ISSN No.: 2456-2165

LOGIN

CALL FOR PAPERS

Paper Submission Last Date
31 - August - 2021

Paper Review Notification
In 1-2 Days

Paper Publishing
In 2-3 Days

SUBMIT YOUR PAPER

LATEST UPDATES

Processing Charges Details.
Click Here

Last Date of Paper Submission is 31- August- 2021.
Click here to submit paper.

Join as Reviewer
Join now

If you getting any problem you can read FAQ

Click Here

IJISRT Impact Factor has been Improved (2020);
click here

LATEST VOLUME ISSUE

Issue 8 - August
Volume 6 - 2021

Issue 7 - July
Volume 6 - 2021

Issue 6 - June
Volume 6 - 2021

Issue 5 - May
Volume 6 - 2021

Issue 4 - April
Volume 6 - 2021

Research Paper Publishing

IJISRT (International Journal of Innovative Science and Research Technology) is an open access peer-reviewed international platform where publishing of top quality and referred papers from highly intellectual scientists and engineers are welcomed. Originality is primarily focused here. Papers with original research are highly appreciated. Authors can also submit the extended versions of previously published conference/ research papers. Peer review selection procedure is used to select the papers for publication thus ensuring the uniqueness, relevance, and readability. The high visibility of published papers to the scientific community is greatly determined by the wide indexing policy used by **IJISRT**. that's we come in the list of top ***paper publishing sites***.

This open journal is exceptionally specific which covers all the points that speak to a wide readership of different branches of science, engineering and other related fields. The IJISRT has numerous advantages all intended towards reinforcing research abilities and propelling academic careers. Academic career advancement is highly influenced by ***Research Paper Publication***.

We ease the **scientific research publishing** in different branches of M Tech such as Mechanical, Computer Science, Information Technology, Electrical and Electronics & Communication by facilitating our authors with high class information, exposure and innovative tools thus enhancing their productivity and ability to take important decisions.

Why IJISRT?

- Scribd, Google Scholar, Slideshare , Academia, Pubmed(Bibliography) are some of the platforms where you can find IJISRT indexed.
- Looking for Open Access Journal, International, Peer Reviewed platform for ***paper publication in journals***, than IJISRT is the right choice.
- Simple and speedy paper publishing processing
- Each author is provided with individual eCertificate
- Promotes your articles along with increasing their visibility by providing Open Access Journal Database
- Online submission facilitates the authors by allowing them to submit their papers at anytime and from anywhere.
- Register and get your paper published in the current issue
- Research and technical papers at IJISRT are accepted only on the basis of their originality and quality.
- "Any time download of full length paper" facility is available to the authors
- 24 hours is the maximum time which IJISRT takes in resolving the queries of authors.

So ***Call for Papers in Journals*** now!

SJIF Impact Factor : 6.253

OUR INDEXING PARTNERS

Google Scholar
publons
Scribd. The world's digital library.
INTERNATIONAL Scientific Indexing
ESJI Eurasian Scientific Journal Index www.ESJIndex.org
SJIFactor
TOGETHER WE REACH THE GOAL
Academic Resource Index ResearchBib
ISSN INTERNATIONAL STANDARD SERIAL NUMBER
DRJI
I2OR
issuu
Academia.edu share research
INDEX COPERNICUS INTERNATIONAL
PubMed Bibliography

CONTACT US
IJISRT | A Digital Library
11/197, 3rd floor, Bhrigu path, Mansarovar, Jaipur, Rajasthan, India-302020

FOLLOW US

Copyright 2019 IJISRT | All Rights Reserved
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

INTERNATIONAL JOURNAL OF INNOVATIVE SCIENCE AND RESEARCH TECHNOLOGY
IJISRT A DIGITAL LIBRARY
ISSN NO : 2456-2165

ISSN No.: 2456-2165
LOGIN

CALL FOR PAPERS
Paper Submission Last Date
31 - August - 2021
Paper Review Notification
In 1-2 Days
Paper Publishing
In 2-3 Days
SUBMIT YOUR PAPER

LATEST UPDATES
IJISRT Impact Factor has been Improved (2020); click here

LATEST VOLUME ISSUE
Issue 8 - August
Volume 6 - 2021
Issue 7 - July
Volume 6 - 2021
Issue 6 - June
Volume 6 - 2021
Issue 5 - May
Volume 6 - 2021
Issue 4 - April
Volume 6 - 2021

INTERNATIONAL JOURNAL OF INNOVATIVE SCIENCE AND RESEARCH TECHNOLOGY
SUBMIT YOUR PAPER

SJIF Impact Factor : 6.253

OUR INDEXING PARTNERS

Manish Gupta (IJISRTREW100)
| Assistant professor | ECE Dept.| VIT jaipur | Rajasthan | India

Hemant Purohit (IJISRTREW77)
| Professor & HOD ECE dept.| JIET | Jodhpur | Rajasthan | India

Jai Prakash Mishra (IJISRTREW13)
| Assistant Professor| ECE Dept.| VIT Jaipur | Rajasthan |India

Harsh Gupta (IJISRTREW02)
| Micro Electronics Dept. | Manipal University | Jaipur | Rajasthan | India

Diwakar Gautam (IJISRTREW05)
| Assistant professor | CE Dept. | Sharda University

Tarun Badiwal (IJISRTREW09)
| Assistant Professor | Electrical Dept. | Jagannath University | Jaipur | Rajasthan | India

Virendra Swami (IJISRTREW105)
| Assistant Professor | ECE Dept. | Maharshi Arvind college| Jaipur |Rajasthan | India

