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7.3 Institutional Distinctiveness

7.3.1 Portray the performance of the Institution in one area distinctive to its priority and thrust





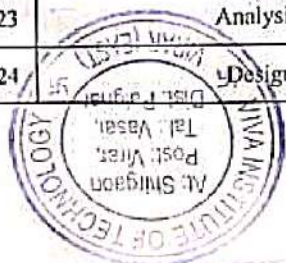
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Number of research papers published per teacher in the Journals notified on UGC website during the last five years

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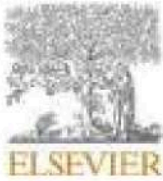
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A specific analytical study of friction stir welded Ti-6Al-4V grade 5 alloy: Stir zone microstructure and mechanical properties	Niyati Raut	Journal of Manufacturing processes	2021-22	2212-4616	https://www.sciencedirect.com/journal/journal-of-manufacturing-processes	https://www.sciencedirect.com/science/article/abs/pii/S1526612522001359	Yes





A specific analytical study of friction stir welded Ti-6Al-4V grade 5 alloy: Stir zone microstructure and mechanical properties

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ABSTRACT

The light metal titanium alloys find extensive usage in industries where weight is a significant factor. Research in friction stir welding (FSW) aimed at producing strong joints without adding extra weight since machines like aircraft and automobiles must have as little weight as possible to improve their fly-to-buy ratio. This study reports 10 mm thick titanium alloy plates that are FSWed by varying rotational speed and tool traverse speed using the W-La₂O₃ tool. Due to the heat produced during the welding process, each material region experiences a different thermal cycle, which significantly affects microstructural changes. The peak temperature during FSW exceeded the β -transition temperature, causing phase transformations in the stir zone (SZ). A lamellar structure was observed in the SZ, and a transition line region (TLR), Bimodal, or duplex microstructure obtained consists of ($\alpha + \beta$) phase. The SZ grain size decreases along the thickness direction, tensile strength increases, and reaches 89–102% of the base material. A lower hardness value is found in the SZ than in the base material (BM). The tensile fracture surface is observed to have a honeycomb-like structure or dimples, representing ductile fracture.

1. Introduction

From their discovery, titanium and its alloys have been applied extensively in aerospace, missiles, biomedical, chemical, nuclear, marine applications, and other structures exposed to seawater because of its highest strength-to-density ratio, high corrosion resistance, and excellent performance mechanical properties [1]. It weighs about 50% lighter but is 30% stronger than steel and 60% heavier than aluminum but twice as intense [2,3]. Its other extensive usage is in industries where weight is a significant factor. The titanium alloys are highly reactive, and their high melting point makes the material difficult to weld. Various fusion welding methods are used to weld titanium alloys like- gas metal arc welding, gas tungsten arc welding, electron beam welding, plasma arc welding, and laser beam welding. At temperatures exceeding a few hundred degrees centigrade (520 °C), titanium shows deliquescent properties towards oxygen, nitrogen, and hydrogen existing in the atmosphere [4,5]. Once absorbed, nitrogen, oxygen, and hydrogen cannot be extracted out, and their presence hinders the mechanical properties of the weld, like a reduction in ductility. The chemical and microstructural changes in the weld zones significantly impact ductility reduction.

Moreover, insufficient protection provided during joining can result in porosity and contamination of the joint. Porosity in welding zones is aroused due to instabilities in the welding process or because of the evaporation, chemical reactions, and shrinkage in the melt pool in fusion welding [6]. Overall defects like pores, solidification cracks, and distortion of the welded joint components constitute a significant concern associated with fusion welding. It fails to get the tensile strength of the weld close to that of the BM material [7]. Solid-state welding appears to be a preferable solution for titanium alloys since it avoids the melting and solidifying issues during fusion welding.

The friction stir welding process (FSW) is the solid-state welding method invented in 1991 by TWI (Patented by Thomas et al.) [8]. FSW offers a cost-effective and less distorted technique for producing high-quality welds. Despite having great benefits of FSW, welding using FSW on titanium is relatively difficult due to its high softening temperature, low thermal conductivity, and overbearing demands from the tool material. Limited work has been done to develop the FSW tool of Titanium [9,10]. Various tools have been developed to date for the FSW of titanium alloys, including WC/Co-based alloys, W-Re alloy, W-La alloy, polycrystalline cubic boron nitride (PCBN), TiC and Co-based alloys, tungsten-based alloys, and Mo-based alloys, reported

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Determination of Johnson Cook parameters for Ti-6Al-4V Grade 5 experimentally by using three different methods.	Niyati Raut	Mechanical	Materials Today: Proceedings	2020-21	2214-7853	https://www.sciencedirect.com/journal/materials-today-proceedings	https://www.sciencedirect.com/science/article/pii/S2214785320395018	yes
A case study- optimization of plastic rotomolding process by Anova and Taguchi methods	Niyati Raut	Mechanical	Industrial Engineering Journal	2020-21	0970-2555	http://www.journal-iiie-india.com/	http://www.journal-iiie-india.com/Year_20.html	UGC care
A numerical technique to analyze the trend of temperature distribution in the Friction Stir Welding Process for Titanium Ti 6Al 4V.	Niyati Raut	Mechanical	Materials Today: Proceedings	2020-21	2214-7853	https://www.sciencedirect.com/journal/materials-today-proceedings	https://www.sciencedirect.com/science/article/abs/pii/S2214785320370462	yes
Electrical, electrochemical & structural studies of a chlorine - derived ionic liquid- based polymer gel electrolyte	Manju Mishra	Humanities and Applied Sciences	BEILSTEIN Journal of Nanotechnology.2021,12	2020-21	2190-4286	https://www.beilstein-institut.de/en/publications/nanotechnology/	https://www.beilstein-journals.org/bjnano/articles/12/92	yes





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Determination of Johnson Cook parameters for Ti-6Al-4 V Grade 5 experimentally by using three different methods

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ABSTRACT

Accurate results can be obtained from numerical simulation only when it replicates or rather simulates the actual machining process as precisely as possible. To achieve the closest precision; boundary conditions, material model and mechanical material properties should be provided properly to the simulation file. Among all the material models, Johnson Cook material model is relatively simple to use. Every process operates under several loading condition with different deformation temperature and these values are different for different materials. For the successful simulation it is essential to have knowledge of exact Johnson Cook model parameters used for respective process and material at its operating temperature and strain rate. In this paper, Johnson Cook model parameters for Ti-6Al-4 V Grade 5 are found experimentally with strain rates as $1 \times 10^{-4} \text{ s}^{-1}$, $1.5 \times 10^{-4} \text{ s}^{-1}$, $1 \times 10^{-3} \text{ s}^{-1}$ and $1.5 \times 10^{-3} \text{ s}^{-1}$ and elevated temperature variations of 200 °C, 300 °C, 400 °C, 800 °C, 1000 °C, 1200 °C and at room temperature. Tensile test is conducted as it is the most suitable and cost effective among all to find properties, properties found are further used to find JC parameters by using three different methods: regression analysis method, least square method and logarithmic plot graph method. Values obtained after using all three methods are compared with each other and it is found that the deviation in values is not wide enough to hinder the results. This ensures that the researcher can practice whichever method is convenient to them according to their expertise.

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1. Introduction

Titanium's strength with low-density makes it broadly recognized as a high strength-to-weight ratio metal. In addition to this, it has fatigue resistance, corrosion resistance, resistance to high temperatures and low propensity to creep. Due to these all properties, titanium and its alloys find huge demand in aero planes, aerospace, missiles, marine applications and other structures exposed to seawater.

Mechanical structures and their material constituents are undergoing an immense range of loading conditions. Specifically, the rate at which the loading takes place can vary from being virtually static to being almost instantaneous. This leads to interesting and challenging problem of perceiving the way a material will respond to various loading rates. According to mechanical behaviour, the stress-strain response is linked elementally to this variation in loading rates. Accurate results can be obtained from

numerical simulation material model should be provided properly to the simulation file. Among all the material models, Johnson Cook material model is relatively simple to use.

In 1985, Gordon R. Johnson and William H. Cook performed tests and determined fracture characteristics of Armco iron, OFHC copper and 4340 steel using split Hopkinson Pressure Bar test apparatus and evaluated independent fracture model with a series of cylinder-impact and biaxial tests [1]. Also Gordon R. Johnson and William H. Cook presented a fundamental model and relevant data for materials subjected to high strains, large strain rates and elevated temperatures by conducting torsion tests over a vast range of static tensile tests, rates, strain rates, dynamic Hopkinson bar tensile tests and Hopkinson bar tests at higher temperatures [2]. In 1983, G.R. Johnson & J. M. Hoegfeldt presented analyses and test data for six very ductile metals subjected to large strains and a range of strain rates. The effects of strain hardening, strain rate hardening and thermal softening have been considered by

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A CASE STUDY- OPTIMIZATION OF PLASTIC ROTOMOLDING PROCESS BY ANOVA AND TAGUCHI METHODS

Ms. Karishma Raut

Mrs. Niyati Raut

Abstract

In manufacturing world demand of hollow plastic product is increasing which are mainly produced by Plastic Rotomolding Process. To produce better qualitative product, some operating parameters and its composition plays important role. By using ANOVA method, we get the most significant factor. Study describes the factors rotational speed, cooling time and oven temperature as operating parameters that produce better product in terms of tensile strength. Low density polyethylene was considered as polymeric matrix produced by bi-axial turret plastic rotomolding machine with the sets of different rotational speed, cooling time and oven temperature decided by design of experiments according to the L16 orthogonal array of Taguchi approach. Tensile-test of workpieces is done with Tinius-Olsen-H10KTUTM. Water tank gets optimum quality by having compositions of parameters, with the help of ANOVA and Taguchi methods. The result of study suggests for both academia and industrialist to consider the correct factors with their specific limit while manufacturing in plastic rotomolding process for achieving better quality of product.

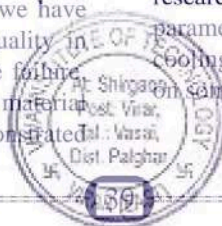
Keywords: ANOVA, Taguchi, LDPE, Rotomolding process.

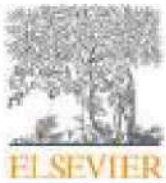
1. INTRODUCTION

The rotomolding is well-known process for hollow plastic production, without weld line. Among all the cavity plastic products about many made by rotomolding process. The principle of rotational molding process and its basic steps are simple as follows (a) mold loading (b) mold heating (c) mold cooling and (d) part removing [1]; the process consists of introducing a known amount of plastic in powder form into a mold. The mold is rotated as well as rocked about two principal axes at relatively low speeds as it is heated so that the polyethylene enclosed in the mold adheres to and forms a uniform layer against the surface [2]. The mold rotation continues during the cooling time so that the plastic retains its desired shape as it solidifies. After determined time, mold rotation and cooling both are stopped to allow the removal of the plastic product from the mold. The process settings are essential, as the optimal rotational speed is important, as wall thickness of product get influenced by the rotational speed of rotomolding process [3]. Quality of rotomolded product is important for customer satisfaction. This study demonstrates a rotomolding process for finding the optimum parameters for producing products with strength. So using Taguchi method, we get different specimens. Tensile tests were carried out using specimens. By using ANOVA method, we get most significant parameter, which directly contribute to improve tensile strength. And hence quality of rotomolded products is achieved. This will give significance and promotion to enlarge rotomolding industry.

Zhang L, gives techniques to improve our business performance. They describe lean manufacturing. In which customer are at focus and for customer satisfaction we have to increase quality of product [4]. To increasing quality in rotational molded product, we must avoid premature failure. This can be achieved by giving proper importance to material selection while manufacturing [5]. LDPE Leo`n, demonstrated

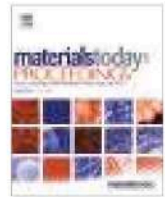
in the literature search conducted on scientific research of rotomolding, 117 articles on rotational molded polymer composites were published and only 22 articles related to polyethylene composites [6]. So we focused our interest in polyethylene-based material. There are many more composites which are polyethylene-based. By Antonio Greco, the main drawback lies in the poor mechanical properties by linear low density polyethylene i.e. LLDPE [7]. So considering all environment conditions of rotomolding process, we gives more refer to low density polyethylene than LLDPE. Chen W., as stated in this paper, signal-to-noise (S/N) ratio and analysis of variance (ANOVA) are used to obtain a combination of parameter settings [8]. Also, for Taguchi method we studied Zerti O., the Taguchi method is a powerful problem-solving technique for process performance and improving productivity. It allows finding answers for problems which need to reduce scrap rates and manufacturing costs due to excessive variability in processes. Taguchi supports the use of orthogonal array designs to assign the chosen factors for the experiment. The ability of the Taguchi method is that it integrates statistical methods into the engineering process [9]. For choosing factors, we study some research articles. Ramin Shaker and Denis Rodrigue, in their study they give importance to some main factors as oven temperature, heating time, rotational speed and particle concentration. They conclude that as increasing rotation speed of LDPE rotomolded product, decreasing number of bubble formation on part surface of product [10]. This gives suggestions to avoid such failure related to quality of product; we concentrated to increase speed of rotation. In our study main part is to selecting proper operating parameters, and rotation speed is taken. For more parameters we studied research article by M. shirinbayan, in which they specified parameters followed by oven temperature, heating time and cooling rate. They mentioned these parameters depended also on same reasons: [11]





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A numerical technique to analyze the trend of temperature distribution in the friction stir welding process for titanium Ti 6Al 4V

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ABSTRACT

Friction stir welding (FSW) process became a game changer for welding of aluminium in a considerably short span of time. Researchers are tempted to use this method on another materials due to of its excellent after FSW weld properties. In fact, researchers and industrial engineers of sectors like automobile and aerospace, where weight is a sensitive issue, feel the need of such a remarkable operation which gives us the best results without any defects in the weld of the material whose softening temperature is high. FSW of nonferrous materials like Ti 6Al 4V-which have high strength and high softening temperature-has become the hottest subject for further research due to its progressing use in the aviation industry. FSW experiments on such materials are tedious and expensive. The achievement of the accurate plasticized stage is very much essential so that the tool can travel in traverse direction flawlessly without damage to achieve sound weld. To get insight of such tedious process as well as to save cost, numerical simulation and computational modelling is the best known option to solve the above problems. In this study, Coupled Eulerian-Lagrangian (CEL) formulation is used to create 3D coupled temperature-displacement FSW model, in which the workpiece domain is described by the combine Eulerian and Lagrangian boundaries and the tool domain by the Lagrangian boundaries. The contrast with experimental results shows that the peak temperature and the temperature distribution are well predicted by the CEL model. Further, the repercussions of the difference in tool travel speeds and tool rotational speeds shows significant changes on the temperature distribution. The elimination of mesh distortion within the workpiece doesn't affect the reliability of the results predicted by the present CEL model and has good potential within the finite element modelling of refill friction stir welding.

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1. Introduction

The year 1991 saw the invention of a unique solid-state joining technique by TWI (The Welding Institute) called Friction stir welding (FSW) [1]. The technique was very well suited for joining many lightweight, hard-to-weld materials, performing exceedingly well with aluminum alloys. The advantages that came with this technique like comparatively low operating temperature, concentrated distortion nearby tool pin and shoulder area and improved grain structure leading to low defect weld attracted a lot of attention which caused FSW to be used extensively in industries, mainly in

railway, aerospace, shipbuilding, and automobile. Both heavy and light weight industries found its use [2]. A FS welding process consists of typically five stages are: Positioning → plunge stage → dwell/delay stage → welding stage → retrieve stage. As shown in Fig. 1, at the first stage, the tool is positioned exactly at the line joining of two workpiece materials. At the second plunge stage, a conical tipped pin with cylindrical shouldered tool is rotated and slowly plunged into the joint line between two pieces butted together. At the third Dwell stage, the tool is kept rotating for some time so that heat will be generated between the tool and the workpiece material and will soften material adjacent to the tool. Dwell period aims to soften the material soft enough so that it will stir, mix and flow smoothly along with the moving tool. During the fourth welding stage, the softened material is joined using

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Electrical, electrochemical and structural studies of a chlorine-derived ionic liquid-based polymer gel electrolyte

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Full Research Paper

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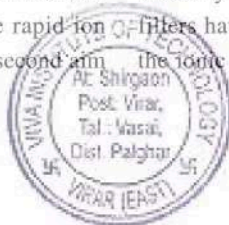
Abstract

In the present article, an ionic liquid-based polymer gel electrolyte was synthesized by using poly(vinylidene fluoride-co-hexafluoropropylene) (PVdF-HFP) as a host polymer. The electrolyte films were synthesized by using the solution casting technique. The as-prepared films were free-standing and transparent with good dimensional stability. Optimized electrolyte films exhibit a maximum room-temperature ionic conductivity of $\sigma = 8.9 \times 10^{-3} \text{ S-cm}^{-1}$. The temperature dependence of the prepared polymer gel electrolytes follows the thermally activated behavior of the Vogel–Tammann–Fulcher equation. The total ionic transference number was ≈ 0.91 with a wider electrochemical potential window of 4.0 V for the prepared electrolyte film which contains 30 wt % of the ionic liquid. The optimized films have good potential to be used as electrolyte materials for energy storage applications.

Introduction

For the past two decades, researchers have been developing polymer electrolytes (solid/gel) as an alternative to commercial liquid-based electrolytes which are suitable for electrochemical devices, such as Li-ion batteries, solar cells, fuel cells, and supercapacitors [1-5]. The main aim is to increase the amorphous content in the polymer which assists in the rapid ion motion while keeping its mechanical stability. The second aim

is to increase the ionic conductivity of the electrolytes, which is generally insufficient for practical applications in electrochemical energy storage devices. Hence, different kinds of techniques, such as the addition of ionic liquids (ILs) with low viscosity and high dielectric constant values or some suitable polymers have been used by the research community to increase the ionic conductivity of polymer electrolytes [6,7].



Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		
						Link to website of the Journal	Link to article / paper / abstract of the article	Is it listed in UGC Care list
Prediction of Coil breaks in SPM using Artificial neural network	Niyati Raut	Mechanical Engineering	International Journal of scientific research in engineering and management	2019-20	2582-3930	http://ijsrem.com	https://iraj.in/journal/IJMPE/paper_detail.php?paper_id=18447&name=Prediction_of_Coil_Breaks_in_SPM_using_Artificial_Neural_Network	Yes
APPLYING SIX SIGMA DMAIC APPROACH ON PLASTIC ROTOMOLDING PROCESS	Niyati Raut	Mechanical Engineering	Social Science Research Network	2019-20	1556-5068	https://ssrn.com	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3989127	Yes
An Overview of Generation Enhancement in Wireless Communication Systems	Ashwini Haryan	EXTC	TEST Engineering & management	2019-20	January-February 2020 ISSN: 0193-4120 Page No. 8728-8736	http://www.testmagazine.biz/index.php/testmagazine	http://www.testmagazine.biz/index.php/testmagazine/article/view/2219/1979	scopus



PREDICTION OF COIL BREAKS IN SPM USING ARTIFICIAL NEURAL NETWORK

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Abstract - Coil breaks are persistent menace for almost every Cold Rolling steel plant. The uncertain demand flow pattern combined with extreme competitive environment has made the steel industry Quality driven. The steel industry consists of processes like Iron Making, Steel Making, Casting, Hot Rolling, Cold rolling, etc. Cold rolling being end process considers defects as wastage of all previous processes, costs, and time invested to achieve the product. Quality defects are considered grave problems for any cold rolling production line. The study aims to predict the formation of coil breaks by use of an artificial neural network at Skin pass mill. The study is conducted at the Tata Steel Cold Rolling Complex (CRC-West) at Tarapur Midc, Boisar. At CRC-W the production lines present are Pickling, 4 hi Rolling mill, Cleaning, Annealing, Skin pass mill, Slitting, Multi blanking line, Cut to length. We are concerning ourselves with the formation of coil breaks at the Skin pass mill. The coil breaks occurs as a result of non-uniform yielding behavior post forming. Typically observed in Deep drawn and extra deep drawn material, however it can also occur in under stabilized IF steel.

Prediction of the formation of coil breaks can be done by an artificial neural network program. An ANN is computing system that learns to perform tasks by considering examples and data sets, generally without being programmed with task-specific rules. The appropriate ANN model is to be developed. The input and output parameters of each of these cases have been decided based on criteria as discussed later. With the Input and Output parameters decided, now the dataset can be taken from the tracking software at the Skin pass mill. The Artificial neural network must be trained so as to increase reliability. The trained ANN must now be validated and tested using a program called Python. The ANN will start predicting if coil breaks will occur or not after skin passing using parameters. The accuracy of ANN will increase as size of dataset increases so for further applications; the ANN could be upgraded to include real time monitoring and prediction.

Keywords - Coil Breaks, Skin Pass Mill, Artificial Neural Network, Cold Rolled Coils, Non Uniform Yielding, Data Sets, Load, Tension, Prediction, Analysis.

I. INTRODUCTION

The Coil breaks mainly occur due to the material internal defects. The occurrences of coil breaks and their causes have not been studied properly. This dataset is originally from Tata Steel depository. The objective is to predict whether a coil break occurs or not. We use Python to make the artificial neural network. Python is an important language for machine learning as it removes complex operations. Its extensive library and machine learning concepts are very helpful. We use supervised learning, in which datasets and learning is predefined to make the model. The work for project is undergone at Tata Steel, Tarapur which is a cold rolling plant.

Artificial neural network is a system closely modeled on the human brain. Artificial neural network contains the multiple layers of simple processing elements called neuron. Each neuron is linked to certain of its neighbors with coefficients of connectivity that represent the strengths of these connections. Learning is accomplished by adjusting these strengths to cause the overall network to output appropriate results. Diagnostic systems, biochemical analysis, image analysis and Internet Algorithm are the various areas where artificial neural network is used successfully. An ANN is a flexible mathematical structure that is capable of identifying complex nonlinear relationships between input and output data sets[1].

In Steel plants systems, normally artificial neural network are used to detect Surface defects. In chemical analysis artificial neural network have been used to analyze Iron and copper samples, track rust levels in pipes and detect conditions such as blowholes. Spots detection on coils, classification of materials according to grades and determination of skeletal age from x-ray images are some of the applications where artificial neural network is being used for image analysis.

Human brain contains $(10)^{14}$ tiny cells called Neurons. A neuron is composed of a cell body, a tabular axon and a multitude of hair like dendrites. The dendrites form a very tiny filamentary brush surrounding at the body neuron. The axon is a long, thin tube that splits into branches terminating in little end bulbs that touch the dendrites of other neuron cells. The small gap between an end bulb and a dendrite is called a synapse, across which information is propagated. The axon of a single neuron forms synthetic connections with many other neurons. The pre synaptic side of the synapse refers to the neuron that sends a signal. The post synaptic side refers in the neuron that receives the signal.

The aim of this study is to better predict and understand the defect of coil breaks which are formed on the steel coils using the artificial neural network.



Applying Six Sigma DMAIC Approach on Plastic Rotomolding Process

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Abstract—The most challenging way for manufacturing a high-quality hollow product is plastic rotomolding. In industry, there has a growing awareness of improving the quality of a rotomolded product. To carry out, the study used the Six Sigma methodology to improve the qualitative rotomolded product in the "Pixel Polyplast" industry. The key goal is to utilize Six Sigma to identify severe flaws and remove underlying causes using the DMAIC approach—define, measure, analyze, improve, and control. To raise qualitative of rotomolded goods, the suggested six sigma techniques effectively combine tools such as statistical process control charts, pareto charts, histograms, run charts, and so on. The research brings out that the six sigma approaches can lower the frequency of rejection. It is observed that the rotomolded product's quality has considerably increased as an outcome, the higher SIGMA level. This result in higher customer satisfaction due to improved service quality, decreased operational costs, and enhanced productivity.

Keywords—DMAIC, LLDPE, Quality, Rotomolding process, Six sigma.

I. INTRODUCTION

Rotomolding is a process for manufacturing hollow plastic products, also known as rotational casting or rotational molding. Rotational molding is best known for the manufacturing of water tanks. It can also be used to make complex medical products, automobile products, milk can, toys, leisure crafts, chemical tanks, marine or fishing floats.

The basic steps of rotational molding are as follows (a) mold loading (b) mold heating (c) mold cooling, and (d) product ejection [1]. Rotational molding is the technique of putting a necessary amount of plastic in powder or granular form into a mold. As the mold is heated, it is rotated and rocked around two primary axes at different speeds so that the material trapped in the mold sticks to it and forms a homogeneous layer against the surface [2]. During the cooling period, the mold rotates at comparatively low rates to ensure that the plastic keeps its final shape while it sets. The cooling and mold rotation are halted to allow the rotomolded product to be removed from the mold. The product is ready at this stage. This is the whole procedure to get a rotomolded product. In this industry for increasing the quality of rotomolded products, studied some past research.

Six Sigma DMAIC methodology is used to improve industry performance, in which customers are at focus. So, have to increase the quality of products for the satisfaction of customers [3]. The Six Sigma DMAIC technique has been applied to attain the main aim. There are several critical aspects to consider. Rotational speed, cooling time, and oven temperature are all factors that contribute to a high-quality

rotomolded product [4]. For rotational molded products, must avoid failure at the early stage. This can be achieved by giving a proper selection of material while rotomolding [5]. According to the literature based on a rotomolding scientific study, 117 papers on rotationally molded polymer composites were published, with just 22 articles linked to polyethylene composites [6]. So, research concentrating on polyethylene-based materials.

