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DESIGN AND FABRICATION OF ANTI-RIOT CONTROL SHIELD

R.Thiruppathi

Assistant professor, Department of Mechanical engineering,
Sri Eshwar College of Engineering, Coimbatore, India.

S.Udayaprathap, M.Suryaprakash, K.Naveenprasanth, M.Velraj
Student, Department of Mechanical engineering,
Sri Eshwar College of Engineering, Coimbatore, India.

Abstract: Riots are these days a district of each civilized society. Disagreement for state selections, non secular intolerance, events, hateful content etc are a number of the most reasons which will simply spark riots. To handle a riot police, army should be ready to pacify/disperse the group while not harming them. To unravel this issue we tend to here style a wise anti-riot protect that permits police personnel repel/arrest rioters while not harming themselves or the rioters. The good protect makes use of non-injurious techniques alongside few alternative options for this purpose. The protect may be a one arm light-weight weight protect created of aluminum for cover against bullets and stones. so the protect provides an answer to protection from riots.

I. OBJECTIVE:

- To replace the wooden riot shields
- To ensure safety to the officer or person who is handling the crowd
- To develop technologies in defence

II. LITERATURE REVIEW:

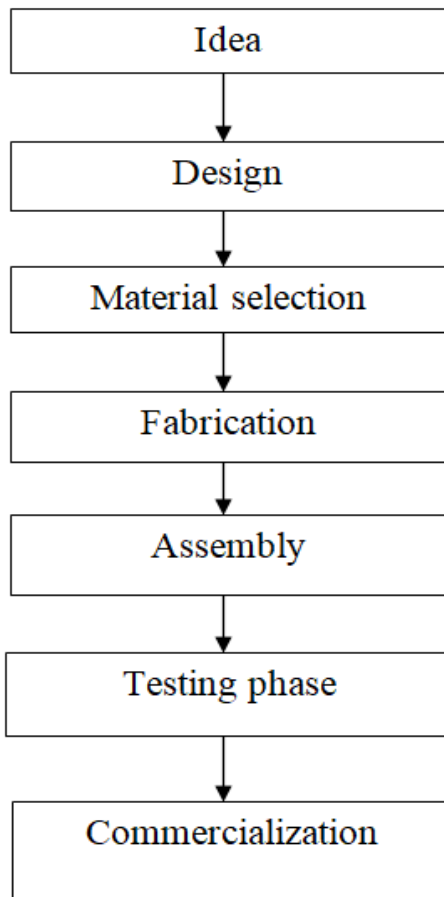
- **V.Narayanamoorthy, C.Lakshmanarao, B.Rao** et al....,[1](1978) designed a Numeric Armour Plate with a Simple Plasticity Model and proved the importance of armour and defence materials.
- **Jessica Hannafi, Eric Jobilonget** al....,[2](1999) presented a paper on Material Recovery Wastes, and improved several defence-oriented shields on riot controls and showed the importance of waste material recovery and refurbishing in defence.
- **M.N.James, C.J.Christopher, Y.Lu, C.A.Patterson** et al....,[3](1974) presented a topic on ballistic materials and their importance to the society and Induced crack tip shielding in polycarbonate and hence proved that crack propagates through the pores with usually high velocity.
- **Zuniga, Mariana; Miroff, Nick** et al....,[4](2002) presented a topic on materials today on Wooden shields

and proved that how venezuellas protestors are protecting themselves against crowds and riots.

- **Daileda, Colin** et al....,[5] (2014), presented a paper on how protestors around the world suit up and protect themselves in the disagreement of government decisions, religious tolerance events and hateful decisions given by their respective governments.
- **Mulrie, Patrick** et al....,[6] (2017), presented a paper on however Bombs, Bullets and trajectory shields policing Ireland's frontier and showed that bombs bullets and therefore the border examines Irish agency security policy and therefore the role compete by nation army on the border throughout a number of the worst years of troubles.
- **Bhatnagar, Ashok** et al....,[7] (2016), they both carried out projects on Light weight ballistic composites and proved the importance of composite materials in defence-oriented projects.
- **Mogollon, meryet** al....,[8] (2017) developed many defence oriented projects on gas masks, wooden shields and presented many papers on how venezuellas protestors are protecting themselves from the riots and crowds.
- **Hambling, David** et al....,[9] (2011), proved that Riot shield could dispose crowds with more advanced techniques like LED blinders with a simple plasticity model.

