

**Development and Analysis on Ergonomic Design of Hand Tool****Sameer Verma\***

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**ABSTRACT**

Generally, hand tools square measure regarded to be as previous because the civilization. in keeping with uncovered proof, prehistoric humans already used hand tools as way back as concerning 10,000 years past (Fraser, 1980). With addition of the handle, these hand tools have assisted humans with vary of motion, physical strength, and effectiveness of their practicality of higher extremities because the wants of individuals have exaggerated, new hand tools consequently are improved or made-up with facilitate of the technology development. In spite of development of mechanization and automation, astonishingly several such tools have modified little or no. Specifically, non-powered tools, with minor modification in terms of external style and materials, square measure still getting used in our daily lives and industrial tasks. maybe, despite advanced technologies, even ninetieth of the staff within the u. s. still use non-powered hand tools at work.

**Keywords:** Tool, Technology**INTRODUCTION**

For some years currently, technology tool style has stirred revived interest amongst users, makers, and researchers. Within the past, emphasis was placed there tool operate so as to boost potency and permit for standardization. The tool was needed to satisfactorily fulfill the task that it had been designed, to reply to the wants of the best potential variety of users, and to be as low cost as potential. Consequently, a given tool was designed to be employed by all potential users. However, in recent years, approaches have modified and new notions of exaggerated comfort and reduced biomechanical solicitation with reference to users' purposeful capacities are introduced into tool style. There square measure many reasons for this development.

The competition between tool makers has crystal rectifier to widening of the talents and power needed of makers, together with applied science, if they're to

reply to plug forces. In apply, tool makers should take 3 new varieties of would like under consideration within the manufacture of hand tools. These are

- integration of applied science into the planning method,
- definition of the various technology stages concerned within the style method,
- data of the various factors concerned within the style of hand tools

**REVIEW OF LITERATURE**

M L Meena et al., (2015) The contractile organ disorders square measure the foremost common work-related health issues in Asian country, moving thousands of staff. Typically, contractile organ disorders have an effect on the low back, neck, shoulders and articulation pain. This study was conducted in screen printing textile trade of Jaipur, Rajasthan, India to verify the prevalence of higher limb issues related to tool style, investigate the present hand tools presently utilized in screen printing, and design tool supported measuring dimensions and technology principles. During this study, three hundred staff were participated and a form survey consisting of private details, measuring dimensions of hand and Nordic form for contractile organ disorders has been done. In sixty four of the cases, the new tool was evaluated as very little higher or higher and therefore the comfort was improved.

Arunesh & Pankaj (2011) the aim of this paper is to specialize in sure vital aspects of screwdriver use in activity work things, with a stress on comfort/discomfort in victimisation screwdriver in keeping with users. Descriptors of comfort/discomfort in victimisation hand tools were collected from literature and interviews. Six comfort factors might be recognized ( they are functionality, posture and muscles, irritation and pain of hand and fingers, irritation of hand surface, handle characteristics, aesthetics). These six factors are classified into 3 purposeful groups: practicality, physical interaction and look. It's complete that practicality and physical interaction square measure the foremost vital factors of comfort in victimisation screwdriver. Therefore the styleers will use to deal with the suitable comfort descriptors within the tool style process; an effort is formed as an instance the relevancy of measuring knowledge within the design of handle of hand tools (screwdriver) victimisation technology principles. The changed technology designed handle of screwdriver can enable higher operating potency and additional torsion than standard handle.

Aptel et al., (2012) the event of technology tools responds to health protection wants on the a part of staff, particularly the work connected contractile organ disorders of the higher limbs and to the event of technology tools to require under consideration the wants of the factories. Solely associate degree technology style method will alter tool makers to satisfy these necessities. 3 factors square measure involved: integration of applied science into the planning method, definition of the various technology stages concerned, and at last data of the various factors concerned in tool style. This document examines these three parts in additional detail and presents shortly a project of analysis whose main purpose is to integrate technology criteria into a style method.

Carrola et al., (2014) The work reported on this paper was geared toward up the potency of a semi-artisanal cheese production method. A general style analysis, conferred in another paper triggered the event of style work. A discursive analysis geared toward making various logos for the Miguel Jose Serra prosecutor Estrela PDO (Protected Designation of Origin) cheese was developed. Observations following associate degree anthropology approach known technology risks in cheese creating throughout the method of cutting excess chips, fostering the emergence of contractile organ disorders at the articulation plana. A tool that matches best to the task at hand was developed. A model of the new tool enabled aggregation feedback from use within the work context, so as to feedback development.

## **DESIGN OF HAND TOOL**

Design may be a terribly advanced task even for associate degree experienced designer. Technological innovation pushes the creative thinking to new limits and thus designers square measure forced to style new product with new practicality inside ever shorter time to plug deadlines. Product square measure typically mass made so as to stay the assembly prices at lowest level and square measure thus designed to suit a good population. However, there has been associate degree exaggerated market demand of customised product, that incorporate whole product customization or customised components for a target population. Major part of corporations or establishments United Nations agency utilize customization is attributed to medical applications (medical corrective, implants, splints, etc.). Recent in depth development in varied technologies reminiscent of medical imaging, 3D scanners, and fast prototyping has wedged additionally customization inside luxury product and in product wherever high stresses and exceptional performance square measure expected reminiscent of superior tools and kit, skilled equipment, and military instrumentality.