After reviewing the literatures, get concluded that this study is unique by using linear low-density polyethylene (LLDPE), as a material in rotomolding process. Selected LLDPE with its specification is listed below, high tensile strength, good flexibility, increased impact and puncture resistance, impact, and elongates under stress, excellent warp resistance, stress cracking resistance, consistent shrinkage with density 924.2 kg/m³ [7]. Combining known amount of LLDPE with various ratios of an exterior layer, intermediate layer, and interior layer in the rotomolding process to create a triple-layered water tank. Uniform thickness of rotomolded product may be obtained with proper process control [8]. There is research in which polyethylene is replaced with natural fibers; these results in form of comparability tougher and more sustainable products [9]. Nowadays, the rotomolding process is becoming more environmentally friendly by utilizing recyclable and reusable materials. If the examined material is replaced with a more environmentally friendly substance in the future, this research will still be useful because it focuses on overall quality improvement through the use of Six Sigma. As a result, no contribution of the six sigma DMAIC method has been noticed in previous studies in the plastic rotomolding process. Considering the above facts; the study focuses to reduce the rejection rate by decreasing or eliminating defects, improving the quality of rotomolded products, taking corrective actions by implementing DMAIC, six sigma methodology.

II. METHODOLOGY

Six Sigma is described as an approach for reducing defects by identifying sources of variation, eliminating them, and error-proofing processes that have a significant impact on the customer. This leads to an increase in yield and a higher quality end product, which increases customer satisfaction. Six Sigma is the creation of a systematic method for measuring and analyzing performance, as well as setting high goals and targets [10].

An Overview of Generation Enhancement in Wireless Communication Systems

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Abstract:

Enhancement in wireless and mobile communication has a remarkable history of generation advancement adopted by more than four billion people today. In the near future, wireless data traffic will be increased exponentially, and the present wireless cellular network system is not capable to match technically this increasing trend. In this paper, generation with technical advancement is portrait as wireless technology progress from "Connected things" to "connected intelligence". Wireless communication system commence with first generation as voice calls unlock system. Progression of wireless communication system is prolonged with second generation and third generation by introducing new concept of digital modulation. Presently 4G offers new services as "anytime anywhere". With the increasing demand, drastic improvement is needed in the current technology. The prime objective of next generation (5G) to match dense traffic requirement is increased capacity, fast data rate transmission, smaller latency which will be launched very early. 5G will not be capable to fulfill the increasing user demands and artificial intelligence requirement of society till 2030, the new paradigm as sixth generation in wireless communication system is expected to commercialize the market in 2030. In this paper, the future vision of 6G technologies and roadmap to achieve 6G is portrait.

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I. INTRODUCTION

Advancement in the wireless communication industry is growing in a fast rate with the features advancement from the number of decades. Presently 4G long term Evolution (LTE) is reaching to saturation and deploying day by day. As the improvement can be expected to be a minimal and new spectrum of small value is unused. For the present scenario, Scientists and researchers must contemplate as "what to do next"? [1] Due to increase in the wireless data traffic due to the regular usage of video and increasing number of subscriber per year, the wireless communication industry moved to 5G cellular technology [2].

The 5G technology is based onto the use of mm wave where frequency spectrum is subjugated above 6 GHz of frequency. 5G offers great flexibility which supports multitude of internet protocol based devices, smaller frequency reuse cell structure and intense region for coverage of subscribers. 5G expansion provides application advancement as device to device communication, tactile internet, device to infrastructure communication, machine to vehicle communication and their application requires tremendously lower network latency and lower energy consumption, low cost and immense number of devices for data communication as shown in figure 1.

As shown in figure 1, 5G is capable in working different environment and traffic data rate must be as



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Structural, electrical and electrochemical Studies of Sodium ion conducting blend polymer electrolytes	Manju Mishra	Humanities and Applied Sciences	Elsevier- Material Today: Proceedings	2018-19	0346-251X.	https://www.journals.elsevier.com/materials-today-proceedings	https://www.ippt.pan.pl/repository/open/6876.pdf	yes
Fabrication and electrical characterization of nano gel composite electrolyte	Manju Mishra	Humanities and Applied Sciences	(IJOER) [Vol-5, Issue-3, March- 2019]	2018-19	[2395-6992]	https://joer.com/	https://joer.com/issue-detail/issue-NCRENB-MAR-2019	yes
Utilization Of Jung –Kin-Shrivastava Integral Operator Over Univalent And Analytic Functions	Jayesh jain Mahender Singh Poonia	Humanities and Applied Sciences	(IJRSET) Vol.8,Sep 2019	2018-19	ISSN2319-8753	http://www.ijrset.com/	http://www.ijrset.com/upload/2019/sep/September%204_4_Utilization%20(1).PDF	yes
On Certain Subclasses Of Univalent Functions: An Application	Jayesh jain Mahender Singh Poonia	Humanities and Applied Sciences	(IRJET)Vol.06,Sep.2019	2018-19	ISSN 2395-0056	https://www.irjet.net/	https://www.academia.edu/40657141/IRJET_ON_CERTAIN_SUBCLASSES_OF_UNIVALENT_FUNCTIONS_AN_APPLICATION	yes
Impact of work Environment on work Performance	Dr Prashant Pawar	Humanities and Applied Sciences	JASC, pp.-3148-3149, Vol.VI, Issue. II, Feb 2019	2018-19	1076-5131	http://j-asc.com/	https://j-asc.com/?s=Prashant+Pawar	yes
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Manufacturing and Testing of ALL TERRAIN VEHICLE	Shweta Patel	Mechanical Engineering	International Journal of Research and Analytical Reviews (IJRAR)	2018-19	2349-5138	https://ijrar.org/	http://www.ijrar.org/papers/IJRAR19J3052.pdf	Yes
Design and Analysis of All terrain vehicle	Shweta Patel	Mechanical Engineering	Journal of Applied Science and Computations	2018-19	1076-5131	http://j-asc.com/	https://j-asc.com/?s=shweta+patel	Yes
Design and Fabrication of Two Wheel Drive Forklift	Priyank Vartak	Mechanical Engineering	International Journal of Research and Analytical Reviews (IJRAR)	2018-19	2349-5138	https://ijrar.org/	http://www.ijrar.org/papers/IJRAR19J3686.pdf	Yes
Gear Changing Mechanism with the Help of Electromagnetic Switch for Bike	Priyank Vartak	Mechanical Engineering	International Journal of Research and Analytical Reviews (IJRAR)	2018-19	2349-5138	https://ijrar.org/	http://www.ijrar.org/papers/IJRAR19J3626.pdf	Yes
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Implementation of Quality Management System in small scale Industry	Aditi Pimpale	Mechanical Engineering	INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS	2018-19	2349-5138	https://ijrar.org/	https://ijrar.org/viewfull.php?&p_id=IJRAR1913666	Yes
Multipurpose CNC Plotter Machine Using Arduino System	Henisha Raut	Mechanical Engineering	International Journal of Research and Analytical Reviews	2018-19	2349-5138	https://ijrar.org/	http://www.ijrar.org/papers/IJRAR1914171.pdf	Yes
Pipe Stress Analysis Using Caesar II Software	Henisha Raut	Mechanical Engineering	Journal of Applied Science and Computation	2018-19	1076-5131	http://j-asc.com/	https://j-asc.com/?n=Pipe+Stress+Analysis+Using+Caesar-II+Software	Yes
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Design and Fabrication of Biomass Pellet Manufacturing Machine	Swapnil Raut	Mechanical Engineering	International Journal of Advanced in Management, Technology and Engineering	2018-19	2249-7455	http://www.ijantex.org/	https://app.box.com/s/41cz7oc9ef5iz8r1u2pon3wq8cf7z31j	Yes
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STABLE SURFACE WATER CLEANER USING QUADCOPTER	Tejas Chaudhari	Mechanical Engineering	International Journal of Research and Analytical Review	2018-19	2349-5138	https://www.ijrar.org/	http://www.ijrar.org/viewfull.php?&p_id=IJRAR1913323	Yes
Design optimization of monogram system for textile application	Mansi Lakhani	Mechanical Engineering	INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR)	2018-19	2349-5138	https://www.ijrar.org/	http://www.ijrar.org/papers/IJRAR1913621.pdf	Yes



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DESIGN AND DEVELOPMENT OF BALL VALVE TO PREVENT LEAKAGE PROBLEM	Pratik Raut	Mechanical Engineering	International Journal of Research and Analytical Reviews (IJRAR)	2018-19	2349-5138	https://www.ijrar.org/	http://www.ijrar.org/papers/IJAR19H1049.pdf	Yes
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Structural, electrical and electrochemical studies of sodium ion conducting blend polymer electrolytes

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ABSTRACT

In the present study sodium ion conducting polymer blend electrolytes has been prepared using poly (vinylidene fluoride – hexafluoro – propylene) (PVdF-HFP), poly (methyl methacrylate) (PMMA), and sodium thiocyanate (NaSCN) salt by solution-cast technique. The highest ionic conductivity of the optimized blend polymer electrolyte system [PVdF(HFP)-PMMA (4:1)] (20 wt%)-[NaSCN (1 M)] (80 wt%) has been found to be $4.54 \times 10^{-2} \text{ S cm}^{-1}$ at room temperature. The temperature dependence conductivity plot shows the Arrhenius behaviour and its activation energy calculated from the plot were found to be 0.13 eV. The structural and morphological studies of polymer blend electrolyte were investigated by XRD, SEM and FTIR spectroscopy. Complex formation between polymer and salt has been confirmed by these studies. The thermal properties of optimized electrolyte system were examined by differential scanning calorimetry (DSC) techniques. The ionic transport number was calculated using d.c polarization techniques and was found to be 0.92, which shows that electrolyte system is predominantly ionic in nature. The electrochemical potential window of optimized polymer blend electrolyte was tested and observed to be $\sim 2.8 \text{ V}$.

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1. Introduction

The studies on polymer electrolytes are quite interesting to physicists, chemists and engineers because of their fundamental physical properties and potential application in various electrochemical devices such as batteries, fuel cells, supercapacitors, sensors and display devices [1–4]. These materials have various advantages over the liquid electrolytes, such as; corrosion, self-discharge, bulky design, miniaturization etc. They exist in crystalline and amorphous phases. The existence of amorphous phase and lower values of glass transition temperature are responsible for ion conduction in such systems. Various approaches have been adopted for synthesis of new polymer electrolytes exhibiting higher ionic conductivity at ambient temperature such as polymer blends [5–7], copolymers [8], comb branch polymer [9], cross linked networks [10,11], addition of plasticizer [12,13], addition

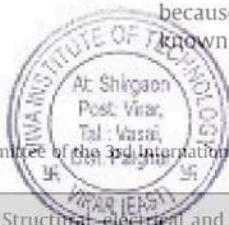
of ceramic filler [14–16], use of a larger anion of dopant salt (acid) etc [17,18]. Out of the abovesaid techniques, polymer blending is one of the most promising and feasible ways to improve the ionic conductivity, flexibility and mechanical strength of the polymeric systems. According to this methods, when two or more polymers are mixed together and give rise to a homogeneous mixture, miscible or compatible blend is formed in which one polymer is adopted to absorb the electrolytes active species while another remains as an un-dissolved inert second phase, providing toughness to the polymer electrolytes films [12,19]. PVdF-HFP has been chosen as a host polymer in the present studies because of its appealing properties. It has high dielectric constant (ϵ_r) of 8.4 and existing in both the phases, amorphous and crystalline. Amorphous phase enhances higher ionic conduction in the system; meanwhile crystalline phase provides strong mechanical support to the polymer electrolytes [20–22]. In order to improve the ionic conductivity, poly(methyl methacrylate) (PMMA) has been used because it has a good amorphous and compatible nature. It is also known that PMMA gels were found to have better interfacial prop-

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Fabrication and electrical characterization of nano gel composite electrolyte

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Abstract— In today's society, we stand before a change in energy paradigm. As our civilization grows, many countries in the developing world seek to have the standard of living that has been exclusive to a few nations, so their arises a need in the development of technology that is compatible enough with the resources provided by nature in order to have sustainable development to all class of the society. Climate change and continuous depletion of fossil fuels compels the society to move towards sustainable and renewable resources. As a result of which, researchers are looking forward to exploit a renewable energy production from natural resources like sun and wind. One of the most important sectors which influence the life of common people is transportation, which at present is strongly dependent on petroleum and natural gases. In order to overcome the prevailing challenges of huge energy crises in near future, there is an urgent need for the development of electrical vehicles or hybrid electrical vehicles with low CO₂ emissions using renewable energy sources. In view of the above, electrochemical capacitors can fulfill the requirements to some extent.

Keywords— compatible, depletion, sustainable, renewable resources, electrochemical capacitors.

I. INTRODUCTION

Now a day's rechargeable batteries and supercapacitors having different types of solid state electrolytes are fabricated which are having different compositions, such as polymer blend electrolyte, polymer composite electrolyte, polymer gel electrolyte, ionic liquid-base polymer gel electrolyte etc., Almost all the electrolytes shows high conductivity almost equivalent to that of liquid electrolyte i.e. $\sim 10^{-4} \text{Scm}^{-1}$, but they deal with some serious problems which restrict their suitability for practical objectives. Poor dimensional stability, less thermal stability and low range of power window are some basic problems which has to be remove from these polymer electrolytes to make it efficient for its use in modern age highly sensitive technical inventions for eg. fuel cells, sensors, electrochromic tool etc. [1-4]. Preparation of nano composite polymer gel electrolyte is the best optional product to overcome these problems. Nano science is the new and emerging field which attracted the attentions of global scientist and research fraternity because it is clear till now that nano size of the materials can do the miracle in electrical as well as electronics field due to its exceptionally unique chemical, physical, and mechanical properties such as: high interfacial energy, exceptionally large aspect ratios, high degree of disorder, high ionic transport [5].

Although polymer gel electrolyte is having very good ionic conductivity of the range $\sim 10^{-4} \text{Scm}^{-1}$, fare flexibility, good electrode-electrolyte contact in fabrication of the device but due to its jelly or semisolid nature they have low geometrical safety, decline in ionic conductivity during long term use, less comfortable relation with electrode interface etc. One of the methods to solve these problems of polymer gel electrolyte is to add some inorganic filler in nano sizes, to convert polymer gel electrolyte in composite type of electrolyte having combined(features of constituent materials) as well as new characteristic features (other than reactants). When such fillers are added or dispersed to the polymer gel electrolyte, amorphous or porous nature of electrolyte increases (to many fold as compared to normal composite electrolytes) which enhances the liquid absorbing quality of polymer and helps in removing the drawbacks of polymer gel electrolytes such as leakage, poor mechanical and thermal stability etc. [6-7] Type of nano filler which is used to prepare the composite polymer gel electrolyte, contributes important part to modify structural configuration at microscopic level for the electrolytic system which further enhances the properties such as polarization, ionization and mobility of charge carriers, they have direct impact on ionic conduction and other phenomenon of good polymer gel electrolyte.



Utilization of Jung-Kim-Srivastava Integral Operator over Univalent & Analytic Function

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ABSTRACT: In this paper, using Jung-kim-Shrivastava integral operator, we have introduced new class of analytic and univalent functions in the unit disc $\mathcal{U} = \{z: |z| < 1\}$ and obtain the coefficient estimate, distortion and growth theorem and radius of starlikeness and convexity for the functions belonging to the class. The various results obtained in this paper are sharp.

KEYWORDS: Analytic function, Univalent function, starlike function, convex function, close to convex function, Hadamard product, Jung-Kim-Srivastava Integral operator.

I. INTRODUCTION

Let S stand in favor of mappings of the structure

$$f(z) = z + \sum_{k=2}^{\infty} a_k z^k, k \in \mathbb{N} \quad (1.1)$$

whichever re

gular & one to one in unit disc $\mathcal{U} = \{z/|z| < 1\}$.

Let $S^*(\alpha, \beta)$ exist the subfamily prior to S according afore mappings of the structure (1.1) & fulfilling effective circumstance

$$\left| \frac{\frac{z(I^\sigma f(z))'}{I^\sigma f(z)} - 1}{\frac{\beta z(I^\sigma f(z))'}{I^\sigma f(z)} - \alpha \frac{z(I^\sigma f(z))'}{I^\sigma f(z)}} \right| < \mu, p \in \mathbb{N}, z \in \mathcal{U} \quad (1.2)$$

where $-1 \leq \alpha < \beta \leq 1$ and $0 < \mu \leq 1$.

Recently, Jung, Kim, and Srivastava [5] introduced the following one parameter family of integral operator

$$I^\sigma f(z) = \frac{2^\sigma}{z\Gamma(\sigma)} \int_0^z \left(\log \frac{z}{x} \right)^{\sigma-1} f(x) dx \quad (1.3)$$

For $f(z) \in S$ and $\sigma > 0$ They showed that



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Impact of Work Environment on Work Performance

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ABSTRACT--The work environment impacts on employee' determination, efficiency and commitment positively as well as negatively. The work environment involves the social relation at the workplace and the relationship between colleagues, supervisors and the organization. It includes the circumstances in which employees are working together. A motivated and hardworking employee is the biggest strength of any organization. Efficiency and productivity of any organization rely on the level of motivation of employees. Productivity is increased or decreased due to the workplace environment. The work environment is one of the most important factors which has a great impact on the satisfaction and motivation level of employees, especially with their immediate atmosphere. Work environment influences on the level of innovation to a great extent and association with other employees and ultimately how long they perform in the job. Good work environment or work culture maintains not only the performance of employees but also affects the growth and success of the whole country. The research article is trying to focus and analyze the impact of the work environment and work culture on the work performance.

KEYWORDS- Work environment, work culture, motivation, work performance, productivity.

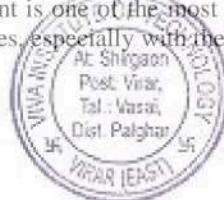
I. INTRODUCTION

The environment is man's immediate atmosphere which he manipulates for his existence. The work environment of a majority of workplaces is insecure and harmful. In today's work environment, organizations can not afford to waste the potential of their workforce. Therefore, the workplace requires an environment in which the worker performs his work while an effective workplace is an environment where outcomes can be achieved as expected by the management. The efficiency of employees is determined by the environment in which they work. Work environment includes all the characteristics which impact on the body and soul of an employee. In an organization, it is the workplace and work environment in which employees are working together and their work is analyzed for better efficiency and high productivity.

II. WORK ENVIRONMENT AND WORK PERFORMANCE

The work environment is a very wide and comprehensive concept including the physical, psychological and social aspects that influence the working conditions. Work environment has both positive and negative impact on the psychology of employees. The work environment can be defined as the environment in which people are working, with incorporating the physical work setting and fundamentals of the work itself. Therefore, all the aspects of work environment are collectively significant and appropriate when considered the work performance and the welfare of employees.

The work environment involves the social relation at the workplace and the relationship between colleague, supervisor and the organization. It includes the circumstances in which employees are working together. A motivated and hardworking employee is the biggest strength of any organization. Efficiency and productivity of any organization rely on the level of motivation of employees. Productivity is increased or decreased due to the workplace environment. The work environment is one of the most important factors which have a great impact on the satisfaction & motivation level of employees, especially with their immediate atmosphere.



IMPACT OF ORGANIZATIONAL CULTURE ON HUMAN RESOURCE MANAGEMENT

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ABSTRACT

The world is changing rapidly and the organizations and the work culture is also changing due to technological development. Due to large opportunities and challenges to the managers and decision makers, today's organization Culture is predominantly dynamic and it is very vital to understand the dynamism to achieve the organizational objectives. Organizational culture in terms of the relative ordering of beliefs, values and assumptions, provides opportunity and broad frame for the development of human resource management skills in an organization. Many scholars of human resource management have proposed that the various features of organizational culture have an impact on values, beliefs and assumptions of the workforce. The present research paper is trying to study the organizational work culture and its impact on the human resource management. The paper emphasis that works culture has the strong relationship with human resource.

Keywords: *Organizational Culture, Management, workforce, Human Resource, motivation*

INTRODUCTION

The world is changing rapidly and the organizations and the work culture is also changing due to technological development. Due to large opportunities and challenges to the managers and decision makers, today's organization Culture is predominantly dynamic and it is very vital to understand the dynamism to achieve the organizational objectives. There has been wide researches to explore the impact of organizational culture on human resource management of an organization. Organizational culture is helping to provide opportunity and broad frame for the development of human resources management skills in an organization which is driven by ethical values. An organization can manage the human resource by embedding ethical values in its culture. However, organizational culture could be varied since organizations differ in their cultural backgrounds in terms of beliefs, values and assumptions. Organizational culture can cope with the continuous changes and fulfill the demands of the organization to gain competitive success in all its activities. Therefore, an organizational culture is considered as a motivational tool which promotes the human resource management to perform smoothly and ensure success in all its accomplishments. Thus, the motive of the paper is to study the impact of organizational culture on the human resource management.

Organizational culture is a shared values and beliefs that help to shape the behavior patterns of the workforce within the organization. It is a collective process of the mind and heart that differentiates the individuals of one group from the other one. Thus, we can summarize that organizational culture can be the tool of maintaining human resource in a link and accelerating them towards organizational objectives. And creating the link between culture and organizational success via its human resource management. These cultural values and



Manufacturing and Testing of ALL TERRAIN VEHICLE

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Abstract : The main aim of this Technical Paper is to Design an All-Terrain Vehicle (ATV) which is safe from Drivers view complying with all the rules specified in BAJA SAE INDIA rule book 2019. Being familiar to the event, certain changes were made to enhance the overall design.

The car's demand is majorly from off-road enthusiast, hence considering drivers ease was a huge design consideration. Driver Ergonomics and performance of the off-roader was one of the major changes incorporated this year. Making the vehicle lighter and durable was another important consideration.

The vehicle was so designed according to the design reports and was tested in different off roads to get the strength of the car and will be used a safe guarded vehicle where a normal car cannot even reach.

This paper highlights the points to analyse the safety of its chassis in case of impact or roll over.

IndexTerms - ATV –all terrain vehicle, CV–continuous joint, KPI – king pin inclination, MC –master cylinder, TMC –tandom master cylinder .

I. INTRODUCTION

The major motive of the design report is to have an overall view of the All-Terrain Vehicle complying with basic Driver Ergonomics, Vehicle Performance and Specifications etc. adhering to all the rules specified in the BAJA SAE International Rule Book 2019. In accordance with last years' experience, the designs were optimized and the concept of 'design for manufacturing' was incorporated.

II. ROLL CAGE:

Design of a roll cage includes various factors like material selection, size selection and frame design and finite element analysis. These steps are elaborated further.

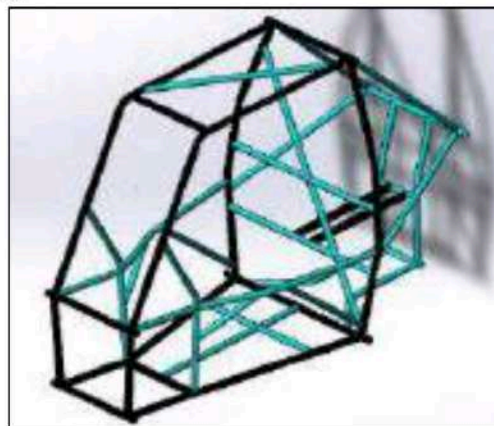


Fig 1. Roll cage Model

2.1 Material Selection:

The material used for this year roll cage is AISI4130 (chrome-moly steel) i.e. chromium molybdenum alloy steel. This was selected on a comparative study on parameters like Availability, Cost, Weight and Strength. We compared this following parameter with other steel grades like AISI 1018 and AISI 1020. But AISI 4130 is quite best among them structure. The properties of this material are:

Bending Stiffness = EI

Bending Strength = $S_y \cdot I/c$

Table 1. Equivalency

Parameter	AISI 1018	AISI 4130
Bending Stiffness	2.76*10 ⁹	3.45*10 ⁹
Bending Strength	387.378*10 ³	706.70*10 ³

Design and Analysis of ALL TERRAIN VEHICLE

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Keywords— *ATV –all terrain vehicle, CV–continuous joint, KPI – king pin inclination, MC –master cylinder, TMC –tandem master cylinder.*

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TABLE I: EQUIVALENCY

Parameter	AISI 1018	AISI 4130
Bending Stiffness	2.76*109	3.45*109
Bending Strength	387.378*103	706.70*103

B. Material Selection:

Last year we started using the primary and secondary pipe sizing method for roll cage. This year also we are using same method. Last year we had better results in weight reduction. This year we made some changes in pipe sizing. This year there were changes made in the diameter of the pipe considering the equivalency calculations as per rules:



Design and Fabrication of Two Wheel Drive Forklift

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Abstract: Material handling involves the short distance movement, storage, protection and control of materials and products. Material handling equipment are used to reduce costs and maximize productivity. A forklift truck is an industrial truck used to pick up and relocate materials. It is an essential piece of equipment in manufacturing and warehousing operations. Lift trucks are widely available in many variants and load capacities. There are numerous goods weighing around 40kgs that are comparatively lighter but not an easy task for human labor to move or transfer them. To fulfill this need we design a 2-wheel drive forklift to lift and transport the goods compact and lighter in size across factories & industrial warehouses. The 2-wheel drive is a fast, efficient and low power consuming vehicle that can work in smaller spaces.

Index Terms - Forklift, Material handling, 2-wheel drive.

I. INTRODUCTION

A forklift is an industrial truck used to lift and transport materials over short distances. A Forklift truck is one of the most used machines employed for several types of tasks. They range from warehouse use to large scale industry with multiple locations. They make lifting of heavy objects fast and a lot easier than manual lifting. There are numerous varieties of forklifts to select from going well with your requirements and necessities. Forklifts either uses propane, gasoline or electricity as a source of power for its operation. Electric forklifts rely on batteries for its operation [6]. Gasoline or propane powered forklifts are sometimes stronger or faster than electric forklifts, but they carry more problems related to maintenance and cost. Electric forklifts are perfect for warehouses because they do not pollute environment with harmful fumes like gas powered machines do. So here we design Two Wheel drive forklift using SOLIDWORKS and ANSYS [5], which uses electricity as a source of power and instead of hydraulic mechanism it will use motor for lifting loads with the help of forks. This will be useful in carrying loads which are less in weight usually 40 kg and hence will be proved better for inhouse operations.