III. METHODOLOGY:

The sequence of techniques and methodologies that we used and applied for making this anti-riot control shield is mentioned as follows.



5).COMPONENTS AND THEIR FUNCTIONS:

5.1).Aluminum frame:

An aluminum frame of dimensions 3*2 feet is used for making the anti-riot shield. The shield which is made of aluminum protects the person from injury, who is handling the crowd. The frame or shield gives protection from stones thrown from crowd and also gives minimum protection from small riffles and bullets used by the persons in the crowd.

5.2).Aluminum Weld mesh:

A weld mesh which is made up of the material aluminum of dimensions (3*2feet) is fixed additionally to the aluminum frame to give additional protection to the person who is handling the riots. It also provides strength and rigidity to the frame. A fiber glass is placed in between both frame and weld mesh to provide sight to the person who is handling the crowd .it also provides protection to the person who is handling the crowd from acid attacks.

5.3).High power LED:

Light Emitting Diodes(LED) are fixed at the top of the shield to give poor eye sight to the crowd who is creating

problems. LEDs of 4 no's are fixed at the top of the shield with a gap of two and half inches each, when the trigger button for led is turned on the light emitting diode burns pink color which prevents the crowd from moving forward and attacking the persons who is handling the crowd.

5.4).DC Battery:

A DC power supply is given from a motorcycle battery which is fixed at the battery cup which is placed at the left bottom corner of the shield. The battery gives power supply to both led's and 12v diaphragm motor which is used to spray pepper spray from the pepper spray tank. Power connections are supplied through wires to the led and motor from the battery.

5.5).Pepper spray tank:

A pepper spray tank is fixed at the right bottom corner of the shield which stores pepper spray for dispersing the crowd .when the valve at the bottom of the pepper spray tank is turned on and the diaphragm motor is triggered using the trigger buttons the pepper spray moves out through the half inch tubes to the nozzles which is fixed outside the shield it disables the crowd from moving forward and makes their eye irritating for some minute so that the crowd controller can move towards a safer position.

5.6).Trigger buttons:

Two push and pull trigger buttons are used to control the on and off of led and motor. The trigger buttons are attached to the led and motor through wires.

5.7).Handle and arm strap:

A handle and an arm strap which is made of plastic which is used in cars at the top for giving controls over any discomforts are used here for holding the shield. The handle is fixed according the centre of gravity of the shield which provide a proper balance for the person who is holding the shield and handling the crowd.

5.8).Diaphragm pump:

A diaphragm pump is fixed attached to the shield by means of screws. It allows the movement of pepper spray from the pepper spray tank to the nozzles when the trigger buttons are pushed on. The power to the diaphragm pump is given by a dc battery power supply through wires.

5.9).Wirings:

A system of wires provides electric circuits for a device. Electrical wiring is an electrical installation of cabling and associated with devices such as switches, distribution, boards, sockets etc., such that the wirings here provide power supply from a dc battery source to a high power led blinder and a diaphragm motor.



5.10).1/2-inch hose and hose clips:

½ inch hose and hose clips are used for movement of water or pepper spray from pepper spray tank to the nozzles through a diaphragm motor. The hoses are clamped tight to the hose collars by means of ½ inch hose clips.

5.11).1-1/2-inch UPVC clamp:

A 1-1/2-inch UPVC pipe clamp is used to hold the pepper spray tank in correct position without any movement or shake.

5.12).Bolts and Nuts:

Bolts and Nuts of 1 dozen is bought together for fixing all the spares together to the shield, in-fact the aluminium frame and weld mesh are clamped together using bolts and nuts and also using buttons.

5.13).Control valve:

A control valve is fixed at the bottom of the fuel tank and is used to control the movement of fluid out of the tank when it is not necessary.

5.14).plumbing items:

Plumbing items such as brass nozzles, brass bands, brass tee and brass hose collars are used for proper movement of pepper spray from tank without any interruption and is clamped together.

