iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** XII **Month of publication:** December 2020

DOI: https://doi.org/10.22214/ijraset.2020.32579

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue XII Dec 2020- Available at www.ijraset.com

Design of Portable Pocket Engineering Drafter

G. Naga Anvesh[1], V. Likesh[2], M. Ravi Teja Sai[3], G Raghu Varma[4]
[1, 2, 3, 4]*UG Student, Mechanical Engineering* Sri Vasavi Engineering college Autonomous, Tadepalligudem, Andhra Pradesh

Abstract: ***During the process of flexible product enhancement and mechanical design, it is important to keep flexibility as huge as possible. One way to improve the flexibility in the mechanical component is by modifying the design of the mechanical units of the current product. Another way is to by add on application of mechanisms to the current product, which enables better utilization of resources and processes. This research paper describes the process of enhancing the knowledge of mechanical mechanism design system by aid of CATIA V5 software for the dimensioning, and development of an Engineering drafter model with two main flexible and foldable supports. In this research work, the design and the mechanical units of the drafter was undertaken. This drafter consists mainly of foldable stem bars with locks pins for folding and locking the stem bars, flip fiber ruler, steel bars and protractor scale. This methodology of modification in the mechanism of mechanical components made a huge development of flexibility in the current Engineering drafter. The main contribution of this paper is the above mentioned. Also, the main goal of this paper is to prove that standard computer-aided design by the aid of CATIA software systems needs to be expanded with these knowledge-based intellectual integrated systems to achieve higher levels of performance.***

Keywords: CATIA design software, design, engineering drafter, foldable stem bars and scale, PORTABLE POCKET ENGINEERING DRAFTER

I. INTRODUCTION

The process of mechanical product design, during product development, is functioned per market demands, technical functional, economic, ergonomic, aesthetic and environmental requirements [1]. It is a very complex process that involves many design procedures and requires the team-work of designers and engineers of different profiles [2]. To support Engineering designers, it is necessary to develop design environments for integrated intelligent systems that provide information for rapid and intelligent decision making on intellectual designs throughout the entire design process [3]. So far, various methodologies and systems for intellectual design have been developed. The mechanical drafting [4] method focuses on dimensioning and tolerances, sectioning, fastenings, and pictorial drawings. The mechanical drafting method goes into further instruction regarding areas for a design in different streams like mechanical and structural detailing, contour mapping, electrical-piping-fluid power schematics, and kinematics. Today employers, students, and drafters are looking for computer-aided design because it is both versatile and fast in drafting production but along with it, they need a portable drafting machine because of this we made an intellectual modification in the mechanism of the current drafter. However, there are still many of these drafting machines around, and they still find use. Both the CNC/CAD-CATIA software /CAM technician and the draftsperson today provide a company with manufacturing support along with we add on our project as be the other support to it[5]. This drafting machine consists of an articulated protractor head that allows an angular rotation and a pair of flipper scales attached at a right angle for rotation of the table. We are facing a lot of issues while carrying the current drafting machine, that's why we made this modification in design

II. WORKING MECHANISM

The Portable pocket engineering drafting machines is primarily hand-held portable devices sized for personal use. The reason behind this project was to make the drafting machine small enough to fit in a handbag and we have made this for easy carry by hand. Each part of the Portable pocket engineering drafter is necessary for it to function. Hand-held portable drafters have a type of foldable parallelogram stem bars that can be made from hollow steel bars or glass fibers. The hollow parallelogram stem bars move away extent on the thinner bar, which in turn, push the lock pins up against the hollow parallelogram stem bar. This creates a force that fully extends the parallelogram stem bars, and with a locking mechanism, secures it in place. When pressing the button on the parallelogram stem bars, they would depart from the hook block unit on the button and move toward a notch which further stretches out the Portable pocket engineering drafter. When the user presses the button on the parallelogram stem bars, the block of hollow stems moves and pushes the pin so that the other end of the pin touches the hook in the thinner control tube. Closing your Portable pocket engineering drafter works oppositely. You press the spring to free the locking mechanism of the drafter. The hollow tubes will automatically move closer to the thinner stem with lock pins were hinged by spring, and you can move it to the bottom. From there, fold up your Portable pocket engineering drafter and save it for another working day.

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue XII Dec 2020- Available at www.ijraset.com

III. CONSTRUCTION

The Portable pocket engineering drafting machine is a tool used in technical drawing/drafting, consisting of a pair of flipper scales to another short scale mounted to form a right angle on an articulated protractor head that allows a 360° angular rotation. The angular protractor head (two flipper scales, another short scale and protractor mechanism) can move freely across the surface of the drawing board, sliding on two guides directly or indirectly anchored to the drawing board. These guides, which act separately, ensure the movement of the set in the horizontal or vertical direction of the drawing board, and can be locked independently of each other.

The foldable parallelogram stem bars have a portion of hollow tubes for getting the foldable nature in it, along with this a spring with locker pins on the lock bar was it located in the thinner hollow tube to lock in the holes hallow bar. The fixing clamps with screws and pivot plate are connected on the end of the end portion of the two foldable parallelogram bars and other two foldable parallelogram bars are connected to both pivot plate of bottom and index plate with locking knob.

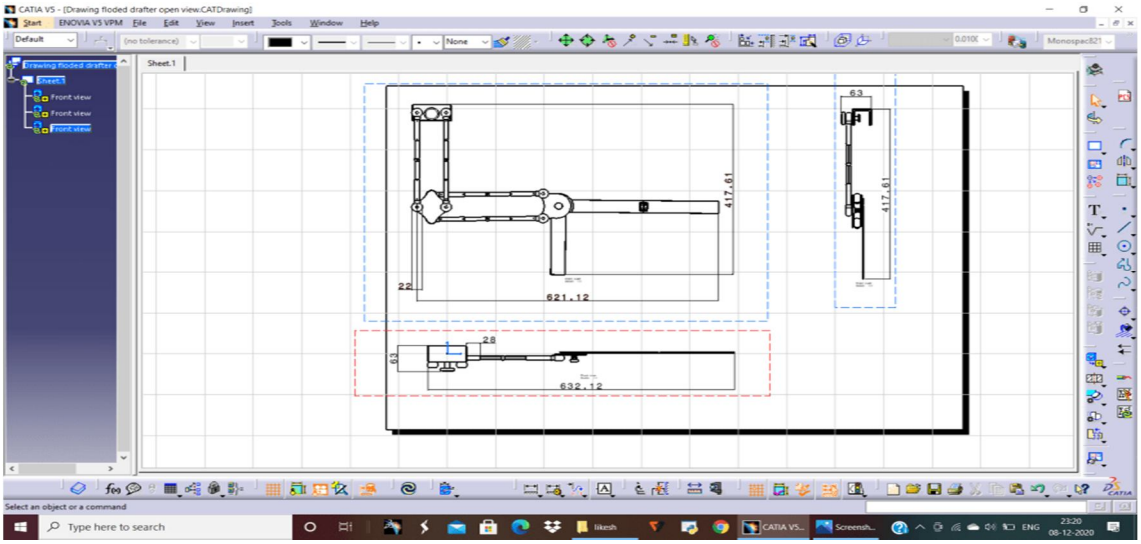


Figure No .3.01.Design Outline diagram of portable pocket drafter in extending condition and their appearance in different views.