1.1 Problem Statement

There are many goods or components are available weighing around 40kg in warehouses. Problems associated with transportation of these loads inside warehouses.

They are listed below:

- Lack of proper vehicle for handling loads weighing around 40kg.
- Forklifts powered by diesel or gasoline are not good for environment.
- Normal forklifts are not compact.

Using regular forklift for such a load is also not a suitable choice, as it would be waste of time and money to use those forklifts which are designed for heavy loads. Also forklifts which uses diesel or gasoline as a fuel will also be harmful for environment. So, we need a vehicle which can work for load of 40 kg [4], without polluting the environment and compact also.

II. OBJECTIVE

Objective of this study is to increase productivity in the industry by reducing the time involved in transportation of small goods. It also reduces the human fatigue.

- To safely pickup and carry the load from one point to another point in warehouse, for small distances.
- To reduce the time involved in transporting light weight goods.
- To carry goods through narrow passages, since it's difficult for regular forklift due to size.
- To carry goods efficiently, since less energy consumed in operation.
- To get better source of power as using battery for powering the forklift will reduce the pollutant exhausted by forklift.

III. CONSTRUCTION

- 1) Counterweight: Counterweight is a heavy mass placed at the rear portion of the forklift truck. The purpose is to balance the load lifted by fork. In our project battery and some other minor components with human weight standing on forklift serves as perfect counterweight.
- 2) Wheel: Wheels allow easy movement of heavy load with least effort. Here we use 4 wheels for mobility of our vehicle in which two front wheels are connected with motor which drives the vehicle primarily and other two rear wheels are used just for stability purpose and can rotate in 360°. All the four wheels are solid type. Diameter of the front wheel is 175mm.
- 3) Fork: The fork is the key component of the forklift. It is used to pick up the goods from ground and hold it at some height. These are two bend strips made by mild steel.
Dimension of the forks are
Length - 250mm
Height - 350mm
Width - 50mm



Gear Changing Mechanism with the Help of Electromagnetic Switch for Bike

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Abstract: The project involves gear changing with the help of electromagnetic coils which are operated by push buttons and mounted on the foot pedal. An electromagnetic coil produces an electromotive force which shifts the gear. The two push buttons are used to activate the two electromagnetic coils respectively. The coils are used to up shift and downshift the gear independently. An additional battery is used to supply the current to these coils. The concept is based on the "ELECTROMAGNETIC INDUCTION". That is we can produce the mechanical force either by electrical field or by magnetic field. The same concept is used to change the gear with the help of pedal. The rectifier of the bike is changed the, new one will be able to charge the two battery at the same time. The coils are mounted on the upper side of the pedal, and the new pedal is attached which is greater in the length. The push buttons are installed on the panel of the handle and their connections is done with battery and coils. Insulations need to be provided, in order to prevent the coils from the water

IndexTerms :- Electromagnetic Coil, Button, Gear Changing Mechanism.

I. INTRODUCTION

In today's generation all bikes are equipped with foot lever gear changing mechanism, but this project involves the gear changing with the help of push buttons and electromagnetic coils. As we all know that if there is production of magnetic field there will production of mechanical force and in our project this force will change the gear easily. When the push buttons are pressed which is connected to the coil, the coils gets activated and mechanical force is produced this leads to the motion of the plunger of the coil in forward direction. For the return back action there will be helical spring of required stiffness is attached.

1.1 Problem Definition

In the way of designing "button operated gear changing system", the limitation of the primitives gear changing system is it uses foot lever for changing of gears.

The bike rider who loves to ride the bike but won't be able to ride just because of the following reason: Ankle pain, Pain in their calves, Cramp problem, And a handicapped person won't be able to change the gear, The bikes which is available with this mechanism is too costlier.

To tackle this situations this idea is developed.

1.2 Previous Work

The previous work in this project idea had stopped due the time required for engaging the gear with this idea. But in this project this thing is eliminated due to introduction of BSIV vehicles and change that had been done in the electromagnetic coil.

1.3 Objective

Introducing electronics system along with mechanical system and their whole arrangement will be under the "Mechatronic System". Hence, the efficiency of the new system will be more than primitive system.

- Reduces overall cost as compared to the bikes which exists with these systems.
- Time for engagement through this system is less.
- This project will provide a combination of mechanical and mechatronics systems.

II. DSEIGN CONSIDERATIONS

Force Exerted by Plunger

Relative permeability of air and coil: - 1

Current density in coil:- 1×10^6 Amp. / m^2

(1) Cross-sectional area of coil = Height * Width = $0.04 \times 0.011 = 4.4 \times 10^{-4} m^2$

Let,

Ampere turn density (ATD) = Current density (I)

Current density = 1×10^6 Amp. / m^2

(2) Ampere turn (AT) = Ampere turn density * Area of coil = $1 \times 10^6 \times 4.4 \times 10^{-4} = 440$

$H_g = AT/g = 440/0.002 = 2,20,000$ Amp./Meter

Where, g is air gap distance

(3) $B_g = \mu_0 * H_g$

$$= 4\pi * 10^{-7} * 220,000 = 0.276 \text{ Tesla}$$

Force exerted on plunger

(4) $F_c = 0.5 * (B_g / \mu_0) * A$

Where, A is plunger cross sectional area = $\pi / 4 * d^2 = \pi / 4 * (0.025)^2 = 4.9 * 10^{-4} m^2$

$$F_c = 0.5 * (0.276 / 4\pi * 10^{-7}) * 4.9 * 10^{-4}$$



Design and Fabrication of Automatic Convertible Wheelchair

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Abstract : Wheelchair is basically a chair with wheels. Wheelchairs are most commonly used medical equipment in indoor and outdoor environment. Transferring patients from wheelchair to bed and vice versa is difficult task for both the patient as well as person transferring the patient. Caretakers even need special training to do this task. So there is a need of an alternate to this problem. This Project focuses on designing and manufacturing a automated wheel chair which can be driven using joystick and can be converted into bed. The Design uses linkage mechanism to convert the Wheelchair into bed and vice versa. Usages of linkages make the construction and assembly very simple and low cost. Chair is also automated by providing a joystick to drive the wheelchair using Arduino.

IndexTerms - Wheelchair, Arduino, Convertible Wheelchair, Automatic Wheelchair, Joystick Controlled.

I. INTRODUCTION

The number of physically disabled or weak peoples in India is increasing day by day. As per Census 2011 there are about 2.68Cr people are disabled. Wheelchairs help these people with disabilities to become productive with their life. Wheelchairs are used by injured, physically disabled people or elderly people as an assistive device to move around. They are commonly used in hospitals, old age homes etc.

As over the year wheelchairs have been improving from manual to electric. Most of the wheelchairs available in market are still manually operated wheelchairs. While these wheelchairs are of low cost it takes a lot of physical strength to operate a wheelchair for a long period of time. There are some power wheelchairs which have electric motors but they cost high amount of money in current market and they are still unable to satisfy the need of the disabled people. While wheelchairs can be very helpful in moving people from place to place, transferring people to wheelchair from bed or to bed from wheelchair is very hard task and is an issue for patients, nurses as well as family members. It has to be done by proper technique in order to avoid any accidents. For people using wheelchairs it is almost impossible to get out of the chair without any help.

1.1 Aim of Project

This Project hence focuses on creating a Multipurpose Wheelchair which is not only automatic but also convertible. The study was done to understand and the needs of the people and to provide an affordable yet quality solution. The conversion is manually operated by using linkages and electric motors with joystick controller are used to control movement of wheelchair.

1.2 Problem Definition

Wheelchair serves the purpose of transporting a person/patient from one location to another. People may feel uncomfortable and require moving due to reasons such as getting fresh air, Wheelchair serves this purpose as it is cheap and most efficient device available. However person who is incapable to move his legs has to manually drive wheelchair by his hands which brings restriction to the movement as it is exhausting. Many times patients with physical disability have to assign a caretaker to move them around which in case of hospitals etc. takes up resources that can be used differently. Moving from wheelchair to bed and vice versa by himself is not possible for a person. Even for some other person such as care taker or family member it is difficult to move a person from wheelchair to bed and is detrimental to health of helper as well as patient. Even though there are power assisted wheelchairs and recliner wheelchair they have high cost. Also the numbers of multifunctional options available are very low. Hence for hospitals or charity homes it is not affordable to give such services to their patients. To eliminate all this problems and to provide patients comfort of moving around a wheelchair was created which can be converted into bed and vice versa.

II. LITERATURE REVIEW

Trinayan Saharia, Jyotika Bauri, 2017 [1] Developed a joystick controlled wheelchair for physically challenged people. This article was focused on how joystick can be used with help of arduino ATmega328p to control movement of wheelchair. The command is implemented by joystick and sent to arduino board. Arduino board will process the command after processing controller sends the command in the form of digital signal to motor driving IC which will operate the DC motor. The paper helped us understand the different parts of the whole system circuit in detail and how they communicate with each other and logics behind the joystick control.

Mithun Kolhe, Dinesh Ahuja, Waseem Saleem Ansari, 2017 [2] worked on design and fabrication of lever propelled wheelchair. The paper had information about different types of wheelchairs with their properties. The manual wheelchair has good maneuverability but it requires more force, Power wheelchairs are advanced and come with facilities like seat elevation, recline etc. Voice controlled and joystick controlled wheelchair can be used by people who have more physical disability other than legs.

Amit Sutradhar, Md. Samiul Haque Sunny, Manash Mandal, Rubel Ahmed 2017 [3] constructed an electric wheelchair. The wheelchair was joystick controlled, voice controlled, keypad controlled and consisted an accelerometer. The paper gave the Control strategy for the joystick and whole circuit.

Implementation Of Quality Management System In Small Scale Industry

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ABSTRACT

The purpose of this report is to use QMS tool to assist small scale manufacturing organization to become more productive and more efficient. A simple approach has been adopted to create the term for implementing quality management system. In the frames of case study, it has been analyzed that implementation of QMS resulted in overall improvement of the organization. Implementation of quality management system in LED manufacturing company at SPECIALITY VALUE LIGHTING & DESIGN Pvt. Ltd and helping them to reach the production requirement within the given deadline along with cost reduction without compromising quality of the product and to reduce wastages of all types. Our aim will be to assist the company in manufacturing and testing of the LED according to the order requirement.

INTRODUCTION

This project is based on the implementation of few document related to quality management system to enhance the productivity and quality industry products. For this purpose, A small scale industry in Vasai East was selected which is known as speciality value lighting and design private limited. Its been a decade company serving to the industries with high quality, specialized and standard led lights. They supply across various states in India directly and indirectly. They are known for prompt delivery of innovative and quality product of light, good customer relationship management.

REASON FOR THE PROJECT

Because of the globalization many of the competitive companies are introduced in market so customers have many options to choose the same product from many companies as per their requirements, specification and the quality prospective. Its very difficult to hold the customer at our end. If our product is frequently coming back to our company because of poor quality inspection so company must focus on quality parameters in all stages such as Inward quality control, Process quality control, outward quality control.

PROBLEM STATEMENT

We visited company Speciality Value Lightning And Designing Pvt. Ltd. After looking into company we came to know that the quality checking of Inward, Outward of items are not well inspected. They do not maintain record of the inspection sheets in proper way. The quality inspector doesnot understand the English language and he records randomly in a book which we cannot understand easily.

OBJECTIVE OF THE STUDY

1. Creating the inspection sheet on each stage of production.
2. Making user friendly quality inspection system.
3. Give the awareness of documentation of the QC sheets of each product such as drivers, COB etc.



MULTIPURPOSE CNC PLOTTER MACHINE USING ARDUINO SYSTEM

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Abstract : "Multipurpose CNC Plotter Machine" is very great innovation idea made in modern world. As considering the drawbacks of conventional CNC Machine. The purpose of making Multipurpose CNC Plotter Machine is based on overcoming problems and efforts of conventional CNC machine. The Multipurpose CNC Plotter Machine are the best option in small scale industries. As small scale industries are having less space and less capital budget hence they cannot use conventional CNC machine. Hence the Multipurpose CNC Plotter Machine has been used as its size is small and compact easily portable, Multipurpose CNC Plotter Machine are easy to handle and the small complicated which are very difficult to made by hand that jobs can be done accurately and easily.

IndexTerms – Multipurpose, Portable, Plotter.

I. INTRODUCTION

About thousands of years ago human try to find ways to make their work easier. Thus variety of techniques and inventions are created to reduce the human work now a days CNC machine is most popular in manufacturing sector so as to reduce the burden on the people portable CNC milling machine this is the best options because it can be removed easily saving time and reducing the use of space CNC milling machine is a very important technology in the manufacturing industry now a days. Operating of portable CNC milling machines with low cost and simply InDesign will be a good news for the development of small scale.

The Project work presented is based on Multipurpose CNC Plotter Machine. There are various types of CNC machines are available in industry for manufacturing various products but they are very expensive and their capital cost is high as they are generally used for the large production that's why the portable CNC machines is the best option for low production volume with the help of portable CNC machines you can manufacture product at minimum cost portable CNC machines are the best option in small scale industries. The portable CNC machine is easy to handle and the small complicated jobs can be done accurately and easily.

II. OBJECTIVE OF STUDY

- The objective of this study is to design Multipurpose CNC plotter Machine which be able to do draw and drill on small sized jobs.
- To reduce the CNC machine size and make it portable.
- To reduce the cost of CNC machine and increase the productivity for small scale industries.
- To fabricated accurate portable CNC machine.

III. PROPOSED METHODOLOGY

We have selected the process Multipurpose CNC Plotter Machine and to fix the manufacturing process. We have done the following operations.

- Design Concept
- Design Calculation
- Modelling
- Selection Of Components
- Working Model

3.1 DESIGN CONCEPT

This project mainly aims at designing and fabricating a portable CNC machine which able to do milling and drilling operation with required accuracy also it has to be small and compact compared to conventional CNC machine, to that it will be easily portable.

3.2 DESIGN CALCULATION

3.2.1 THREADED ROD

Permissible bending stress for 303stainless steel
= 750 n/mm

Radius = 5 mm

Length = 500 mm



Pipe Stress Analysis Using Caesar II Software

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Abstract: Designing of piping system is done keeping in mind international standard codes and company standards. Pipe and piping system are the main part of plant which is used for transporting fluid, vapour's and slurries etc. under different condition as per the need of the plant. Piping system are made of different components named as valves, tee, bend, elbow and different fittings components. Our main aim is to describe basic concept of Stress Intensification Factor (SIF) and flexibility, which we have attempted to compare results of B31 result against B31J. Our main aim is to solve all the forces in component which are above allowable limit against standard load condition such as Sustained, Operation, Hydro-static and other Experimental cases.

Keywords - Stress Analysis, Flexibility, Codes, Standards, B31J, SIF Calculations, Stress Analysis Report.

I. INTRODUCTION

One of the major task in industry is the transportation of fluid from one location to another the piping system not only involves pipes but also fittings. According to Mark's (1940-1950) who was a scientist done different experiments on piping system and he observed that major failure are occurred at fittings such as elbow, tee, reducer, etc. in the piping system due to the varying cross section of the fittings. Our main aim is to analyze the failure region using Caesar II and resolve stresses at T-junction.

II. Data and Sources of Data

Followings are the documents (input) must be available in order to analysis any piping system.

- Piping Material Specification (PMS)
- Piping & Instrumentation Diagram (P & ID)
- Pipe Isometric Drawings
- Mechanical Data Sheet Drawing (MDS)
- Line List (Stress Critical Line List)

III. Indentations and Equations

Abbreviations:

Mean radius of matching pipe (r1)
Flexibility characteristics (h)
Section modulus of pipe (Z)
Stress intensification factor (SIF)
Header outside diameter (D)
Branch outside diameter (Db)

Header nominal thickness (th)
Branch nominal thickness: (tb)
Flexibility Factor (k)
Outer Diameter (r2)
Stress intensification factor out plane (i_o)
Stress intensification factor In plane (i_i)

$$SIF(i_o) = \frac{0.9}{h^{2/3}}$$

$$SIF(i_i) = \frac{3}{4} i_o + \frac{1}{4}$$

$$k = 1$$



MULTIPURPOSE CNC PLOTTER MACHINE USING ARDUINO SYSTEM

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3.2 DESIGN CALCULATION

3.2.1 THREADED ROD

Permissible bending stress for 303stainless steel
= 750 N/mm

Radius = 5 mm

Length = 500 mm



ANALYSIS OF AMPHIBIAN VEHICLE USING ANSYS

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Abstract : — An amphibian vehicle is a motor vehicle that can travel on both land and water. It has wide range of applications in defense ministry, transport, tourism but the main aim of this project is to design it efficiently for rescue purposes. It involves the process of design followed with analysis and fabrication processes. This paper is presenting the methods and various types of analysis using Ansys workbench 16.0. The steps to solve different types of analysis such as static structural, fluid flow analysis are stated briefly. In the later stages we have shown the static structural analysis, modal analysis, and the CFD of the vehicle. As the analysis is an important aspect of this project, it will help to analyze the amphibious vehicle accurately thus the various strengths and required forces can be calculated. An amphibian vehicle has great future benefits though it still requires some focused work in research and development field.

Keywords— Ansys workbench, static structural analysis, fluid flow analysis, amphibious vehicle.

I. INTRODUCTION

Today's world require speed in each and every field. Hence rapidness and quick working is the most important. The engineers are constantly faced with the challenges of bringing ideas and design into reality. New machines and techniques are being developed continuously to manufacture various products at cheaper rates and high quality. The machine "Amphibian Vehicle" is an innovative that requires theoretical and practical knowledge to manufacture [1]. In this research paper we have shown the analysis of various components of the amphibian vehicle. We have used Ansys workbench 16.0 to perform various analysis such as Structural analysis, modal analysis, and CFD. It's necessary to analyse these components to check for their safety and to study how various stresses acts on the vehicle.

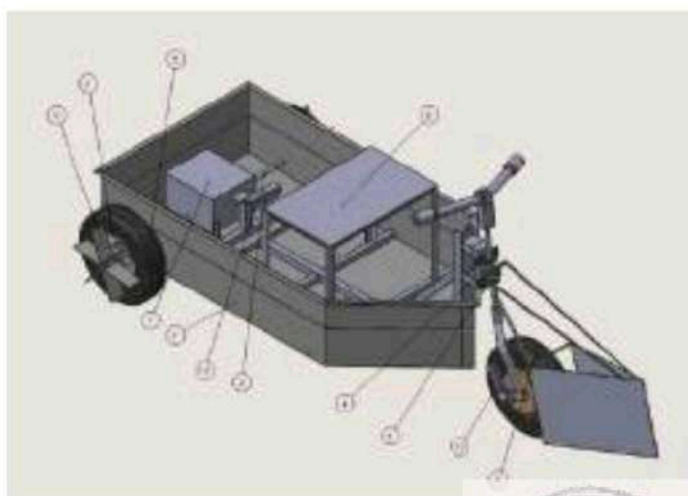
II. OBJECTIVE

- To study the different analysis performed on the amphibian vehicle.
- To solve problem faced during designing of vehicle.
- To provide modifications if necessary.
- To check the safety of design.

III. PROPOSED METHODOLOGY

Analysis is the process of breaking a complex topic or substance into smaller parts in order to gain a better understanding of it. Webster defines analysis as a detailed examination of anything complex in order to understand [2] its nature or to determine its essential features thorough study [3]. Cambridge dictionary defines analysis as the process of studying or examining something in an organized way to learn more about it or a particular study of something.

3.1 Assembly model of Amphibian Vehicle



ITEM NO.	PART NUMBER	QTY.
1	BOAT	1
2	MAIN FRAME	1
3	ENGINE FRAME	1
4	BEARING	4
5	HANDLE	1
6	FRONT WHEEL	1
7	ENGINE BLOCK	1
8	REAR WHEEL	2
9	FLAPPER	2
10	SUSPENSION	1
11	HUB	2
12	POWER TRANSMITTING SHAFT	2

3.1.1 Part list

3.1.1.1 Boat



DESIGN OF AMPHIBIAN VEHICLE

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Abstract : Amphibious vehicle, vehicle for transporting passengers and cargo that can operate on land and in water. Amphibious vehicles include amphibious bicycles, ATVs, cars, buses, trucks, military vehicles, boats and hovercraft. It has a wide range of application in different fields. The main aim of this project is to design it efficiently for rescue purposes. This paper focuses on the concept of Amphibious vehicle which is to be designed. The designing process includes various steps. Designing is first and crucial step in fabrication of vehicle. Designing consist of rough ideas, parameters, selection of material and cad model to work on. The further process is preceded by analyzing the model.

Keywords : All Terrain Vehicle (ATV),Cad model, Parameters, Rough Idea, Selection of material

I. INTRODUCTION

An amphibian vehicle can operate on both terrain i.e. land and water bodies as well. In this paper we will try to elaborate idea of designing an amphibian vehicle by considering various problems that will arise during designing the vehicle. Designing must be proceeding as per various affecting factors on vehicle. Even aesthesis play a crucial role in designing as the vehicle should be attractive to look. Designing has to deal with an important factor i.e. cost, design should be functional as well as cost effective, by using maximum standard parts that are available in market to make the design cost effective. To make vehicle functional, some parts must be manufactured as per the requirement. The design is kept simple and effective without increasing the unnecessary complexity. Designing gives a theoretical idea of forces acting on it and as per them we can select the material to use.

II. PROBLEM STATEMENT

Vehicle serves the purpose of transporting from one location to another. Many times we have to travel through water bodies too, at such times a boat serves as the most efficient option available. However many a times boats are not always available. At such times we have to find boats or some public ferry. This wastes time as well as money. Thus it is necessary to find a way at such situations. To eliminate all this problems and to provide people comfort of moving around anytime even in water bodies, Amphibian Vehicle was invented. An Amphibian Vehicle can travel through both land as well as water. To design the parts and select the materials as per the requirements through the process of defining the concept and brainstorming it, discussing the possible outcomes on it and deciding the efficient way to proceed, presenting the idea to the team and discussing with everyone, after that calculations are made and surveying the market for getting the most suitable parts and material for project as per the calculations.



MANUFACTURING OF AMPHIBIAN VEHICLE

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Abstract : — An Amphibian vehicle is means of transport, viable on land as well as on water. It is simply may also called as Amphibian. Amphibian vehicle is a concept of vehicle having versatile usage. It can be put forward for the commercialization purpose with respect to various applications like in the field of military and rescue operations. Researchers are working on a amphibious vehicle with capability to run in adverse conditions in a efficient way. This paper focuses on a concept of amphibian vehicle in detail. In later stages of the paper we have explain and described the design and analysis of amphibian vehicles. We have followed proper design concept and procedure and enlisted the material used in detail. Capabilities of efficient amphibious vehicle will fulfil all the emerging needs of society. Success of every concept largely relies on research and development, though amphibious vehicle is yet to travel a long journey of innovative development, it has shown excellent potentials for future benefits.

Keywords— Capabilities, Commercialization, Innovative, Military, Rescue.

I. INTRODUCTION

Manufacturing is one of the important aspects for the performance of a vehicle. Manufacturing of the model for amphibian vehicle is done in such a way that it won't cause any hindrance while running on land and should support smooth motion in the water.[1] As per the design aspects few things should be primarily taken care of like buoyancy forces exerted by water on the body and easy handling of attachments. After number of brainstorming sessions[2], we finalized a design which has four different sections to be designed like Front float, Rear float, Frame and Blades. Selection of materials for the manufacture of the basic materials is an important[3] for ensuring that the vehicle is able to float on the water. Among the criteria required the material for manufacture of the vehicle is that it must be durable, has good properties of waterproof, easy to set up and easy to do the repairs for any kind of damage and maintenance work.[4]

II. PROBLEM STATEMENT

The goal of this project is to design and manufacture a vehicle that can do everything it currently does, but in addition, this vehicle would be able to ride on water. Other than recreation, with the recent flooding in vasai-virar, it could also be useful (if conditions permitted for emergency use) for transportation on flooded roadways. We will improve an existing vehicle, and give it the ability to ride on water, in addition to land.

Another problem for consideration here is, the costing of the structure. The structure used here costs around ₹5 lakh to ₹7 lakh. Structure are specially manufactured by rapid prototyping process, since it is very costlier. Thus, maintenance of vehicle on regular basis is not possible here. Above all, spare parts for the same are costlier too.

III. OBJECTIVE

Main aim of the work presented is to optimize existing monogram system and to achieve following objectives:

- Cost-** Structure of vehicle is very costlier. Present body structure replacement can cost around ₹5 lakh to ₹7 lakh, which is very costlier. Above all, any damage to body structure can indirectly damage the main component of the vehicle which costs around ₹2 lakh to ₹3 lakhs. So our objective is to manufacture a vehicle which is cost effective and replacement of which is less expensive.
- Modification-** Modify structure which acts as a rudder, fixed in front of front wheel. Which gives direction to the vehicle and reduce the drag. Power is provided only by the engine to the vehicle on the land as well as in water in forward and reverse direction.

TABLE 1. Dimension of vehicle with part description

Sr. No.	Parts of vehicle	Dimension / weight
1	Size of vehicle body	1834.82*901.7 mm
2	Wheel diameter	381 mm
3	Diameter of rear shaft	20 mm
4	Distance between front and rear wheel	
5	Total weight of vehicle	210 kg

DESIGN AND MODIFICATION OF A 4 STROKE BIKE USING GOBAR GAS

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Abstract: Looking at the exponential growth of Pollution we can predict the future of the Earth. Diseases like asthma, lung cancer, skin cancer, etc., will be common. Observing at the current scenario of the petroleum and its rising price, ordinary person cannot afford to spend such a huge amount, unless it's a need and not leisure. This project gives an opportunity to crush all the problems. The cure to these problems is to use an alternate fuel which can be environment friendly, using green gas in essence, Gobar Gas. As Gobar gas emits very less pollutants so we can save the environment from air pollution. From the research we get to know that there are many sources of pollution, out of which transport has a drastic increase of 1301 tonnes of pollution which can make our environment more and more polluted. In this project we have aimed to modify the chosen bike so as it runs on an alternate fuel which is gobar gas. This bike is designed for rural region peoples. It is seen that gobar gas production is more in rural areas where there are more of cattle farms. Hence, it is easy to get fuel for this bike at very lower cost. The bike when fuelled with gobar gas produces enough torque to take up its dead load with a rider, thus making it possible to have a very low cost ride. This bike is made for convenient transportation of a person from one point to another.