6).Working:

Riots are these days a district of each civilized society. Disagreement for state selections, non secular in-tolerance, events, hateful content etc are a number of the most reasons which will simply spark riots. To handle a riot police, army should be ready to pacify/disperse the group while not harming them. To unravel this issue we tend to here style a wise anti-riot protect that permits police personnel repel/arrest rioters while not harming themselves or the rioters. The smart shield makes use of non-injurious techniques along with few other features for this purpose. This riot control shield is attached with more advanced technologies like LED blinders and pepper spray system which is used to control the crowd and provide protection to the person who is handling the crowd. The protect may be a one arm lightweight protect created of aluminum for cover against bullets and stones. The protect is integrated with a electrical switch trigger to spray aerosol bomb onto rioters United Nations agency equal enough to carry the protect. This sprays aerosol bomb that ends up in eye etching and repels them. For stone pelters United Nations agency throw stones from a distance, the protect includes another trigger that allows diode blinders..The working of pump is controlled by a push and pull switch. The size & weight of the shield are reduced by introducing a light weight material. The working of LED lights is controlled by using a push and pull switch. The power to LED is supplied by

using a DC battery. Pepper spray is stored in a storage tank where the bottom is mount with a on and off valve to control leakage of water through tubes. Thus the smart shield makes use of non-injurious techniques along with few other features for controlling Riots.

IV. CONCLUSION:

The project comprises of research and user study. Literature survey is carried out based on the existing patents on riot control shield and is observed that there are many difficulties in controlling the crowd in any Disagreement for government decisions, religious in-tolerance, events, hateful content etc. Below are some of the advantages based on newly designed product and its functions.

- Light Weight Design
- Bulletproof and Stone Proof Design
- One arm mounted
- Pepper Spray Repellent for Close Encounters
- Blinding LEDs for Stone Pelters
- The smart shield makes use of non-injurious techniques along with few other features for controlling Riots.

About the market, this model is compact and ensures safety to the person who is handling the crowd.

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REFERENCES:

- [1]. V.Narayanamoorthy, C.Lakshmanarao ,B.Rao (1978), “Numeric Armour Plate with a Simple Plasticity Model” IJRST, Vol-4, Issue 6, Sept 1978,ISSN : 2349-6010.
- [2]. Jessica Hannafi, Eric Jobilong (1999), “Material Recovery Wastes, Social and Behavioural Sciences Defence log”, IRJET, Vol08. Issue 08, Oct 1999, e-ISSN: 2395-0056.
- [3]. M.N.James, C.J.Christopher, Y.Lu, C.A.Patterson (1974),“ induced crack tip shielding in polycarbonate, Ballistic materials”, IJIJEE, Vol09, Issue 01, Oct 1974, ISSN : 2278-3075.
- [4]. Zuniga, Mariana; Miroff, Nick (2002), “Wooden shields: How venezuellas protestors are protecting themselves”, Materials today: Proceedings 08(2002), 24404-24419.
- [5]. Daileda, Colin (2014), “How protestors around the world suit up and protect themselves”(2014) 389-394.