In the above picture we showcased that the design outline assembly view of portable pocket drafter. The design outline appearance of the main parts in the pocket portable drafter in different views was illustrated below.

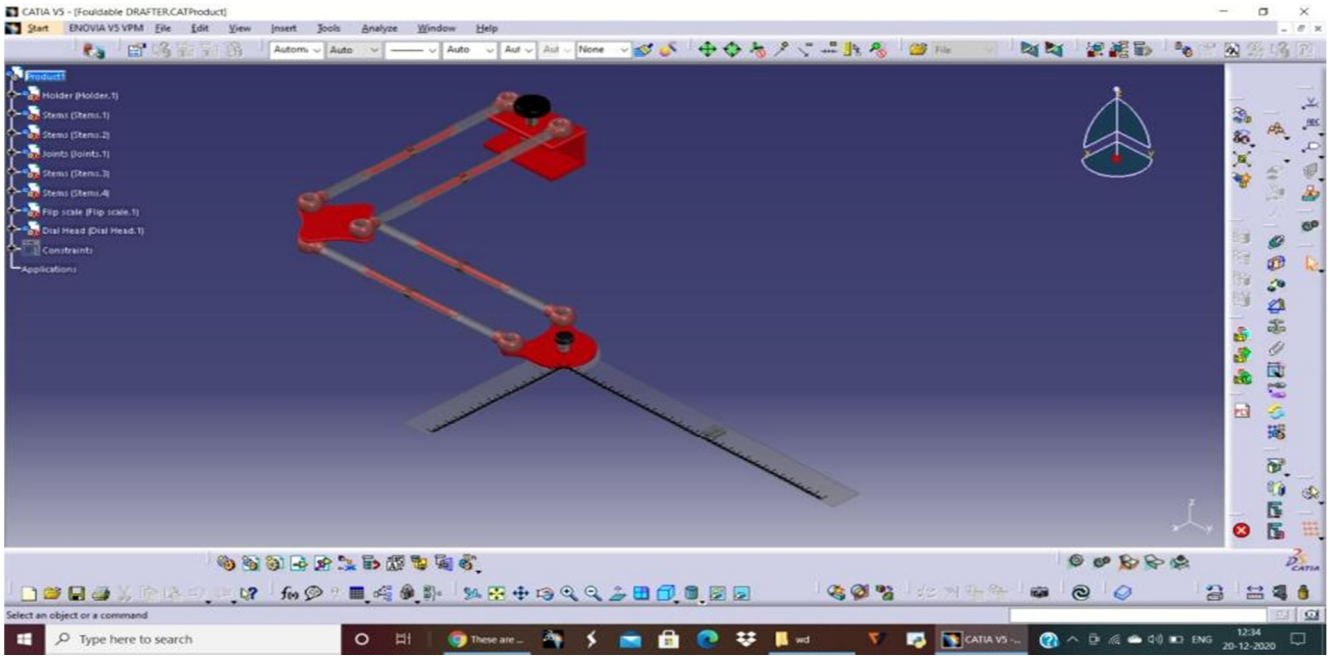


Figure No .3.01.(i).Design of 3D assembly diagram of portable pocket drafter in extending condition .

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue XII Dec 2020- Available at www.ijraset.com

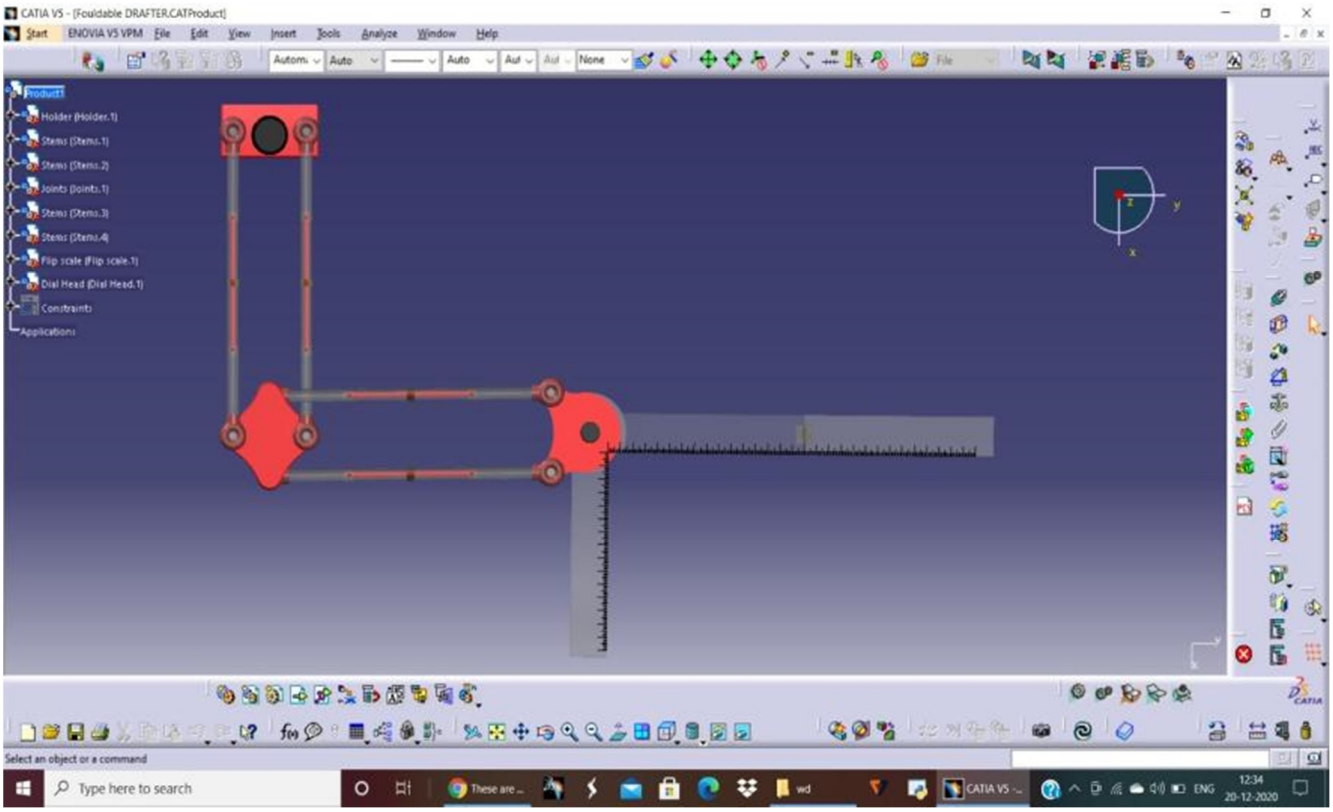


Figure No .3.01.(ii).Top-view- Design of 3D assembly diagram of portable pocket drafter in extending condition