IndexTerms - Alternate fuel, Gobar gas, Low cost bike, Modification of bike.

I. INTRODUCTION

This report contains project work based on designing and modifying a Bike which is operated by a Four Stroke Engine. This bike is designed and modified to such an extent that it may run on Gobar Gas.

As we know, there is a constant increase in consumption of non-renewable fuel (diesel and petrol). Hence, these sources of energy can be annihilated in future. Also high emission of harmful gases from the exhaust has a worst impact on environment which leads to global warming. And also everyone is aware of the continuous increase in cost of fuel.

These problems can be solved by using an alternate fuel like Gobar Gas. This gas is also called as green gas as it is generated naturally.

In this project we are attempting to use an alternate fuel for a Four Stroke engine bike. The fuel we use is gobar gas which is disintegrated from cow dung.

II. NEED FOR THE DEVELOPMENT

In today's world competition for the super power is rising, ending up with making of technologies which are itself dangerous to the whole ecosystem. The everyday increase in pollution given out by industries and many other sources are making an imbalance situation to the blue planet Earth and making it into black planet.

There are many sources that give out harmful pollutants. But if we try to reduce these sources, we can help ourselves to live longer upto long generations.

If we see internal combustion engines mostly run on fuels like gasoline, diesel, kerosene, oil, etc., which give out harmful gas like carbon monoxide, carbon dioxide, sulphur dioxide, NOx, etc. which when in contact with the oxygen and moisture in air becomes harmful acid like sulphuric acid, nitric acid which causes diseases like skin cancer eye blindness, etc.

By using an alternate fuel for IC engine which is environment friendly, we can reduce the above mentioned problems.

III. PROBLEM STATEMENT

After looking to the increasing rate of air pollution in the world and annihilation of the non-renewable resource, to sustain life is getting much more difficult.

The day by day increase in rate of gasoline and diesel are striking the market. As we know the whole market is directly or indirectly affected by the fluctuating rates of petrol and diesel.

The harmful pollutant gasses emitted from the exhaust of IC engine also contribute a huge share into air pollution.

A common man cannot sustain in this world with all these problems he faces.

IV. OBJECTIVE OF STUDY

1. Modification of 4-stroke bike so as to replace petrol as a fuel with CH₄ (gobar gas).
2. Minimize the cost of overall bike.
3. To make bike more efficient with least pollutants as output.



DESIGN AND MANUFACTURING OF GAUGES AND FIXTURES FOR CNG COMPONENTS OF MAHINDRA & MAHINDRA LTD

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Abstract : We have been given a task to make the design and manufacture gauges and fixtures for the Mahindra & Mahindra new CNG vehicle. Few parts of that vehicle needed three new fixtures and four gauges out of those we already had one of the fixtures but it was unstable during the production. So we are going to construct the gauges and fixtures in such a way that it should be light in weight, very easy to operate and it should be less time consuming and we improvised that one fixture in which they had problems during the production and make them too easy in handling and increased the production rate. The design is the basic step for manufacturing the gauges and fixtures. If the design is proper and safe the manufacturing and production goes smooth.

KEYWORDS:

CC- Center To Center Distance,

CNG- Compressed Natural Gas,

TRIMOS- Vertical Dimensions Measurement Instrument

I. INTRODUCTION

The Project work presented is based on design and manufacturing of fixtures and gauges for project few components of Mahindra & Mahindra CNG vehicle. The Company selected to accomplish this project is Prince Metal work which is located at Burma shell petrol pump, Sativali road, Vasai (E). The Prince Metal Work Company established in 1971 and it makes the oil sump for engine parts. Now this Company have got few components of CNG vehicle of Mahindra & Mahindra. The fixture is used to securely locate and support the work piece ensuring that all parts produced using the fixture will maintain conformity and interchangeability. The gauges are devices for confirming its dimensions to start the production of those parts. like "to determine thickness, gap in space, diameter of materials, and to check the center to center distance of the manufactured components

II. PROBLEM STATEMENT

1. Mahindra and Mahindra starting a new CNG vehicle so we are supposed to design and manufacture three welding fixtures and four gauges corresponding to the CNG components.
2. From three fixtures we already had one fixture for Bracket Ignition Coil but the fixture was having stability issue during the operation and that was time consuming. So we were supposed to make the new fixture but we been asked to improvise that fixture.
3. For other two components we been asked to design and manufacture two new fixtures which will be reliable, easy in handling and increase the production rate etc.
4. We been asked to design and manufacture four gauges which will be less time consuming, less dependence on operator skill and economical etc.



DESIGN AND FABRICATION OF COCONUT DEHUSKING MACHINE

Swapnil Raut¹, Niraj Bhoir², Tejas Jadhav³, Vaibhav Kadam⁴

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Abstract - Coconut is a main crop of Kokan, Kerala region and dehusking of coconut is very necessary step in making the coconut ready for further utilization. Coconut dehusking machine is used to removing of the husk from the coconut. Traditional dehusking is time consuming and difficult process. Generally, coconuts area unit dehusked manually employing a hand cutter. These strategies need skilled labor that is tough and painstaking method. To overcome these limitations and to provide safety for the operator, a new design of dehusking machine is introduced and fabricated. Optimum variety of blades is arranged on the rollers to dehusk the coconut with minimum force.

Keywords – coconut, dehusking, roller, spikes.

I. INTRODUCTION

India is the third largest producer of coconut in the world after the Philippines and Indonesia. India alone accounts for about 69% of the world production of coir and coir products. The total output of coir and coir products in India is estimated to be around Rs.1500.00 core including exports of Rs.350.00 core. Coconut husk, shell, copra, coconut water are useful parts of coconut orchard. In various forms such as shell as a fuel, copra as food, coconut water as nutritious liquid in this way coconut husk used in coir industry. Coconuts are grown in approximately more than 93 countries of the world, with a total production of 5.4 billion tons per year. An individual coconut fruit is made up of an excerpt, India is the second largest country to grow the coconut palms. In the economic, social and cultural activities of millions of people in our country coconut plays an important role. Food, edible oil, industrial oil and health drink to humanity are produced from the coconut. All parts of coconut tree is useful in one way or other and the crop profoundly affects the socio-economic security for millions of farm families. The main source of vegetable oil used for both edible and industrial applications is coconut. The present study is focused on the various machines which are available for the husking operation of coconut and points out the advantages and disadvantages of each.

II. PROBLEM DEFINITION

Dehusking with traditional hand tools like machete or a spike depends on the skill of worker and involves training. Nowadays there is shortage of such skilled. Workers. The mechanized or the power operated machines are developed to eliminate the drawbacks of manual tools. Following causes were identified for dehusking of coconut :-

- The dehusking of coconut regarded as most time consuming.
- Tiring and difficult operation to perform.
- Involves more drudgery
- Skill worker is required because dehusking is done with the help of traditional hand tool.

All methodology of Coconut dehusking machine can be used as a continuous improvement the above mentioned problems are affecting the dehusking rate of coconut hence it will affect the market demand of coconut. Hence in order to eliminate the above mentioned causes.

III. OBJECTIVE

- Reduction of human effort.
- Low cost coconut dehusking.



Design And Fabrication Of Biomass Pellet Manufacturing Machine

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Abstract

Pellet fuels (or pellets) are biofuels which are made from compressed organic matter or biomass. Constituents of these pellets may include industrial waste and co-products, food waste, agricultural residues, energy crops, etc. The shapes of the pellets are cylindrical, having diameter 6–10 mm and length 10–30 mm.

The Project work presented in this report is based on design and fabrication of pellet manufacturing machine. The main objective in building this machine is to find a low cost and high energy burning fuel. Also, an effort in reducing pollution and to use the large agro residues that goes wasted.

Keywords: Biomass pellet machine, pellets, wood pellets, sawdust, pelleting technology.

1. Introduction

Many of the developing countries produce huge quantities of agro residues but they are not able to use it efficiently causing extensive polluted environment. Apart from transportation, storage, and handling problems, the direct burning of loose biomass in conventional grates is having very low thermal efficiency and widespread air pollution. The conversion efficiencies are as low as 40% with particulate emissions in the flue gases in excess of 3000 mg/Nm³. In addition, a large percentage of the ash of unburnt carbonaceous has to be disposed of. This amounts to more than 40% of the feed burnt. in the case of rice husk. As a typical example, about 800 tonnes of rice husk ash are generated every day in Ludhiana (Punjab) resulting in burning of 2000 tonnes of husk. Pelleting of the husk could lead to mitigation of these pollution problems while at the same this important industrial/domestic energy resource can be utilized.

With a motive to solve this problem, it is required to convert waste agro residues and other biomass constituents in the form of pellets for easy use, transportation and trade. However, it must be ensured that this technology should be cheap, simple and easy maintain.



Review on Implementation of manufacturing tools in small-scale industry

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Abstract— Implementation of manufacturing tools in small scale tablet tooling industry reduces waste time, reducing defects, number of workers producing job per day, material intake in tonnes per month and improvement the activities by using tools like check sheet, FIFO and PDCA tool. In order to implement these manufacturing tools, the data is to be collected by workers and to analyze so that it can reduce defects and improving the activities. Our aim is to know number of workers working on which product at what time. To use materials first, which come first and then which come later. The goal is to identify and eliminate the waste, which is any activity that does not add value to the final product, in the production process.

Keywords— FIFO, Check sheet, PDCA

I. INTRODUCTION

The Project work presented in this paper is based on implementation of manufacturing tools in small scale industry to improve productivity of a tablet tooling manufacturing company. The Company selected to conduct this study is Pacific Tools Pvt. Ltd which is in Bhoidapada, Vasai (E). Pacific Tools is one of the leading manufacturers of tablet tooling in India. As company produces N number of punches but we have selected two punches such as shape punches and round punches. These Tools find their applications in Pharmaceutical industries as a Tablet Punch Dies for various operations. Some of the companies esteemed clients are Cipla, Sandoz, and Flamingo etc.

1.1 Lean manufacturing

In Lean Manufacturing, “lean” means minimization of waste and utilization of resources in a manufacturing system. Lean manufacturing is also considered as theory of a set of tools and practices for continuous improvement in manufacturing with high quality, low cost and short lead-time. In today’s global manufacturing, lean manufacturing process are the most important strategy for competitive advantage.

There are variety of tools and determining for effective manufacturing system in an organization. Total Quality Management (TQM), Kanban system, Just in time (JIT), 5S are the key tools used in lean manufacturing. Lean manufacturing helps in identifying the waste and elimination of waste to improve the quality and productivity and reduce cost. Lean manufacturing method increases productivity by reducing the inventory.

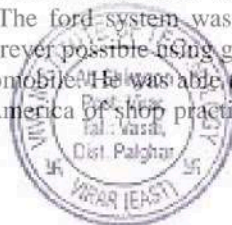
1.2 Need of manufacturing tools in industry

In today’s competitive environment, industry has to increase the demand without increasing the sale price of the product. This has forced the company to improve effectiveness of production and other operation to reduce the cost. Thus to achieve the target there is emergent need of lean manufacturing tools. PDCA, FIFO, check sheet tools has effective foundation for eliminating various wastes from lean manufacturing system.

The key objective of FIFO, check sheet, PDCA manufacturing tools is to collect details of number of workers working for producing the job per day, material in take in tonnes per month and improvement in the activities. FIFO helps in setting the raw material in order and check sheet helps in collecting the data of number of workers producing jobs per day. PDCA helps to reduce inventory and continuous improvement.

1.3. History of Lean manufacturing tools

Lean principle were first developed in Japanese manufacturing industry. It was first termed by “John Krafcik” in his article “Triumph of lean production” in 1988. John Krafcik was the quality engineer in Toyota-GM. “Henry Ford” was truly first person to integrate entire production process. In 1993 introduced interchangeable parts as standard word and making conveyance for what he called Flow Production. The ford system was that the process was not in flow. Ford made their fabrication process in a proper sequential order, wherever possible using general and special purpose machine and use of Go/No Go gauge to fabricate and assemble the parts of automobile. He was able to reduce the inventories of the entire company in few days. He stopped the revolutionary system of the America of shop practices using general-purpose machine in-group process.



Stable Surface Water Cleaner Using Quadcopter

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Abstract: This project is where we are using a quadcopter to fly around and collect the garbage from the oceans, lakes and any water body. Here we are using a container which is attached below the quadcopter, the container is fixed to the floats of the quadcopter. When it collects the garbage from the lake or the ocean we can remove the container and empty the contents. This container uses a pump which will push the water out to create pressure to fill the container back and also pull the garbage in it. Then after a period of time when the quadcopter gets full with garbage there will be sensors which will detect the amount of garbage filled in it and then it will take of automatically and return to the location it took off from. The user can then empty its content's, clean it up and sends it back to do its job again.

IndexTerms - Quadcopter, KK board and Water surface cleaner.

I. INTRODUCTION

This project is based on the concept where we are using a quad-copter to clean the garbage from the water bodies, the garbage that floats in the oceans, lakes or any type of water body is mostly consisted of plastic. This is the garbage that doesn't degrade so it stays there we need to clean it otherwise our environment will be polluted and it will cause harm to the marine life and the fish in the lakes. To prevent these things we are creating this quad-copter so we can clean the water bodies.

II. OBJECTIVE OF STUDY

This project will help to clean the water bodies. This will reduce the pollution and we can also recycle the plastic waste so that it can be reused for better purposes. Here we can also use a device to work in oceans to separate the water and oil then collect the oil and let clean water flow back so it can be useful for the environment.

III. CONCEPT REVIEW

The system consists of KK2.1.5 Multi-rotor board, transmitter, receiver, Lipo battery, electronic speed controllers, motors, and frame shown in the Fig 1.

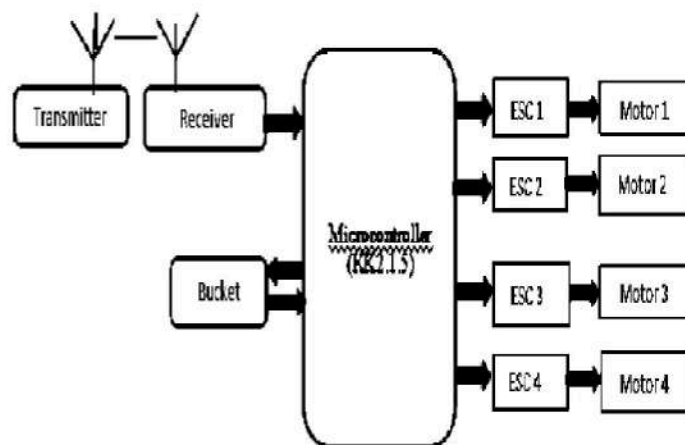


Fig.1 Block Diagram

The Quad-copter used in this project works on a KK board with a Mega 324PA microcontroller it is used to hold a container to collect garbage from the water bodies. The container is attached to the quad-copter when it flies, it needs to be light weight so that there is no problem when it takes off after collecting the garbage also so that it won't affect it when it's flying.

To achieve this we have the following points below.

- We are using hinges to attach the bucket to the quad-copter.
- There is a pump to create a back flow for pulling water into the bucket and also the garbage.
- There are holes on the container to drain the water so it's easy to take off.
- There are floats which keep the quad-copter above the water level.

These are the points which if taken care of there will be no issues in the project and it will be implementable.



DESIGN OPTIMIZATION OF MONOGRAM SYSTEM FOR TEXTILE APPLICATION

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Abstract : In the era of computerized automation, highly intelligent systems are breaking the bounds of traditional textiles and its design. The integration of technologies with clothing, accessories, upholstery, or industrial technical textiles provides higher user-comfort and enables their seamless use in everyday activities. Investment in spinning and weaving equipment have increased very rapidly in Countries which is producing and exporting textiles. The Government is working to devise suitable measures to facilitate the Textile Industry growth at the rate of 18% per annum. India is moving towards higher productivity for increasing export growth of textiles. Sulzer is an Switzerland brand which manufactures cloth weaving textile machines. Sulzer textile machines produces one of the finest cloth materials. Many cloth weaving processes are distributed in sulzer machines in form of frames. These processes are selvedge, body design, monogram, vsd. Monogram is a system use to weave name of brand on cloth pieces. The original monogram system consists of bulky frames which are much heavier in weight and expensive too. A textile industry using sulzer machines as its prime cloth producing source was selected for this project. The study work presented in this paper is focused on reducing the weight of the mechanical components on the machine frame, reducing the overall load acting on the frame and reducing the cost of the system. For this purpose, an optimized design of existing frame is made consisting of cheap and light materials. The implementation of optimised design will eliminate the problems faced by the manufacturer and will also increase the efficiency and performance of the machine.

Keywords—Monogram, Selvedge, Sulzer, Textile, Variable Speed Drive.

I. INTRODUCTION

The work presented in this paper is based on improvement and optimization of monogram system of Sulzer machine in textile manufacturing company. Sulzer is a machine, used for weaving the cloths pieces since 1991. Sulzer is a Switzerland based brand which mainly designs and manufactures machines for textile industries. In Sulzer machines, for name printing purpose, there is a special system used which is called as Monogram System. Monogram system uses special mechanisms to weave required name on cloth pieces. The Existing Monogram system is costly and requires high maintenance. Current study deals with optimizing crucial parts of machine and modifying it for better performance and reducing its cost. Sulzer is a projectile type weaving machine which is a shuttle-less loom method for filling yarn insertion using a small metal device resembling a bullet in appearance with a clamp for gripping the yarn at one end, which is then propelled into and through the shed. In Sulzer machine, the weft alignment is carried out by small clamp projectiles, which depends on the weaving width and their grippers take out the weft yarn from big cross-wound bobbins and insert it into the shed which is always in the same direction. The system's main working is based on dobby movement. [1][2][3]

II. PROBLEM STATEMENT

In present cloth weaving machines, huge and bulky components like 'Healed Frames' are used. These frames comprises of large weights. Due to this heavy weights of the frames, the ultimate working load on the harness frame increases, thus increasing the load on the 'Dobby System' (NC System). Along with it, due to high loads acting, wear and tear of machine components also increases.

Another problem for consideration here is, the costing of the frames. The healed frames used here costs around ₹15000 to ₹20000 per frames. Sulzer textile machines are specially designed for cloth weaving machines which are imported from Switzerland. Thus, maintenance of machines on regular basis is not possible here. Above all, spare parts for the same are costlier too.

III. OBJECTIVE

Main aim of the work presented is to optimize existing monogram system and to achieve following objectives:

1. Cost- Monogram systems are very costlier. Present monogram system replacement can cost around ₹15000 to ₹20000 per system, which is very costlier. Above all, any damage to monogram system can indirectly damage the main dobby system which costs around ₹1 lakh to ₹1.15 lakhs. So our objective is to design a system which is cost effective and replacement of which is less expensive.

2. Efficiency- The efficiency of any machine measures the degree to which friction and other factors reduce the actual work output of the machine from its theoretical maximum. A machine with zero friction will always have an efficiency of 100%. A machine with an efficiency of 20% has an less output only one fifth of its theoretical output. The efficiency of a machine is equal to the ratio of its output (i.e. resistance multiplied by the distance it is moved) to its input (i.e. effort multiplied by distance through which it is exerted). The main aim of our system is to increase the machines working ability by redesigning the frame structure. Utilizing light weight mechanical part is the best option to increase the machines efficiency.

3. Performance- Presently, Monogram systems with large weights are used. This increases the ultimate load acting on the machine system and thus wear and tear of the system occurs frequently. Utilization of light weight materials will increase the performing rates of the machine. Using this system will reduce the risk of wear and tear of the machine system and thus increasing its performing life.



Design And Development Of Ball Valve To Prevent Leakage Problem

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Abstract: Practical knowledge means the visualization of the knowledge, which we read in our books. For this, we perform experiments and get observations. Practical knowledge is very important in every field. One must be familiar with the problems related to that field so that he may solve them and become a successful person. After achieving the proper goal in life, an engineer has to enter in professional life. According to this life, he/she have to serve an industry, may be public or private sector in self-own. For the efficient work in the field, he must be aware of the practical knowledge as well as theoretical knowledge. To be a good engineer, one must be aware of the industrial environment and must know about management, working in the industry, labor problems etc. so he can tackle them successfully.

IndexTerms - Ball Valve, PTFE, SS316.

I. INTRODUCTION

A ball valve is a form of quarter-turn valve which uses a hollow, perforated and pivoting ball to control flow through it. It is open when the ball's hole is in line with the flow and closed when it is pivoted 90-degrees by the valve handle. The handle lies flat in alignment with the flow when open, and is perpendicular to it when closed, making for easy visual confirmation of the valve's status. Ball valves are durable, performing well after many cycles, and reliable, closing securely even after long periods of disuse. These qualities make them an excellent choice for shutoff and control applications, where they are often preferred to gates and globe valves, but they lack their fine control in throttling applications.

II. OBJECTIVE OF STUDY

The objective of this study is to improve productivity, to avoid leakages, prevent valve parts from corrosion, increase the life of the valve, decrease the lead contamination, constantly achieve the desired pressure, avoid pressure drop, Proper material selection for seats so that they can work in the extreme condition, going from assembly to casting to avoid leakages from the joints, utilizing best of techniques to achieve quality, customer satisfaction, developing good customer relationship.

III. CONCEPT REVIEW

A ball valve is a form of quarter-turn valve which uses a hollow, perforated and pivoting ball to control flow through it. It is open when the ball's hole is in line with the flow and closed when it is pivoted 90-degrees by the valve handle. The handle lies flat in alignment with the flow when open, and is perpendicular to it when closed, making for easy visual confirmation of the valve's status. Ball valves are durable, performing well after many cycles, and reliable, closing securely even after long periods of disuse. These qualities make them an excellent choice for shutoff and control applications, where they are often preferred to gates and globe valves, but they lack their fine control in throttling applications.

Basically it consist of the following parts;

1. Flange 2X
2. Stem
3. Seat
4. Body

Flanges: Flanges are those which are connected to the pipeline by the means of four holes. It is usually the connecting member of the valve.

Stem: Stem is the moving member of the valve which helps to regulate the flow of the fluid. Its further connected to the actuator where the shut off n shut on is taken place.

Seat: Seat or seal is a sealing member of the valve, without which leakage may occur and the desirable pressure is not achieved.

Body: Body comprises of the ball and stem arrangement in such a manner that when the operator push the actuator the valve may be activated or closed.

3.1 PART DESRIPTION

In this system there are various parts used which are given below;

Table No. 1

MATERIAL	DESCRIPTION
ASTM A351 Gr.CF3 [SS316]	BODY, ADAPTOR, BALL, STEM.
ASTM A312 [SS304]	LEVER, STUD, NUT.
ASTM D3294 [PTFE]	SEAT, GLAND PACKING, STEM SEAL.

DESIGN & CFD ANALYSIS OF BLADELESS WIND TURBINE

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Abstract—Conventional wind turbine need relatively high wind speed to produce power, so their application is limited to the areas with high average wind velocity is available throughout the year for optimum power generation. In order to tackle this problem a new concept was coined by a Spanish tech start-up, Vortex Bladeless S.L in the form of wind turbine without blades also known as bladeless wind turbine. The operation of Bladeless Wind Turbine is based on VIV (Vortex Induced Vibration) phenomenon. The motive of this study is to analyse the behaviour of the bladeless wind turbine when place in a fluid (air) flow and study the various parameters related to it. The best way to estimate/evaluate the performance of bladeless wind turbine is through the use of analysis software (ANSYS). In our project we are going to validation of our methodology by comparing our simulated results with experimental results provided in references given below using a finite volume based software ANSYS Fluent and later simulate and optimize our designed model. Our area of focus is to increase frequency and displacement and can have better stress distribution since it is prone to high fatigue stresses due to resonance that will be required in its operation.

Keywords— Vortex Bladeless, Vortex Induced Vibration, ANSYS Fluent, Bladeless Wind Turbine, Frequency.

I. INTRODUCTION

Wind energy can be considered as an indirect form of energy resulting from solar energy and in order to harness wind energy, mainly two types of wind power generation devices are being used, they are horizontal axis wind turbine and vertical axis wind turbine. But these devices need relatively high wind speed to produce power, so their application is limited to the areas with high average wind velocity is available throughout the year for optimum power generation. In order to tackle this problem a new concept was coined by a Spanish tech start-up, Vortex Bladeless S.L in the form of wind turbine without blades also known as bladeless wind turbine. The operation of bladeless wind turbine is based on VIV (Vortex Induced Vibration) phenomenon. Since its introduction to the world many improvements have been made and it still strives for the betterment.

The motive of this study is to analyse the behaviour of the bladeless wind turbine when place in a fluid (air) flow and study the various parameters related to it. If we were to test the bladeless wind turbine experimentally it will prove to be expensive as well as time consuming considering the manufacturing of the altered models, operating conditions etc. So the best way to estimate/evaluate the performance of bladeless wind turbine is through the use of analysis software (ANSYS). Our area of focus is to increase frequency and displacement and can have better stress distribution since its prone to high fatigue stresses due to resonance that will be required in its operation.

II. PROBLEM DEFINITION

As conventional windmill are very costly to use. The cost of production, transportation and maintenance is considerably high. Setting up a conventional windmill takes up a lot of area which is a major problem. They are prone to harm birds during their operation and during their operation they develop low frequency sound which is not good for human health. Problem with bladeless windmill is that it won't be having gearing system or any kind of amplifying device to increase output in order to reduce mechanical losses and simplicity of design. Idea is to make most compact electricity generating device. Then our only option is to modify its structure to improve the efficiency of working.