- [6]. Mulrie, Patrick(2017), “Bombs, Bullets and Ballistic shields policing Ireland’s frontier”(2017) Irish security policy,1969-1978.
- [7]. Bhatnagar, Ashok (2016), “Light weight ballistic composites: Military law enforcement applications” (2016) ISBN 978-0081004258.
- [8]. Mogollon, mery (2017), “gas masks, wooden shields, Howvenezuellas protestors are protecting themselves, from the original” (may9,2017) 455-462.
- [9]. Hambling, David (2011), “Riot shield could dispose crowds with more advanced techniques like LED blinders” (Dec 07,2011),CIRP 82 - 389-394.
- [10]. Venkatesh, S., Kumar, R.S., Sivapirakasam, S.P., Sakthivel, M., Venkatesh, D. and Arafath, S.Y., 2020. Multi-objective optimization, experimental and CFD approach for performance analysis in square cyclone separator. Powder Technology, 371, pp.115-129.
- [11]. Kumar, R.S., Alexis, J. and Thangarasu, V.S., 2017. Optimization of high speed CNC end milling process of BSL 168 Aluminium composite for aeronautical applications. Transactions of the Canadian society for Mechanical Engineering, 41(4), pp.609-625
- [12]. Kumar, S.R., Alexis, J.S. and Thangarasu, V.S., 2017. Experimental Investigation of Influential Parameters in High Speed Machining of AMS 4205. Asian Journal of Research in Social Sciences and Humanities, 7(2), pp.508-523
- [13]. Alexis, J. and Thangarasu, V.S., 2016. Prediction of machining parameters for A91060 in end milling. Advances in Natural and Applied Sciences, 10(6 SE), pp.157-164.
- [14]. Kumar, R.S., Thangarasu, V.S. and Alexis, S.J., 2016. Adaptive control systems in CNC machining processes--a review. Advances in Natural and Applied Sciences, 10(6 SE), pp.120-130.
- [15]. Suresh Kumar, R., John Alexis, S. and Thangarasu, V.S., 2015. Application of GA & ANN for the optimization of cutting parameters for end milling operation-A comparison. International Journal of Applied Engineering Research, 10(20)
- [16]. Jeyakumar R, Balasubramanian K, Ramamoorthi R, Ramakrishnan T.,2021,Development Of Compact Electro Gear Pump For Airborne Applications. paideumajournal.14 (3), pp.50-57.
- [17]. Ramakrishnan, T. and Sampath, P.S., 2017. Dry sliding wear characteristics of new short agave angustifolia marginata (AAM) fiber-reinforced polymer matrix composite material. Journal of Biobased Materials and Bioenergy, 11(5), pp.391-399.
- [18]. Thirumalaisamy, R. and SUBRAMANI, S.P., 2018. Investigation of physico-mechanical and moisture absorption characteristics of raw and alkali treated new agave angustifolia marginata (AAM) fiber. Materials Science, 24(1), pp.53-58.
- [19]. Ramakrishnan, T., Sampath, P.S. and Ramamoorthi, R., 2016. Investigation of mechanical properties and morphological study of the alkali treated agave angustifolia marginata fiber reinforced epoxy polymer composites. Asian Journal of Research in Social Sciences and Humanities, 6(9), pp.461-472.
- [20]. Sathish, K., Ramakrishnan, T. and Sathishkumar, S., 2016. Optimization of turning parameters to improve surface finish of 16 Mn Cr 5 material. Advances in Natural and Applied Sciences, 10(6 SE), pp.151-157.
- [21]. Ramakrishnan, T., Sathish, K., Sampath, P.S. and Anandkumar, S., 2016. Experimental investigation and optimization of surface roughness of AISI 52100 alloy steel material by using Taguchi method. Advances in Natural and Applied Sciences, 10(6 SE), pp.130-138.
- [22]. Ramakrishnan, T. and Sampath, P.S., 2016. Thermogravimetric Analysis (TGA) and the Effect of Moisture Absorption on the Mechanical Properties of New Agave Angustifolia Marginata 3 Fiber (AAMF) Reinforced Epoxy Polymer Composite Material. International Journal of Printing, Packaging & Allied Sciences, 4(5), pp.3245-3256.
- [23]. Gokilakrishnan, G. and Varthanan, P.A., 2019. Development of manufacturing-distribution plan considering quality cost. International Journal of Enterprise Network Management, 10(3-4), pp.280-304.
- [24]. Varthanan, P.A. and Gokilakrishnan, G., 2018. Simulation Based Swarm Intelligence to Generate Manufacturing-distribution Plan for a Bearing Industry under Uncertain Demand and Inventory Scenario. International Journal of Pure and Applied Mathematics, 119(12), pp.2117-2134.
- [25]. Gokilakrishnan, G.E., Divya, S., Rajesh, R. and Selvakumar, V., 2014. Operating torque in ball valves: a review. Int J Technol Res Eng, 2(4), pp.311-315.
- [26]. Venkatesh, S., Sivapirakasam, S.P., Sakthivel, M., Ganeshkumar, S., Prabhu, M.M. and Naveenkumar, M., 2021. Experimental and numerical investigation in the series arrangement square cyclone separator. Powder Technology, 383, pp.93-103.
- [27]. Venkatesh, S., Sakthivel, M., Saranav, H., Saravanan, N., Rathnakumar, M. and Santhosh, K.K., 2020. Performance investigation of the combined series and parallel arrangement cyclone separator using experimental and CFD approach. Powder Technology, 361, pp.1070-1080.
- [28]. Venkatesh, S., Sakthivel, M., Avinasilingam, M., Gopalsamy, S., Arulkumar, E. and Devarajan, H.P., 2019. Optimization and experimental investigation in bottom inlet cyclone separator for performance