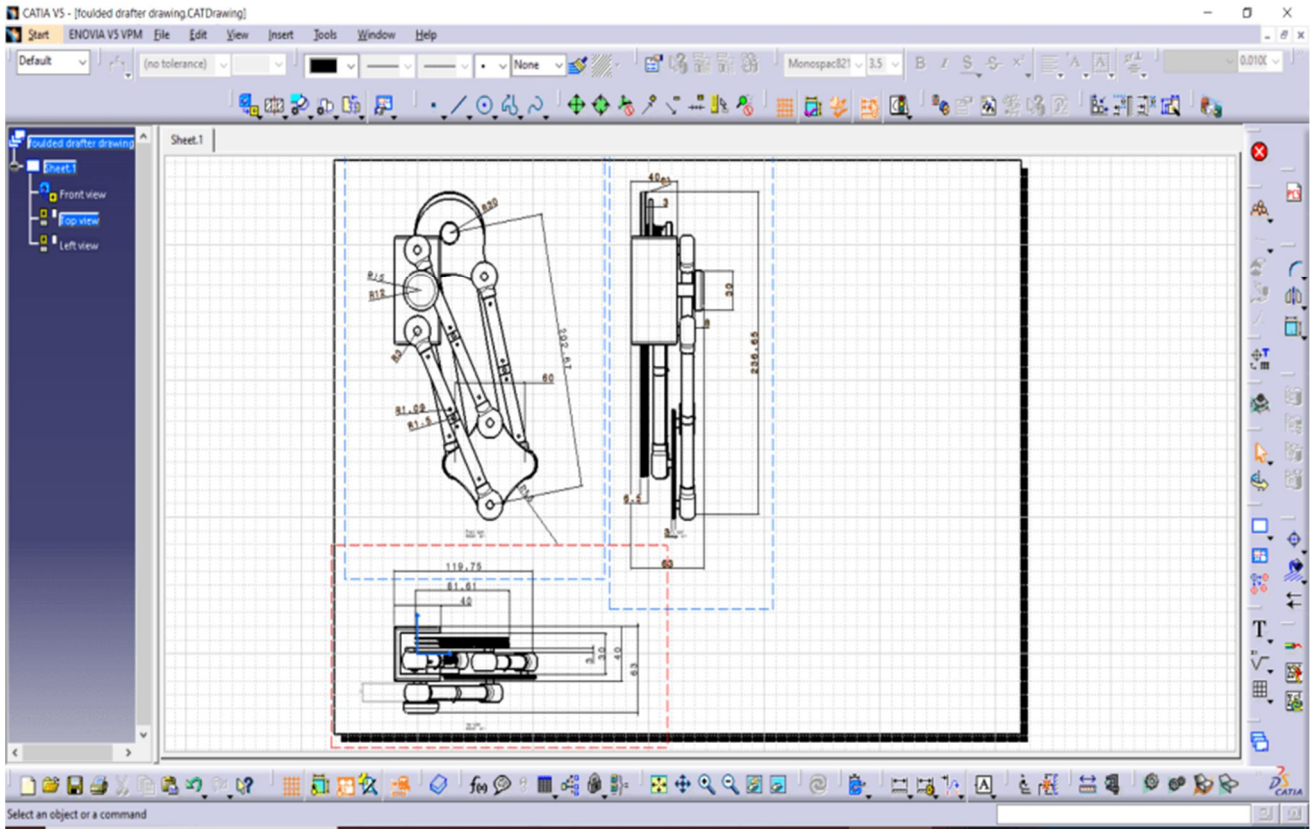


Figure No .3.02. Design Outline diagram of portable pocket drafter in Folding condition and their appearance in different views.

In the above picture we showcased that the design outline assembly view of portable pocket drafter in folding condition, the entire assembly unit would be folded

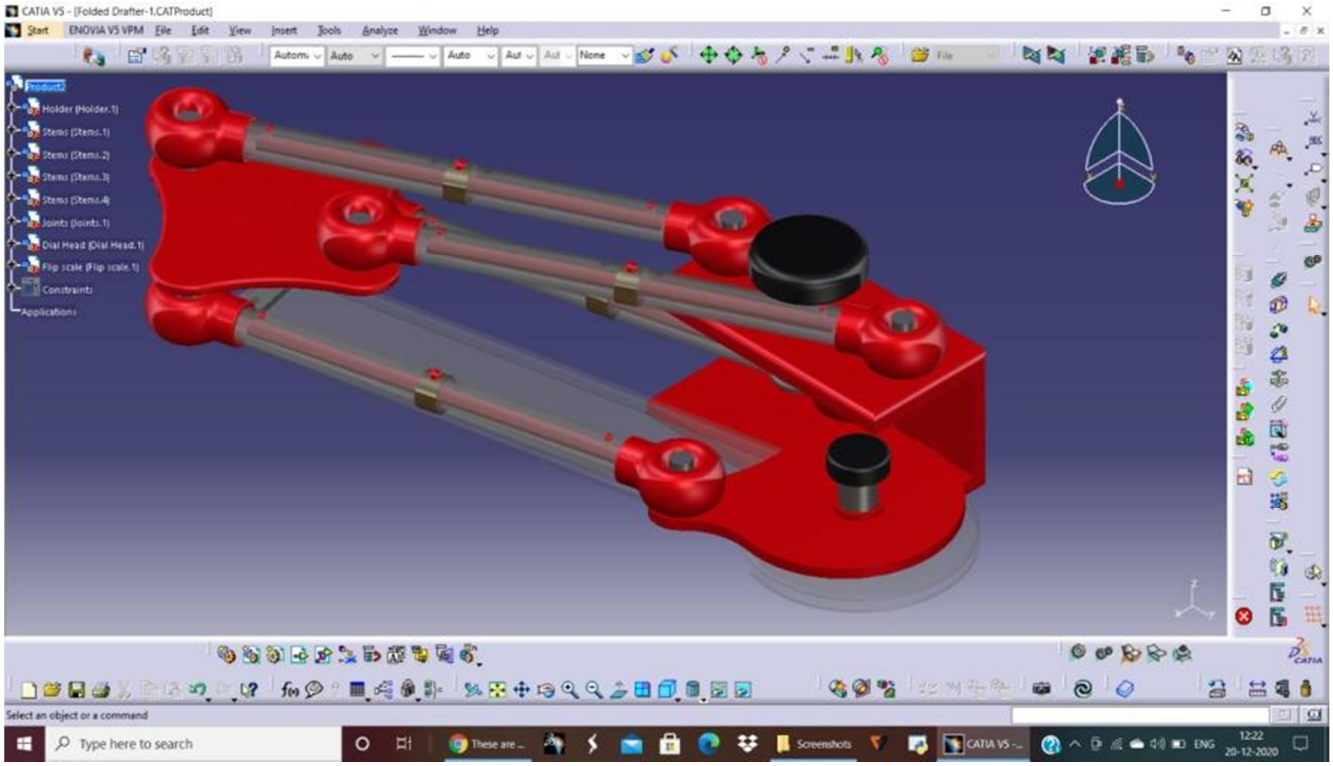


Figure No .3.02.(ii) Design of 3D assembly diagram of portable pocket drafter in folding condition.