III. METHODOLOGY

For the validation of our methodology, a baseline model will be generated and simulations will be carried out based on the experimental data given by Gaurao Gohate et al. [2]. The baseline model consist of uniform circular cross section. Later the 2D Model of bladeless wind turbine consisting of baseline model will be created and simulations will be performed in order to validate the method and the computed force obtained from CFD Simulation will be used to check the deflection of Geometry in Static Structural with the material properties mentioned in Gaurao Gohate et al. [2]. Later the same procedure will be followed on our designed model. Since the current study focuses on increasing frequency and displacement of baseline model the results of both the models were finally compared.



DESIGN AND CFD ANALYSIS OF VERTICAL AXIS WIND TURBINE

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Abstract— Simple drag type vertical axis wind turbine has proven to be greatly advantageous in the history of wind energy technology and the first successful electrical power generating wind turbine was built by Professor James Blyth of Scotland in 1887. This research work focuses on computational study of the boundary layer control of a vertical axis wind turbine by modifying the geometry of the blade that is to be used in wind energy conservation. The control method used is passive method which will be consisting of implementation of tubercles geometry on leading edge inspired from a humpback whale flipper. The baseline design is an H-type three bladed Darrieus turbine consisting of NACA0015 profile as its cross-section.

For CAD modelling SOLIDWORKS software is used whereas finite-volume based software ANSYS Fluent will be used for simulation purposes. Two & Three dimensional, steady & unsteady, turbulent, simulations for the modified blade geometry will be carried out in order to see for the achievable improvement on the performance.

Keywords— ANSYS, computational study, energy conservation, tubercles, vertical axis wind turbine.

I. Introduction

Wind turbine is the technology that extracts the energy from the wind by leveraging the aerodynamic principals of lift and drag. After reaching TSR of 1.6 it is observed that as the C_p (coefficient of performance) reaches a value close to 0.3 and decreases due to the elevation in the magnitude of drag force acting on each of the turbine blade at high speed. This results in decrease in power generation of turbine.

Hence in order to eliminate the above causes, the aerodynamics of the turbine blades has to be improved. Now the purpose of this study is to analyze the unsteady as well as the complex aerodynamic flow corresponding with wind turbine functioning. The all-around objective of this study is the comparison of the performance between baseline model and modified model. The tubercle along the leading edge may drive the boundary layer to higher extent which may prevent the flow separation for longer time and therefore delaying the stall.

II. Problem Identification

There are many factors that are to be considered while designing aerodynamic shape of the turbine with tubercles on the leading edge. Namely interaction of blades at certain Angle of Attacks, chord length, height of blade, the rotor diameter and Tip Speed Ratio. The area of rotor through which air is passing plays role of absorbing wind energy which is impinged on blades from every possible direction. This defines the coefficient of turbine to be either maximum or minimum. In conventional vertical axis wind turbines, this is the matter of concern, "the act of absorbing power which wind is carrying". Most of the available power is used to reduce the drag which decreases the C_p/C_d ratio of each blade in flow field. Role of this research is to design an aerodynamic blade consisting tubercles which satisfies the law of conservation of energy and direct the available power to maximize the C_p/C_d ratio.

III. Proposed Methodology

For validation of methodology, a baseline design will be modeled and simulations will be carried out based on the experimental data given by Bravo et al. [4]. The baseline turbine blade will consist of constant cross section made of NACA 0015 profile. Now the two dimensional model of VAWT consisting of baseline blade was created and simulations were performed in order to validate the method and also to provide the value of C_p/C_d ratio for baseline model.



DESIGN AND FABRICATION OF SOLAR POWERED WATER PURIFIER AND COOLER

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Abstract : —“Design and fabrication of solar powered water purifier and cooler”, deals with the fabrication of a system that will achieve water cooling by utilizing the solar energy which will be beneficial for households both rural and urban. Cooling process employs different methods to cool water. But considering the lower application and cost effectiveness, the water cooling by using thermoelectric module (Peltier effect) and filtration system is considered for our project.

The present water cooling technique/system is producing cooling effect by using refrigerants like Freon, Ammonia, etc. Using these refrigerants one can achieve maximum output but one of the major drawback is its poisonous gas emission and global warming we can cope up this problem with use of thermoelectric module and thereby protecting the environment.

This project deals with the thermoelectric water cooling using Peltier effect is discussed.

Thermoelectric cooling system have advantages over conventional cooling devices such as small in size, lightweight, highly reliable, no moving parts and working fluid.

Keywords— Solar energy, solar panel, peltier module, water purifier and cooler.

I. INTRODUCTION:

Solar energy is the light and radiant heat from the Sun that influences Earth's climate and weather and sustains life. Solar power is sometimes used as a synonym for solar energy referred to electricity generated from solar radiation. From decades humans have been using solar energy in various forms such as wind, tidal, biomass etc. Solar energy technologies can provide electrical generation by means of heat engine or photovoltaic means. Sunlight can be converted into electricity by using photovoltaics (PV), concentrating solar power (CSP), and various experimental technologies. PV has mainly been used to power small and medium sized applications and medium sized applications, from a calculator powered by a single solar cell to off grid homes powered by off-grid photovoltaic array. 2 In this project, the voltage developed by the solar panels will drive the entire system setup which includes the thermoelectric module. Thermoelectric cooling also referred to as TECs (thermoelectric coolers) has advantages of high reliability, no moving parts, compact in size and light in weight. In addition it possesses the advantage that it can be powered direct current electric sources. When a voltage is applied to two dissimilar conductors, a circuit can be created that allows continuous heat transport between the conductor's junctions this is the principle of thermoelectric cooling. Direct conversion between electrical and thermal energy is possible because of the two important effects: Seebeck effect and Peltier effect. The method into consideration is the Peltier effect which refers to the absorption of heat into one end of a thermoelectric material and release of heat from the other end due to flowing current through the material. The cooling technique which is utilized in this project is Thermo-electric cooling also known as “Peltier Cooling System” which is a thermoelectric device and consists of semiconductors. The main advantage of using this effect is that it lacks moving parts compared to other refrigeration cycles; Thermoelectric can be used for cooling electronic devices and as refrigerator and air conditioners.

II. METHOD:

1. Components used

1.1 Solar panel:

Thermoelectric cooling, commonly referred to as cooling technology which makes use of thermoelectric coolers (TECs), has advantages of high reliability, no mechanical moving parts, compact in size and light in weight and no working fluid. Air conditioning removes heat from a room and other applications. The harmful gasses are chloro fluoro and some other gasses are present.

1.2 Fans:

A standalone fan is typically powered with an electric motor in this project, two small dc fans will be used in the heat sink in order to cool the hot side of the peltier module by increasing the heat transfer rate by supplying the air at the ambient temperature to the heat sink which will increase the durability of the peltier module eventually.

1.3 DC pump:

A pump is used for recirculation purpose which will be attempted multiple times since achieving the desired water temperature is not possible in the single pass through the heat exchanger by using the pump and through the recirculation the temperature of the water will be gradually decreased to the desired temperature. Pump will be controlled by the thermostat attached to the wall of the tank.



Cruise Control System of Two Wheeler

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Abstract—Cruise Control System (CCS) is a device that performs the work of maintaining the speed automatically to keep pace with the car in front. When the driver sets his/her desirable speed and engages the system, the speed of vehicle gets locked which in simpler terms, speed is no more a variable factor and is semi-dependent on acceleration system. This CCS is paired with pre-crash system that alerts and starts braking. Adaptive Cruise Control is also called Active Cruise Control, Autonomous Cruise Control, Intelligent Cruise Control and Radar Cruise Control. Regardless of modern technology, CCS works day and night but its abilities are obstructed by heavy rain, fog and snow. CCS is typically connected with forward collision sensors. These sensors help the CCS to connect with frontal surroundings to slow down the vehicle when necessary.

Keywords—Automation, Automated Braking, Cruise Control, Two-Wheeler.

I. INTRODUCTION

The project work presented in this report is based on Adaptive Cruise Control pre-installed in high range automobiles. Since it is not possible for every common people to buy a high range motorcycle, this project focusses on providing this feature in all the mid and low range motorcycles. With the increase in the number and quality of the highways, the passion for going long distances on motorcycles is increasing within the riders. When on a highway, most of the time the speed is to be kept constant, which means that the rider has to hold the throttle in the same position for a long period of time. This causes strain and fatigue to the rider. To avoid this fatigue, we need a mechanism that can lock and unlock the throttle position at the will of the rider. Cruise control is the feature which does the same electronically on motorcycles equipped with a Ride-By Wire Throttle arrangement instead of a conventional throttle cable.

II. STOCK ACCELERATION MECHANISM

A Throttle Cable Mechanism is used for the propulsion in motorcycle. The volume of air entering the intake manifold is controlled by the throttle valve. As the accelerator is further applied, the throttle plate rotates which rotates the butterfly valve within the throttle body. This opens the throttle passage to allow more air to swoop into the intake manifold. The carburettor has a venturi like shape which increases air flow velocity further, causing a low-pressure region. This occurs due to the Bernoulli's Principle. This low-pressure region lets in more fuel from the float chamber causing more fuel-air mixture to enter into the cylinder. This results into more power generation and acceleration in vehicle.

III. ADDITIONAL COMPONENTS CONSIDERED

The Cruise Control Mechanism is the modification to the stock acceleration system in two-wheeler motorcycles. These modifications consist of few added mechanisms to indulge a sense of control and response to the vehicle. These additions and alterations help in improving the effectiveness of the cruise control system. The combined system of the following components will work simultaneously to achieve the aim.

A. Locking Mechanism

Locking Mechanism which is the main part of the Cruise Control System is based on a Stapler Punching Device. The primary purpose of the locking mechanism is to firmly hold the throttle cable. This mechanism is made of two part such as a stapler. Both the part is pinned from their one ends while the other end is used to attach the brake pads. These brake pads grip the throttle cable in position. A pear-shaped cam is designed which operates the vertical movement of the mechanism. This cam is specified by 90° of dwell, 90° of rise, 90° of fall and followed by 90° of dwell. This cam is powered by a servo motor. Thus, with a 180° of servo rotation, the cam lets the mechanism to lock the throttle cable and with next 180° unlock the throttle cable.

B. Programming Board – Arduino UNO

A programming board is a must device that is to be used. It helps to connect the vehicle to all the electronic devices that connect to the outside surrounding. It is the brain of the system and the vehicle which co-ordinates with all the signals and information from rest of the components.

C. Trigger Switch

An ON/OFF trigger switch is provided at the handle bar of the vehicle. This triggers the programming board by sending a signal.

D. Sensors

To respond the vehicle according to the outside surrounding, sensors are put to the use. Here, Ultrasonic Sensors are used to sense the obstacles which might prove as a danger to the vehicle while in Cruise Control mode. These sensors are set at a maximum possible distance of 10 meters(m). So as there is any incoming obstacle within the range of 10m, an alert signal will be sent to the programming board.



DESIGN AND FABRICATION OF PORTABLE 3D PRINTER

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Abstract: 3D printing technology is used since end of 19th century. In the current era this technology is widely used in many industries. Even though 3D printing is expensive people like to go for 3D printing. There are many industries who manufacture 3D printer which uses various rapid prototyping processes. In this paper we are proposing a 3D printer which can be launched as a product at less cost than current 3D printers available in market. This paper gives brief details about 3D printer we are manufacturing. The concept used in forming 3D object is layer by layer formation of an object by means of melting a plastic filament. The filaments are made of material ABS, PLA as well as composite material. The 3D printing process is similar to inkjet printers but instead of single layer by layer, multiple layers are printed to form a 3D shape. This paper also gives details about construction and working of our 3D printer. Once the construction is finished it is attached to the microprocessor base controller. This is used for controlling the machine based on program. For program generation 3D model is saved in .STL format, then it is inserted into software. After we load the filament 3D printing starts. Thus we get the good quality product in less cost.

Keywords— 3D printing, Rapid Prototyping, ABS, PLA, Low-cost.

I. INTRODUCTION

In 1981, Hideo Kodama of the Nagoya Municipal Industrial Research Institute (Nagoya, Japan) has studied and published for the first time the manufacturing of a printed solid model, the starting point of the “additive manufacturing”, “rapid prototyping” or “3D printing technology”. In the next decades, this technology has been substantially improved and has evolved into a useful tool for researchers, manufacturers, designers, engineers and scientists.

Since 1984, when the first 3D printer was designed and realized by Charles W. Hull from 3D Systems Corp. 3D printing is diversifying and accelerating our life, letting various qualities of products to be synthesized easier and faster. Along 3D printing, companies can extract and innovate new ideologies and various design replications with no time or tool expense. 3D printing possibly challenges mass production processes in future. Nowadays, rapid prototyping has a wide range of applications in various fields of human activity: research, engineering, medical industry, military, construction, architecture, fashion, education, computer industry and many others.

II. Objective

1. To study the working procedure of each component of a 3D printer and the evolution of 3D printer.
2. To design and fabricate a low-cost 3D printer.
3. To make it portable and easy to use.
4. To develop Eco-Friendly and low maintenance product.

III. Literature Review

Vaibhav S.Jadhav, Santosh R.Wankhade, A Review: Fused Deposition Modeling – Rapid Prototyping Process, IRJET, Volume 4, 2017, page no. 523 – 527. In this paper they have shown the details of solid based rapid prototyping process i.e. Fused Deposition Modeling.

Barry Berman, 3D printing: The new Industrial Evolution, Business Horizons, Vol-55, 2012, page no. 155-16. We refer in this overview of 3D printing process having low cost manufacturing.

Ramya, Sai leela Vanapalli, 3D Printing Technologies in Various Applications, International Journal of Mechanical Engineering and Technology (IJMET), Volume 7, 2016, page no. 396 – 409. In this we refer the idea of the manufacturing the low volume customize parts.

Ojas Dandgaval, Pranita Bichkar, Rapid Prototyping Technology – Study of Fused Deposition Technique, International Journal of Mechanical Engineering and Production Engineering, Volume 4, 2016, page no. 44 – 47. We take idea about Rapid Prototyping technology and it is focus on Fused Deposition Modelling.

IV. Problem Definition

There are varieties of 3D printers available in the market developed by number of manufacture. But the main problem with all such printers is that they all are costly and are not affordable for low cost manufacturing. Because of this product cost will increase and ultimately manufacturing cost increases.

V. Existing Methodology

In 3D Printing an object is formed layer by layer according to the program which is controlled by a microcontroller and computer system. The 3D printers available in the market use different rapid prototyping processes that are too costly. Some of them are Stereolithography, Selective Laser Sintering, etc. All these processes use different methods to print the product even materials used are different. SLA uses liquid polymer material while LOM uses sheet metal such materials are difficult to store and handle.



Automated Coffee Vending Machine Using RFID

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Abstract : The vending machine are usually used for fast and instant service. These systems used in this are mostly of automation where coin or tags are used for identification. This paper presents system which work on RFID Tags, it operates on RFID system. This system gives information regarding access of RFID. A RFID reader scan the respective tags. For identification particular RFID tag is given to each employee. According to program the numbers of cups per day as per employee requirement are programmed on Arduino chip. Then an employee goes to vending machine show his card to the reader then the drink is released. For every single cup of coffee the record will be feed in arduino.

IndexTerms - Arduino, RFID, Vending machine, Timer sensor, Heating Coil.

I. INTRODUCTION

Vending machine is a machine that releases item components or item whenever required after ensuring to customer automatically. These machines are mostly used in various area like commercial, industrial, shops, organization etc. Automatic regular coffee vending machine including coffee powder, sugar, and milk powder stored in container. It also includes the hot water container where the water is heated through heating coil. After giving command through a program the machine add that specific amount of ingredients in the hot water. And then it gets released in the cup through nozzle opening. The controlling like heating and mixing of ingredient is done by the use of microcontroller.

II. PROBLEM DEFINITION

The installation of approximately Coffee Vending machines in an college space for mechanical faculty, saved one of 45% of total cost spend on coffee. Many of the staff are happy with the concept of having control over their coffee, from having the machine availability of having the ability to choose how many spoon of each ingredient is dispensed. Powder milk has the tendency to lump when the machine is not thoroughly cleaned. This can cause quite a lot of frustration for staff without a full time cleaning person.

Control means everyone doesn't get what they want – Coffee vending machines control how much product people can dispense from them which often contributes to their cost saving effect. Control on the flipside can lead to unhappy staff members who can't use as much milk and sugar as they want once a vending machine has been installed.

III. METHODOLOGY

In traditional approach wherever the coffee vending machine is placed or installed, man need to be physically present there to serve the coffee and to continuously monitor the system. But sometimes it is not possible for man to be physically present there. This proposed system is designed in such a way that a customer can order his coffee via a mobile app. It provides complete authentication of the customer using RFID (Radio frequency identification) reader.

It consists of the arduino uno, temperature sensor LM35, water level BC547 sensor, RFID reader, 16*2 LCD display, relay driver ULN2803 where Arduino uno is a master controller and all rest parts are interfaced with it. Here the relay driver is used to give a start to coffee heater, coffee selector and the pump.

The level of the ingredient in the machine is continuously monitored by the sensor. Arduino uno is used to read the data from the sensor. The temperature sensor will maintain the constant water temperature. In this project a PIC microcontroller reads data from the RFID reader. The RFID reader sends 12 bytes of data at 9600 baud rate. The microcontroller displays this data on LCD screen. The microcontroller receives the data from the cloud and starts the procedure. The microcontroller first checks if water in the tank is available or not. It displays Water Level Low message and waits until sufficient water level is reached. Then it starts the heater and when the temperature reaches 80 degree it stops the heater. Then it adds 1 spoon of coffee mixture in heated water with the help of dispenser. Next it pumps the ready coffee to the cup by a 12V Dc pump.

KEY PARTS:-

• RFID: RADIO FREQUENCY IDENTIFICATION

Radio Frequency Identification is an electronic component which consists of a small chip. The chip can manage a data of about 2000 bytes. RFID is alike to the barcode which provides a exclusive identifier for that object. RFID device is scanned to retrieve the information. RFID tag is scanned and identified by means of Unique Identification Number (UIN) by the RFID reader and it is not essential that the RFID tag should be in the sequence to a reader. The RFID reader is able of scanning the RFID tag if it is within the range of area of the system. The reader consists of a RF module which act as the transmitter and receiver for the radio signals. The transmitter itself is a combination of oscillator, modulator and an amplifier.

The modulator impinges the data command upon the carrier signal created oscillator. The boosting of the signal is amplified so that taken the signal can awake the tag and tag reader. The microprocessor or microcontroller stores the data and it is the control unit which employs an operating system and memory of data. The RFID reader installed in this system operates at a frequency of about 125 KHz.

Modification And Fabrication Of Open Differential For Anti-Slip Effect

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Abstract : India is a developing country and hence the vehicle market in India is cost driven. Most of the everyday cars use open differential. But it has some shortcomings. To overcome this, various types of limited slip differential are used, but they are too expensive to be accommodated in a low cost vehicle. This project aims to modify an open differential of a goods carrier like TATA ACE to act like a limited slip differential. The open differential will be modified by using a centrifugal clutch. The spring of the centrifugal clutch will be designed. This method will be economical as minimum changes are made to the original differential. This method can be of great help to small sized pick up vehicles. The clutch can also be controlled using a solenoid valve so as to engage only when needed.

IndexTerms – Centrifugal clutch, Gear, Limited slip differential, Open differential, Wheels.

I. INTRODUCTION

The inner and Outer wheels of a vehicle in a turn actually carve two different circles of different radii, they travel a different distance on the same turn. Since the wheels are usually the same size the outer wheel has to rotate faster to keep up with the inner wheel which is travelling a shorter distance in the same time. When you connect the wheels with a hard axle, like on a toy car the wheel is obliged to drag along uselessly while the other wheel controls the process. Now think of the rear wheel of a front wheel drive car. They are not in too much trouble because the engine isn't directly driving them. You could just uncouple them from each other and let them vary their speed till they are happy. But when you add an engine into the mix, like on the front end on a front wheel drive car, things get complicated. As the engine now, is trying to turn the wheels at equal speed. But turning required the speed to vary and on a rigid axle they cannot. The result is a vehicle that's unwieldy to turn and use. Not nice. And that is where differential come in.

What they do is allow the two wheels to rotate at different speeds. It's a simple function but an important one and the mechanism is slightly complex. But in all cases a differential is placed between two driven wheels to allow the wheels in question to vary the rotational speed during a turn. In a front wheel drive car the differential or diff is seated within the same housing as the gearbox while a rear wheel drive car will feature the diff as a mid-axle globe into which the drive shaft disappears.

The main difference between open differential and a Limited slip differential is noticed when the vehicle gets stuck. Open differential applies equal torque on both wheels and the maximum amount of torque is limited to greatest amount that will not make the wheels slip. It does not take much torque to make a tire slip. And when the wheel with good traction is only getting a very small amount of torque that can be applied to the wheel with less friction, the vehicle is going to get stuck. This is when Limited slip differential comes into play. It transfers the torque of one wheel to the other wheel which will be on traction surface. This helps the vehicle to overcome the problem.

II. METHODOLOGY

The process of making the project to achieve the aim included following steps

2.1 Initial Research

Initial research was conducted to find about the existing dilemma of the people due to two wheel drive, already available products and their cost and reach to people etc. Also data required for the design as well as manufacturing stage was collected. This includes the existing open differential of the vehicle, best position to accommodate the centrifugal clutch and the load carrying capacity of the clutch for the model etc. from modification aspects. For manufacturing material, availability ratings of motors, manufacturing resources etc. were found out.

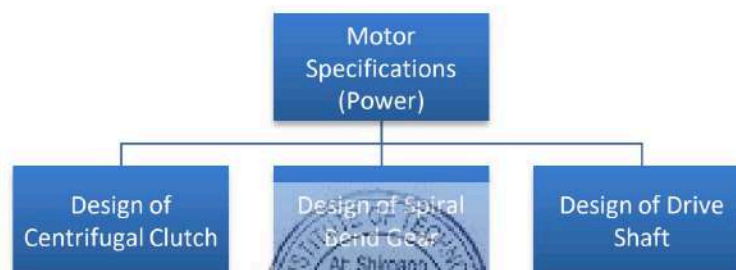


Fig.1 DESIGN METHODOLOGY

Design and Analysis of UAV

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Abstract: The air craft making was started by Wright brothers. As before that no single aircraft was made. After so many decades every scientist got a question that many of the time in aircraft there is risk to human health to everyone started hunting solution. After so many decade scientist found a new innovation to these above problem by Remote control aircraft so this gives new born to RC aero modelling. After innovation of RC aero modelling each sectors such as military, luggage transportation, surveillance of geographical boundary was used. And now a day it is very commonly used in United States of America and in recent five years Indian government also adopting that RC aircraft culture. In India there is less awareness about RC aero modelling. Sometime model without human interface may do work which a model with human interface can't do. To utilize our knowledge about aero modelling and make a product of RC aircraft which will solve above issues. Our main aim is to lift maximum payload at minimum power consumption according to that we are designing aircraft. In every year we will planning for new & unique design for best performance. In previous year we build passenger plane and this time we are making load carrying military plane. Designed product is efficient for upcoming RC industries.

Index Terms - Aero modelling, RC, Aircraft , Geographical boundary.

I. INTRODUCTION

In India RC aeromodelling in public sector is banned but in military it is used because there is no human interface so there is no risk to our soldier health. To help in military sector due to scarcity of equipments RC aeromodelling will help them while war. In India there is less awareness about RC aeromodelling. Sometime model without human interface may do work which a model with human interface can't do.

II. OBJECTIVE OF STUDY

- To design unmanned Aerial vehicle to carry maximum payload without using gyroscope.
- To apply all the aerodynamic knowledge to build actual miniature passenger plane.
- To surveillance from the sky.
- To analyse RC plane using software like solid work, Ansys.
- Build an aircraft which is having its own design & used for payload transportation using transmitter receiver.
- Using limited power of less than 1,000 watt & to create maximum power output.

III. CONCEPT REVIEW

1. Design Layout

1.1 Optimization

1.1.1 Design Sensitivity

Sensitivity of individual components in model with respective changes and design parameter are mandatory in order to facilitate structural modifications. Wing layout is an important design variable where its span is inversely proportional to its chord length. Other variables like horizontal tail and vertical tail parameters are dependent on wing area. A secondary design variable like fuselage fineness ratio which is dependent on fuselage diameter is commonly picked between 4 and 8. This makes fuselage length dominant over fuselage diameter.

1.1.2 System of Systems

For wing, as S1223 airfoil, it has come to know that the point where S1223 gives minimum value of L/D. At point where other airfoil giving low CL, S1223 gives maximum CL. Hence airfoil is perfect for high lift.



DESIGN AND FABRICATION OF KINEMATIC LEGGED ROBOT

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Abstract : The first kinematic walking model is appeared in 1870, which is invented by the famous Russian mathematician Chebyshev with the help of the kinematic linkages and as the years passed there are many inventions are happened in kinematic walking robot. Now the use of wheeled robot is not always the best in some cases. In general, wheels are not used in drive over obstacle situation. Depending on the terrain, a robot needs to pass small or large obstacles. For a wheel to get over a vertical obstacle, it has to be at least twice as tall as the vertical obstacle. The Kinematic Legged Robot is the robot which is walk on any Surfaces with a stiff gait slow and carries a limited load. It could be used for surveillance in sewer maintenance. This project involves the design and fabrication of a kinematic walker. This kinematic walker is six-legged machine did can walk on any surface. It is an arrangement of six linkages did together are powered by a single engine. The motor can be powered by mains either or a battery. The kinematic legged robot comprises six legs that move simultaneously to provide motion.

IndexTerms - Kinematic, Robot, Chebyshev.

