Appliance Manufacturer.

[5] Charles, M. (2009) Manufacturing Simulation;. The need for Standard Methodologies, Model, and Data Interfaces.

[6] Candace C.(2010). Improving Productivity in Mold Design and Fabrication.

[7] Charnes, D. M. Morrice, D. T. Brunner, and J. J. (2006). Swain, 21−27. Institute of Electrical and Electronics Engineers, Piscataway, New Jersey.

[8] Chime R.O. (2006). Design and Fabrication of Block Moulding Machine (Submitted to Council of the Regulation of Engineering for Full Registration as Engineer.).

[9] Chime, R.O. Ukwuaba S .I, and Nwachukwu U. (2013). Design, Modelling Simulation and Fabrication of Screw Press Palm kernel oil expeller NSE International Conference

[10] Felicia .O. Akere and Nathanel. C. Akhire (2013). Design and construction of a three mold hydraulic interlocking Brick Mold machine.

[11] Law, A. M., and McComas, M. G. (1991). Secrets of Successful Simulation Studies, Proceedings of the Winter Simulation Conference.

[12] Michael G. (2009). Dual Manufacturing both Real and Virtual Products, NASA MSFC/University of Lowa.

[13] Olaf, A.H. (1974).“Fundamental Approach to Concrete Making” Fourth Edition, John Willy and Sons Ltd, New York

[14] Oloko, O. (1983), Factors in Labour Productivity, Proceeding of a National Conference on Productivity, Edited by Osoba, A.M. Page 7.

ISSN: 2319-5967
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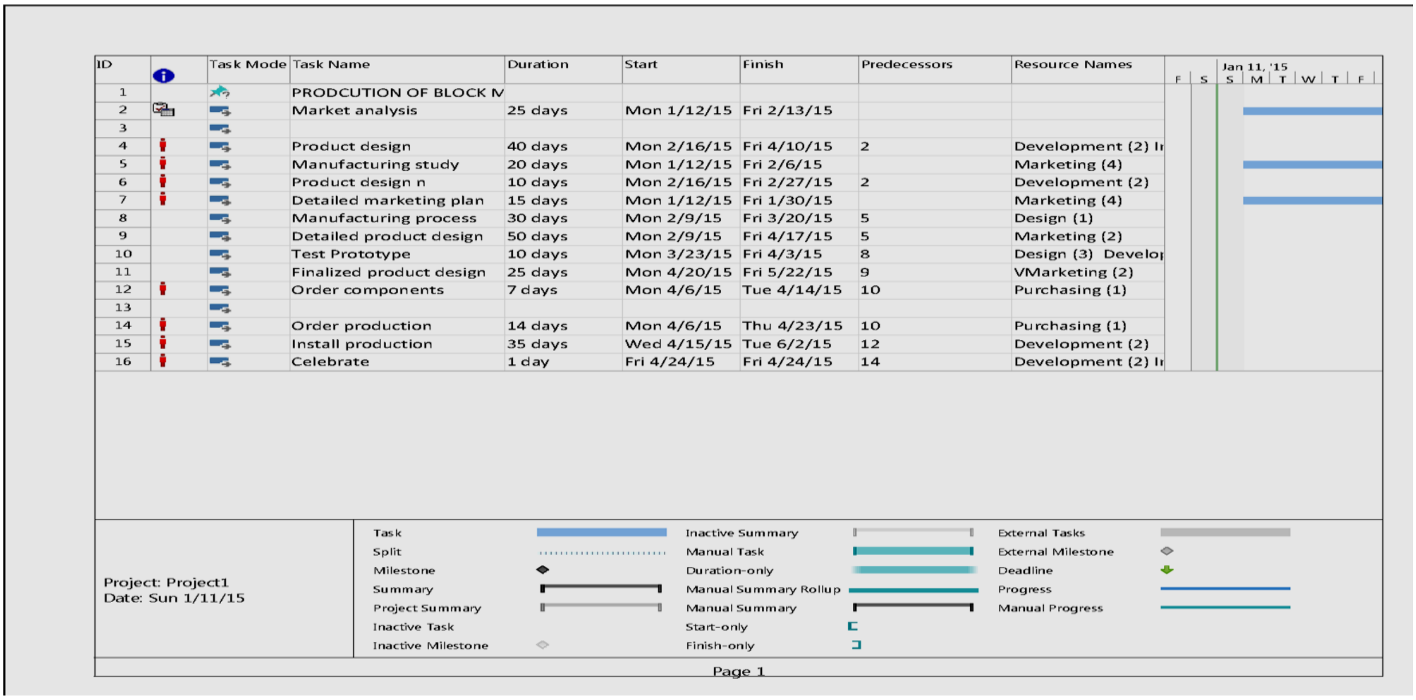
International Journal of Engineering Science and Innovative Technology (IJESIT)
Volume 5, Issue 3, May 2016