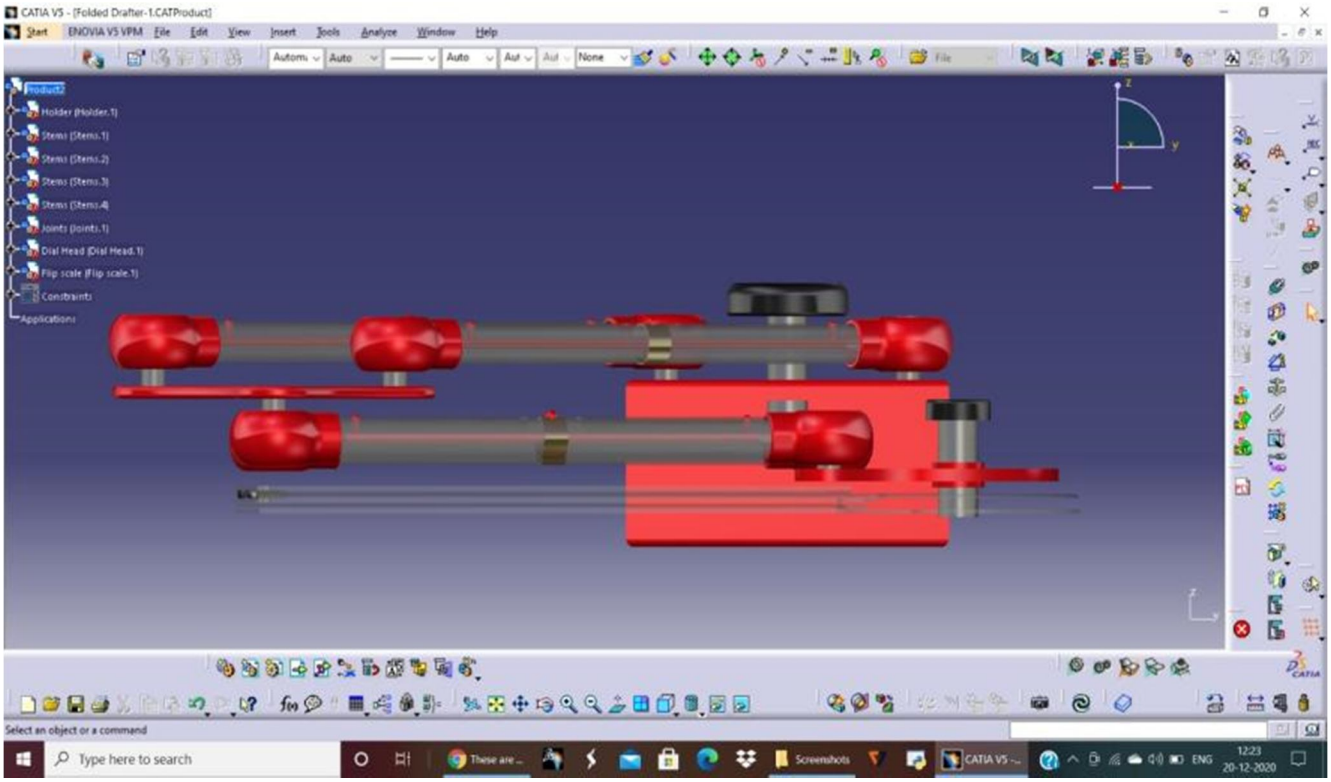


Figure No .3.02.(ii)Side View- Design of 3D assembly diagram of portable pocket drafter in folding condition.

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue XII Dec 2020- Available at www.ijraset.com

IV. ILLUSTRATION OF MAIN COMPONENTS

A. *Foldable Parallelogram Stem Bars*

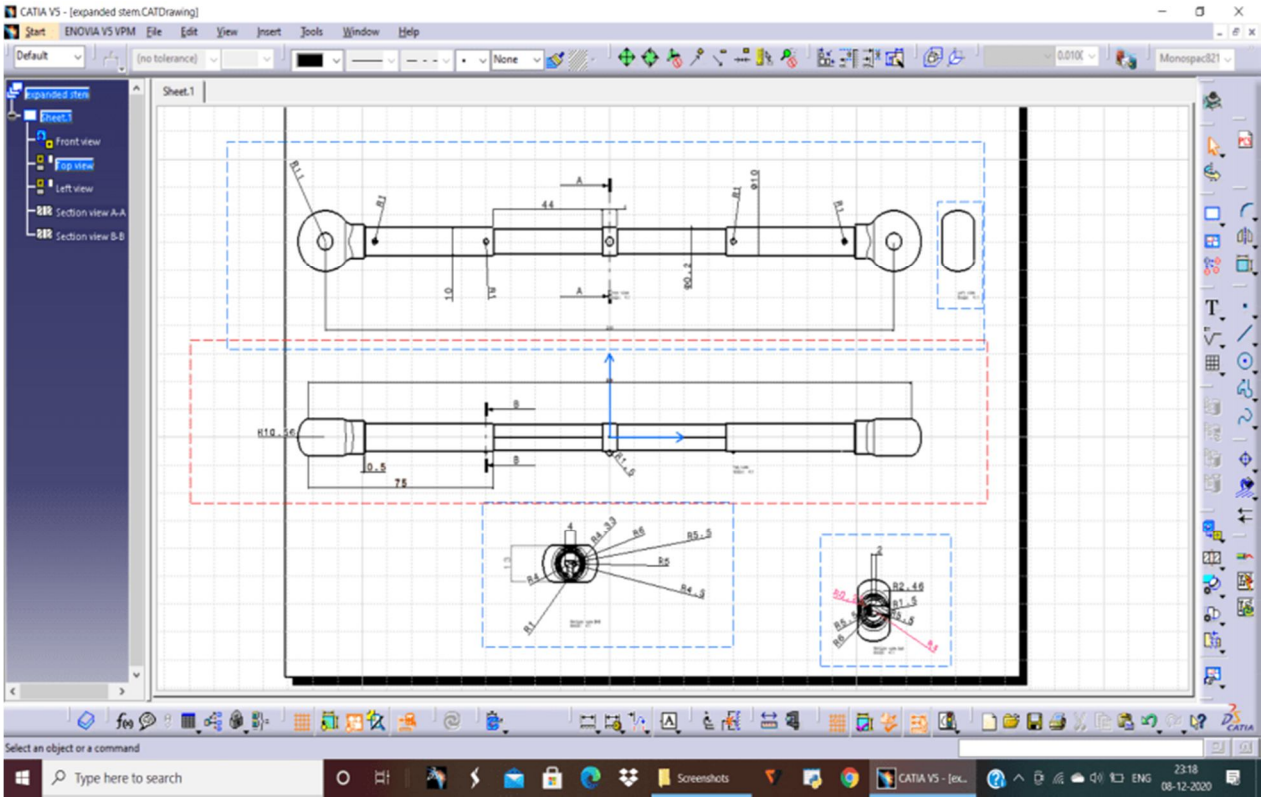


Figure No.3.1.1. Design outline diagram of foldable parallelogram stem bars with spring lock pin knob.