- analysis. Korean Journal of Chemical Engineering, 36(6), pp.929-941.
- [29]. Venkatesh, S., Sakthivel, M., Sudhagar, S. and Daniel, S.A.A., 2018. Modification of the cyclone separator geometry for improving the performance using Taguchi and CFD approach. Particulate Science and Technology.
- [30]. Venkatesh, S. and Sakthivel, M., 2017. Numerical investigation and optimization for performance analysis in Venturi inlet cyclone separator. Desalination and Water treatment, 90, pp.168-179.
- [31]. Venkatesh, S., Bruno Clement, I., Avinasilingam, M. and Arulkumar, E., 2017. Design of Experiment Technique for Improving the Performance of Stirling Engine. International Research Journal of Engineering and Technology, 4(5), pp.62-65.
- [32]. Vennilaa, D.B., Karuppusami, G. and Senthil, P., 2016. Analysis of different infiltration effect for selective laser sintering process through Taguchi method. Australian Journal of Mechanical Engineering, 14(3), pp.217-223.
- [33]. NaveenPrabhu, V., SaravanaKumar, K., Suresh, T. and Suresh, M., 2016. Experimental investigation on tube-in-tube heat exchanger using nanofluids. Advances in Natural and Applied Sciences, 10(7 SE), pp.272-279.
- [34]. Justin Dhiraviam, F., Naveen Prabhu, V., Suresh, T. and Selva Senthil Prabhu, C., 2015. Improved efficiency in engine cooling system by repositioning of turbo inter cooler. In Applied Mechanics and Materials (Vol. 787, pp. 792-796). Trans Tech Publications Ltd.
- [35]. Naveen Prabhu, V. and Suresh, M., 2015. Performance evaluation of tube-in-tube heat exchanger using nanofluids. In Applied Mechanics and Materials (Vol. 787, pp. 72-76). Trans Tech Publications Ltd.
- [36]. Prabhu, V.N. and Manigandan, N., 2014. Design and Fabrication of Solar Transport Vehicle. OSR J. Mech. Civ. Eng, 11, pp.14-19.
- [37]. Manigandan, N., NaveenPrabhu, V. and Suresh, M., 2015. Experimental investigation of a brazed chevron type plate heat exchanger. International Journal of Science Technology & Engineering, 1(12), pp.1-7.
- [38]. Dhiraviam, F.J., Naveenprabhu, V. and Santhosh, M., 2017. Study the Effects of Solar Assisted Vapour Compression Air Conditioning System for Winter Applications. International Journal for Scientific Research & Development, 4(11), pp.505-508.
- [39]. Manigandan, N., Naveenprabhu, V. and Devakumar, M., 2014. Design and Fabrication of Mechanical device for Effective Degreasing in Roller Bearing. Procedia Engineering, 97, pp.134-140.
- [40]. Pravin, V.N.D.M.K. and Swamy, V.R.S.S.A., A Review of Evaporative Cooling of Finned and Non-Finned Heat Exchanger on Condenser.
- [41]. Naveenprabhu, V. and Suresh, M., 2020. Performance enhancement studies on evaporative cooling using volumetric heat and mass transfer coefficients. Numerical Heat Transfer, Part A: Applications, 78(9), pp.504-523.
- [42]. Dhiraviam, F.J., Naveenprabhu, V., Satish, K. and Palanivelrajan, A.R., 2019, October. Emission characteristic in CI engines using zirconium porous medium in piston head. In AIP Conference Proceedings (Vol. 2161, No. 1, p. 020012). AIP Publishing LLC.
- [43]. N. Balaji, **S.Balasubramani**, V.Pandiaraj., 2021, Fabrication and Analysis of Al6061/Al₂O₃/TiC Hybrid Metal Matrix Composite, Paideuma Journal of Research., Vol 14, No 3, pp 24-35.
- [44]. **Balasubramani, S.**, Dhanabalakrishnan, K.P. and Balaji, N., 2015. Optimization of machining parameters in aluminium HMMC using response surface methodology. International journal of applied engineering research, 10(20), pp.19736-19739.
- [45]. **Balasubramani S.**, Manikandan, S.Prasath, P., Suresh, D. and ShanmugaSundaram, P., 2018. "Vibration Analysis of Work Holding Devices in Composite Materials" International Journal for Scientific Research & Development, Vol. 6, No 2, pp 2520-2523.
- [46]. **Subramaniam, B.**, Purusothaman, V.R., Karuppusamy, S.M., Ganesh, S.H. and Markandan, R.K., 2020. Review on properties of aluminium metal matrix composites. Journal of Mechanical and Energy Engineering, 4(1), pp.57-66.
- [47]. Balaji, N., **Balasubramani, S.**, Ramakrishnan, T. and Sureshbabu, Y., 2020. Experimental Investigation of Chemical and Tensile Properties of Sansevieria Cylindrica Fiber Composites. In Materials Science Forum (Vol. 979, pp. 58-62). Trans Tech Publications Ltd
- [48]. **Balasubramani, S.** and Balaji, N., 2016. Investigations of vision inspection method for surface defects in image processing techniques-a review. Advances in Natural and Applied Sciences, 10(6 SE), pp.115-120.
- [49]. Ganeshkumar S, Sureshkumar R, Sureshbabu Y, Balasubramani S 2020, A Review On Cutting Tool measurement In Turning Tools By Cloud Computing Systems In Industry 4.0 And Iot, GIS SCIENCE JOURNAL, Vol 7, No 8, pp 1-7.
- [50]. Ganeshkumar S, Sureshkumar R, Sureshbabu Y, Balasubramani S, 2019, A Numerical Approach To Cutting Tool Stress In Cnc Turning Of En8 Steel With Silicon Carbide Tool Insert, International