In order to provide a customised half for a target population, the styleer has a good additional advanced design method to beat. The designer has got to think about the product-human interaction so as to develop product with high rate of potency and luxury. In a very human-product interaction, the designer has 3 constraints, that need to be thought-about to style associate degree economical product. Style attributes of the merchandise outline the task and merchandise constraints; the psychological feature and biomechanical constraints square measure outlined with the user. If there's a viable human-product interaction potential, all 3 constraints should overlap to some extent. Somewhere within the intersected space is that the best human-product interaction for the target population. To search out the optimum, the designer has got to set his objective operate and perform optimisation. Task and merchandise constraints is altered with totally different style attributes; thus, a styleer has got to have data concerning the target population's biomechanical and additionally psychological feature constraints so as to adapt the merchandise design for the best human-product interaction that consists of expected product practicality, performance, and additionally safety.

Ergonomic principles ought to be enclosed within the part of industrial/mechanical product style before the engineers tackle the matter, as a result of the most operate of the merchandise and therefore the kind of the merchandise square measure typically powerfully connected. Since product applied science is associate degree knowledge domain science, the styleer has got to possess wide selection of information and additionally expertise to permit a holistic design approach to achieve the expected human-product performance and safety. Trendy CAE and CAD package enable the designer to judge the new product nearly. Within the field of geographic point applied science, several package solutions exist, though there's still an absence of dedicated applied science package within the field of product applied science and style, which might create analysis and analysis of the planned style at the virtual stage potential.

Traditional user-centered style techniques reminiscent of planning with recommendations, planning supported measuring knowledge, and derived mathematical models don't incorporate enough subject knowledge to style a customised product with best appropriate a selected target population. To beat limitations of ancient style, there has been a rise in use of knowledge domain medical imaging approach to reverse engineer 3D package (CAD) models of human anatomical components to include them into the planning method in CAD package or to utilize finite part analyses (FEA). It may be, 3D models of vertebrate foot supported medical imaging square measure progressively getting used within the style method of footwear. They're wont to utilize CAD and FEA so as to optimize the performance and luxury rate of the users. There has been additionally associate degree extended use of medical imaging in generating 3D digital human models, which might be utilised for user-centered style, though they're typically used for geographic point applied science and can't be utilized in customised product style.

## **DISCUSSION**

In this competitive market, a product ought to serve its primary purpose. These days client demands square measure totally different from older times. The merchandise has additionally become a standing image for a client. Aesthetic charm is equally vital for a product to sustain within the market along side the purposeful charm. However will one differentiate between the aesthetic appeals of 2 similar classes of product? The solution lies within the comparative analysis of the products victimisation antecedently outlined rules that guide analysis. From this in depth analysis it's known that from the pliability and practicality perspective, one will judge a brand new category of product. However from the aesthetics, usability and applied science perspective, it's tough to judge a product as per style standards.

It has been shown that there's vital distinction within the comfort relating to Fits the hands and offers nice grip feeling. this will be explained by the anatomical form of the handle, as a result of the anatomical handle considers the best power-grasp posture, with best diameters being achieved for every finger, that assures the utmost voluntary contraction of fingers. This was not possible with the cylindrical handle, since it took just one finger's best diameter determination under consideration. Applied math vital distinction is additionally ascertained in terms of stability. The bulk of the forces and moments square measure transferred over to the anatomical handle form and far less with the friction between the handle material and skin; thus, the themes rated the anatomical handle as additional stable. It is additionally assumed that the conventional engrossing force of a cylindrical handle would be thus higher to forestall slippage of the handle. High native and overall contact pressures occur from extremely exerted traditional forces that may cause discomfort and additionally acute disorders and CTD (i.e., blisters, inflamed skin, incommodious muscles, etc.). In terms of overall comfort, the themes rated the obtained anatomical handle as more leisurely than cylindrical.

## **CONCLUSION**

The sustained and informed development of the proposals distributed, further because the chance of light different opportunities for action, was in strength solely potential thanks to the intersection points that arose throughout the

method of observation, analysis and project-development. The latter sprang from approaching the assembly method of the semi-artisanal cheese from a systems style perspective, winding up a general analysis of a producing system, demonstrating a macroergonomics approach, whereas the emblem design and therefore the tool style comes demonstrate microergonomics approaches.

Limitations inside ancient style strategies have crystal rectifier to the event of recent user-centered style strategies supported medical imaging that square measure conferred during this study. Conferred quality and reliableness of those strategies is used for the innovative style method to develop product which permit high thought rate of biomechanical constraints and thus offer best appropriate the target population. The medical approach is very suited to integrated CAD/FEA style method. With utilization of conferred user-centered style strategies supported medical imaging, it absolutely was potential to develop associate degreed manufacture a best sized and formed tool handle for a target population with improved applied science.

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