In the above picture we drawn that the design outline diagram of a foldable parallelogram stem bars with spring lock pin knob, a key component of a portable pocket drafter and their appearance in different views. In this portable pocket drafter consists four foldable parallelogram stem bars as same as we shown in the above picture.

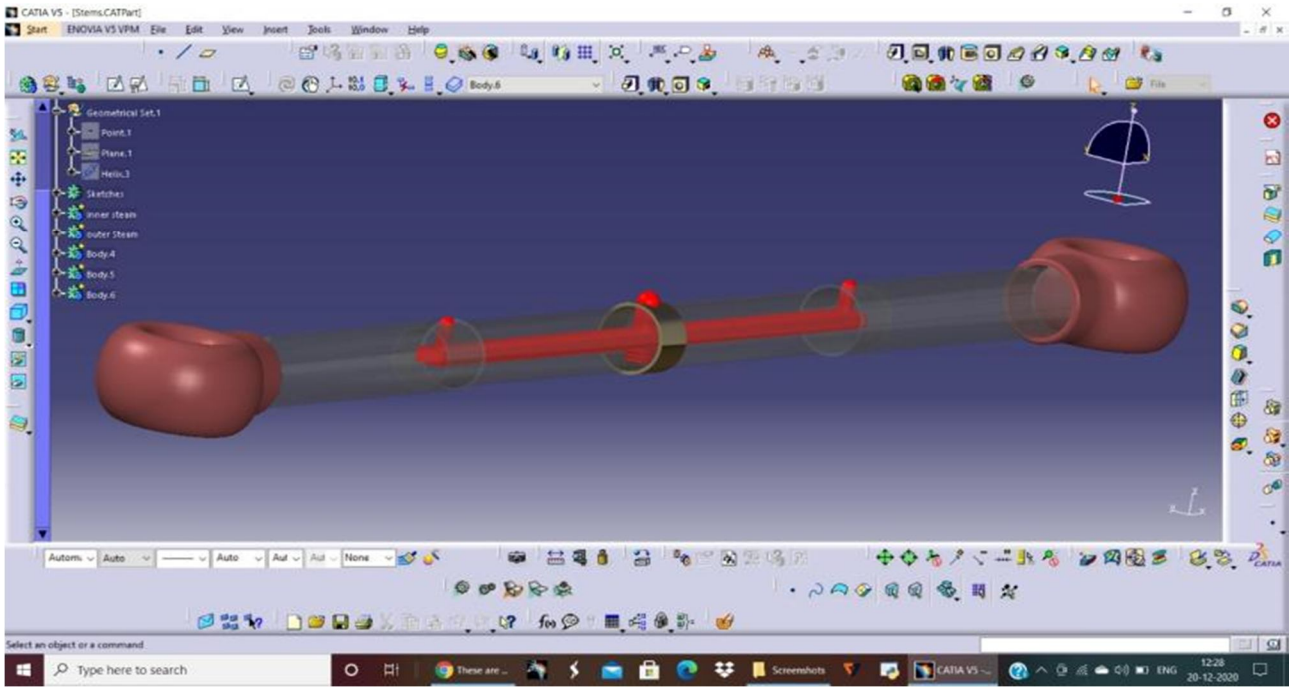


Figure No.3.1.1.(i).Design of 3D assembly diagram of foldable parallelogram stem bars with spring lock pin knob.

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue XII Dec 2020- Available at www.ijraset.com

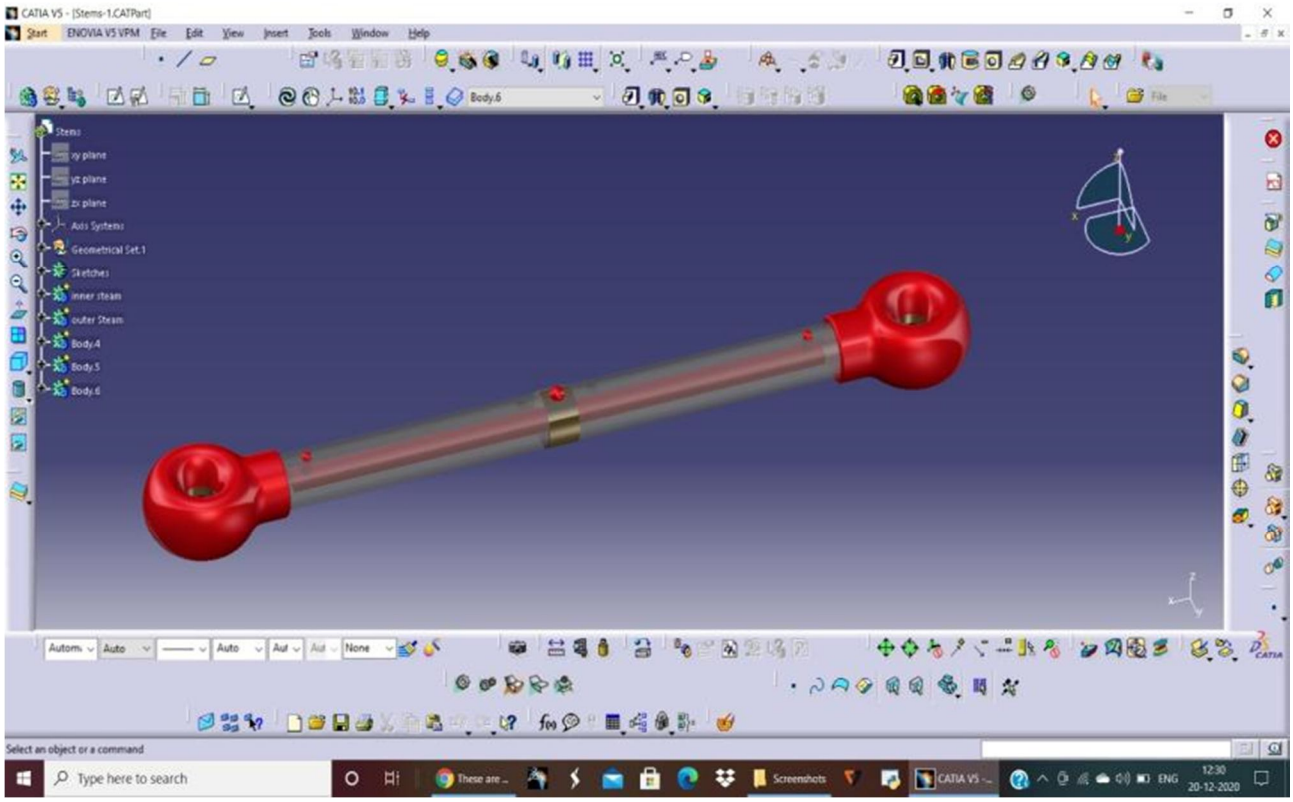


Figure No.3.1.1.(ii).Design of 3D assembly diagram of foldable parallelogram stem bars with spring lock pin knob. And in this picture we have shown the out view of stems in folding condition.