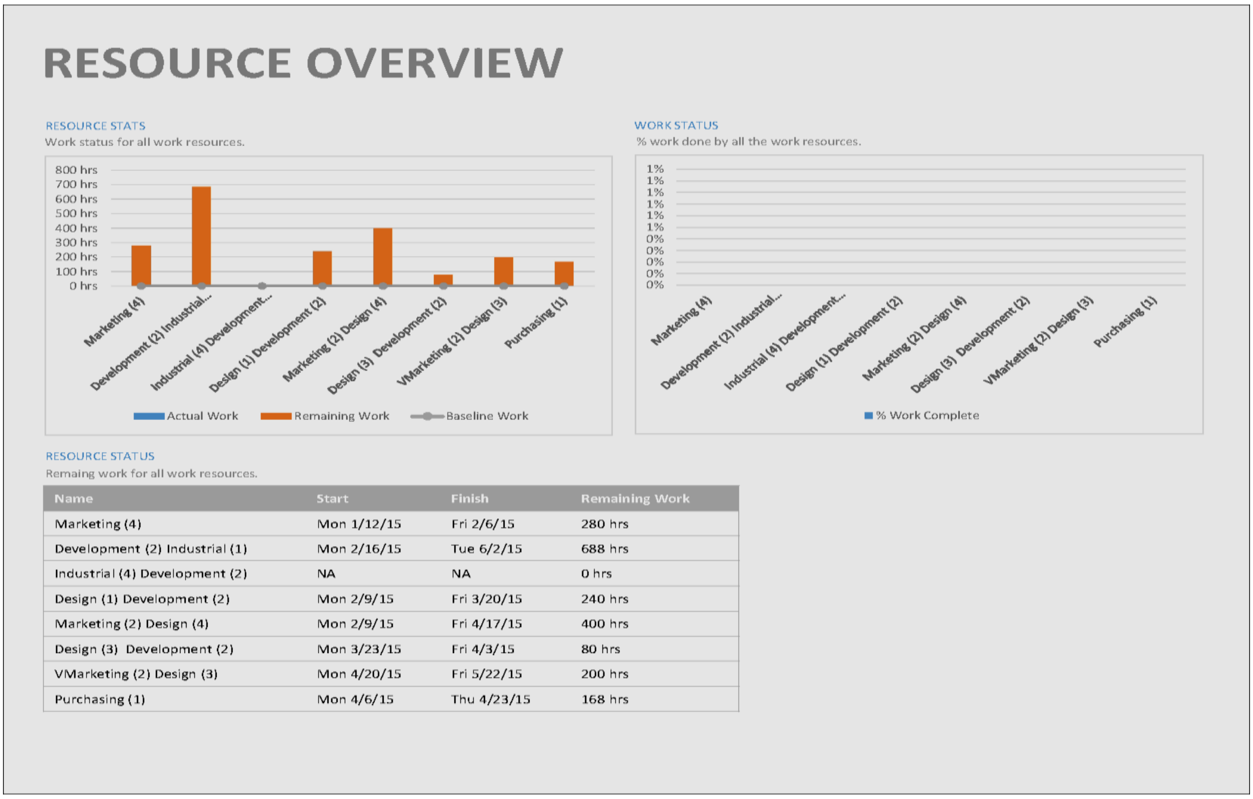
[15] Olusegun H.D. and Ajiboe T.K. (2006).Design Construction and Testing of Vibrator compactor Block Making machine for Rural Application.

[16] Sanni O.K.(2006) Design and Construction of A Brick Mould Machine University of Ilorin Project Work.

APPENDIX A GANTT CHART



ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1			PRODCUTION OF BLOCK M					
2			Market analysis	25 days	Mon 1/12/15	Fri 2/13/15		
3								
4			Product design	40 days	Mon 2/16/15	Fri 4/10/15	2	Development (2) Ir
5			Manufacturing study	20 days	Mon 1/12/15	Fri 2/6/15		Marketing (4)
6			Product design n	10 days	Mon 2/16/15	Fri 2/27/15	2	Development (2)
7			Detailed marketing plan	15 days	Mon 1/12/15	Fri 1/30/15		Marketing (4)
8			Manufacturing process	30 days	Mon 2/9/15	Fri 3/20/15	5	Design (1)
9			Detailed product design	50 days	Mon 2/9/15	Fri 4/17/15	5	Marketing (2)
10			Test Prototype	10 days	Mon 3/23/15	Fri 4/3/15	8	Design (3) Develo
11			Finalized product design	25 days	Mon 4/20/15	Fri 5/22/15	9	VMarketing (2)
12			Order components	7 days	Mon 4/6/15	Tue 4/14/15	10	Purchasing (1)
13								
14			Order production	14 days	Mon 4/6/15	Thu 4/23/15	10	Purchasing (1)
15			Install production	35 days	Wed 4/15/15	Tue 6/2/15	12	Development (2)
16			Celebrate	1 day	Fri 4/24/15	Fri 4/24/15	14	Development (2) Ir