Nishant Chauhan (IJISRTREW79)
| Assistant Professor | Electrical Dept. | Mahershi Arvind College| Jaipur | Rajasthan | India

Prince Ja.cob (IJISRTREW91)
| Assistant Professor | Electrical Dept. | Mahershi Arvind College| Jaipur | Rajasthan | India

Dr.S.Saira Banu (IJISRTREW10)
| Associate Professor | ECE Dept. | Karpagam University| Coimbatore | Tamil Nadu | India

Balaji Velusamy (IJISRTREW500)
| Associate Professor | Info Institute of Engineering| Coimbatore | Tamil Nadu | India

Lalit Mohan Nainwal (IJISRTREW501)
|School of Pharmaceutical Sciences and Research| Jamia Hamdard| Delhi | India

Bais Nirav Kishorkumar (IJISRTREW502)
|Assistant Professor|Ganpat University-Institute of Technology| Ahmedabad| Gujarat | India

Raj Kumar Gupta (IJISRTREW503)
|Assistant Professor|Amity University| Jaipur| Rajasthan | India

Dr. Neeta Saxena (IJISRTREW504)
|Assistant Professor|Amity University| Gwalior| Madhya Pradesh | India

Dr. Nageswara Rao Moparthi (IJISRTREW505)
|Associate Professor| Velagapudi Ramakrishna Siddhartha Engineering College| Vijayawada | Andhra Pradesh | India

R. Narendran (IJISRTREW506)
|Faculty of Marine Sciences| Annamalai University| Parangipettai | Tamil Nadu | India

Mahadeva.M (IJISRTREW507)
|Assistant Professor| Shri Pillappa College of Engineering | Bangalore| Karnataka| India

Dr. Richa Mehrotra (IJISRTREW508)
|Assistant Professor| Amity University | Bangalore| Uttar Pradesh | India

Dr. Chetan. S. Patali. (IJISRTREW509)
|Principal | Dhanush Institute of Nursing, Behind Durga Vihar | Bagalkot | India

Suvarna S Pinnapati (IJISRTREW510)
| Vice Principal | Dhanush Institute of Nursing Sciences | Bagalkot | India

Nugzar Aleksidze (IJISRTREW511)
| Professor of the Chair of Biochemistry and Biotechnology of Iv. Javakhishvili Tbilisi State University |Georgia|

Dr. Abdul Rahmat (IJISRTREW513)
| Professor at Gorontalo State University | Gorontalo | Indonesia |

Elhadi Ibrahim Miskeen (IJISRTREW514)
| Faculty of Medicine, University of Bisha | Bisha | Saudi Arabia|

Dr. Ming-An Chung (IJISRTREW515)
| MICROELECTRONICS TECHNOLOGY Inc., | | Taiwan |

Selwa Yousif Abdeldafie Mohammed (IJISRTREW516)
| Assistant professor in Pediatric Nursing/ Nursing Department, | | KSA |

MOHD. MUNTJIR (IJISRTREW517)
| At Taif University | | Saudi Arabia|

RAJESH A S (IJISRTREW518)
| Assistant Professor in the Department of Mechanical Engineering at MIT | Mysuru | India |

Anyira, Isaac Echezonam (CLN) (IJISRTREW519)
| Lecturer in the Department of Library and Information Science | Ogwashi-Uku| Nigeria|

Dr. MEHBOOB ALAM PASHA (IJISRTREW520)
| Associate Professor of Surgery ,Faculty of Medicine | Kedah | Malaysia|

Ahmed Abdelhalim Mohamed (IJISRTREW521)
| Department of Geology, Faculty of Science, Assiut University | Assiut | Egypt |

Lateef Ayodele AGBETUNDE (IJISRTREW522)
| Fountain University | Osogbo | Nigeria |

OTUU CHIDIEBERE AGHA (IJISRTREW523)
| Department of Zoology and Environmental Biology | Nsukka | Nigeria |

Yeap Kim Huat (IJISRTREW524)
| Westlake International School Position : A-Level Physics Teacher | Kampar | Malaysia|

Luqman Kareem SALATI (IJISRTREW525)
| Department of Mineral & Petroleum Resources Engineering, Kaduna Polytechnic | Kaduna| Nigeria |

Mostafa Ibrahim Hassan (IJISRTREW526)
| Zoology Department, Faculty of Science (Men) , Al-Azhar University | Nasr City, Cairo | Egypt |

Dibua Emmanuel Chijioke (IJISRTREW527)
| Nnamdi Azikiwe University | Awka | Nigeria |

Dr. Mochammad Munir Rachman (IJISRTREW528)
| The designation as Lecturer of Faculty Economic and Business | Surabaya | Indonesia|

Akinola Yinka Paul Ojelade (IJISRTREW529)
| The Provost, Federal College of Education | Abeokuta | Nigeria |

Dr. PRAKASH BETHAPUDI (IJISRTREW530)
| VIGNAN Institute of Engineering for Women, HOD, IT | Visakhapatnam | India |

Dr. T. velumani (IJISRTREW531)
| Assistant Professor , Rathinam College of Arts and Science(Autonomous) | Coimbatore | India |

PANCHAL RONAKKUMAR KANTILAL (IJISRTREW532)
| Assistant Professor in Vidyabharti Trust College of BBA & BCA | Umrakh | India |

RAGHAVENDRA D (IJISRTREW533)
| Assistant Professor at Department of Civil Engineering, , Don Bosco Institute of Technology | New Delhi | India |