B. Flip Scales

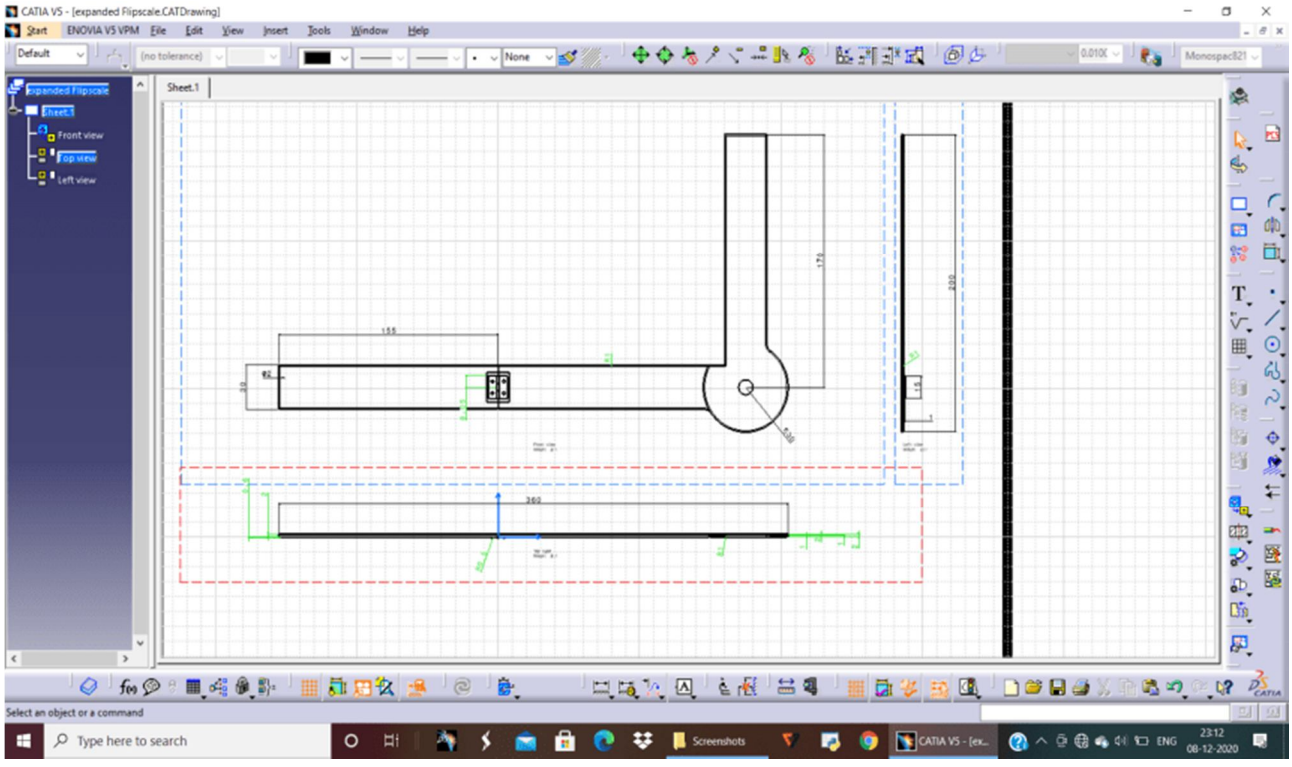


Figure No.3.1.2. Design outline diagram of both flip scale unit and short scale.

In the above picture we shown that the design outline diagram of a flip scales, a other key component of a portable pocket drafter and their appearance in different views. In this portable pocket drafter consists of long scale with flipping mechanism action and it in-corporate with short scale with protractor

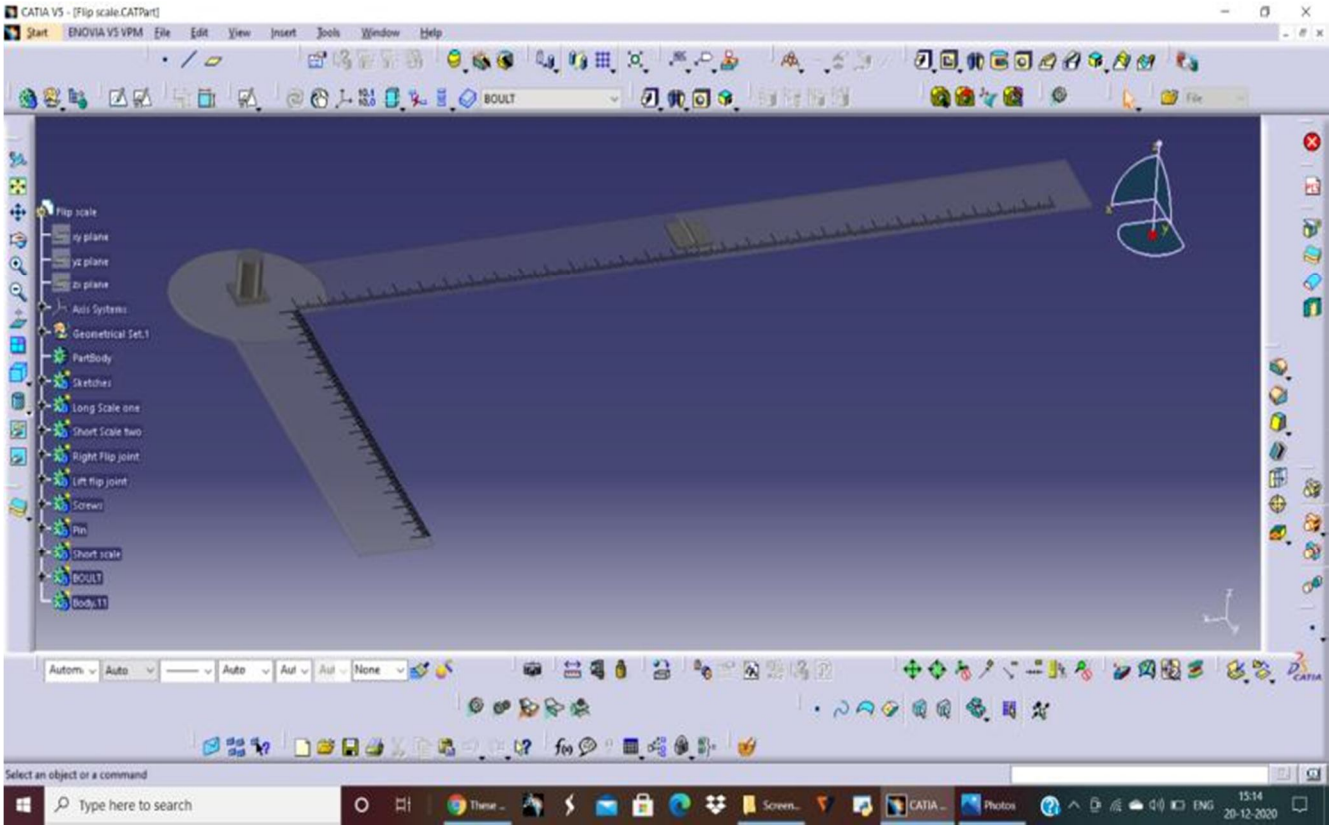


Figure No.3.1.2.(i). Design of 3D assembly diagram of flip scale unit and small scale in both enlarging condition and flipping condition