I. INTRODUCTION

The Modern researchers are continuously upgrading the idea of legged machines. It has become very popular as well as necessary field of robotics for upcoming explorations. Taking together all the development of computer-controlled machines, have provided strong base and technical feasibility to make walking machine possible. The idea of walking robots originated from nature of insect movement. These legged machines have been used for at least a hundred years and are superior to wheeled machines. They can be operated on various soil conditions, smooth as well as rough surface and are capable of crossing obstacles.

Thus we have to design and fabricate a small, robust and highly maneuverable walking robot which has good stability, speed as well as load carrying capacity. It will be design for walking and carrying loads with it on the different platforms overcoming obstacles in its path.

1.1 THE MECHANICS OF LEGGED ROBOTS

1.1.1 Number and Arrangement

The number of legs provided plays a major factor in its performance. Machines equipped with higher number of legs are suitable for heavy loaded slow moving robot, whereas bipeds and quadrupeds seem to be fastest and most agile. Some of the properties affected by the number of legs are:

1. Stability.
2. Energetic Efficiency.
3. Redundancy: the ability to use fewer legs if some are damaged.
4. Quality of joint control required
5. Cost.
6. Weight.
7. Complexity of sensing needed.
8. Possible gait.

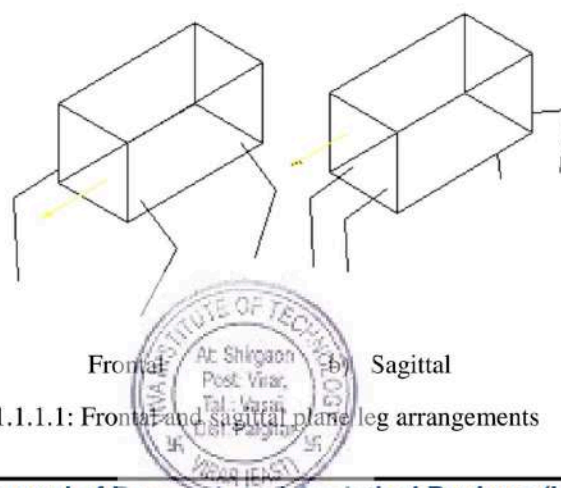


Fig 1.1.1.1: Frontal and Sagittal plane leg arrangements

Overview of “SIX SIGMA “and its Methods

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Abstract— A Vision and Philosophical commitment to our consumers to offer the highest quality at lowest cost product. A practical application of statistical Tools and Methods to help us measure, analyze, improve, and control our process. For this paper, first reviewed the current literature on Six Sigma, and then performed an analysis of Six Sigma in light of the management literature. The review and analysis suggested that Six Sigma is best tool to quality management. Consequently, Six Sigma provides a new context for a number of research questions. This study could laid a foundation for future research on Six Sigma. It's a Metric that set quality levels at 99.9997% performance of products and processes. Six Sigma is uniquely driven by understanding the needs of customers, disciplined use of facts, data and statistical analysis, and special attention to improving, managing and reinventing business processes.

Keywords — *Six Sigma; Future research; Quality tool; Management tool; Minimizing defect; Increases productivity; Quality management tool*

I. INTRODUCTION

Six Sigma is a disciplined, statistical-based, data-driven approach and also it is a continuous improvement methodology for reducing defects in a product, process or service. The roots of Six Sigma as a measurement standard can be found back with the name of Carl Friedrich Gauss who introduced the concept of the normal curve. Six Sigma as a metric standard in product variation could be found back to the 1920's when Walter Shewhart showed that three sigma from the mean is the point where a process requires correction. Many different measurement standards (such as Cpk, Zero Defects, etc.) came later but the credit for “Six Sigma” goes to a Motorola engineer named as Bill Smith. (Incidentally, “Six Sigma” is a federally registered trademark of Motorola). In 1980s with Chairman Bob Galvin, Motorola engineers decided that the traditional quality levels — measuring defects in thousands of opportunities; instead, they wanted to measure the defects per million opportunities.

Motorola developed this new methodology and needed cultural and other changes associated with it. Six Sigma helped Motorola realize powerful bottom-line results in their organization – in fact, they documented more than \$16 Billion in savings as a result of our Six Sigma efforts.

Since then, thousands of companies around the world have adopted and Six Sigma as a way of doing business. Leaders such as Larry Bossidy of Allied Signal (now Honeywell), and Jack Welch of General Electric Company also implemented this concept later on. Six Sigma has evolved over time. It is just simply more than just a quality system like TQM or ISO. It's a way of doing business.

Six Sigma is disciplined, focused and scientific problem solving technique, which uses statistical and non statistical tools integrated with methodology to bring down number of defects to 3.4 defects per million opportunities in any process.

ma is a quality management tool to achieve “Six Sigma” levels of quality.

Six Sigma represents the population standard deviation, which is a measure of the variation in a data set collected about the process. If a defect is defined by specification limits separating well from bad outcomes of a process, then a six sigma process has a process mean (average) that is six standard deviations from the nearest specification limit. This provides enough buffers between the process natural variation and the specification limits. Goal is to achieve “zero defects”

Six Sigma is a system of statistically management quality tools and techniques aimed at eliminating defects and reducing process variability. The pprocess includes measurement, improvement and validation activities. The designation, or title of Six Sigma relates to the connection between the numbers of defects per million opportunities (DPMO) and the number of standard deviations or fluctuations in values found within a process specification. In statistics, sigma is a reference to the intervals under a “Normal” or “Gaussian” or “Bell” curve. Each interval is equal to one standard deviation or sigma. Therefore, Six Sigma refers to the plus or minus three sigma from the mean of the data under the curve. In the case of a normal distribution pattern, 68.26% of the data points are within plus or minus one sigma from the mean, 95.46% are within two sigma and 99.73% are within three sigma. A process variation exceeding ± 3 sigma should be improved for six sigma. With the use of Six Sigma quality tool, only a very small finite number of possible failures could fall outside specification limits.

Sigma level	Sigma (with 1.5 σ shift)	DPMO	Percent defective	Percentage yield
1	-0.5	6,91,462	69%	31%
2	0.5	3,08,538	31%	69%
3	1.5	66,807	6.70%	93.30%
4	2.5	6,210	0.62%	99.38%
5	3.5	233	0.02%	99.98%
6	4.5	3.4	0.00%	100.00%
7	5.5	0.019	0.00%	100.00%

II. METHODOLOGIES

Six Sigma projects follow two methodologies inspired by Plan-Do-Study-Act Cycle. These methodologies, composed of five phases each, bear the acronyms DMAIC and DMADV.

- DMAIC focuses on improving an already existing business process.
- DMADV focuses on creating new product or process designs.

Developing Interpretive Structural Modelling for Total Quality Management to Improve Productivity and Quality in SMEs

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Abstract: In today's changing world quality management is becoming one of the key drivers for change's and competitive advantage within industry. SME's need to respond rapidly to these emerging changes so as to full fill their customer needs more rapidly. This research aims to examine relationship between organizational culture of the small and medium enterprises and total quality management implementation barriers; to gain a more comprehensive understanding of the factors affecting to its implementation. In this context, a questionnaire research methodology is adopted. For responding to these questionnaires experts were selected from organization. For the responded values of the questionnaire factors were selected. Among the various factors, eleven major factors were selected for developing relation between them. Modeling of these factors, interpretive structural modeling technique was adopted. With help of this technique, interpretive structural modeling model of total quality management was developed and proposed to SMEs.

Index Terms - Structural Self Interaction Matrix, Interpretive Structural Modelling, SMEs, Total Quality Management.

I. INTRODUCTION

In today's global competition and economic liberalization, quality has become one of the important factors for achieving competitive advantage. A good quality product or service enables an organization to add and retain customers. Poor quality leads to discontented customers, so the costs of poor quality are not just those of immediate waste or rectification but also the loss of future sales. Small and medium-sized manufacturing firms nowadays, are under severe competitive pressure due to increased global competition and customer requirement. These challenges along with higher materials and energy costs in recent years have forced many small-medium manufacturing firms to continuously modify and optimize their operations both at the strategic and tactical levels. Quality has been considered as significant driver for success for manufacturing SMEs in the era of global competition. The majority of successful manufacturing companies have embraced total quality management (TQM) strategy and realized its invaluable contribution. TQM philosophy is mainly dominated by large firms but the fear of losing contracts from large manufacturing firms prompt SMEs to bring quality into their system, to enhance firm's efficiency and competitiveness. Compared to large organizations, manufacturing SMEs in India have been slow to adopt TQM, without sufficient conviction, as they consider implementation of the quality management practices to be a daunting and expensive prospect, with high on-going operational costs. However, based upon current production system of manufacturing SME, implementation of a quality management system could be low cost and low maintenance with little documentation needed. The use of a strategic approach to quality management by the SMEs will therefore improve their competitiveness. This paper aims at identifying the factors affecting the implementation of TQM in SMEs and developing a contextual relationship among the factors using interpretive structural modelling so as to develop a TQM model for improving productivity and quality in SME.

II. RESEARCH METHODOLOGY

Total quality management implementation in the small and medium enterprises includes various factors so that it helps to improve the quality and the productivity of the SMEs in the challenging world. The quality product will satisfy the customer & also makes the company to grow in the highly competitive global market. The main goal of the research to understand the small & medium enterprises in Indian manufacturing sector and also factor affecting implementation of the total quality management in the Indian manufacturing sector. To achieve the goal following steps are as follows:

Step 1: Identification and classification of small and medium enterprises

Step 2: To understand organizational culture and tools used and their methodology for data collection.

Step 3: Selection of the factors on the basis of rating & identification of the factors.

Step 4: Developing the relation between them and model development.

Step 4: The result and the conclusions are drawn from the interpretive structural modelling to understand the effect on the implementation of it.

Step 5: Suggestion & Recommendations for changes in organizational culture, so that implementation of it will be more effectively in SMEs.



FACTORS AFFECTING TOTAL QUALITY MANAGEMENT IN INDIAN SMEs

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Abstract:-In the present scenario of highly competitive business environment in domestic as well as global market, implementation of Total Quality Management (TQM) concept has become an essential business culture and a key survival tool, both for manufacturing and service industries, from large scale to small scale, for achieving the business competitiveness. TQM has been adopted by a good number of large scale industries. However, negligible units of Small and Medium Enterprises (SME) have adopted TQM. This paper examines the current position of small and medium enterprises (SMEs) in their manufacturing methods and the techniques which they follow and aims to identify the factors that affect the implementation of TQM so as to facilitate the proper implementation of TQM in SMEs.

Index Terms - Total Quality Management, SMEs, Factors, Questionnaire.

I. INTRODUCTION

In today's increasingly globalized economy, small and medium enterprises SMEs are now considered to be major source of dynamism, innovation and flexibility in the emerging and developing countries like India, as well as to the economies of most industrialized nations. In the last three decades, most of the literature shows that innovation is the key driver to enhance the competitiveness of the manufacturing sectors in India. Thus, in order to sustain the competitiveness in the global marketplace, they need to engage in a continuous improvement of technologies as well as innovation. Manufacturing Sector is the main engine of economic growth and wealth creator for a country; it creates a sustainable economic, encourages investments, creates jobs and builds the nation. The share of manufacturing sector has been stagnating at a low level for over two decades. One of the major reasons for the reduced level of contribution by manufacturing has been the inability of the country to build and maintain competitiveness needed to meet the global challenges as well as to develop a larger domestic market through low cost production. In the developing country like India; the demand of the various products and the various need of the population should be fulfilled so that it is necessary to improve the manufacturing sector of the India. For the improvement of SMEs, which led to the various emergent in the economics of the India and also fulfilled the needs of the growing population of the India, SMEs form as a potential economics back-bone of many regions and make a large contribution to employment than the large firm. SMEs have potential to be powerful engine growth and innovation in the field of manufacturing products and goods. An efficient quality management requires quality actions to be planned, improved and controlled. In order to implement TQM efficiently it is essential to identify the factors that affect the implementation of TQM in SMEs. This paper aims at identifying factors that affect the implementation of TQM in SMEs so that quality and productivity can be developed by analyzing those factors.

II. LITERATURE REVIEW

There are many studies done on the impact of TQM implementation in SMEs. Many of the researchers have done various researches on implementation of the TQM in the SMEs and reviews of the various research papers has been studied to understand the various methods of the implementation and challenges of it in SMEs during the implementation of TQM. Rajesh Kumar & Abhimanyu Samrat et al 2015, a study was conducted for analyzing the effectiveness of QMS i.e. Quality Management System in the Gujarat manufacturing industries in the study data form which consist of the combination of exploratory and descriptive nature. In primary data collection the survey questionnaire was divided into the different level related to the organization. The questionnaire administered on 62 respondents out of which 54 have been found to be valid. This response was used to analyze the result of the organization. The result analyzed the QMS practice/ methodology which was followed by the Gujarat manufacturing industries and the difficulty or challenges during the implementation of the Total Quality Management. Asutosh Samal, Sushanta Tripathy and Satyabrata Aich, 2015, the objective of the study was to identify the critical success factors that contribute to the performance of quality management practices in Indian manufacturing firms and to establish a guideline that the management can take care off to improvise their firms productivity. Laxmikumari, Dr Y Vijay Kumar and Dr. V.Venkata Ramana, 2014, this paper primarily discusses one of such techniques called total quality control (TQM), the various concepts of TQM highlighting the different dimensions, approaches and benefits in detail. Further states the need and importance of TQM in overall organization enhancement



Title of paper	Name of the author/s	Department of the teacher	Name of Journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		
						Link to website of the Journal	Link to article / paper / abstract of the article	Is it listed in UGC Care list
Refining Soft Skills of Engineering Students to Make Them Future Ready	DR. TRUPTI PATIL	Humanities and Applied Sciences	IJMER, Volume 6, Issue 9(1),	2017-18	2277-7881	http://www.ijmer.in/	http://s3-ap-southeast-1.amazonaws.com/ijmer/pdf/volume6/volume6-issue9(1)-2017.pdf	yes
Personality Development and Soft Skills: Demand of Today's Workplace	DR. TRUPTI PATIL	Humanities and Applied Sciences	IJETS, Volume 4, Issue 10 October 2017	2017-18	ISSN 2394 – 3386	http://www.ijetsr.com/faq.html	http://ijetsr.com/images/short_pdf/1509774445_1006-1008--mccia916-ijetsr.pdf	yes
Cognizance of Soft Skills for Job Seekers	DR. TRUPTI PATIL	Humanities and Applied Sciences	IAETSD JOURNAL FOR ADVANCED RESEARCH IN APPLIED SCIENCES(JARAS), VOLUME 4, ISSUE 5	2017-18	ISSN (ONLINE): 2394-8442	http://iaetsdjaras.org/	https://app.box.com/s/ojjeqd4hbskgejbkmnlp0fwsiqm5rhy	yes
Impact of Teaching Methods on the Motivation of Students	Dr Prashant Pawar	Humanities and Applied Sciences	IJERMCA, pp.- 7-8, Vol.6, Issue 11, Nov-2017	2017-18	2319-7471	https://ijerice.org/index.php/ijerice	http://www.ijerice.org/download/conferences/ICEMTE_2017/Track_6_(Others)/1487915435_23-02-2017.pdf	yes
Teachers' Attitude: A Motivation to Learn	Dr Prashant Pawar	Humanities and Applied Sciences	IJMER, pp.-40-44, Vol.6, Issue 9(1) sep 2017	2017-18	2277-7881	http://www.ijmer.in/	http://s3-ap-southeast-1.amazonaws.com/ijmer/pdf/volume6/volume6-issue9(1)-2017.pdf	yes
Parametric optimisation of MIG welding on IS 0179 HR 2 by Taguchi method	Mayur Jagtap	Mechanical Engineering	Proceeding Of ICIMA by Springer	2017-18	978-981-13-2490-1	https://www.springerprofessional.de/en	https://www.springerprofessional.de/en/parametric-optimization-of-mig-welding-on-is-1079-hr-2-by-taguchi/16950332	Yes
A Review on optimization of Welding Process using Different Statistical Techniques	Mayur Jagtap	Mechanical Engineering	International journal for research in applied science and engineering technology(IJRASET)	2017-18	2321-9653	https://www.ijraset.com/	ijraset.com/files/serve.php?FID=16128	Yes
Tube Hydroforming: Simulation on ANSYS and Validation",	Shweta Patel	Mechanical Engineering	International Journal of Advanced Scientific Research and Management	2017-18	2455-6378	http://www.ijasrm.com/	http://ijasrm.com/wp-content/uploads/2018/05/IJASRM_V3S5_566_103_109.pdf	Yes
Tube Forming using Hydroforming Technology and analyzing the Process on Explicit Dynamics	Shweta Patel	Mechanical Engineering	International Journal for Research in Applied Science & Engineering Technology	2017-18	2321-9653	https://www.ijraset.com/	https://www.ijraset.com/files/serve.php?FID=16256	Yes
Implementation of theory of constraint philosophy for productivity improvement	Priyank Vartak	Mechanical Engineering	Journal of emerging technologies and innovative research (JETIR)	2017-18	2349-5162	https://www.jetir.org/	http://www.jetir.org/papers/JETIR1805561.pdf	Yes



Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		
						Link to website of the Journal	Link to article / paper / abstract of the article	Is it listed in UGC Care list
Applying theory of constraint philosophy for lead time reduction	Priyank Vartak	Mechanical Engineering	International journal for research in applied science and engineering technology.(IJRASET)	2017-18	2321-9653	https://www.ijraset.com/	http://ijraset.com/files/serve.php?FID=16437	Yes
IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT BASED ON NEW QUALITY TOOLS	Aditi Pimpale/Pra tiksha Manik Aditi	Mechanical Engineering	INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS	2017-18	2320-2882	https://www.ijcrt.org/	http://www.ijcrt.org/papers/IJCRT1812922.pdf	Yes
IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT TOOLS BASED ON EFFECTIVE SYSTEM	Pimpale/Pra tiksha Manik Aditi	Mechanical Engineering	INTERNATIONAL JOURNAL FOR RESEARCH IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY	2017-18	2321-9653	https://www.ijraset.com/	https://www.ijraset.com/files/serve.php?FID=16247	Yes
Optimization of Cutting Parameters for turning operation on CNC lathe	Chhaya Patil	Mechanical Engineering	International journal of advanced scientific research and management	2017-18	2455-6378	http://ijasrm.com/issues/	http://ijasrm.com/wp-content/uploads/2018/08/IJASRM_V3S57_721_290_294.pdf	Yes
Numerical Simulation of Buffeting Effect on Wings	Swapnil Raut	Mechanical Engineering	International Journal of Advanced in Management, Technology and Engineering Sciences	2017-18	2249-7455	http://sijfactor.com/passp-ort.php?id=19813	http://www.ijamtes.org/gallery/60.%20apr%20-%20%20ijamtes%20-%20420.pdf	Yes
Design and analysis of Wind Tunnel Testing Rig	Swapnil Raut	Mechanical Engineering	International Journal of Advanced in Management, Technology and Engineering Sciences	2017-18	2249-7455	http://sijfactor.com/passp-ort.php?id=19813	http://www.ijamtes.org/gallery/44.%20apr%20-%20ijamtes%20-%20405.pdf	Yes
OPTIMIZATION OF PIN ON DISC TYPE WEAR TEST	Mansi Lakhani	Mechanical Engineering	IAETSD JOURNAL FOR ADVANCED RESEARCH IN APPLIED SCIENCES	2017-18	2394-8442	http://iaetsdjaras.org/	http://iaetsdjaras.org/gallery/78-april-717.pdf	Yes
Design and Analysis of Cooling Tower	Sunet Mehta	Mechanical Engineering	International Research Journal of Engineering and Technology (IRJET)	2017-18	2395-0072	https://www.irjet.net/	https://www.irjet.net/archives/V5/I2/IRJET-V5I2480.pdf	Yes
Tube Forming using Hydroforming Technology and analyzing the Process on Explicit Dynamics	Shweta Patel	Mechanical Engineering	International Journal of Advanced Scientific Research and Management	2017-18	2321-9653	https://www.ijraset.com/	https://www.ijraset.com/files/serve.php?FID=162566	Yes
Tube Hydroforming: Simulation on ANSYS and Validation"	Shweta Patel	Mechanical Engineering	International Journal of Advanced Scientific Research and Management	2017-18	2455-6378	http://www.ijasrm.com/	http://ijasrm.com/wp-content/uploads/2018/05/IJASRM_V3S5_566_103_109.pdf	Yes
DC Load Flow Studies of DC link for Power System Planning	Ritesh Chavan	Electrical	IJCRT	2017-18	2320-2882	https://www.ijcrt.org/arc-hive.php?vol=6&issue=2	https://www.ijcrt.org/papers/IJCRT1813706.pdf	Yes





REFINING SOFT SKILLS OF ENGINEERING STUDENTS TO MAKE THEM FUTURE READY

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Abstract

The present paper makes an attempt to highlight the preeminence of soft skills for improving the employability skills of engineering students. Acquiring the competencies in soft skills has become dominantly important over the last 15 years for the employers as they positioned soft skills and other communication skills as the highest credential for a better job prospect. Every year around 2 lakhs of young graduates received an engineering degree, but ironically only 25% of students are fit for the job as they lack soft skills proficiencies, which is the need of the hour to get a job and required positions. Soft skills appear to be the most prerequisite skills at the workplace. So the present study will focus on recognizing the reasons behind the lack of soft skills among engineering pupil and how proper training of the soft skills will act as the means to improve the probabilities of getting positioned in multinational or other IT companies.

Key Words: Soft Skills, Engineering Pupil, Workplace, Proficiency

Introduction

Today in India the engineering education is witnessing the greatest challenge to train and prepare the young engineers for the workplace by improving their soft skill competencies. As with the emergence of globalization and rapidly changing technology, the modern world needs engineers who are competent not just in technical skills or hard skills, but the smart engineers as suggested by Theodore Roosevelt the single most essential ingredient in success formula is to easily get along with the other people. Human capital is the single most



Personality Development and Soft Skills: Demand of Today's Workplace

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ABSTRACT

An employee becomes a burden on his/her organization when he fails to make additional tasks beyond his/her regular key responsibility areas. All-round employees certainly have an edge over those who limit themselves only to a specific job and fail to contribute in other departments and areas. Organizations tend to retain those who show enthusiasm in attending various trainings, workshops, seminars, and conferences in order to constantly advance their knowledge and acquire additional skills. Therefore, soft skills along with personality development is imperative not only to career growth but also for survival in the organization. In fact, the importance of soft skills and of polished personality has increased manifold in twenty first century. In this paper, an attempt has been made to focus on soft skills and its various aspects which are essential for in today's workplace.

KEY WORDS: *Soft skills, Personality, Organization, Productivity*

INTRODUCTION

There occurs a situation where some people are more successful in their career than others. Why does this happen? What influences the increasing career of people? Why some people move up their career more rapidly and to a higher level than others? The answer is soft skills along with personality development. People who are more successful in their life than others focus more on soft skills and in turn on personality development.

Career success is of concern not only for persons but also for organizations because employees' career success ultimately contributes to organizational success. Soft skills along with personality development can empower employees to work smart and attain more. Looking any difficult situation as a chance to learn, develop, and change for the better is possible through incorporating soft skills and improved personality. It helps you stay fit, calm, and balanced, thereby preparing an individual for new, all of which are needed for satisfied and successful career. Before going further in discussion about the importance of personality development, it is necessary to understand the term personality. Personality is nothing but the collection of reminiscences and occurrences in an individual's entire life time. It is how we interact with others. It is, indeed, a totality of characteristics of an individual which makes him different from the others. It is an individual's personality which makes him unique and helps us stand apart from the crowd. An individual's physique, attractiveness, body type, complexion, body weight, the environment to which an individual is exposed to during his growing years, varied cultures, family background, circumstances and situations and so on have a crucial role in shaping an individual's personality.

Personality Development means refining and grooming outer and inner self to bring about a positive change. Each individual has a unique persona that can be developed, polished and refined. The process of personality development includes enhancing confidence, developing communication skills, advancing knowledge, learning fine etiquettes, adding style and beauty to appearance, the way one talks and walks and overall imbuing self with positivity, dynamism, and peace.

Soft skills, on the other hand, are the general attributes of the personality which includes qualities like motivating self and the others, time management, leadership, flexibility, creativity and innovativeness and so

Cognizance of Soft Skills for Job Seekers

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ABSTRACT

This paper attempts to explore the skills set essential for sustainable employability of young graduates in India. Most of the colleges in India, young scholars are from mixed social, academic upbringings from distinct places speaking different dialects. Hence, it is very much essential to create a common platform which will enable them to be proficient to face today's rapidly changing and challenging world of corporate in the 21st century era. It is English language only, a lingua franca of the world, which can exterminate the variances in languages amongst all and becomes a common medium of communication. Besides effective communication in English, which is utmost important for success in any sphere, the soft skills such as time management, presentation skills, team management or team handling, positive approach, self-confidence, are very important in job seeking process and for effective sustainability of young graduates in the today's toughest competition of the corporate.

KEYWORDS: Sustainability, Soft Skills, Corporate

INTRODUCTION

With the Globalization and speedily varying technology, the business world witnesses a change in the business and education pattern. In this moving world, the struggle to get a job and sustain it to meet the increasing demands of the corporates, is becoming tougher day by day. In the past era to technical knowledge about the subjects was the only criterion to get a good job, but in modern times, besides knowing hard skills or subject knowledge a person needs to have an excellent communication skills, good personality and the technique to manage oneself and the others. Thus, to be in the competition and get success, young graduates are left with no other alternatives to furnish their hard skills along with soft skills to showcase the real talent of their personality. Thus, the soft skills are important in the existing job bazaar.