D. Vijaychendar (IJISRTREW534)
| LECTURER IN R.K.L.K College of Education | Suryapet | India |

Ajay B. Gadicha (IJISRTREW535)
| .R.Pote College of Engg and Management Amravati as Assistant Professor in Computer Sci. & Engg Department | Amravati | India |

Dr. Neshat Anjum (IJISRTREW536)
| Assistant Professor, Aligarh Muslim University | Aligarh | India |

PREM KUMAR (IJISRTREW537)
| Project Fellow under UGC-SAP (DRS II) research project at Dept | Pondicherry | India |

BHARATH V (IJISRTREW538)
| Assistant Professor, Brindavan College of Engineering, Yelahanka | Bangalore | India |

Dr. AMRITA MEHTA (IJISRTREW539)
| Lecturer in Department of MBA in Singhania University | Udaipur | India |

Dr.G. Vedanthadesikan (IJISRTREW540)
| Associate Professor & Director Centre for Rural Development Annamalai University | Annamalainagar | India |

SOUPTIK BHATTACHARYA (IJISRTREW541)
| Executive Civil Engineer, Baguiati | Kolkata | India |

Dr. R. RAJESHKANNA (IJISRTREW542)
| Associate Professor and Head, Department of Information Technology at Dr.N.G.P Arts & Science College | Coimbatore | India |

Dr. Y. Md. Riyazuddin (IJISRTREW543)
| Assistant Professor Dept of IT, GITAM University | Hyderabad | India |

Dr. BALAJI. A. P. B (IJISRTREW544)
| Senior Research Scientist- Analytical Chemistry Division" in Vanta Bioscience Pvt Ltd | Chennai | India |

Dr. UMESH KUMAR SHARMA (IJISRTREW545)
| Professor Academic Council meetings and other day to day administrative activities in an University | | India |

Dr. Tamilselvan (IJISRTREW546)
| Associate Professor, KMCH College of Pharmacy | Coimbatore | India |

Dr.Somnath Thigale (IJISRTREW547)
| Coordinator for IIT Bombay's AAKASH for Education | Mumbai | India |

Maya Kumari (IJISRTREW548)
| Assistant Professor, Amity University | Noida | India |

Dr. ABHISHEK JHA (IJISRTREW549)
| Content Developer and faculty for CSIR NET LIFE SCIENCES at Delhi Academy of Medical Sciences | Dehli | India |

Dr. M. VINOD KUMAR (IJISRTREW550)
| Associate professor in Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology | Chennai | India |

Jaime L. Coyne (Berry) (IJISRTREW551)
| Associate Professor, Department of School of Teaching & Learning College of Education Sam Houston State University | Huntsville | Texas |

DR. SHAILENDRA YADAV (IJISRTREW552)
| Assistant professor, Department of chemistry ,(Basic sciences) A.K.S. UNIVERSITY | SATNA | India |

Dr. ANNIE P. ALEXANDER (IJISRTREW553)
| Vice Principal & HOD Upasana College of Nursing | Kollam | India |

Dr. Manoj Kumar Banjare (IJISRTREW554)
| Assistance professor Biological and Chemical Sciences, MATS University | Pagaria | India |

Dr. A. SUJIN JOSE (IJISRTREW555)
| ASSOCIATE PROFESSOR NEW HORIZON COLLEGE OF ENGINEERING AND TECHNOLOGY | BANGLORE | India |

Dr. S. Gopinath (IJISRTREW556)
| Associate Professor, Karpagam Institute of Technology | Coimbatore | India |

Dr. N. SURESHKUMAR (IJISRTREW557)
| Associate Professor in ECE Dept A.V.S Engineering College | Salem | India |

Dr. Ashim Bora (IJISRTREW558)
| HoD & Associate Professor Department of Mathematics Diphu Government College | Diphu | India |

Dr. SANDEEP KAUR (IJISRTREW559)
| Assistant Professor (Department of Food Science) at MCM DAV College for Women, Sector 36 | Chandigarh | India |

SELVAGANAPATHY MANOHARAN (IJISRTREW560)
| Assistant Professor in CK COLLEGE OF ENGINEERING AND TECHNOLOGY | CUDDALORE | India |

Amarjeet Singh (IJISRTREW561)
| COD Pyramid College of Business & Technology | Phagwara | India |

Dr. R. SARAVANAN (IJISRTREW562)
| Associate Professor Balaji Institute of Technology & Science | Laknepally | India |

Dr. Arvind Kumar Shukla (IJISRTREW563)
| Assistant Professor at School of Computer Applications, IFTM University | Moradabad | India |

Dr. Ayad M. Fadhil Al-Quraishi (IJISRTREW564)
| Professor of Environmental Remote Sensing, and Head of the Environmental Engineering Department, College of Engineering | Erbil | Iraq |

Dr. K.V. SHALINI (IJISRTREW565)
| Assistant Professor Rathnavel Subramaniam College of Arts and Science | Coimbatore | India |

Dr. Devendra S. Shirode (IJISRTREW566)
| Associate Professor in Dr. D. Y. Patil College of Pharmacy | Pune | India |

Dr. Satish Geeri (IJISRTREW567)
| Associate Professor Pragati Engineering College | Surampalem | India |

V. PRADEEPA (IJISRTREW568)
| Assistant Professor Seethalakshmi Achi College for women | Pallathur | India |

Dr. S.THULASEE KRISHNA (IJISRTREW569)
| Professor in CSE at Chadalawada Ramanamma Engineering College | Tirupathi | India|