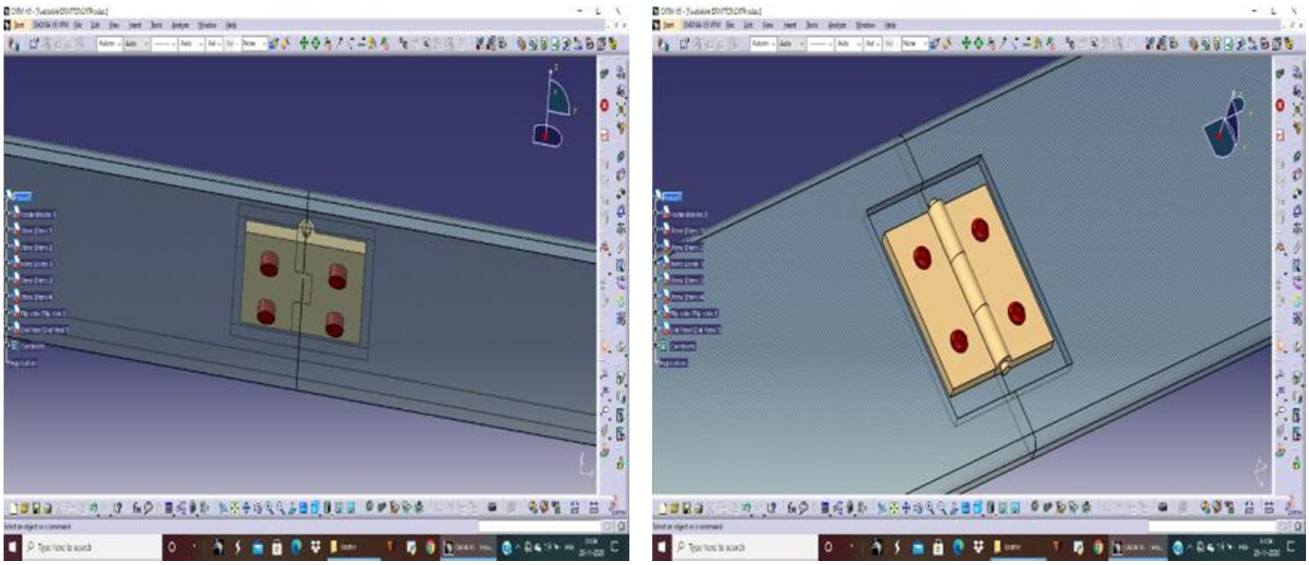


Figure No.3.1.2.(ii).Design of 3D assembly diagram of flip scale linkages in both top and bottom view.

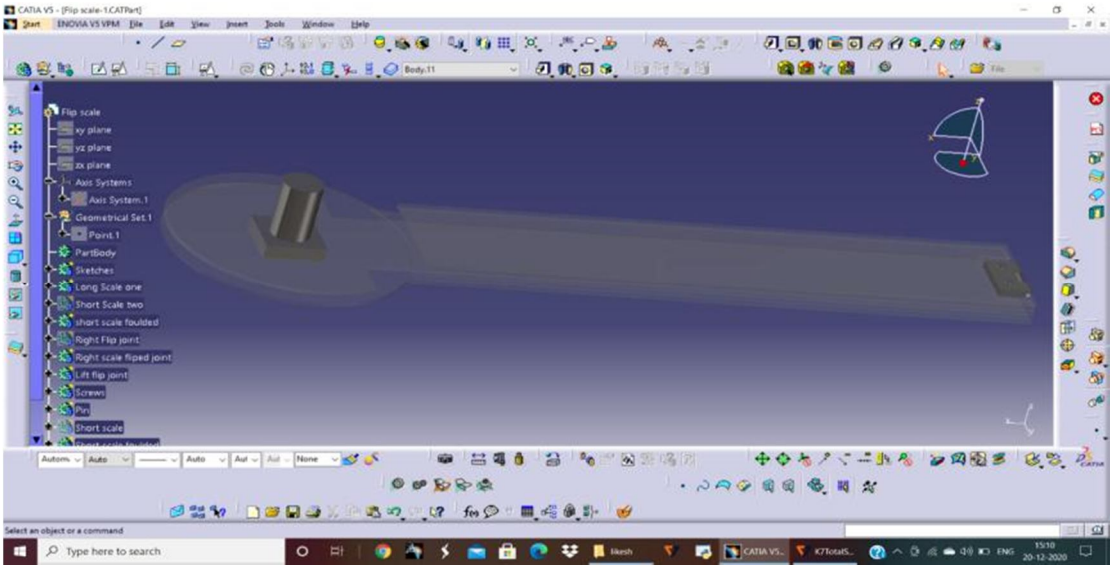


Figure No.3.1.2.(ii).Design of 3D assembly diagram of flip scale unit and short scale ,their appearance in different views.

V. FUTURE SCOPE

To provide better evidence of the usefulness of this system, future research addresses the following issues: It can be extended with automatic locking and unlocking of the foldable parallelogram as the parallelograms stem bars in the present system folds in the hollow tube by automatic operated unit by advanced electronics. We can also plan to perform the folding of scales automatically and also distinguishing the type of it, locking and unlocking, by using an appropriate operated electronic network. The results of this work can also be used for the mechanism training process. It should be noted and understood that with respect to the embodiments of the present work done, the ideas suggested may be modified or substituted in smart way to achieve the general overall result with high efficiency.

VI. CONCLUSION

The method of proposed system of Portable pocket engineering drafter is going to make a revolution in physical drafting , design and the user can handle while drafting a mechanical component in which drafter was molded to adopt nature. Due to the foldable nature of the mechanical units in the engineering drafter enhances flexibility finds application in a large number of fields. The "Portable pocket engineering drafter" will significantly help in improving the flexibility level of the current engineering drafter. Portable pocket engineering drafter is going to shape the future of engineering drafter and will serve our hands with magical flexible experience. Most importantly, the proposed flexible system is practically feasible as well as implementable.