Name	Start	Finish	Remaining Work
Marketing (4)	Mon 1/12/15	Fri 2/6/15	280 hrs
Development (2) Industrial (1)	Mon 2/16/15	Tue 6/2/15	688 hrs
Industrial (4) Development (2)	NA	NA	0 hrs
Design (1) Development (2)	Mon 2/9/15	Fri 3/20/15	240 hrs
Marketing (2) Design (4)	Mon 2/9/15	Fri 4/17/15	400 hrs
Design (3) Development (2)	Mon 3/23/15	Fri 4/3/15	80 hrs
VMarketing (2) Design (3)	Mon 4/20/15	Fri 5/22/15	200 hrs
Purchasing (1)	Mon 4/6/15	Thu 4/23/15	168 hrs

ISSN: 2319-5967
ISO 9001:2008 Certified
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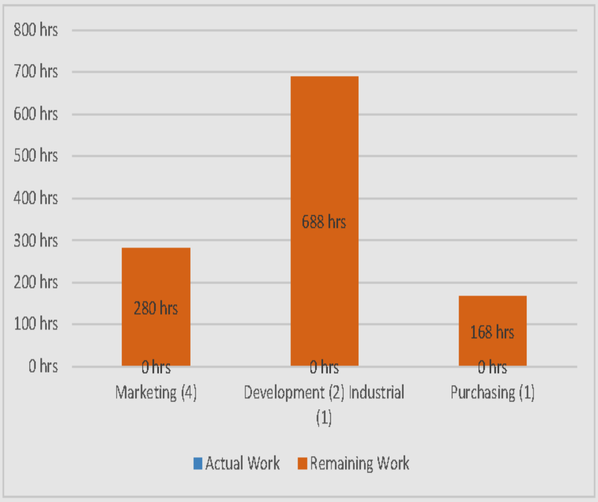
OVERALLOCATED RESOURCES

WORK STATUS

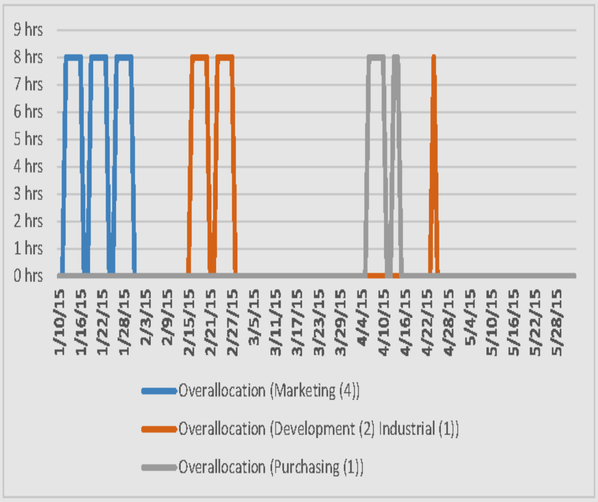
Work status for overallocated resources.



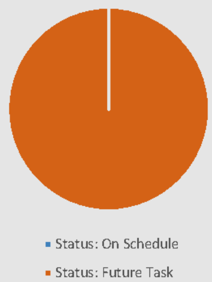
OVERALLOCATION

Surplus work assigned to overallocated resources. To resolve overallocations use

Team Planner View



CRITICAL TASKS



A task is critical if there is no room in the schedule for it to slip.

Learn more about managing your project's critical path.

Name	Start	Finish	% Complete	Remaining Work	Resource Names
Manufacturing study	Mon 1/12/15	Fri 2/6/15	0%	160 hrs	Marketing (4)
Manufacturing process	Mon 2/9/15	Fri 3/20/15	0%	240 hrs	Design (1) Development (2)
Test Prototype	Mon 3/23/15	Fri 4/3/15	0%	80 hrs	Design (3) Development (2)
Order components	Mon 4/6/15	Tue 4/14/15	0%	56 hrs	Purchasing (1)
Install production equipment	Wed 4/15/15	Tue 6/2/15	0%	280 hrs	Development (2) Industrial (1)