Dr. K. HUSSAIN (IJISRTREW570)
| Associate Professor Sharad Institute of Technology, College of Engineering | Yadrav | India |

Mohamed Ashik (IJISRTREW571)
| Assistant Professor in Statistics Department of Mathematics, Merit Arts and Science College | Tirunelveli | India |

Dr. SUBHASH LAXMAN GADHAVE (IJISRTREW572)
| Associate Professor in, Dr.D.Y.Patil Institute of Technology | Pimpri | India |

DR. WANJARA AMOS OTIENO (IJISRTREW573)
| Kisii University | Kisii | Kenya |

Dr. Pawan Singh (IJISRTREW574)
| Asst. professor IFTM University | Moradabad | India |

M.PARVATHY (IJISRTREW575)
| Lecturer Sethu Institute of Technology | Virudhunagar | India |

K.SRIPRASADH (IJISRTREW576)
| Associate Professor Computer science Engineering Department Thirumalai Engineering College | Kancheepuram | India |

R.BHOOPATHI (IJISRTREW577)
| Assistant Professor Grade -II Sri Sairam Engineering | Chennai | India |

Narendra Kumar (IJISRTREW578)
| Assistant Professor in the Department of Management Studies, Kumaun University | Nainital | India |

Dr. Ajay B. Gadicha (IJISRTREW579)
| Assistant Professor P.R.Pote College of Engg and Management | Amravati | India |

Dr. G.SWAMINATHAN (IJISRTREW580)
| Assistant professor SRM Institute of science and Technology | Chennai | India |

DR. ANIMESH KUMAR SHARMA (IJISRTREW581)
| S V College of Agricultural Engineering & Technology and Research Station, IGKV Campus | Raipur | India |

Dr. Anupam Tiwari (IJISRTREW582)
| Assistant Professor Janta Vaidik College | Meerut | India |

Dr. Anand Kumar (IJISRTREW583)
| Assistant Professor, Faculty of Commerce & Management, Maharishi University | Mundiya Purohitan | India |

Dr. Manoj Kumar Banjare (IJISRTREW584)
| Assistance professor Biological and Chemical Sciences, MATS University | Pagaria | India |

Dr. SRINIVASA RAO P (IJISRTREW585)
| Associate Professor in LENDI institute of Engineering and Technology | Vizianagaram | India |

Dr. T.velumani (IJISRTREW586)
| Assistant Professor in Department of Computer science at Kongu Arts & Science College | Coimbatore | India |

Dr. Shubham Agarwal (IJISRTREW587)
| Associate Professor New Delhi Institute of Management | New Delhi | India |

Dr. P. ALAGURAJA (IJISRTREW588)
| Associate Professor Jay Shriram Group of Institutions, Anna University | Tirunelveli | India |

Dr. Ramesh Saudagar Ghogare (IJISRTREW589)
| Assistant Professor chemistry at B. N. N. College | Thane | India |

Dr. RAGHU CHAND R (IJISRTREW590)
| Professor & Vice Principal, Department of Mechanical Engineering, Karavali Institute of Technology | Bondathila | India |

Dr. Ashim Bora (IJISRTREW591)
| HoD & Associate Professor Department of Mathematics Diphu Government College | Diphu | India |

Mekala Ramesh (IJISRTREW592)
| rofessor Science and Engineering Sri Ranganathar Institute of Engineering and Technology | Coimbatore | India |

Dr. Dnyaneshwar M.Mate (IJISRTREW593)
| Associate Professor JSPM's Rajarshi Shahu College of Engg. | Pune | India |

Dr. Vikas Kundu (IJISRTREW594)
| Principal Geeta College of Education | Sonepat | India |

Michael Halim (IJISRTREW595)
| MBBS and PhD Biomedical Science, University of Salford | Salford | United Kingdom |

Dr. Raghaw Saran (IJISRTREW596)
| Adjunct Professor, RAMDEOBABA COLLEGE of ENGINEERING and MANAGEMENT | Nagpur | India |

Shital Ashok Pawar (IJISRTREW597)
| Associate Professor, Bharati Vidyapeeth's College of Engineering for Women | Pune | India |

To get complete Reviewer list contact us at :- editor@ijisrt.com

DOWNLOADS
Certificate Hardcopy Form
Copyright Agreement Form
IJISRT Paper Temp
IJISRT Manuscript Template

USEFUL LINKS
What is Peer Review
Publishing Ethics
FAQ

OUR POLICIES
Refund & Cancellation Policies
Privacy Policy
Terms and Conditions

CONTACT US
IJISRT | A Digital Library
11/197, 3rd floor, Bhrigu path, Mansarovar, Jaipur, Rajasthan, India-302020
FOLLOW US

Copyright 2019 IJISRT | All Rights Reserved
This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

INTERNATIONAL JOURNAL OF INNOVATIVE SCIENCE AND RESEARCH TECHNOLOGY

IJISRT A DIGITAL LIBRARY

ISSN NO : 2456-2165

ISSN No.: 2456-2165

Volume 5 - 2020, Issue 7 - July

Small Cell Neuroendocrine Carcinoma of Tonsil – A Rare Occurrence

Author Name : Peoli Mukutawat; Anil Kumar Dhull; Vivek Kaushal; Rakesh Dhankhar; Rajeev Atri; Kunwar Prativyom

CITE/EXPERT DOWNLOAD

Eye Examination Techniques for Malingering Patients- A Review

Author Name : Janak Poudel; Premnath Krishnasamy; B.Optom; M. Optom

CITE/EXPERT DOWNLOAD

Impact of Government Interventions on Corona Virus Transmission in Nigeria

Author Name : Muhyideen Oloyede

SJIF Impact Factor : 6.253

OUR INDEXING PARTNERS

Google Scholar

publons

Scribd. The world's digital library.