Industrialization and changing technology have led in a disparity between wants of the corporates and the final outcome of the educational institutions. Specifically technical education is facing many challenges as nature of the workplace has been internationalized. The young engineering graduates of this country lack in many employability skills, especially in soft skill competency. Improving on soft skills mainly presentation skills, leadership, managing time, self-management and managing others, positive approach towards life and good communication skills, is the need of the hour. Thus training students in soft skills is the most important issue especially in a country like India where education pattern or curriculum gives any importance to personality grooming. According to recent research, only 25% of the engineering graduates are industry ready or employable. Thus it actually highlights a huge gap between industries wants and final product of students manufactured by the curriculum pattern of the university. To meet the rising competition of the national and international market, the education system must be competent enough to face the challenging 21st century.

Soft skills are basically people skills. They are valid on wider scale across the business world. As per the "Wikipedia", the online encyclopedia, "soft skills denotes to the cluster of personality traits, social grace, facility with language, personal habits, friendliness, and optimism that mark people to varying degrees. Soft skills complement hard skills, which are technical requirements of a job." (Wikipedia, 2007)

Today the entire world has shriveled to a global parish. It is the personal attributes which enable individual to communicate efficiently and pleasantly with the other people in society. So an employee should know the cultural context in which he works. If an employee is not aware about the cultural variances, effectiveness of business meetings, day to day communication will be less effective or fail to achieve the purpose. Thus from the very beginning every candidate should pay attention on improvising his or her personality. Ethics, etiquettes, confidence, positivity, effective communications are some of important attributes of soft skills for improving one's personality.



Impact of Attitude and Motivation on Students' Learning

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Abstract: Attitude and motivation is undoubtedly the only essential element of learning. Learning is a very hard working process and thus, it can be possible with attitude and motivation. If students are motivated with attitude, they will learn easily and willingly, and teaching activity becomes interesting. The various research proves that the teacher and teachers' attitude can motivate their students to learn. It is said that attitude and motivation is a vital element of good teaching and learning process. The teacher, who is an expert in the subject matter, is only in the position to show the students why and how much the subject matter is important, interesting, and valuable for them to learn. This is the main goal of an effective teacher to convey the message and how can the teachers and their attitude motivate the students to learn? Thus, the present research article tries to focus on the different aspects of teaching-learning process to motivate students to learn.

Keywords- Attitude, Motivation, Teaching-Learning Process, Teaching, Learning.

I. INTRODUCTION

Attitude and motivation is undoubtedly the only essential element that teacher can focus with the aim to improve learning of the students. Regarding the students, if students are motivated with positive attitude on a regular basis, their learning will be at the high level. The various components are effecting on students attitude and motivation like teaching methods, content knowledge of teachers and their attitude with classroom environment. Motivation is defined as the action of conveying or exchanging; a motivating force, stimulus, or influence; incentive; drive; something that induces a person or student to act and the collective effort to accomplish results.

Impact of Attitude and Motivation on Students' Learning

Attitude and motivation is an element which is most essential in quality education. We come to know about the students motivation to learn with positive attitude when they are attending the class properly, working on tasks enthusiastically, participating eagerly in questions and answers session. For that, the student should have access, ability, interest, and value and quality education. The teacher must be knowledgeable, master in the pedagogical process, be dedicated and responsible to his or her students, and be motivational. The subject content must be accurate, appropriate, stimulating, and relevant to the current and future needs of the students. The teaching and learning process must be innovative, inspiring, stimulating, constructive, implementing and applying in the real life situations. The environment needs to be pleasant, safe, conducive and empowering. Attitude and motivation is enhanced when teachers creating various sources of motivation in students learning experience in each classroom on a consistent basis.

In education, the role of students is very important and extended beyond the traditional view as knowledge gainer. For education, the raw material and the result as the primary products of education and most important...as a foundation, students are involved in creating education. As such teachers are in the position to produce the environments which motivate students' attitude to improve learning as much as possible and educational organizations must become learning homes where relationships among students are cherished and exposed their own potentials. Students' active participation is a key to academic performance. Teachers should encourage the students' active participation in classroom activities and should change their attitude towards learning by providing 24-7 access and fulfilling immediate satisfaction of students. It will help in finding a connection between students learning and teachers teaching. Through interactions in groups, discussions, projects, and group presentations with their peers or teachers, they can be more involved in learning activities effectively.

The role of teachers is shifted from knowledge transformer to facilitator in student learning and classroom environment. By expanding their role, the teacher should support students for peer interaction to share their ideas and views effectively. Being a facilitator of learning, the teacher should have an immediate and visible impact on student motivation. In order to enhance students' learning and motivation to learn, the teacher should present the content and conduct the activities in an organized and interesting way, to maintain student attention. Students should be recognized for the hard work and their efforts with constructive and timely feedback. If teachers don't provide feedback on their performance, it is often difficult for the





TEACHERS' ATTITUDE: A MOTIVATION TO LEARN

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ABSTRACT

In this article, the essayist has the reason to guiding the person about the effect of attitude on the students learning and their performance in the classroom. We can enhance the students learning with the help of teachers' attitude. To learn anything, attitude is the most important factor and teachers' attitude is a prime concern in students' motivation to learn. Thus there is a huge number of elements are affecting on students' attitude as well as their motivation to learn. The current article is helpful to the reader to get the better understanding of various elements which are affecting the attitude at high or low scale and students' motivation to learn. The fundamental of human work life is attitude and we can achieve anything in our life through our attitude. In this manner, the teachers' attitude is an important aspect in students' motivation to learn and reaches at the peak point of success. Keywords: Attitude, Learning, students, teacher

INTRODUCTION

The education system comprises of course material, infrastructure, various facilities as well as visions and missions with subtle aims and objectives. The various methods are used to achieve these aims and objectives. But, actually, there are two integral personalities like the teacher and the students in the education system. But now the center position is occupied by the students. So the varying factors which abolish or nourish the students' performance and it is quite essential to understand these factors. As a gardener, who knows very well about soil and which soil is more suitable to which plant and what time, and



Parametric Optimization of MIG Welding on IS 1079 HR 2 by Taguchi Method



Mayur D. Jagtap and Niyati Raut

Abstract The hot-rolled low-carbon (IS 1079 HR 2) steel is widely used material in automobile industry. Joining of metal for different parts is done by GMAW. Process parameter greatly affects the welded joint strength. This paper presents the case study to investigate the ongoing MIG welding process carried out by industrial firm in its welding protocol, by suggesting alternative effective method to achieve better strength with improved process parameters. These suggestions are achieved by investigating parameters like welding voltage, current, and shielding gas. Research is designed by Taguchi method to get required data and further analyzed by S/N ratio with interaction plot. The optimum process parameters 150 A, 30 V, and 25 L/min gas flow rate are suggested. This research also suggests that Taguchi method has successfully improved the existing welding protocol of the firm.

Keywords IS 1079 HR 2 • Hot-rolled low-carbon steel • S/N ratio
Visual inspection • Tension test • UTM

1 Introduction

The IS 1079 HR 2 is hot-rolled low-carbon steel, which contains carbon of 0.12%. It is also called GRADE-D material which is specifically used for automobile industry. This particular material has properties like drawing, severe forming, and welding [1]. The weld ability of this steel and alloy is of great importance to manufacturing and automobile fields. The failure of such welding part in automobile can be life threatening. There is a lot of scope for setting parameters on an appropriate level to boost the strength of joint. However, most industrial firms stick to their old set of parameters, and this could happen because of lack of research on such material or on joining process. The value of each parameter affects greatly on the welded joint. Parameters for MIG welding are voltage, welding current, shielding gas flow rate,

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A Review on Optimization of Welding Process using Different Statistical Techniques

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Abstract: *Joining of metals has discovered its utilization broadly in control age, electronic, atomic reactors, petrochemical and substance businesses because of ecological concern. However effective welding of unique metals has represented a noteworthy test because of distinction in mechanical and concoction properties of the materials to be joined under a typical welding condition. This causes a lofty slope of the mechanical properties along the weld. An assortment of issues come up in different welding like breaking, extensive weld leftover burdens, relocation of particles, amid welding causing pressure fixation on one side of the weld, compressive and tractable anxieties, push consumption splitting, and so on. To beat this causes there is a requirement of perfect welding process parameter on mechanical property. MIG welding is a standout amongst the most generally utilized procedures in industry. Welding process parameters are influencing quality and efficiency of welding. Streamlining methods are utilized to improve the procedure parameters. This audit depends on enhancement procedures and investigation instruments utilized by specialists to advance the parameters. Additionally numerous scientist conveyed think about on different reaction parameters like penetration depth, globule width, bead height, strength of joint and so forth..*

Keywords: MIG Welding, ANOVA, Design of Experiment, Fillet Weld, Taguchi Design, Full Factorial design.

I. INTRODUCTION

Welding is a procedure of joining of two metals. It is most practical process than riveting and casting. There are a few strategies for welding forms. Of all the welding forms, Metal Inert Gas (MIG) welding is equipped for accomplishing the most noteworthy quality welds. MIG welding is a standout amongst the most generally utilized procedures in industry. It can be utilized with basically any weld-capable metals, including different metals, and thicknesses from 0.3mm upwards. MIG welding is an ordinarily utilized high testimony rate welding process. The information parameters assume an exceptionally noteworthy part in deciding the nature of a welded joint. Truth be told, weld geometry specifically influences the multifaceted nature of weld plans and in this manner the development and assembling expenses of aluminium structures and mechanical gadgets diminishes. In this manner, these parameters influencing the bend and welding way ought to be assessed and their changing conditions amid process must be known before so as to get ideal outcomes, in truth an immaculate arc can be accomplished when every one of the parameters are in congruity. These are consolidated in two gatherings as first request flexible and second request customizable parameters characterized before welding process. Previous are welding current, bend voltage and welding speed. These parameters will influence the weld qualities as it were. Since these elements can be fluctuated over a huge range, they are viewed as the essential changes in any welding task. Their qualities ought to be recorded for each unique sort of weld to allow reproducibility. Different parameters are burn edge, spout separate, welding course, position and the stream rate of gas. Be that as it may, torch distance across and its structure, flow rate of gas are the characterized parameters before beginning welding and can't be changed amid the procedure.

II. LITERATURE REVIEW

Abdul wahab et al. [1], have contemplated the impact of welding process parameter in welding joint of different metal by utilizing MIG spot welding. In this examination the bas material chose for welding are austenitic stainless steel-type AISI 316L and carbon steel. The filler metal use for welding this divergent metal is E80S-G and CO₂ is utilized as inert gas. The analysis was completed by taking wire feed rate, time for feeding and input current as parameter. The impact of these parameters on measurement of the spot and shear drive was anticipated by doing the investigation. From the outcome they presume that the extent of spot weld and shear compel is increment with expanding welding current while the shear stress is diminish with increment of welding time. Ajit Hooda et al. [2], have built up a response surface model to anticipate elasticity of dormant gas metal bend welding of AISI 1040 medium carbon steel joint. In this exploration the welding voltage, current, wire speed and gas stream rate are considered as information parameter. The investigation was planned by face centered composite matrix. From the trial they presume that the ideal estimations of process parameter, for example, welding voltage 22.5 V, wire speed 2.4 m/min and gas stream rate 12 l/min for most extreme yield quality both transverse and longitudinal are stay same, yet the present esteem is 190 & 210 Amp.

Tube Hydroforming: Simulation on ANSYS and Validation

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Abstract

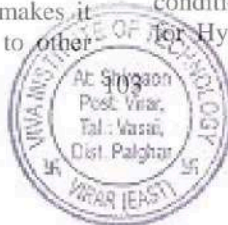
The objective of this paper is to validate THF process by using strength and mechanical properties of the material. The model is generated on SolidWorks and further imported to ANSYS for Analysis. The stress distribution during the THF process is also studied. Practical trial and error of the process is not advisable for processes like THF, thus there is need of some simulative experiments which can predict the performance of the process without any losses. Explicit Dynamics is used for Analysis and MISO plasticity model is used, considering the characteristics of the process and the end effects obtained from the process. The simulation results obtained using ANSYS were correlating with the experimental data, thus THF for a product can be validated using Explicit Dynamics.

Keywords: THF, ANSYS, Explicit Dynamics, MISO, E34 4012A, Stress Distribution.

1. Introduction

Recent growth in Hydroforming brings on several changes and advantages that the deep drawn product lacks. The light weight, complex geometry and efforts of assembling components, welding are looked upon in deep drawing but the light weight and complex geometry is better achieved in Hydroforming, also there is no welding and assembling needed as a part can be made as a whole, in Hydroforming. The recent development in Hydroforming process involves machines with number of intensifiers that allows quick process completion and more number of parts are producible in given time. Thus the production target is achieved before time. Complexities in Geometry are the most difficult part to obtain, but Hydroforming makes it simpler to achieve in less time compared to other

forming processes. Hydroforming is already widely used - in the US, more than a million engine cradles a year are produced by hydroforming processes, and in Europe the technology is being used in sub-frames for models such as Ford's Mondeo and General Motor's Vectra. Some 2.8 million components a year for one of Chrysler's model are produced by hydroforming, too. However, as hydroforming - particularly high-pressure hydroforming - is at the frontier of modern steel technology, many designers and engineers still need convincing of its capabilities. No doubt Hydroforming has tremendous results, but those results could only be achieved if the designers and the engineers change their way of working and thinking throughout the production process. Due to its technical elegance it is even used in India, its robustness enhances its appearances in all the automotive industries. The main advantages of Hydroforming are complex geometry with contours, firm parts with light weight and enhanced strength, seamless bonding, Surface finish obtained is high quality, reduction in cost when compared to stamped parts or stamped and welded parts. Combination of spinning and hydroforming gives high quality products with cost effectiveness. The main purpose of this study is to validate the Tube Hydroforming process. The study is focused completely on the simulation results obtained on ANSYS 18.2, the analyzed process and the parameters are considered and user defined. Explicit Dynamics solver is used for analyzing the process. Multilinear Isotropic Hardening is used as Plasticity model in Explicit Dynamics. Different loading conditions are studied based on different metals used for Hydroforming. The pressure load and the axial





Tube Forming using Hydroforming Technology and analyzing the Process on Explicit Dynamics

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Abstract: Tube forming being the most unified need for every automotive company, needs to be taken care of throughout the manufacturing process. Various automotive sectors have range of complex geometries of tubes and these geometries are classified by group technology. The THF process enables these sectors to produce tubes that are light in weight, without causing any losses in the material strength after the THF process. This study describes the Analysis of THF process for a simple circular c/s tube which is converted into rectangular tube. The equivalent Von-Mises stress generated is the main factor for THF process in this study. Material of the tube is E34 4012A CS. MISO is the plasticity model used and Explicit Dynamics solver is used on ANSYS.

Keywords: THF, MISO, Explicit Dynamics, ANSYS, Von-Mises stress.

I. INTRODUCTION

Tube hydroforming, THF contrives to be the emerging technique for forming the tube having complex geometry. Hydroforming uses fluid pressure to form the components which has intricate corners and edges that can be damaged easily when formed with other forming processes. The normal forming of tube has stages that undergoes various processes and thus the mechanical as well as chemical properties are likely to get changed in the final product, the strength of the final product thus changes. Tube Hydroforming causes change in the mechanical and chemical properties as well, but to an extent which does not affect the requirements of the final product. It is of utmost need to consider the maximum pressure up to which the tube can behave to be ductile without bursting. THF is a replacement to conventional forming, as it uses the high pressurized fluid to form the blank instead of the solid die as a counter mould that is been used in case of deep drawing.

A. Classification of Hydroforming

Hydroforming can be classified into two different categories: Depending on the pressure, Depending on the Application.

- 1) *Depending on the Pressure:* a) Low Pressure Hydroforming- Low Pressure Hydroforming has the fluid pressure (water pressure) range 80MPa to 450MPa b) High Pressure Hydroforming- High Pressure Hydroforming has the fluid pressure above 450MPa, used for complex geometry.
- 2) *Depending on the Application:* a) Sheet Metal Hydroforming- Sheet Metal Hydroforming has Fluid pressure ranging below or equal to 100MPa. b) Tube Hydroforming- Low pressure and High Pressure Tube hydroforming both can be successfully achieved in case of tube hydroforming depending on whichever is suitable for the purpose, both could be analysed and whichever turns out to be the best should be used.

B. Working of Hydroforming

A pre-bended tube is placed in a lower die, which is further closed by upper die, axial punches mounted on the shaft close the ends of the tube. Now internal hydrostatic pressure is imparted. Hydroforming works on the principle of pressurized internal fluid which forms the metal. Implication of internal hydrostatic pressure causes the metal to form which is not possible to be accomplished without the axial punches, which gives compressive force. The force imparted from the upper die is also a crucial parameter to be considered. Sheet hydroforming works on the similar principle, as that of traditional forming techniques, except the solid upper die is replaced by hydrostatic pressure. Increase in the internal hydrostatic pressure may cause bursting and increase in axial forces may cause wrinkling or buckling whereas increase in both may end up giving poor quality products as the outputs, thus the pressure and the forces are meant to be controlled throughout the process.

C. Advantages of Hydroforming

Hydroforming simply replaces the conventional forming methods which has male and female parts thus allowing a more widespread applications of complex geometry, which otherwise becomes a long process, as complex parts requires intricate corners and welds at



IMPLEMENTATION OF THEORY OF CONSTRAINT PHILOSOPHY FOR PRODUCTIVITY IMPROVEMENT

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Abstract: A toggle clamp manufacturer company struggling to keep pace with this increasing competition with a fear to lose the future orders because of their larger delivery time was selected for this study. This research is primarily focused on improving on time deliveries, productivity as well as reducing lead time and inventory levels by implementing five step methodology of Theory of Constraint Philosophy. In order to improve the delivery time, the five steps methodology of Theory of Constrained philosophy provides a better option as it aims at improving the productivity by focusing only at a bottlenecks rather than focusing on an entire process. For this purpose, manual method is used along with critical path analysis and value stream map for identifying the bottleneck resources which causes the problem of larger delivery time. The local optimization techniques are used to eliminate identified bottleneck and thus reducing the delivery time by reducing production lead time. Comparison of productivity, lead time, inventory levels and percentage on time deliveries before and after implementation of TOC philosophy will validate the success of TOC implementation.

IndexTerms - TOC, Critical Path Analysis, Value Stream Mapping, Lead time, Productivity.

I. INTRODUCTION

Today's businesses are competing increasingly based on reducing delivery time and improved product quality. Hence it is essential for companies to produce high quality products in shorter throughput time and in order to do this, there is a need of utilizing the capacity of the production facilities to the fullest. When the system is seen as a whole, it can be seen that the output is a function of the weakest link of the system's process flow. This weakest link is nothing but the constraint. The aim of every organization is to achieve higher profits and each of them has at least one constraint that stands on the path, blocking it from reaching its final goal of improved profitability. Thus it is vital for any business to identify and manage constraints in order to achieve higher profits. Focusing on improving an entire system rather than improving bottleneck constraint, does not impact the overall system output.

The Theory of Constraints is a methodology for identifying the most important limiting factor (i.e. constraint) that stands in the way of achieving a goal and then systematically improving that constraint until it is no longer the limiting factor. In manufacturing, the constraint is often referred to as a bottleneck. In TOC, the machine or station with the lowest capacity is called the constraint, while the rest of the links in the system goes by the term non- constraints. TOC is generally pulled- based system. One of the appealing characteristics of the Theory of Constraints is that it inherently prioritizes improvement activities. The top priority is always the current constraint. In environments where there is an urgent need to improve, TOC offers a highly focused methodology for creating rapid improvement. Some research has found that, the results obtained are not necessarily the typical results of TOC implementation yet the organizations who applied TOC gained considerable improvements in important performance measures such as lead time, cycle time etc.^[1]

II. METHODOLOGY

Objective of this research study is to reduce the delivery time to avoid future order loss. HV-500 clamp of HV series was selected for this study as it was the most sold product series and also they had live order of 300 Pcs. To overcome the problem of larger delivery time, Theory of Constraint Concepts was implemented which includes five steps methodology as follows.

Step 1: Identify the Constraint

Step 2: Exploit the Constraint

Step 3: Subordinate everything

Step 4: Elevate the Constraint

Step 5: Overcome Inertia and Repeat

This fifth step in implementation of TOC makes it a cyclic process aiming at continuous improvement.

2.1 Identify the Constraint

The constraint was roughly figure out by walking the floor and questioning the workers. This manual method narrowed down the area of focus to casting handle and arm of selected clamp. The validation of the identified bottleneck was done by applying critical path analysis to the production process so as to identify the most critical path followed by value stream mapping of this path. As value stream mapping is an effective tool for cycle time reduction^[2], it is used to identify the process that can be improve so as to increase the productivity of the selected clamp based on reduction in lead time^[3]. Fig. 1 shows the network diagram for production process of HV 500.





Applying Theory of Constraint Philosophy for Lead Time Reduction

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Abstract: Theory of Constraint (TOC) philosophy was first introduced by Eli Goldratt in 1988 aiming at improving the weakest links of a chain considering a fact that the performance of any production system is limited by the bottleneck and focusing on eliminating these bottlenecks can improve the efficiency of a system. The fierce competition in today's business environment makes it necessary to reduce non-productive time and thus reducing the delivery time. The problem of larger delivery time faced by a leading toggle clamp manufacturers have been addressed in this paper. In order to reduce lead time, the five steps methodology of Theory of Constraint Concepts is suggested for implementation. On analysing the Value Stream Map, plating process was identified as a constraint. Hence erecting the new in-house plating plant was considered as a solution in order to reduce the waiting time before the plating process and thus reducing the lead time. The study concludes possible estimated reduction of 75% in lead time by observing future state Value Stream Map developed considering the alternative of new in-house plating plant erection.

Keywords: TOC, Lead Time, Non-productive time, Value Stream Map, Toggle Clamp

I. INTRODUCTION

Today's businesses are competing based on delivery time and quality of product. To survive in this fierce competition, they have to produce better quality products in shorter throughput time. Thus in order to fulfil customer's requirement within the shortest possible time, there is a need of proper utilization of the capacity of production facilities. The output of a system is a function of the entire system and not just of single process and when the system is seen as a whole, it can be seen that the output is a function of the weakest link of the system's process flow. This weakest link is nothing but the constraint. The aim of every organization is to achieve higher profits and each of them has at least one constraint that prevent it from achieving its final goal of improved profitability. Thus it is vital for any business to identify and manage these constraints in order to achieve higher profits. Focusing on improving an entire system rather than improving bottleneck constraint, does not impact output of the overall system. Most organizations have to accomplish many things with limited resources. Thus in order to make real progress towards the goal, it is necessary to be focussed on the constraint rather than the entire system. Given this perspective, Theory of Constraint's 5-step process offers a systematic and focused approach that can be used by the organization to successfully pursue ongoing improvement. Theory of Constraints (TOC) aims at identifying the weakest link, or the bottleneck and focusing on eliminating these constraints and hence leads to increase in the efficiency of a system.

Theory of constraint Philosophy has been typically used in almost all the sectors of business environment. Trumone Sims et.al. proposed three new methods for Constraint identification namely, flow Constraint analysis, effective utilization analysis and quick effective utilization analysis for moving assembly lines in order to determine the true Constraint [1]. Azar Izmailov et. al. studied TOC tools for planning and project management and found that implementing TOC methodology may yield reduction of 25 to 50% in project duration & 95% chances of projects being completed on time [2]. Sherif Mostafa et.al. studied various waste identification tools and a framework consisting of three phases has been suggested for waste elimination by identifying non-value added activities [3]. Sahno Jevgeni et. al. developed and applied a new framework to wind power generator allowing continuous improvement of production process and product throughput by defining and measuring failure of the production process. The results obtained showed reduction in lead time and increase in product throughput with less expenses [4]. Roberto Panizzolo et.al. compared characteristics of TOC with Dispatching, Kanban and daily rate using theoretical investigation & empirical study of five case studies and identified an interpretative framework based on TOC characteristics by highlighting the main differences between them based on nature and scope of these systems [5]. Bahadır GÜLSÜN et.al. applied five steps of TOC in a supplier firm to eliminate the wastes so as to have better system structure. The results showed considerable increase in throughput & hence increase in profit [6]. C. Carl Pegels et.al. studied a case where TOC is applied in a manufacturing plant for resolving operation problem. The collective

Implementation of Total Quality Management Based on New Quality Tools

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Abstract : Technical empowerment has been booming into the markets so as to satisfy and make improvements and keep on changing as per the needs of the markets. In order make changes with the growing markets and to increase the feasibility to improve the quality. To improve and enhance the quality by implementing tools so to bring a new revolution in production shop floor and to maintain continuous improvement in the firm. To withstand the quality in today's terms of markets by maintaining good relationship between company market and customers so as to fulfill the required conditions of customers by taking into consideration quality and production and also workers satisfaction. This also leads to improvement into new technologies and thus here we are overcoming the old tools by new quality tools to implement the Total quality management.

IndexTerms – Total quality management, JIT ,New quality Tools.

I. INTRODUCTION

Total Quality Management, TQM, is a method by which management and employees can become involved in the continuous improvement of the production of goods and services. It is a combination of quality and management tools aimed at increasing business and reducing losses. TQM is a management philosophy that seeks to integrate all organizational functions (marketing, finance, design, engineering, and production, customer service, etc.) to focus on meeting customer needs and organizational objectives. It maintains that organizations must strive to continuously improve these processes by incorporating the knowledge and experiences of workers. TQM is now becoming recognized as a generic management tool, just as applicable in service and public sector organization.

Following are the different specifications of Total quality Management:

- Performance (Affinity Diagram)
- How well a product/service corresponds to the customer's expectation
- Reliability
- Consistency of performance (Agile manufacturing)
- Durability
- Useful life of a product/service
- Perceived Quality
- Indirect evaluation of quality (e.g. reputation)
- After Sales Service
- Handling of complaints and requests for information

The quality cost concept is an effective tool that can be used to express the value of the quality aspects of the operation in terms of money so that monitoring and analysis of investments and savings in that area can be readily evaluated using the language of business by reducing the time and maintaining the productivity and improving the quality.