- Journal of Scientific & Technology Research, Vol 8, No 12, pp 3227-3231.
- [51]. Ganeshkumar, S., Thirunavukkarasu, V., Sureshkumar, R., Venkatesh, S. and Ramakrishnan, T., 2019. Investigation of wear behaviour of silicon carbide tool inserts and titanium nitride coated tool inserts in machining of en8 steel. *International Journal of Mechanical Engineering and Technology*, 10(01), pp.1862-1873.
- [52]. Venkatesh, S., Sivapirakasam, S.P., Sakthivel, M., Ganeshkumar, S., Prabhu, M.M. and Naveenkumar, M., 2021. Experimental and numerical investigation in the series arrangement square cyclone separator. *Powder Technology*, 383, pp.93-103.
- [53]. Kumar, S.G. and Thirunavukkarasu, V., 2016. Investigation of Tool Wear and Optimization of Process Parameters in Turning of EN8 and EN 36 Steels. *Asian Journal of Research in Social Sciences and Humanities*, 6(11), pp.237-243.
- [54]. Ganeshkumar, S., Sureshkumar, R., Sureshbabu, M.Y. and Balasubramani, M.S., A Review of Performance Investigations in Hydrogen–Oxygen Generator for Internal Combustion Engines.
- [55]. KUMAR, S.D. and KUMAR, S.S., 2021. Effect of heat treatment conditions on ballistic behaviour of various zones of friction stir welded magnesium alloy joints. *Transactions of Nonferrous Metals Society of China*, 31(1), pp.156-166.
- [56]. Kumar, S.D. and Kumar, S.S., 2020. Numerical and experimental ballistic performance of welded magnesium (AZ31B) plates. *Emerging Materials Research*, 9(4), pp.1217-1228.
- [57]. Kumar, S.D., Kumar, S.S. and Kumar, K.A., 2020. Investigation of forced frequency in a commercial vehicle suspension system. *Mechanics and Mechanical Engineering*, 22(4), pp.967-974.
- [58]. Sundaram, S.K., 2020. Experimental ballistic performance determination of friction stir welded magnesium (AZ31B) targets. *Mechanics Based Design of Structures and Machines*.
- [59]. Kumar, S.S., Kumar, S.D. and Magarajan, U., 2020. Investigation of mechanical and wear behaviour of graphene reinforced aluminium alloy 6061 metal matrix composite. *KOVOVE MATERIALY-METALLIC MATERIALS*, 58(5), pp.341-349.
- [60]. Kumar, S.D. and Kumar, S.S., 2019. Investigation of mechanical behavior of friction stir welded joints of AA6063 with AA5083 aluminum alloys. *Mechanics and Mechanical Engineering*, 23(1), pp.59-63.
- [61]. Magarajan, U., Arvind, D., Kannan, N. and Hemanandan, P., 2018. A comparative study on the static mechanical properties of glass fibre vs glass-jute fibre polymer composite. *Materials Today: Proceedings*, 5(2), pp.6711-6716.
- [62]. Yessian, S. and Varthanan, P.A., 2020. Optimization of performance and emission characteristics of catalytic coated ic engine with biodiesel using grey-taguchi method. *Scientific reports*, 10(1), pp.1-13.
- [63]. Sureshbabu, Y. and AshokaVarthanan, P., 2014. Study the emission characteristics of catalytic coated piston and combustion chamber of a four stroke spark ignition (SI) engine. *Journal of Chemical and Pharmaceutical Sciences, JCHPS Special*, (4).
- [64]. Sureshbabu, Y., Ashokavarthnan, P., Balasubramani, S. and Naveenprabhu, V., 2019, October. Experimental investigation on four strokes catalytic coated spark ignition (SI) engine. In *AIP Conference Proceedings (Vol. 2161, No. 1, p. 020041)*. AIP Publishing LLC.

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