Issue 4 - April
Volume 6 - 2021

Cardiovascular Biofluid Mechanics

Author Name : Parvati Rajesh

CITE/EXPERT DOWNLOAD

Geographic Information System (GIS) for Natural Resources Management in Rural Areas:- A Case Study of Village Jeeda, Block Goniana, District Bathinda (Punjab)

Author Name : Charanjeet Singh; Hardeep Singh

CITE/EXPERT DOWNLOAD

Nurses Perception of Biological Risk

Author Name : Rosa Elvira Minchala Urgilés; Ángel Efraín Palaguachi Tenecela; Luis Francisco Altamirano Cardenas; Pedro Carlos Martínez Suárez; Elvia Narcisa Godoy Durán; Andrés Alexis Ramírez-Coronel

CITE/EXPERT DOWNLOAD

The Effect of Training on Work Motivation and Its Impact on Employee Performance (Case Study at BPJS Ketenagakerjaan Headquarters)

Author Name : Mochammad Habibie; Ika Mustika

CITE/EXPERT DOWNLOAD

Zakah and its Utilization as Working Capital for Micro, Small and Medium Enterprises

Author Name : Zainal Arif; M. Nurzansyah

CITE/EXPERT DOWNLOAD

I2OR
issuu
Academia.edu share research
INDEX COPERNICUS INTERNATIONAL
PubMed Bibliography

Environmental Factors and Terminal Cancer Development- Review Article

Author Name : Urmil Shingala

CITE/EXPERT DOWNLOAD

Antenatal Education Model Based Gamification in Terms of Knowledge and Attitude Among Pregnant Women in the Antenatal Classes

Author Name : Erlin Chusnia Putri; Rasipin; Bedjo Santoso

CITE/EXPERT DOWNLOAD

The Effect of Water Content on the Gamma-ray Attenuation Factor of the Reactor Shielding Concrete

Author Name : S. Alhajali ; M. Boush.

CITE/EXPERT DOWNLOAD

Influence of Work Culture, Work Environment and Discipline of Work Safety in Safety Employees of Palm Plantation PT. XYZ in East Kalimantan

Author Name : Vaschalis David Suswanto; Kasmir

CITE/EXPERT DOWNLOAD

Calculation of Overall Equipment Effectiveness (OEE) in Rotary Machine 5 Feet in Order to Total Productive Maintenance Implementation

Author Name : Sigit Dwi Cahyono; Fourry Handoko; Nelly Budiharti

CITE/EXPERT DOWNLOAD

ISSN No:-2456-2165

Calculation of Overall Equipment Effectiveness (OEE) in Rotary Machine 5 Feet in Order to Total Productive Maintenance Implementation

Sigit Dwi Cahyono[1], Fourry Handoko[2], Nelly Budiharti[3]
[1,2,3] Student, Post-graduate Department of Industrial Engineering, ITN Malang

Abstract:- PT. Tri Tunggal Laksana is an industry that focusing on wood processing. During the production period, the tools have a high frequency of trouble. Total Productive Maintenance (TPM) has been recognized as one of the significant operation strategy to regain the production losses due to equipment inefficiency. Many organizations have implemented TPM to improve their equipment efficiency and to obtain the competitive advantage in the global market in terms of cost and quality. In the implementation of TPM in a manufacturing organization, both Human-oriented and Process-oriented strategy has been identified as critical success factors. Based on the problem background, the research do because Rotary Machine 5 Feet having so many trouble in July to December of 2019 during the production period. After the research is done, the average of OEE calculation is equal to 56.29%. It can be concluded that the effectiveness of the machine is still far from world class standard that is equal to 85%. Six big losses factors that contribute most to Rotary Machine effectiveness is Reduce Speed Losses that is 22,31%. According to the fishbone diagram analysis factors that causing the OEE is low can be identified so that improvement can be done immediately.

Keywords:- *Fishbone Diagram, Overall Equipment Effectiveness, Six Big Losses, Total Productive Maintenance.*

I. INTRODUCTION

In this competitive world, total elimination of waste is necessary for the survival of the organization. The wastes generated due to the failure shutdown of facilities that have been built, with huge investment and also waste such as defective products should be absolutely eliminated. The main goal of each industry is to obtain maximum profits by optimal utilization of resources. The problem faced by the company today is how to carry out the production process effectively and efficiently by utilizing existing resources both raw materials, production machinery and human resources. In fact, PT. Tri Tunggal Laksana as one of wood processing industry face a problem in Rotary machine having breakdown about 244.8 hours during July to December 2019.

TPM is one of a Lean Manufacturing (LM) tools focus on optimizing machine and process productivity and an important pillar in the continuous improvement process [1]. TPM is an innovative maintenance approach to eliminate failures/breakdowns, optimize equipment effectiveness, and promote autonomous maintenance by operators of daily activities involving all employees [2]. TPM is a maintenance and production program that is designed primarily to maximize the effectiveness of all tools through the participation, engagement and motivation of all staff / employees. The six major equipment losses, to zero, have been recognized as necessary for corporate survival. This approach emphasizes the role of teamwork, small group activities, and the participation of all employees to accomplish equipment improvement objectives. It challenges a sense of joint responsibility between operators and maintenance workers, not only to keep the machines running smoothly, but also to extend and optimize their overall performance. It is also defined as, bringing both functions (production and maintenance) togetherby a combination of good working practices, team working, and continuous improvement. TPM is intended to bring both functions (production and maintenance) together by a combination of good working practices, team working and continuous improvement. Based on the problems above, this study aims to: (1) assess the effectiveness of Rotary Machine 5 Feet using OEE. (2) defines the six big losses that occur in Rotary machine effectiveness. (3) Analyze cause and effect of the losses using fishbone diagram.

II. LITERATURES STUDY

Many companies try to improve their business performance through the application of TPM methods. Total productive maintenance (TPM) is an original idea from Nakajima (1988) that emphasizes the utilization and involvement of human resources and preventive maintenance systems to maximize the effectiveness of equipment by involving all departments and organizational functions [3].TPM is an innovative approach to maintenance that optimizes equipment effectiveness, eliminates breakdowns, and promotes autonomous maintenance by operators from day to day activities involving total employee. TPM is a maintenance and production program designed mainly to maximize the effectiveness of all tools through participation and motivation of all staff/employee and the basic practices of TPM are often called the “pillars” or “elements” of TPM.

Overall Equipment Effectiveness (OEE) is a measurement used to determine how efficiently a machine is running. OEE is a hierarchy of metrics that focuses on how effectively a manufacturing operation is utilized [4].

ISSN No:-2456-2165

The losses are divided into six major categories, which affect the overall performance of the equipment namely:

- Equipment failures/breakdown losses are the time losses and quantity losses caused by defective products.
- Set-up and adjustment losses are defined as time losses resulting from downtime and defective products that occur when production of one item ends and the equipment is adjusted to meet the requirements of another item.
- Idling and minor stop losses occur when the production is interrupted by a temporary malfunction or when a machine is idling.
- Reduced speed losses refer to the difference between equipment design speed and actual operating speed.
- Reduced yield losses occur during the early stages of production from machine start up to stabilization.
- Quality defects and reworks are losses in quality caused by malfunctioning of production equipment.

The first two losses are known as down time loss and are used to calculate availability of a machine. The third and fourth are speed losses that determine the performance efficiency and the final two losses are considered to be losses due to defects in the products. OEE is measured in terms of these six losses, which are function of availability rate, performance rate and quality rate of the machine, production line or factory [3].

OEE is an abbreviation for the manufacturing metric Overall Equipment Effectiveness. OEE takes into account the various sub components of the manufacturing process – Availability, Performance and Quality. After the various factors are taken into account the result is expressed as a percentage. This percentage can be viewed as a snapshot of the current production efficiency for a machine, line or cell. The process of OEE analysis is figure out in figure 1 below:

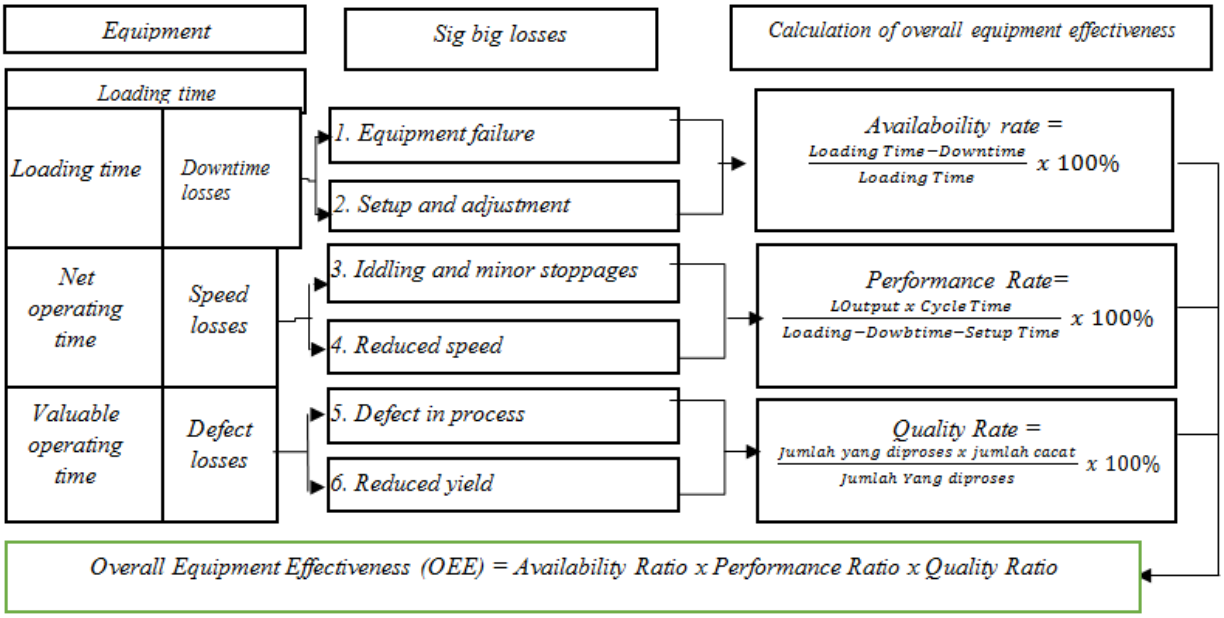

Fig 1:- Overall Equipment Effectiveness Process
Source: Nakajima (1988)

III. RESULT AND DISCUSSION

These are the production data of PT. Tri Tunggal Laksana on July to December 2019:

No.	Month	Raw Material (m^3)	Veneer (m^3)
1	July	1024.73	332.30
2	August	1114.61	218.25
3	September	1544.82	439.52
4	October	1814.03	677.96
5	November	2201.71	226.525
6	December	2518.65	144.974
Total		10218.55	2039.529

Table 1:- Production Data from July to December 2019

➢ *Measuring Availability Rate*

The availability is a percentage of time a machine is available to produce parts. The formula for this calculation is:

$$Availability\ Ratio = \frac{Loading\ Time - Downtime}{Loading\ Time}\ x\ 100\% \quad (1)$$

No.	Month	*Loading Time* (hour)	*Downtime* (hour)	*Availability Ratio* (%)
1	July	357.75	92.3	74.20
2	August	344.50	62.8	81.77
3	September	331.25	85.4	74.22
4	October	304.75	55.6	81.76
5	November	331.25	35.4	89.31
6	December	318.00	50.8	84.03
Average				80.88

Table 2:- Availability Rate Data of Rotary Machine

➢ *Measuring Performance Rate*

The performance metric is a pure measurement of speed that is designed to exclude the effect of quality and availability. The formula for calculating performance rate is:

$$Performance\ Ratio = \frac{Output\ x\ Ideal\ Cycle\ Time}{Operating\ Time}\ x\ 100\% \quad (2)$$

No.	Month	*Output* (m^3)	*Ideal Cycle Time* (hour)	*Operating Time* (hour/m^3)	*Performance Ratio* (%)
1	July	645.08	0.24	247.45	62.57
2	August	766.92	0.25	264.37	72.52
3	September	1033.56	0.16	229.18	72.16
4	October	1195.24	0.14	233.82	71.57
5	November	1500.19	0.14	279.18	75.23
6	December	1563.08	0.11	251.20	68.45
Average					70.41

Table 3:- Performance Rate Data of Rotary Machine

➢ *Measuring Quality Rate*

The quality metric is a pure measurement of process yield that is designed to exclude the effect of availability and performance. The formula for calculating quality is:

$$Quality\ Ratio = \frac{Output - Rejuced\ Yield - Reject}{Output}\ x\ 100\% \quad (3)$$

No.	Month	*Output* (m^3)	*Reduced Yield* (m^3)	*Reject* (m^3)	*Quality Ratio* (%)
1	July	1000.85	8.20	0	98.73
2	August	1021.02	2.56	0	99.67
3	September	1432.12	6.71	0	99.35
4	October	1666.45	3.45	0	99.71
5	November	1935.18	26.80	0	98.21
6	December	2302.77	40.85	0	97.39
Average					98.84

Table 4:- Quality Rate Data of Rotary Machine

➢ *Measuring Overall Equipment Effectiveness*

OEE = *Availability* x *Performance* x *Quality* (4)

No.	Month	*Availability Ratio* (%)	*Performance Ratio* (%)	*Quality Ratio* (%)	*OEE* (%)
1	July	74.20	62.57	98.73	45.84
2	August	81.77	72.52	99.67	59.10
3	September	74.22	72.16	99.35	53.21
4	October	81.76	71.57	99.71	58.35
5	November	89.31	75.23	98.21	65.99
6	December	84.03	68.45	97.39	56.02
Average		80.88	70.41	98.84	56.29

Table 5:- OEE Data of Rotary Machine

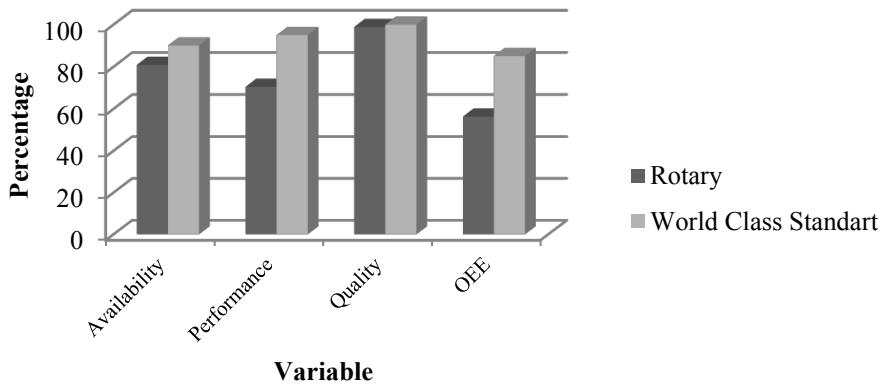

Fig 2:- Comparison Ratio Diagram of Rotary Machine

Figure 2 shows the comparison between actual OEE ratio and the world class standard ratio in which availability and performance rate are below the world standard. OEE value of Rotary machine is 56.29% under 85%. It explains that Rotary machine has low efficiency when it compare of global standards ratio. The factors of the losses should be identify further so the improvement can be identified.

➢ *Identifying Six Big Losses*

No.	Six Big **Losses**	Average Rate **(%)**
1	Breakdown Losses	12.20
2	Setup and Adjustment Losses	6.92
3	Idling and Minor Stoppages	2.51
4	Reduce Speed Losses	22.31
5	Reduce Yield / Scrap Losses	0.63
6	Defect in Process and Rework	0

Table 6:- Six Big Losses in Rotary Machine

➢ *Fishbone Diagram*

Reduce speed losses is the major factor that cause the Rotary machine having low OEE (56.29%). This losses occur due to defect when the machine or equipment is operating at lower than recommended speed. The reason for the lower speed is that operators are not sure of the quality level produced under normal speeds. To improve these losses, we use fishbone diagram or Ishikawa diagram. The fishbone diagram identifies many possible causes for an effect or problem. It can be used to structure a brainstorming session. It immediately sorts ideas into useful categories.

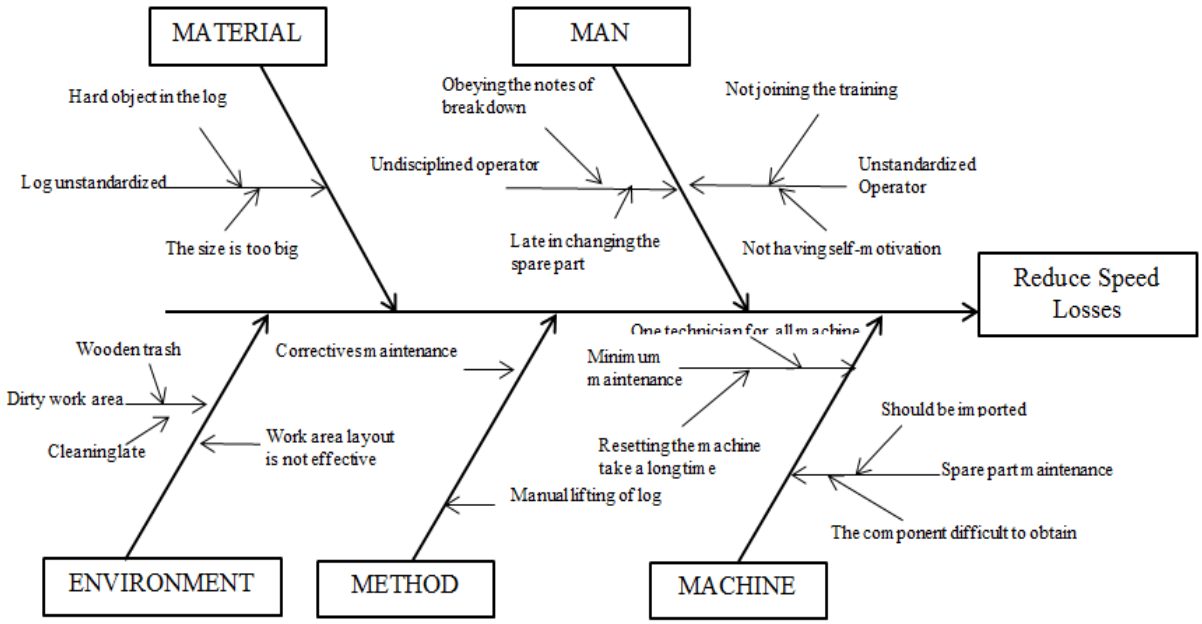

Fig 3:- Ishikawa Diagram of Reduce Speed Losses in Rotary Machine

From figure 3 we can identify the problems that causes reduce speed losses in Rotary machine. It can be identified based on 5 factors:

➢ *Material*

Material factor or raw material due to log wood which is not in accordance with the standard, namely the presence of foreign objects in the log, the log size is too large (exceeding the machine's capacity). Improvements that need to be done are to meet the standard size of the wooden log and conduct an initial inspection using a metal detector to detect the presence of foreign objects in the log.

➢ *Man*

- The operator is undisciplined to do component replacement and does not keep track of damage properly. Improvements that need to be done are implementing operator discipline by providing a reward and punishment system.
- Workers or operators do not meet human resource qualification standards because they do not attend training and do not have a strong motivation to learn. For that the company needs to require operators to attend training and improve their skills.

➢ *Environment*

- The work area is dirty because the amount of wood waste that is scattered and not immediately cleaned can disturb the mobility of workers and interfere with the work activities of the machine, for example the machine stops moving due to the presence of squashed wood waste. To overcome this problem, workers should applying the habits and discipline of workers to keep the work area clean and neat.
- The log yard location is far from the main machine, causing workers need more time to distribute raw materials to the production machine.

➢ *Method*

- Machine maintenance methods need to be repaired so as to prevent further damage. Self-maintenance by operator can provide improvements in engine maintenance methods.
- Transportation of raw materials that have so far been carried out manually can be used as tools such as forklifts to speed up and facilitate the distribution of raw materials.

➢ *Machine*

- The engine maintenance system is not optimal because there is only one technician, so it takes more time for the repair process.
- Machine components are damaged and the original components are not yet available. For that the company can provide components in advance through imported components so that the authenticity of the goods can be guaranteed to ensure the machine runs according to its capacity.

IV. CONCLUSION

Overall Equipment Effectiveness (OEE) is a common measure of performance to indicate the utilization of the machine. Following conclusion is derived from the analysis of OEE in Rotary machine 5 feet:

➢ The OEE value of Rotary machine 5 Feet is 56.29% in average of July to December 2019.
➢ Reduce Speed Losses is the factor that affect the most. It is 22.31% of the losses.
➢ To improve the Total Productive Maintenance in the company, it is important to apply the fishbone diagram analysis result

REFERENCES

[1]. Y. Mishra and M. Aarif. 2016. "Total Productive Maintenance," Emerg. Trends Eng. Manag. Sustain. Dev
[2]. P. S. Ahuja and J. S. Khamba. 2008 "Total Productive Maintenance: Literature Review and Directions," Int. J. Qual. Reliab. Manag., vol. 25, no. 7, pp. 709–756,
[3]. S. Nakajima. 1988. Introduction to Total Productive Maintenance, Productivity press, Cambridge, MA
[4]. D.H Stamatis, 2010. The OEE Primer: Understanding overall Equipment Effectiveness, Reliability, and Maintainability. Productivity Press, New York.