Implementation of Total Quality Management Tools based on Effective System

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Abstract: *In order make changes with the growing markets and to increase the feasibility to improvise the quality. To improve and enhance the quality by implementing tools so to bring a new revolution in production shop floor and to maintain continuous improvement in the firm. To withstand the quality in today's terms of markets by maintaining good relationship between company market and customers so as to fulfill the required conditions of customers by taking into consideration quality and production and also workers satisfaction. All this is possible by overcoming the hindrances and to implement effectively the tools that are abibe to Total quality management to also make profitable to firm and feasible to customers.*

Keywords: *Total quality management, agile manufacturing, new quality tools and JIT techniques.*

I. INTRODUCTION

Total Quality Management is a management approach that originated in the 1950s and has steadily become more popular since the early 1980s. Total Quality is a description of the culture, attitude and organization of a company that strives to provide customers with products and services that satisfy their needs. The culture requires quality in all aspects of the company's operations, with processes being done right the first time and defects and waste remove from operations.

A. Improvements Based On Agile Manufacturing

Agile manufacturing is a term applied to an organization that has created the processes, tools, and training to enable it to respond quickly to customer needs and market changes while still controlling costs and quality. An enabling factor in becoming an agile manufacturer has been the development of manufacturing support technology that allows the marketers, the designers and the production personnel to share a common database of parts and products, to share data on production capacities and problems.

B. Techniques For Quality Improvement

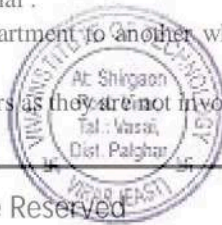
The quality of product or service is ensuring if proper designing process is followed. This designing process needs to be backed by appropriate process design supported by a suitable technology which confirms to requirements of customers. Quality control ensures that defects and errors are prevented and finally removed from the process or product. Therefore, quality control should include; planning, designing, implementation, gaps identification and improvisation. If organization can implement a stringent quality control than following benefits are possible:

- 1) Reducing product defects lead to less variable cost associated with labor and material.
- 2) Reduction in wastage, scrap and pollution.
- 3) Ability to produce quality products over longer period of time
- 4) With quality maintenance needs for inspection reduces leading to decrease in maintenance cost.
- 5) Large pool of satisfied customers.
- 6) Increase in employee motivation and awareness of quality.
- 7) Increase in productivity and overall efficiency.

Above mentioned points are relevant not only for production stage but are equally important for input material, manufacturing process, delivery process, etc.

II. IDENTIFICATION AND RESEARCH COLLECTION.

- A. There is no clear plan or layout for travel of material .
- B. There are helpers to shift material from one department to another which is creating the energy wastes in non value adding activities.
- C. There is no provision to utilize the skills of workers as they are not involved in decision making.



Optimization of Cutting Parameters for Turning Operation on CNC Lathe

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Abstract

The main objective of today's manufacturing industries is to produce low cost, high quality products in a shortest possible time. The selection of optimal cutting parameters is a very important aspect for every machining process in order to enhance the quality of machining products and reduce the machining costs. This paper investigates the machining of alloy steel to find optimal parameters for CNC turning process. The Full Factorial method is used to formulate the experimental layout, to analyse the effect of each parameter on the machining characteristics and to predict the optimal choice for each turning parameters such as Speed, Feed and Depth of cut. It is found that these parameters have a significant influence on machining characteristics such as Material removal rate (MRR) and Surface roughness (SR). The Analysis of Variance (ANOVA) is used to study the performance characteristics in turning operation.

Keywords: Full Factorial, Surface roughness, ANOVA, Quality.

1. Introduction

The global market has been more competitive than ever. Challenge of modern machining industries is mainly focused on achieving high quality, in terms of work piece dimensional accuracy, surface finish, high production rate, less wear on the cutting tools, economy of machining in terms of cost saving and increasing the performance of the product with reduced environmental impact.

Metal cutting plays a pivotal role in innumerable manufacturing processes and is widely used in various engineering industries. Surface roughness is an important parameter of metal cutting as it is the characteristic of quality and influences

performance of the mechanical parts and also the production cost. Cost and quality are inversely proportional to each other. Thus we need to find a way to balance both objectives. Thus, selection of proper tool and work-piece combination which influences cost and quality can help us to achieve the best possible solution to our problem.

2. Literature Review

In this study, the effect of different foaming durations on the pore structure of Al foam material was examined and the foaming duration for homogenous pore distribution was determined (Gultekin Uzun et al, 2017). The obtained samples were drilled with drills of different diameters at different feed rates and cutting speeds. Feed forces increased with the increase in cutting speed. Feed force exhibited increases in the interval 200–500 % with the increase in feed amount. Foamed structure affected the chip breakings causing an increase in chip adhesions proportionally with the cutting speed. Bharadwaj et al, 2017 showed optimization of process parameters in drilling EN8 steel using Taguchi technique and gave conclusion that Surface roughness increases with increase in feed, increase in depth of hole while with spindle speed, surface roughness initially decreases as the spindle speed increases from 360 RPM to 490 RPM and surface roughness increases with increase in spindle speed from 490 RPM to 680 RPM and all the three independent parameters (spindle speed, feed and depth of hole) seem to be the influential drilling parameters that affect the surface roughness. (Kima et al, 2016). In this study, a micro-patterned insert, fabricated using an EDM process was shown to reduce force, coefficients of friction, and tool wear through improved tri-biological properties. The



Numerical Simulation of Buffeting Effect on Wings

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Abstract

The one of the major problem in the aircraft while accelerating in transonic regime the aircraft's wing gets shock waves due to change in velocity from sonic to supersonic regime. The critical Mach number is that free-stream Mach number at which sonic flow is first achieved on the aerofoil surface. In order to fly the aircraft in transonic regime or above transonic speed we will analyze the critical mach number. The analysis of buffeting effect on the particular type of wing of the aircraft, while predesigning is required to avoid any unpleasant conditions. In this project work numerical method will be used to analyze buffeting effect on wing of the aircraft. Using CFD technique numerical model of aerofoil will be generated and iterations will be carried numerical equations by applying appropriate Boundary conditions. Thus, validating the project work.

Keywords: Buffeting, wings ,aerofoil ,simulation, mach number

1. Introduction

The Buffeting is high-frequency instability, caused by airflow separation or shock wave oscillations from one object striking another. It is caused by a sudden impulse of load increasing. It is a random forced vibration. Generally, it affects the aircraft structure due to air flow downstream of the wing.

2. Objectives

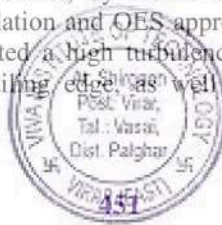
The following objectives of the project are as

- To predict the best method for turbulene modelling
- To reduce the number of iterations
- To minimize the residual error for numerical solution
- To study behavior of aerofoil undergoing buffeting effect.

3. Literature Review

Azizul Hasan [2016] [3], have introduced, numerical study of some iterative methods for solving non-linear equations. Many iterative methods for solving algebraic and transcendental equations is presented by the different formulae. Using bisection method, second method is the Newton's iterative method and their results are compared. Newton's method always uses two iterations whereas the others take only one. They have concluded that the secant method is formally the most effective from the Newton method, as iterating only a single function evaluation per iteration. Analysis of efficiency from the numerical computation shows that bisection method converges too slow but it will converge.

Damien Szubert, et al. [2016] [4], have presented an analysis on the turbulent flow around a supercritical aerofoil at high Reynolds number and in the transonic regime, involving shock-wave/boundary layer interaction and buffet, by means of numerical simulation and turbulence modelling. They carried URANS simulation and OES approach. The URANS simulations based on the k-epsilon SST model have indicated a high turbulence diffusion level and a decrease in the appearance of instabilities pas the trailing edge, as well as a short shock amplitude. The OES



Design and Analysis of Wind Tunnel Testing Rig

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Abstract

A wind tunnel is a tool used in aerodynamic research to study the effects of air moving past solid objects. Even though it predicts accurate results and flow parameter it comes with the disadvantage of high cost, large space utilization, noise problem. Hence the productivity and use of wind tunnel are limited. The existing wind tunnel model is much complicated to compute and to obtain necessary results. Also, this wind tunnel is not portable and generally manufactured for the large industrial testing purpose. Power required to test a small aerodynamic model is large in such wind tunnel. Hence, to test any small-scale graduate level project become unaffordable due to the cost of testing.

This project describes the design and analysis of the open circuit, small size, economical wind tunnel used for testing of the Aerodynamic model. This project uses computational fluid dynamics to determine the theoretical values for wind tunnel which will be statistically compared to actual values of fluid flow. An overall analysis and simulation of flow will also be performed. Aerodynamics of any high-speed car or airplane can be studied by using a scale model of an actual model by this apparatus.

Keywords: Mechanical engineering, Aerodynamics, Design, Wind tunnel, Fluid dynamics, Analysis, Simulation, scale model, Testing.

1. Introduction

Wind tunnels are one of the important tool for aerodynamics studies wind tunnel are used to simulate the actual flow condition of a prototype on a scale model by facilitating the actual flow conditions of a prototype on a scale mode one can study the aerodynamic property experienced by the prototype on the scale model with reasonable accuracy. It is a device in which air of uniform property are produced past the model. Basically, it a tubular passage for air or any other gases which are forced to produce a flow of uniform properties in the test section. The model which has to undergo for aerodynamic studies are mounted in the test section with suitable instrumentation for measuring the forces, pressure distribution and other aerodynamic characteristics.

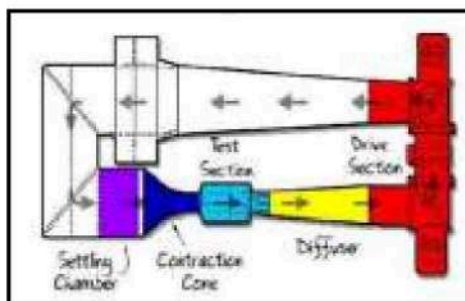


Figure 1. Closed circuit wind tunnel

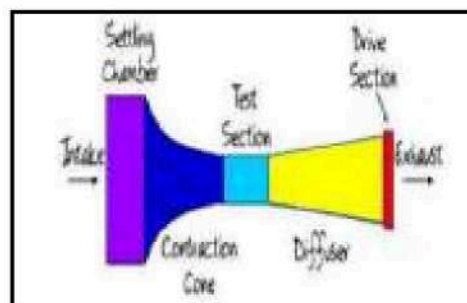


Figure 2. open circuit wind tunnel



“OPTIMIZATION OF PIN ON DISC TYPE WEAR TEST”

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Abstract— From a surface engineering point of view, wear test is carried out to evaluate the potential of using a certain surface engineering technology to reduce wear for a specific application, and to investigate the effect of treatment conditions (processing parameters) on the wear performance, so that optimized surface treatment conditions can be realized. Current work aims at developing the setup which is used to check the wear resistance of different materials as per the standards.

From a material point of view, the test is performed to evaluate the wear property of a material so as to determine whether the material is adequate for a specific wear application. The set up development is so as to get accurate and reliable results to further use for analyzing the material for different applications involving resistance to wear. The setup having some problem like more vibration, speed variation and other, hence by changing the some parameter or adding some device the existing setup give accurate result.

Wear is a process of removal of material from one or both of two solid surfaces in solid state contact. As the wear is a surface removal phenomenon and occurs mostly at outer surfaces, it is more appropriate and economical to make surface modification of existing alloys than using the Wear resistant alloys. Hence by different speed and different sliding contact different material wear rate calculated.

Keywords—mechanical, vibration, design, clamping, speed, wear

I. INTRODUCTION

To study wear of the materials, simulate the process of wear in a controlled manner and study the effect on different samples with the same test conditions. One way to perform the wear is with a pin-on-disc test. In this test, the sample to study is mounted on a rotating stage and a pin, comes in contact with the sample surface, with a known force, to create the wear. A flat or a sphere shaped indenter is loaded on to the test sample with a precisely known force. The indenter (a pin) is mounted on a stiff lever, designed as a frictionless force transducer. As the disk is rotated, resulting frictional forces acting between the pin on the disk are measured. A pin for the evaluation of wear loss provides several distinct advantages. Their reproducibility and quality can be excellent ensuring easy accurate comparisons. Evaluating the wear of the pin provides wear information at the contact point which stays under load during the full duration of the test. This compared to the base material that only experiences wear during a comparatively short period of time. Wear test is carried out to predict the wear performance and to investigate the wear mechanism.



Design and Analysis of Cooling Tower

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Abstract - A cooling tower is a vital element of power plants, petrochemical plants, petroleum refineries, semi-conductor plants, natural gas processing plants, food processing plants, etc. The major function of a cooling tower is to discard heat into the environment. The major types of cooling towers are the mechanical draft (induced draft) and natural draft cooling towers. Very large concrete chimneys are used by the natural draft cooling tower to introduce air through the media. They are usually used for high water flow rates, i.e. above 45,000 m³/hr., due to the large size of these natural draft cooling towers. These types of natural draft cooling towers are used only by utility power stations. Mechanical draft cooling towers use large fans to suck or force air through circulated water overfill. The waterfalls downhill over the fill media, which helps to increase the contact time between the air and the water, this helps to maximize heat transfer between them. The counter-flow and cross flows are two elementary designs of induced (mechanical) cooling tower. It is well known that heat exchange in counter flow is more effective than heat exchange in cross-flow or parallel flow.

This paper includes the performance study, working principle, and analysis of induced draft cooling tower, which is one of the deciding factors used for increasing the power plant efficiency. A setup is fabricated and various parameters of cooling tower are observed and calculated i.e. effectiveness, range, approach, and evaporation loss.

Key Words: Mechanical, Thermal, Cooling Tower, DBT (dry bulb temperature), WBT (wet bulb temperature), effectiveness, evaporation loss, experiment, numerical, natural draft, induced draft.

1. INTRODUCTION

1.1 Introduction

Cooling towers are an essential part of Power plants. The primary job of a cooling tower is to discard heat into the environment. Hot water from Condenser is sent to the cooling tower. The water exits the cooling tower and is sent back to the boiler for further process. In cooling towers, air is passed alongside or counter at present with water. The heat gained by air is the heat lost by water. The effectiveness of cooling tower depends on water and air flow rates and working temperatures.

In the chemical industries, utilities play an important role in plant tasks. Two types of utilities are used in industries, i.e.

heating utilities and cooling utilities. Cold water is required for condenser, reactors, heat exchangers and other cooling purposes. Cooling towers are used to cool the water for its various applications. The high-temperature water used for various applications can be cooled and reused. Various types of cooling towers include Natural draft, forced draft, and induced draft cooling towers. Various researchers have carried out studies and investigation on various characteristics of the cooling tower which impact the effectiveness and functioning of the cooling tower.

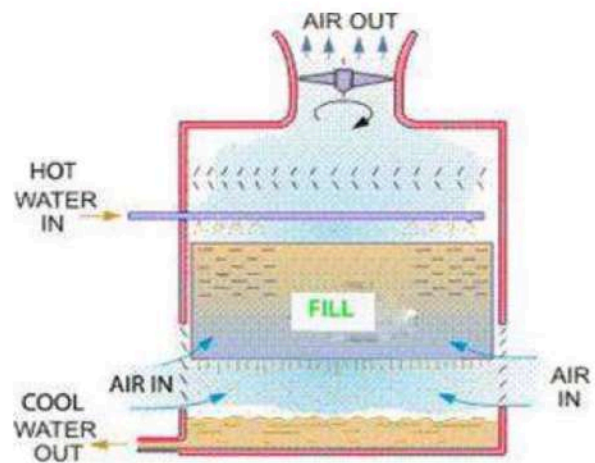


Fig -1: Cooling tower

1.2 Components of Cooling Tower

The basic components of an evaporative tower are:

Fill: Most towers use fills to facilitate heat transfer by increasing water and air contact. Fills are of two types, i.e. splash or film type. With splash fill, waterfalls over successive layers of horizontal splash bars, continuously breaking into smaller droplets, while also wetting the fill surface. Plastic splash fill promotes improved heat transfer than the wood splash fill. Film fill consists of thin, closely spaced plastic surfaces over which the water spreads, forming a thin film in contact with the air. These surfaces may be flat, corrugated, honeycombed, or other patterns. The film type of fill is the more efficient and provides same heat transfer in a smaller volume than the splash fill.

Cold water basin: The cold water basin, located at or near the bottom of the tower, receives the cooled water that flows down through the tower and fills. The basin usually has a pump or low point for the cold water discharge connection.



Tube Forming using Hydroforming Technology and analyzing the Process on Explicit Dynamics

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Abstract: Tube forming being the most unified need for every automotive company, needs to be taken care of throughout the manufacturing process. Various automotive sectors have range of complex geometries of tubes and these geometries are classified by group technology. The THF process enables these sectors to produce tubes that are light in weight, without causing any losses in the material strength after the THF process. This study describes the Analysis of THF process for a simple circular c/s tube which is converted into rectangular tube. The equivalent Von-Mises stress generated is the main factor for THF process in this study. Material of the tube is E34 4012A CS. MISO is the plasticity model used and Explicit Dynamics solver is used on ANSYS.

Keywords: THF, MISO, Explicit Dynamics, ANSYS, Von-Mises stress.

I. INTRODUCTION

Tube hydroforming, THF contrives to be the emerging technique for forming the tube having complex geometry. Hydroforming uses fluid pressure to form the components which has intricate corners and edges that can be damaged easily when formed with other forming processes. The normal forming of tube has stages that undergoes various processes and thus the mechanical as well as chemical properties are likely to get changed in the final product, the strength of the final product thus changes. Tube Hydroforming causes change in the mechanical and chemical properties as well, but to an extent which does not affect the requirements of the final product. It is of utmost need to consider the maximum pressure up to which the tube can behave to be ductile without bursting. THF is a replacement to conventional forming, as it uses the high pressurized fluid to form the blank instead of the solid die as a counter mould that is been used in case of deep drawing.

A. Classification of Hydroforming

Hydroforming can be classified into two different categories: Depending on the pressure, Depending on the Application.

- 1) *Depending on the Pressure:* a) Low Pressure Hydroforming- Low Pressure Hydroforming has the fluid pressure (water pressure) range 80MPa to 450MPa b) High Pressure Hydroforming- High Pressure Hydroforming has the fluid pressure above 450MPa, used for complex geometry.
- 2) *Depending on the Application:* a) Sheet Metal Hydroforming- Sheet Metal Hydroforming has Fluid pressure ranging below or equal to 100MPa. b) Tube Hydroforming- Low pressure and High Pressure Tube hydroforming both can be successfully achieved in case of tube hydroforming depending on whichever is suitable for the purpose, both could be analysed and whichever turns out to be the best should be used.

B. Working of Hydroforming

A pre-bended tube is placed in a lower die, which is further closed by upper die, axial punches mounted on the shaft close the ends of the tube. Now internal hydrostatic pressure is imparted. Hydroforming works on the principle of pressurized internal fluid which forms the metal. Implication of internal hydrostatic pressure causes the metal to form which is not possible to be accomplished without the axial punches, which gives compressive force. The force imparted from the upper die is also a crucial parameter to be considered. Sheet hydroforming works on the similar principle, as that of traditional forming techniques, except the solid upper die is replaced by hydrostatic pressure. Increase in the internal hydrostatic pressure may cause bursting and increase in axial forces may cause wrinkling or buckling whereas increase in both may end up giving poor quality products as the outputs, thus the pressure and the forces are meant to be controlled throughout the process.

C. Advantages of Hydroforming

Hydroforming simply replaces the conventional forming methods which has male and female parts thus allowing a more widespread applications of complex geometry, which otherwise becomes a long process, as complex parts requires intricate corners and welds at



Tube Hydroforming: Simulation on ANSYS and Validation

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Abstract

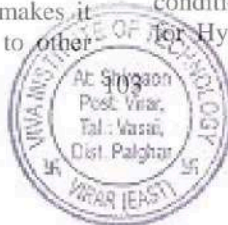
The objective of this paper is to validate THF process by using strength and mechanical properties of the material. The model is generated on SolidWorks and further imported to ANSYS for Analysis. The stress distribution during the THF process is also studied. Practical trial and error of the process is not advisable for processes like THF, thus there is need of some simulative experiments which can predict the performance of the process without any losses. Explicit Dynamics is used for Analysis and MISO plasticity model is used, considering the characteristics of the process and the end effects obtained from the process. The simulation results obtained using ANSYS were correlating with the experimental data, thus THF for a product can be validated using Explicit Dynamics.

Keywords: THF, ANSYS, Explicit Dynamics, MISO, E34 4012A, Stress Distribution.

1. Introduction

Recent growth in Hydroforming brings on several changes and advantages that the deep drawn product lacks. The light weight, complex geometry and efforts of assembling components, welding are looked upon in deep drawing but the light weight and complex geometry is better achieved in Hydroforming, also there is no welding and assembling needed as a part can be made as a whole, in Hydroforming. The recent development in Hydroforming process involves machines with number of intensifiers that allows quick process completion and more number of parts are producible in given time. Thus the production target is achieved before time. Complexities in Geometry are the most difficult part to obtain, but Hydroforming makes it simpler to achieve in less time compared to other

forming processes. Hydroforming is already widely used - in the US, more than a million engine cradles a year are produced by hydroforming processes, and in Europe the technology is being used in sub-frames for models such as Ford's Mondeo and General Motor's Vectra. Some 2.8 million components a year for one of Chrysler's model are produced by hydroforming, too. However, as hydroforming - particularly high-pressure hydroforming - is at the frontier of modern steel technology, many designers and engineers still need convincing of its capabilities. No doubt Hydroforming has tremendous results, but those results could only be achieved if the designers and the engineers change their way of working and thinking throughout the production process. Due to its technical elegance it is even used in India, its robustness enhances its appearances in all the automotive industries. The main advantages of Hydroforming are complex geometry with contours, firm parts with light weight and enhanced strength, seamless bonding, Surface finish obtained is high quality, reduction in cost when compared to stamped parts or stamped and welded parts. Combination of spinning and hydroforming gives high quality products with cost effectiveness. The main purpose of this study is to validate the Tube Hydroforming process. The study is focused completely on the simulation results obtained on ANSYS 18.2, the analyzed process and the parameters are considered and user defined. Explicit Dynamics solver is used for analyzing the process. Multilinear Isotropic Hardening is used as Plasticity model in Explicit Dynamics. Different loading conditions are studied based on different metals used for Hydroforming. The pressure load and the axial



DC Load Flow Studies of DC link for Power System Planning

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Abstract— High Voltage Direct Current (HVDC) technology has characteristics that make it especially attractive for certain transmission applications like bulk power over a long distance with minimum losses. It has inherent beauty to connect the grid who operates at different frequencies called as asynchronous interconnections, also HVDC used in long submarine cable crossings and fast power controllability. Then, the HVDC transmission has proved its potential to be an interesting alternative or complement to the AC transmission. AC transmission line control is more complicated because of the frequency and dependency of power transfer on Power Angle. DC transmission does not have these limitations, which has led to build long High Voltage Direct Current (HVDC) transmission lines. Similar to AC load flow analysis, DC load flow analysis is also important. The load flow equations and the methods of load flow analysis need to be modified while using them in DC load flow analysis.

Index Terms-- HVDC links, Load flow studies, DC link, Optimal power flow.

I. INTRODUCTION

Alternating current (AC) is widely used in industries and residential areas, but for the long transmission line (more than 600 Km) AC transmission is more expensive than direct current (DC). Technically, AC transmission line control is more complicated because of the frequency and dependency of power transfer on angle difference between the voltage phasors at the two ends. DC transmission does not have these limitations, which has led to build long High Voltage Direct Current (HVDC) transmission lines. HVDC technology is a high power electronics technology used in electric power systems to transfer bulk power over long distances. The DC transmission requires conversion at two ends, from AC to DC at the sending end and DC to AC at the receiving end. This conversion is done at converter stations. By simple control action, converter can be switched from rectifier to inverter and vice-versa. Thus facilitating power reversal. A brief information about HVDC transmission system, its different configurations, main components of HVDC system, assumptions used, the modifications that are needed to carry out while using the load flow study for HVDC etc. are included in this report. Power flow studies using Newton-Raphson Method, Gauss Seidal Method are also performed [1].

II. HVDC TRANSMISSION SYSTEM

There are different types of DC links as given in the configuration [1].

A. Configuration of HVDC [1]

1. Monopolar HVDC system
2. Bipolar HVDC system
3. Homopolar HVDC system
4. Back-to-back HVDC system
5. Multiterminal HVDC system

B. Components of HVDC system [1]

1. Converters: Perform AC/DC and DC/AC conversion. The valve bridges consists of high voltage valves connected in a 6-pulse or 12-pulse arrangements. It consists of thyristor and such power electronics devices generates the harmonics and consume reactive power in the system [2].
 2. Transformers: Normally, the converters are connected to the AC system via transformers. The most important function of the transformers is to transform the voltage of the AC system to a level suitable for the converter.
 3. Smoothing reactors: These are large reactors having inductance as high as 1.0 H connected in series with each pole of each converter station which serves following purposes: i) Decrease harmonic voltages and currents in the DC line. ii) Prevent current from being discontinuous at light load. iii) Limit the crest current in the rectifier during short-circuit on the DC line.
 4. AC Filters: The AC voltage output contains harmonic components, caused by the switching of the Thyristors/IGBTs. The harmonics emitted into the AC system have to be limited to prevent them from causing malfunction of AC system equipment or radio and telecommunication disturbances.
 5. Electrodes: Most DC lines are designed to use earth as a neutral conductor for some time. The connection to the earth requires a large-surface-area conductor to minimize current densities and surface voltage gradients. This conductor is referred to as an electrode.
- AC Circuit Breakers: For clearing faults in the transformer and for taking the DC line out of service, circuit-breakers are used on the AC side.