REFERENCES

[1] Hafif Taarruz Uçağı için Katlanabilir İniş Takımı Tasarımı ve Analizi
[2] Durmu¸s Karayel, S. Serdar Ozkan, and Fahri Vatansever. Integrated knowledge-based system for machine design. Advances in Mechanical Engineering, 2013, 2013.
[3] C. K.M. Lee, H. C.W. Lau, and K. M. Yu. An objectbased knowledge integration system for product development a case study. Journal of Manufacturing Technology Management, 16(2):156–177, 2005.
[4] S. Klancnik, M. Brezocnik, and J Balic. Intelligent CAD/CAM system for programming of CNC machine tools. International Journal of Simulation Modelling, 15(1):109–120, 2016.
[5] Ying Hua Liao, Gao Jun Liu, and Xiang Guo Sun. Development of an intelligent CAD system for involute cylindrical gear cutting tools. In Applied Mechanics and Materials, volume 532, pages 249–252, 2014.
[6] Isad Saric, Nedim Pervan, Adil J. Muminovic, and Mirsad Colic. Development of integrated intelligent cad system for design of shafts. Tehnicki Vjesnik, 25(Supplement 1):99–104, may 2018.
[7] Isad Saric, Nedim Pervan, Adil J. Muminovic, and Mirsad Colic. Development of Integrated Intelligent Cad System for Design of Shafts. Tehni˘cki vjesnik, 25(Supplement 1):99–104, 2018.
[8] Nedim Pervan, Adis J. Muminovi´c, Adil Muminovi´c, and Muamer Deli´c. Development of Parametric CAD Model and Structural Analysis of the Car Jack. Advances in Science and Technology Research Journal, 13(3):24–30, sep 2019.
[9] Adis J. Muminovic, Isad Saric, and Nedzad Repcic. Analysis of stress concentration factors using different computer software solutions. In Procedia Engineering, volume 69, pages 609–615. Elsevier Ltd, jan 2014.
[10] Josef Kogan. Crane Design Theory and Calculations of reliability. Wiley, 1976.

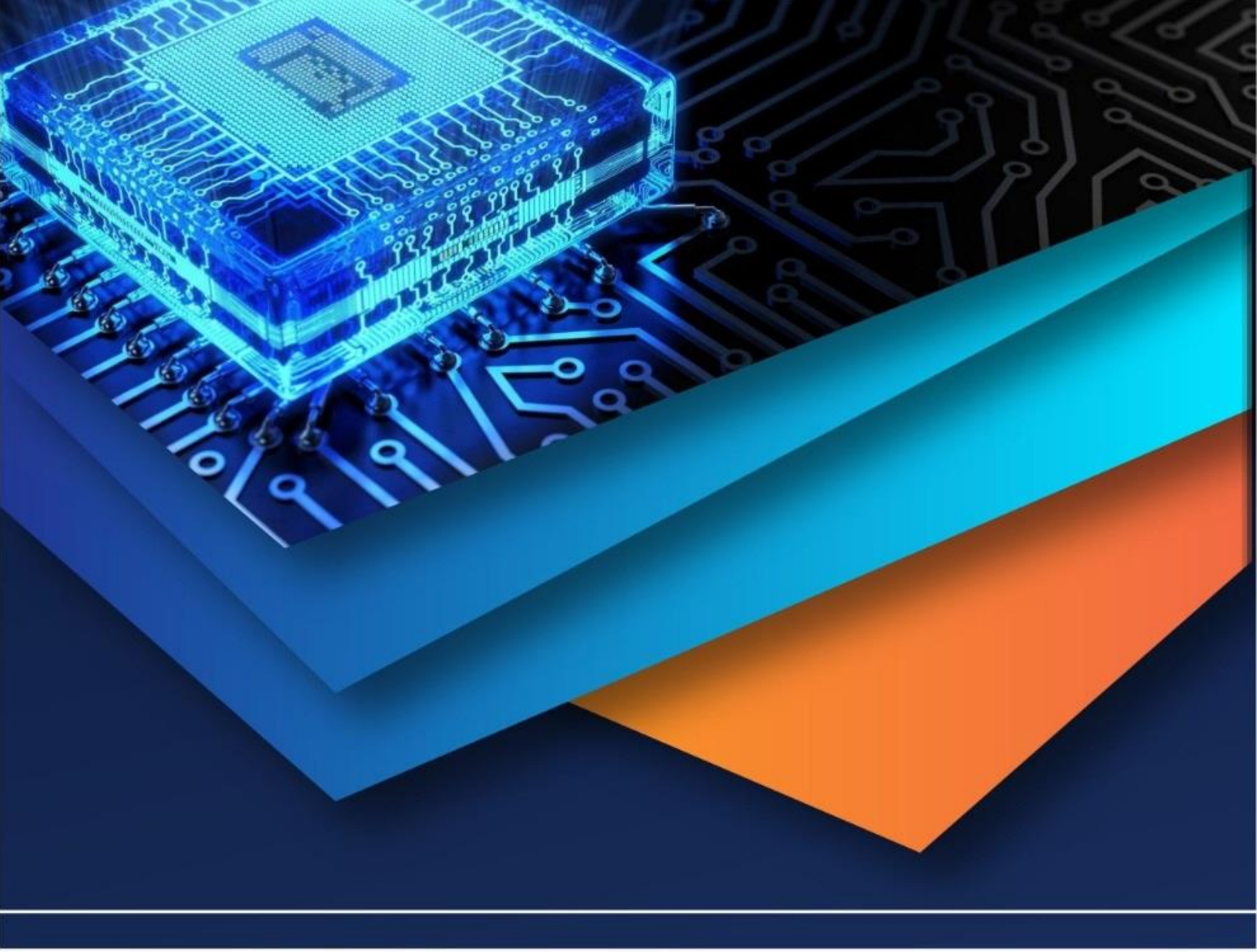
AUTHORS

First A. Author ,(M'22) NagaAnvesh G was born in gudivada,krishna district, Andhra Pradesh,INDIA in 1998.He received the Diploma in mechanical engineering from C.R.reddy college of Engineering and Technology, vatluru, Andhra Pradesh in 2014 . He is currently pursuing the B.TECH . degree in mechanical engineering at Sri Vasavi Engineering college, Peddatadepalli, Andhra Pradesh, INDIA.He has an experience as a trainee in hero and Bajaj Automobiles in 2013.He did his intern at BHEL, Hyderabad in 2019.He is a member of Entrepreneurship cell from Sri Vasavi engineering college.

Second B. Author ,(M'22) Likesh V was born in tanuku,west Godavari district, Andhra Pradesh,INDIA in 1998.He received the Diploma in mechanical engineering from at Sri Vasavi Engineering college, Peddatadepalli,Andhra Pradesh in 2014 . He is currently pursuing the B.TECH. degree in mechanical engineering at Sri Vasavi Engineering college, Peddatadepalli, Andhra Pradesh, INDIA. .He did his intern at BHEL, Hyderabad in 2019.

Third C . Author ,(M'21)Mr. Ravi Teja Sai M was born in Tadepalligudem,west godavari district, Andhra Pradesh,INDIA in 1999.He received the Diploma in mechanical engineering from Srivasavi college of Engineering and Technology, peddatadepalli, Andhra Pradesh in 2014 . He is currently pursuing the B.TECH degree in mechanical engineering at Sri VASAVI Engineering college, peddatadepalli, Andhra Pradesh, INDIA.He has an experience as a trainee in Mahendra Automobiles in 2013.He is a member of Entrepreneurship cell from Sri Vasavi sengineering college.

Forth D. Author , (M'21) Raghu Varma G was born in gudivada,krishna district, Andhra Pradesh,INDIA in 1999.He received the Diploma in mechanical engineering from C.R.reddy college of Engineering and Technology, vatluru, Andhra Pradesh in 2014 . He is currently pursuing the B.TECH . degree in mechanical engineering at Sri Vasavi Engineering college, Peddatadepalli, Andhra Pradesh, INDIA. He has an experience as a trainee in hero



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY