Criterion 3–Research,Innovations and Extension

Key Indicator – 3.2 Innovation Ecosystem

3.2.1. Institution has created an ecosystem for innovations and has initiatives for creation and transfer of knowledge (patents filed, published,incubation center facilities in the HEI to be considered)

NOTE: The supporting documents for this metric exceed the upload limit of 5MB. Hence the documents are made available in HEI website and links for the metric is given below.

INDEX

METRIC	PARAMETER	LINK TO RELEVANT DOCUMENTS
3.2.1	Institution has created an ecosystem for innovations and has initiatives for creation and transfer of knowledge (patents filed, published,incubation center facilities in the HEI to be considered)	VIEW DOCUMENTS

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3.2.1. Institution has created an ecosystem for innovations and has initiatives for creation and transfer of knowledge (patents filed, published, incubation center facilities in the HEI to be considered)

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A.R.ENGINEERING COLLEGE

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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

3.2.1. Institution has created an ecosystem for innovations and has initiatives for creation and transfer of knowledge (patents filed, published,incubation center facilities in the HEI to be considered)

Response:

A.R.Engineering college provides acongenial atmosphere for the promotion of innovation and incubation.The college has adequate infrastructure and the guidance is extended to the students.Students are motivated to apply technology in their project for social needs.

Necessary support is being provided for documentation, publication of research papers and for obtaining patents.The college organizes awareness programmes,workshops, seminars and guest lectures on entrepreneurship, opportunities are provided to the students to directly interact with outstanding entrepreneurs who excel in their chosen fields.

Product service training is provided for creating awareness on marketing techniques.

Financial support is extended to the deserving students for their models at the Institution Innovation Council. Competitions are held by the organisation. Students are given opportunities to acquire skills for communication of their products. The local entrepreneurs are invited to address and inspire the students.

Objective of the Incubation Centre:

The main objective of the Incubation Centre is to help the students to materialize their ideas into technological innovation. Students are encouraged to assemble prototypes needed for national development through the application of technology.

Trendy expos are held time and again to instill the spirit of research and development among the students who range from different walks of the society. Students are fittingly rewarded and they are given hands on training in our well-equipped state-of-the-art laboratories.

Research Activities:

The college has well-developed and research promotion policies. A handful numbers of faculty members pursue Ph.D.programme in different leading universities. Research fairs are organised in the campus where all research scholars across the nation demonstrate their research work.

Opportunities are provided to the faculties in all their research endeavors on multi-disciplinary areas.

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To achieve the quality research ambience at our A.R.Engineering college the following policies have been undertaken. A Research & Develoment cell has been established to prepare and implement the document for research and development activites within the institute.

The Research and Development cell implements wide range of activites to establish centre of excellence,honing and cultivating appropriate research skills of faculty by deputing for Ph.D. studies,conference,workshops,and short term training programs,promoting faculty member to submit research proposal for different funding agenicies such as All India council for Techinical Education(AICTE),University Grant Commission(UGC),Department of Science and Technology(DST),etc

- To motivate students to carry out innovative and creative projects.
- To creat awareness among faculty members about intellectual property Rights(IPR).
- To motivate our faculty members and students to apply for patents.
- To protect and Commercialize the Institutes intellectual property.
- To develop infrastructure conducive to promoting the quality and quantity of research and development.
- To monitor the research and development performance of individuals and groups.
- To oversee the application of the Code of Research Ethics for the responsible practice of research.
- Faculty publications (Affiliation must be A.R.Engineering college in either SCI or WEB indexed journals are appreciated.

CODE OF RESEARCH ETHICS

The following are the codes of research ethics which express the ethical values to be practiced by all the staff engaged in academic and research activities at A.R.Engineering college.

- To maintain security of the research findings/technical information and to avoid communication of any official document or information to others without permission.
- To commit no form of plat-of-work and preparatio and dissemination of reports and research articles.
- To practice and promote justice in research

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Effect of Open Central Hole Stress Concentration on Mechanical Properties of Luffa fiber Reinforced Epoxy Composite

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Effect of Open Central Hole Stress Concentration on Mechanical Properties of Luffa fiber Reinforced Epoxy Composite

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Abstract: **This work focuses on the open hole mechanical properties of luffa fiber reinforced epoxy polymer composites. The effect of stress concentration on the composites is analysed by introducing central open holes with different diameters. Luffa fiber reinforced epoxy resin matrix composites were developed using a hand lay-up technique with two different fiber volume fractions. Effects of central open hole on the tensile and impact strengths of the composites were studied by five sets of tensile specimens containing central open holes of five different diameters. Open hole tensile strength varied from 9.6 MPa to 19.10 MPa, and impact energy varied from 0.39 Joules to 1.24 Joules, depending on fiber volume fraction. The hole sensitivity was found to increase with increasing hole diameter. The optimum mechanical properties were obtained for composites with 40% fiber volume fraction. SEM analysis on the fractured surface of the composite was performed and the fractured surface of the composite indicates matrix cracking and fiber pull out.**

Keywords: **Mechanical properties; tensile strength; Luffa fiber; open hole.**

INTRODUCTION

Natural fiber reinforced composites possess many advantageous features such as low cost, low density, recyclability and very low tool wear during machining. These features have paved way for their use in structural sector. Assembly of structural members requires the incorporation of open holes for making joints and connections. These holes cause stress concentration in the proximity of the hole and reduce the tensile strength of the member. Durao et al., [1] presented comparative study on the glass reinforced and sisal reinforced epoxy composites. They evaluated the bearing resistance and residual open-holed tensile strength. Hussein M Ali et al., [2] reported influence of drilling and milling machining parameters for hole making process on the woven laminated GFRP material. A statistical approach was used to understand the effects of the control parameters on the response variables. They showed that milling process is more suitable than drilling at low order feed rate.

Luis Miguel et al., [3] performed the damage assessment method using radiographic images compared and correlated with experiments such as bearing test and delamination onset test. The results explained the relative importance of drilling tools and machining parameters to extend the life cycle of these laminates. Salleh et al [4] performed open hole tensile testing with centrally drilled holes on the long kenaf composites and long kenaf/woven glass reinforced polyester resin composites and reported that tensile strength of composites decreased with increasing of open hole diameter and also estimated the damage area of the composites.

Luffa cylindrica (LC) is a tropical plant belonging to the family of Cucurbitaceous. The fibre obtained from the dried fruit of this plant can be used as natural fiber reinforcement for the polymer composites. The fabrication procedure and mechanical properties of luffa fiber reinforced epoxy polymer composites were reported elsewhere [5]. In order to estimate the effect of stress concentration on the tensile strength of this composite, the introduction of an open central hole is required. Hence the present research work focuses on evaluation of open hole tensile properties of luffa fiber reinforced epoxy polymer composite. The tensile and impact properties and microstructure of fractured surfaces of the composite have been discussed in detail.

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EXPERIMENTAL

A. Materials and fabrication

The raw materials for manufacturing the composites are Epoxy resin, Luffa Fiber, Hardener, Mansion Wax. Luffa fiber as 0^0- 90^0 single fiber as randomly oriented. Fibers were chemically treated with alkali medium. The composites were fabricated with 30% and 40% fiber volume fractions in the matrix materials. The treated fibers are taken with required volume fractions and laid in to the mould of same size 300mm x 300mm x 5mm under compression molding.

B. Open hole tensile and impact testing

Drilling of holes was performed using a radial drilling machine. HSS twist drill with a point angle of 118°, a standard drill is used in this experiment. Considering the purpose of this work with effect of stress concentration five different drill diameters 3mm, 5mm, 7mm, 9mm, 10mm were used. The composite was fixed on the machine table using an appropriate clamping device without sacrificial plates under the composite.

The dimension of open central hole specimens are shown in Fig. 1 and 2. Drill diameters in this study are denoted as S1, S2, S3, S4, and S5 which refers to the drill diameter 3mm, 5mm, 7mm, 9mm and 10 mm respectively.

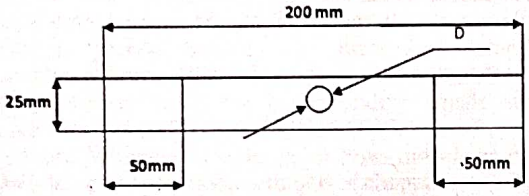

Fig.1.Open hole for tensile specimen

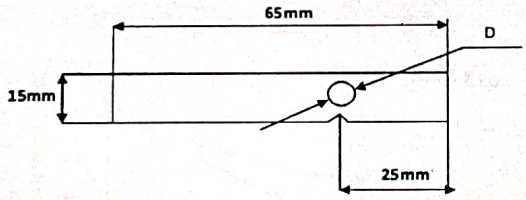

Fig.2.Open hole for impact specimen

The tensile strength of the composite was determined using a Universal Testing Machine (Instron 3369). Specimens of length 250 mm and width 25 mm were cut. The test was conducted at a crosshead speed of 5 mm/min using 10 kg load cell. In each case, 3 samples were used and the average values were reported.

Charpy impact test was carried out to determine the amount of energy absorbed by the material during fracture. This absorbed energy is a measured for a sample of size 65mmx15mmx5mm.

C. Microstructure

A scanning electron microscope (SEM) at 10 kV accelerating voltage was used to study the microstructure of the composite. The samples were coated with a thin film of gold to increase the electrical conductance for the analysis.

RESULTS AND DISCUSSION

A. Tensile Strength

It is well known that fiber content and fibre-matrix adhesion are mainly responsible for tensile properties of a fibre reinforced composite. The variation in open hole tensile strength of the composites with 30% and 40% of volume fractions of fibres is shown in fig 3. The results show a decrease in open hole tensile strength value with an increase in hole diameter and the values corresponding to a hole diameter of 3mm are very close to the unnotched tensile strengths which are 18.8 MPa and 19.25 for samples with 30% and 40% fibre contents respectively.

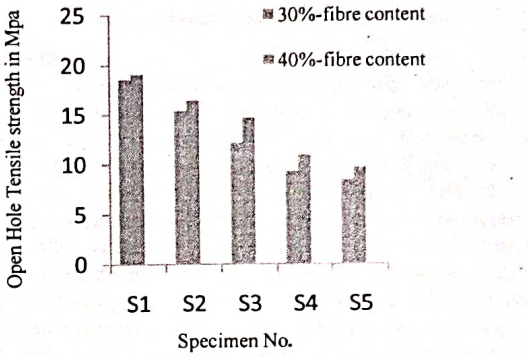

Fig. 3.Open hole tensile strength

Similar observations were reported by L.M. Durao et al., [1] in a study of two different types of reinforced plates, glass reinforced epoxy plate and sisal reinforced epoxy plate. It may be mentioned here that for recommending any composite as a candidate for structural applications tensile strength is of immense importance.

Adherence to Whitney-Nusimer point stress model

Whitney-Nusimer point stress model is a mathematical relationship that can be used to predict the notched (open hole) tensile strength of a laminate composite using the unnotched tensile strength value. The Whitney-Nusimer point stress model for an infinitely wide laminate plate exhibiting isotropic properties is given by the expression [6]

$$\sigma_{th.} = \left[\frac{2}{2+\lambda^2+3\lambda^4}\right]\frac{\sigma_o}{C_w} \qquad [1]$$

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$\sigma_{th.}$-theoretical gross area notched tensile stress

σ_o - unnotched tensile stress

C_W - width correction factor

λ - r/(r+r_o) (where 'r' is hole radius and r_o is the distance from hole edge to the point where notched tensile stress equals unnotched tensile stress)

The width correction factor (C_w) is given by

$$C_w = 1 - 0.05\left[\frac{d}{w}\right] + 1.5\left[\frac{d}{w}\right]^2$$

d- diameter of the hole

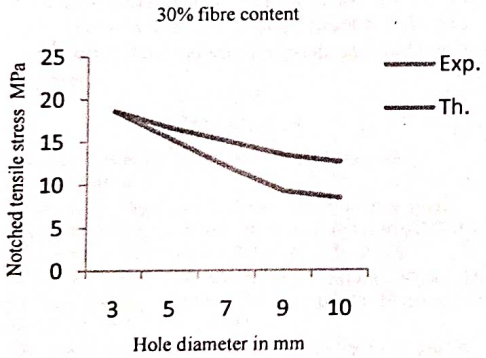
w- width of the tensile specimen

The luffa-epoxy composite is in the form of a rectangular plate consisting of randomly oriented fibers which render it isotropic. Therefore, the theoretical open hole tensile strength values were calculated using the above expressions following the approach of P.K. Mallick [6].

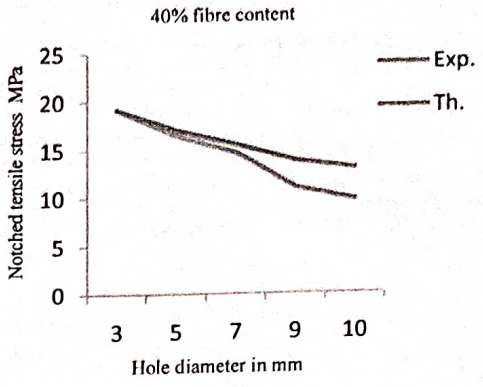
The theoretical open hole tensile strength values are close to the experimental values and the deviation increases with increasing hole diameter (fig.4). Till 5mm diameter, very good similarity is present between the theoretical values and experimental values. Hole diameters exceeding 5mm are practically undesirable as the corresponding tensile strength values are very low (refer fig.6. S3, S4,S5).

Therefore, Whitney- Nusimer point stress model can be used to predict the open hole tensile strength of chopped random luffa fibre-epoxy composites.

Exp. - Experimental notched tensile stress
Th.- Theoretical notched tensile stress



(i)



(ii)

Fig.4.Deviation between theoretical and experimental values

B. Impact Strength

The variation of open hole impact strength with the ratio of percentage luffa fiber in these composites is presented in Fig 5. In the case of maximum strength, the values vary between 0.39 Joules to 1.24 Joules. The impact strength of these composites was found to be enhanced when alkali treated luffa fiber composites. This variation in impact strength of the composites, with 30% and 40% volume fractions are shown in fig 5. These figures clearly indicate the gradual decrease in (3mm to 7 mm diameter for drill) impact strength for 30% and 40% volume fraction and more or less same volume fraction for increase in diameter of drill with negligible change in impact strength. Similar observation was made by Y. Cao et al [7] , I. Isik et al [8] and R.Panneerdhass et al [9].

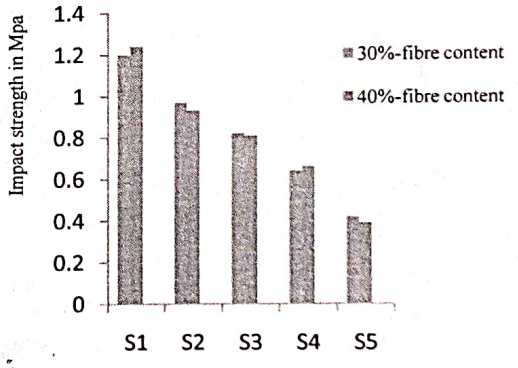


Fig.5. Open hole impact strength

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C. Microstructure properties

To analyse the surface morphology and failure mechanisms involved, fractographs of the notched luffa fiber reinforced epoxy samples were taken. From the fractographs shown in figure 6, it is clearly evident that the surface of the fibers becomes rough on alkali treatment which might be due to the removal of hemi-cellulose. Matrix cracking indicated by a smooth fractured surface of epoxy appears to be the dominant failure mechanism and the contribution of fiber pullout towards failure seems to be very low. Thus the alkali treatment has improved the fibre-matrix adhesion. This is in accordance with the mechanical characteristics of natural fibre composites.

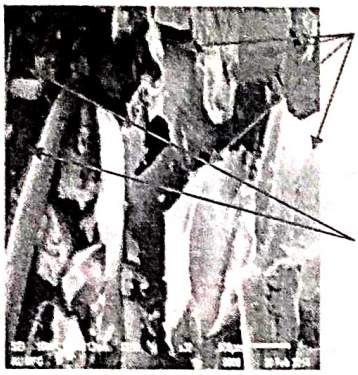

Fig. 6. Micrograph of epoxy- luffa fiber composite

CONCLUSION

The effect of stress concentration on tensile and impact properties of the epoxy-luffa fibers reinforced composites with 30% and 40% fibre content was analysed. The hole sensitivity was found to increase with increasing hole diameter and a very negligible hole sensitivity was observed for a hole diameter of 3mm. It was observed that composites having 40% fiber content possess higher open hole tensile strength values than those with 30% fiber content.

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Distributed Detection Of Minimun Cuts in Wireless Multi-Hop Networks

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Abstract

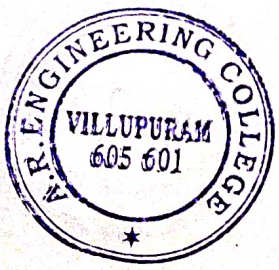
A wireless sensor network can get separated into multiple connected components due to the failure of some of its nodes, which is called a "cut". Here consider the problem of detecting cuts by the remaining nodes of a wireless sensor network. Here propose an algorithm that allows (i) every node to detect when the connectivity to a specially designated node has been lost, and (ii) one ormore nodes (that are connected to the special node after the cut) to detect the occurrence of the cut. The algorithm is distributed and asynchronous: every node needs to communicate with only those nodes that are within its communication range. The algorithm is based on the iterative computation of a fictitious "electrical potential" of the nodes. The convergence rate of the underlying iterative scheme is independent of the size and structure of the network. All cut nodes information is been updated and created into a log file of system and filtered log records of cut nodes are maintained.

I. INTRODUCTION

Wireless sensor networks (WSNs) are a promising technology for monitoring large regions at high spatial and temporal resolution. In fact, node failure is expected to be quite common due to the typically limited energy budget of the nodes that are powered by small batteries. Failure of a set of nodes will reduce the number of multi-hop paths in the network. Such failures can cause a subset of nodes that have not failed to become disconnected from the rest, resulting in a "cut". Two nodes are said to be disconnected if there is no path between them. Wireless sensor networks (WSNs), consisting of large numbers of low-cost and low-power.

:II. LITERATURE SURVEY

Authors in [1] proposed a Topological change Adap- tive Ad hoc On-demand Multipath Distance Vector (TA- AOMDV) routing protocol, which focuses on minimizing the data trafc with the use of QoS. The limitation of this protocol is that it does not work well in dynamic layouts which require both route stability and node density. Generally, this protocol provides a little performance improvement where other protocols in many cases do way better.



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Periyasamy et al. [2] proposed a protocol called Link Reliable Multipath Routing (LRMR). The pair of metrics used in this protocol is route length and Route-Link Qual- ity Estimator (P-LQE) which produce multiple link reliable routes. It also minimizes the probability of routing interruptions in wireless ad hoc networks. Resources of a node such as residual energy and the available bandwidth are not taken into account so the QoS metric can only be useful to some extent. Furthermore, the End-to-End Link Reliable Energy Efficient Multipath Routing (E2E-LREEMR) protocol was proposed to deal with the faulty links and route breakages. This mechanism suggested the use of P-LQE and Route-Node Energy Estimator to find multiple steady energy-saving routes. However, E2E-LREEMR slightly improves the network performance compared to AOMDV.

FF-AOMDV was proposed in [3] which presented the concept of selecting the efcient route that has a minimum energy consumption and the shortest distance. This proto- col used AOMDV so in case of any failure or link break- age, the transmission will be done through the alternative route having the next shortest route in the routing table. The FF-AOMDV model considered few QoS parameters so its performance is not that high compared to AOMDV while the enhancement of the network's lifetime is quite bounded.

Authors of [4] proposed Least Common Multiple based Routing (LCMR) for load-balanced multipath routing in MANETs. The multiple routes are selected based on the min- imum of calculated routing times between the sender and the receiver. LCMR has better results than the existing multipath load-balanced routing protocols like Fibonacci Multipath Load Balancing (FMLB) and Multiple AODV (MAODV) as it considers the distribution of packets along different routes. Energy consumption is the main element that drives a network, however, it is not considered in this protocol.

GA was used in [5] for the route selection though opti- mizing both distance and congestion metrics. This algorithm selects the route having less possibility of congestion in case of high-load traffic. However, energy consumption status is not considered. Hence, in case of a high load is flooding the network, the network lifetime is reduced.

III.PROPOSED SYSTEM

In our project ,we have two sections :

1.Network node controller

2.Network nodes

Firstly we will enter the nodes and make it as activeand inactive according to which the path will be decided fromthe source to destination.All the node details will be updated In network node controller frame. Data will be sent fromsource to destination for this random path will be selected ifthere is inactive node in the random path then the cut will bedetected and this will be shown in the form of graph.

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IV. METHODOLOGY

Past decade has seen a surge of research activities in the field of wireless Communication. Emerging from this research thrust are new points of view on how to communicate effectively over wireless channels. Here our complete mechanism is divided into the major domain.

1. Wireless Transmission Channel
2. Routing Algorithm
3. Cut Detection

Route Discovery: The selection of path for datatransmission is done based on the availability of the nodes in the region using the ad-hoc on demand distance vector routing algorithm. By using the Ad hoc On demand Distance Vector (AODV) routing protocol, the routes are created on demand, i.e. only when a route is needed for which there isno "fresh" record in the routing table. In order to facilitate determination of the freshness of routing information, AODVmaintains the time since when an entry has been last utilized. A routing table entry is "expired" after a certain predetermined threshold of time. Consider all the nodes to be in the position. Now the shortest path is to be determined by implementing the Ad hoc on Demand Distance Vector routing protocol in the wireless simulation environment for periodically sending the messages to the neighbors and the shortest path.

Route Maintenance: The next step is the maintenance ofthese routes which is equally important. The source has to continuously monitor the position of the nodes to make sure the data is being carried through the path to the destination without loss. In any case, if the position of the node change and the source doesn't make a note of it then the packets will be lost and eventually have to be resent.

Data Transmission: The path selection maintenance and data transmission are consecutive process which happen in split seconds in real-time transmission. Hence the paths allocated priory is used for data transmission. The first path allocated previously is now used for data transmission. The data is transferred through the highlighted path. The second path selected is now used for data transmission. The data is transferred through the highlighted path. The third path selected is used for data transmission. The data is transferred through the highlighted path. When a node u is disconnected from the source, we say that a DOS (Disconnected fromSource) event has occurred for u. When a cut occurs in the network that does not separate a node u from the source node, we say that CCOS (Connected, but a Cut Occurred Somewhere) event has occurred for u. By cut detection we mean 1) detection by each node of a DOS event when it occurs, and 2) detection of CCOS events by the nodes closeto a cut,

and the approximate location of the cut. In thisarticle we propose a distributed algorithm to detect cuts, named the *Distributed Cut Detection* (DCD) algorithm. The algorithm allows each node to detect DOS events and a subset of nodes to detect CCOS events. The algorithm we propose is distributed and asynchronous: it involves onlylocal communication between neighboring nodes, and is robust to temporary communication failure between node pairs All cut nodes information is been updated and created into a log file of system and filtered log record of cut nodes are maintained .

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DOS Detection:

The approach here is to exploit the fact that if the state isclose to 0 then the node is disconnected from the source, otherwise not. In order to reduce sensitivity of the algorithm to variations in network size and structure, we use a normalized state. DOS detection part consists of steady-state detection, normalized state computation,and connection/separation detection. Every node i maintains abinary variable $DOS_i(k)$, which is set to 1 if the node believesit is disconnected from the source and 0 otherwise. Thisvariable, which is called the DOS status, is initialized to 1 since there is no reason to believe a node is connected to the source initially.

Each node i computes the normalized state difference $\delta x_i(k)$ as follows:

$$x_i^{\text{norm}}(k) := \begin{cases} \dfrac{x_i(k)}{\hat{x}_i^{ss}(k)}, & \text{if } \hat{x}_i^{ss}(k) > 0, \\ \infty, & \text{otherwise,} \end{cases}$$

where εzero is a small positive number.

Each node computes a normalized state $x^{norm}(k)$ as

$$\delta x_i(k) = \begin{cases} \dfrac{x_i(k) - x_i(k-1)}{x_i(k-1)}, & \text{if } x_i(k-1) > \epsilon_{zero}, \\ \infty, & \text{otherwise,} \end{cases}$$

where $x^{ss}(k)$ is the last steady state seen by i at k, i.e., the lastentry of the vector $X^{ss}(k)$. If the normalized state of i is less than $^{\epsilon}$DOS, where $^{\epsilon}$DOS is a small positive number, then the node declares a cut has taken place: $DOS_i = 1$. If the normalized state is ∞, meaning no steady state was seen until.

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V. PERFORMANCE EVALUATION

Two important metrics of performance for the DCD algorithm are 1) detection accuracy, and 2) detection delay. Detection accuracy refers to the ability to detect a cut when it occurs and not declaring a cut when none has occurred. DOS detection delay for a node i that has undergone a DOS eventis the minimum number of iterations (after the node has been disconnected) it takes before the node switches its DOS_i flag from 0 to 1. CCOS detection delay is the minimum numberof iterations it takes after the occurrence of a cut before a node detects it.

In detecting disconnection from source (DOS) events, two kinds of inaccuracies are possible. A DOS0/1 error is said to occur if a node concludes it is connected to the source while it is in fact disconnected, i.e., node i declares DOSi to be 0 while it should be 1. A DOS1/0 error is said to

k, then DOSi(k) is set to 0 if the state is positive (i.e., $x_i(k) > \varepsilon$zero) and 1 otherwise.

CCOS Detection:

The algorithm for detecting CCOS events relies on finding a short path around a hole, if it exists, and is partially inspired by the jamming detection algorithm proposed in [9]. Themethod utilizes node states to assign the task of hole- detection to the most appropriate nodes. When a node detects a large change in its local state as well as failure of one or more of its neighbors, and both of these events occur within a (predetermined) small time interval, the node initiates a PROBE message.

Each PROBE message p contains following information:

1 A unique probe ID

2. Probe centroid Cp

3. Destination node

4. Path traversal (in chronological order)

5. The angle traversed by the probe around the centroid

occur if a node concludes that is disconnected from the source while in fact it is connected. In CCOS detection, again two kinds of inaccuracies are possible. A CCOS0/1 error is said to occur when cut (or a large hole) has occurred but not asingle node is able to detect it. A CCOS1/0 error is said to occur when a node concludes that there has been a cut (or large hole) at a particular location while no cut has taken place near that location.

5.1 Communication Cost:

A reasonable metric of communication cost is the number of packets transmitted per node per unit of time. The epoch between two successive iterations k and k + 1 is taken as one unit of time. It is important to recognize that a single message(some quanta of information) may require multiple packet transmissions.

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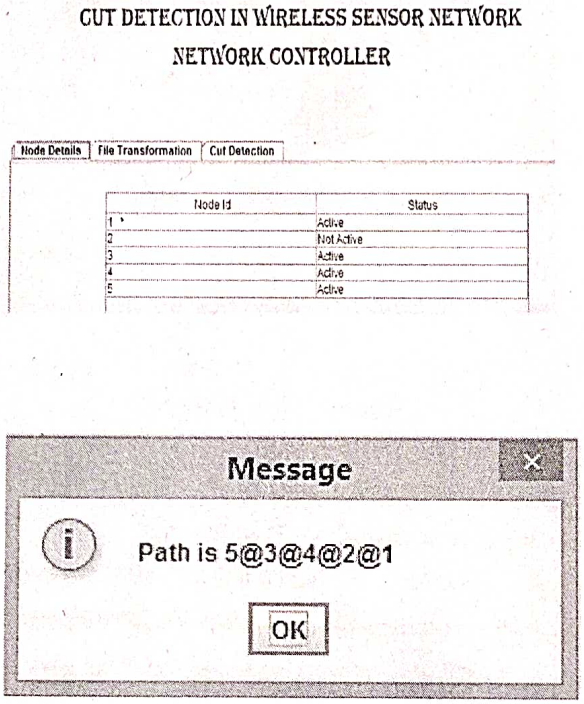
Next step is comparing the communication cost of the DCD algorithm with that of the bidirectional flooding scheme. Let T be the *flooding time-period* for both nodes-to-source flooding and source-to-nodes flooding. For the nodes-to- source flooding, this means at intervals of T time units, everynode generates a new time-stamped message intended for the source that contains its ID. These messages will be routed to the source by a multihop routing protocol. Assuming that a node aggregates the messages received from its neighbors before forwarding it to the next node in the routing tree, the number of messages to be transmitted in every T time units is n−1. In the source-to-nodes flooding, the source node generates a new time-stamped message that is intended for all the nodes in the network every T time units. A node i that receives this packet has to forward it to its active neighbours.

VI. RESULTS

We have successfully completed the project. By assuming five nodes in which source nod is 5 and destination node is 1.As node2 is inactive so the cut is detected at node 2as shown in below fig.



which it can do efficiently by broadcasting. If ηd is the number of nodes that are at a graphical distance of d from thesource node, then the number of copies of this message broadcasted during a flooding time period is 1+η1 +η2 + ▪

▬ ▬ +ηT−1 = |VT−1|, where VT−1 is the set of nodes inGthat are within a distance of T − 1 hops from the base station. The number of messages broadcasted per node per unit time is therefore:

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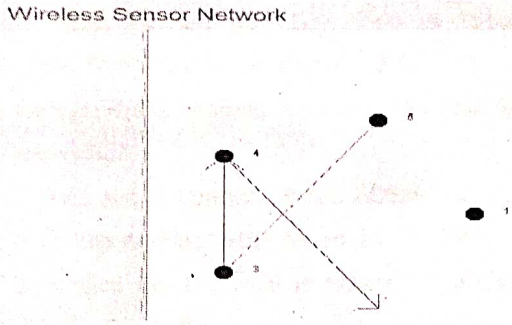
$$\frac{1}{nT}(n + |\mathcal{V}_{T-1}|) = \frac{1}{T} + \frac{1}{T}\frac{|\mathcal{V}_{T-1}|}{n}.$$

In a 2D-grid, |VT−1| = O(T 2), so that the communicationcost is 1/T + O(T/n).



VII. CONCLUSION

In this report, a distributed algorithm is proposed to detect cuts, named the Distributed Cut Detection (DCD) algorithm. The algorithm allows each node to detect DOS events and a subset of nodes to detect CCOS events. The algorithm propose here is distributed and asynchronous: it involves only local communication between neighboring nodes, and it can be robust to temporary communication failure between node pairs. A key component of the DCD algorithm is a distributed iterative computational step through which the nodes compute their electricapotentials. The convergence rateof the computation is independent of the size and structure of the network. The DCD algorithm is used for every node of a wireless sensor network to detect Disconnected from Source events if they occur. Second, it is also used for a subset of nodes that experience CCOS events to detect them and estimate the approximate location of the cut in the form of a list of active nodes that lie at the boundary of the cut/hole. The DOS and CCOS events are defined with respect to a specially designated source node. The algorithm is based on ideas from electrical network theory and parallel iterativesolution of linear equations. All cut nodes information is been updated and created into a log file of system and filteredlog records of cut nodes are maintained.

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Mechanical Properties of Luffa Fiber and Ground nut Reinforced Epoxy Polymer Hybrid Composites

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Mechanical Properties of Luffa Fiber and Ground nut Reinforced Epoxy Polymer Hybrid Composites

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Abstract

This paper presents the study of the tensile, compressive, flexural, impact energy and water absorption characteristics of the luffa fiber and Ground nut reinforced epoxy polymer hybrid composites. Luffa fiber and Ground nut reinforced epoxy resin matrix composites have been developed by hand lay-up technique with luffa fiber treated conditions and Ground nut with different volume fraction of fibers as in 1:1 ratio (10%, 20%, 30%, 40% and 50%). Effects of volume fraction on the Tensile, Compressive, Flexural, Impact strength were studied. SEM analysis on the composite materials was performed. Tensile strength varies from 10.35 MPa to 19.31 MPa, compressive strength varies from 26.66 MPa to 52.22 MPa, flexural strength varies from 35.75 MPa to 58.95 MPa and impact energy varies from 0.6 Joules to 1.3 Joules, as a function of fiber volume fraction. The optimum mechanical properties were obtained at 40% of fiber volume fraction of treated fiber composites. Fractures surface of the composite shows the pull out and de-bonding of fiber is occurred.

Selection and peer-review under responsibility of the Organizing Committee of GCMM 2014

Keywords: Mechanical properties; volume of fraction; Luffa/Ground nut fiber; SEM Analysis

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1. Introduction

In today's scenario, there is an increasing need for eco-friendly materials with relatively high strength to weight ratio. FRPs reinforced with synthetic fibres are of high strength to weight ratios and become excellent substitutes for conventionally used high strength materials. The poor biodegradability of synthetic FRPs is a serious issue, as of today. Natural fibre reinforced FRPs can solve both the performance and environment related issues. Murali et al. [1] carried out a research to study the possibilities of introducing new natural fibers as fillers in a polymeric matrix, to develop economic and light weight structural materials. Later, techniques for extraction of fibres from plants like vakka (Roystonea regia), date and bamboo fibers were developed by researchers. The density and tensile properties of these fibers were almost as good as those of established fibers like sisal, banana, coconut and palm. Mechanical properties of coconut spathe and coconut spathe-fiber reinforced epoxy composites were studied by Sapuan et al. [2] and their potential to become successful materials in engineering applications was quantified. Tensile strength and flexural strength for the coconut spathe-fiber-reinforced composite laminates ranged from 7.9 MPa to 11.6 MPa and 25.6 MPa to 67.2 MPa respectively. These values were lesser compared to that of composites made from cotton fibre, coconut coir and banana fiber. The coconut spathe-fiber-reinforced composite laminates with chemically treated fibres showed good fibre marix adhesion and hence better mechanical properties.

Many researchers developed composites containing both natural and synthetic fillers and these materials were termed as hybrid composites. The hybrid composites showed better impact and compressive properties than mono-filler FRPs [3-4]. The mechanical properties of short random oil palm fiber reinforced epoxy (OPF/epoxy) composites were studied by Mohd zuhri et al [5]. In their study, composite plates with different volume fractions (5, 10, 15 and 20 vol%) of oil palm fiber were fabricated by hand-layup technique. The tensile and flexural properties showed inverse variation with fibre loading. The maximum tensile strength values were obtained for the sample with 5 vol% fraction of fibres and beyond that there was no significant change. From this research, it is obvious that oil palm fibre is not suitable for structural applications. Mansour Rokbi et al. [6] analysed the influence of alkaline treatments on the flexural properties of Alfa fibre to determine the optimum conditions for alkaline treatment. The experimental results obtained from a treatment with 10% NaOH in 24h, showed improvement in the flexural strength and flexural modulus, from 23 MPa to 57 MPa and from 1.16 GPa to 3.04 GPa respectively.

Naga prasad Naidu et al. [7] presented the tensile and flexural strengths of Glass-sisal polyester hybrid composites. Tensile strength and flexural strength for the composite laminates were about 12.35 MPa and 53.46 MPa. Lassaad Ghali et al. [8] found that the luffa fiber weight fraction influenced the flexural properties of polyester composites. The maximum values of strength and strain were reported at 10% weight fraction of fiber. Boyand et al. [9] studied an effect of alkali treatment of sponge gourd (luffa cylindrica) fibers on the flexural properties of polyester matrix composites. Experiment results showed an increase of flexural strength by 14%. Girisha et al. [10] fabricated composites consisting of reinforcement in the hybrid combination such as sisal-coconut spathe, sisal-ridge gourd and coconut spathe-ridge gourd with fibers varying from 5% to 30 Wt%. The tensile strength reached a maximum value of 22 MPa at 25% weight fraction of fibers. This result explained that the incorporation of different natural fibres (instead of a synthetic and a natural fibre) as reinforcements is also a very practical approach. The tensile and compressive properties such as strength and modulus of fibrous composites decreased with increase in angle of fibres from 0° to 90° [11]. Raju et al. [12] prepared the composite with different weight % of randomly distributed groundnut shell in polymer matrix. The addition of the ground nut shell to the polymer composites results reduced thermal conductivity and increases the glass transition temperature of the composites. The scarcity of literature on morphologically different natural reinforced composites directs us towards the development of luffa-ground nut shell–epoxy hybrid composite. In this work, epoxy based polymer composites were prepared with single luffa fiber and ground nut fibre as the reinforcing materials. The tensile, compressive, impact and flexural tests and SEM analysis of fractured surfaces of the composite were performed and are discussed in detail.

2. Experimental

2.1. Materials

The raw materials involved in the fabrication were Epoxy resin LY 556, Luffa Fiber, Ground nut shell, Hardener HY951, and Mansion Wax. Luffa fiber and ground nut are randomly oriented in polymer matrix. Samples are to be prepared with alkali treated fibers. Luff and ground nut shell were alkali-treated in 2% NaOH solution for 30 min to remove any greasy material and hemi cellulose, and then dried in sun light. The single fiber was used in making the luffa fiber and ground nut epoxy composite.

2.2. Material Preparation

Luffa cylindrica (LC) is a tropical plant belonging to the family of Cucurbitacea, The fruit of this plant has a vascular system with a fibrous arrangement [9]. Raw luffa fibers were cut lengthwise and the middle part was removed. Finally the fiber was cut to 10mm to 20mm long segments as shown in figure 1. The Botanical name of the groundnut is Arachis hypogeal which belongs to Leguminosae family, as shown in fig. 2(a) and 2(b). Groundnut shell is protecting cover of the pod is also known as a seed, former one having higher mechanical properties. The reported average length, thickness and density of the groundnut shell were 38 mm, 0.25 mm and 1.06g/cm^3 respectively [12].

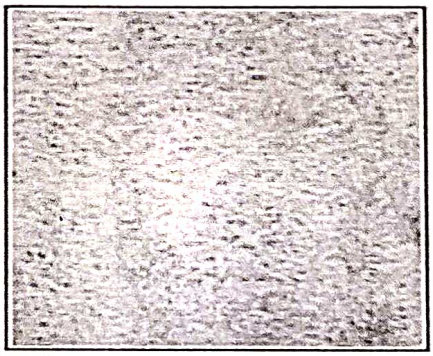

Fig. 1 The rectangular portion of Luffa fiber

Fig 2 (a) Ground nut fiber

Fig 2 (b) Ground nut cylindrical shell

2.3. Volume fraction of fiber and Orientation of fibers

The composites were fabricated with 10%, 20%, 30%, 40% and 50% fiber and ground nut shell in the ratio of 1:1 as in volume fractions. The treated fibers were taken with required volume fractions laid into the mold of same size 300 mm x 300 mm x 5 mm and care is taken to ensure that the fibers are pressed to form the size of the mold. Then the top mold is closed and bolts are tightened. Then the mold is transferred to a compression press and placed under pressure for about an hour such that it compresses and forms a thin laminate shape. Orientation is termed as the alignment of fiber in the mould along with the resin mix. This also defines the properties of composites to be fabricated. In this work, the discontinuous fiber mat has oriented in longitudinal axis and discontinuous single fiber materials are in random orientation.

3. Fabrication process

Considering factors such as type of reinforcement and matrix materials, size, shape, quantity and cost, there are many specialized processes available. The most commonly used process is the hand layup method. The set-up for hand lay-up technique is shown in figure 3. The mould used for the composite is made of mild steel with stainless sheet placed in the inner surface. A de-bonding agent (mansion wax) is applied before curing of resin on the stainless sheet and the composite specimen is casted in the mould. The inner cavity dimension of the mould is 300mm x 300mm x 5mm. The hand lay-up method is a simple and the most widely used for FRP fabrication process. This process comprises of applying resin on the either side of natural fibre knitted pad with usage simple tools brush and roller. The fiber is arranged in discontinuous method in the steel plate and it is compressed by the help of bolt. After 15 minutes the bolt are released and the mat form fiber is taken out carefully without any damage. The fiber are arranged in such a way that there is no gap in-between the fiber, If there is any gap in the fiber arrangement the resin is filled by the gap so as to manage the strength. Measure the weight of the fiber using weighing scale. Then 1:5 of resin and hardener is added and mixed using the jar. Then the steel plate was cleaned with acetone and wax is applied in the inner side of the plate finally resin is poured and steel plate was compressed by tighten the bolt and nut. After 24 hrs the bolt was released and the laminates are taken carefully without any damage. Specimens are cut for testing as per ASTM standards.

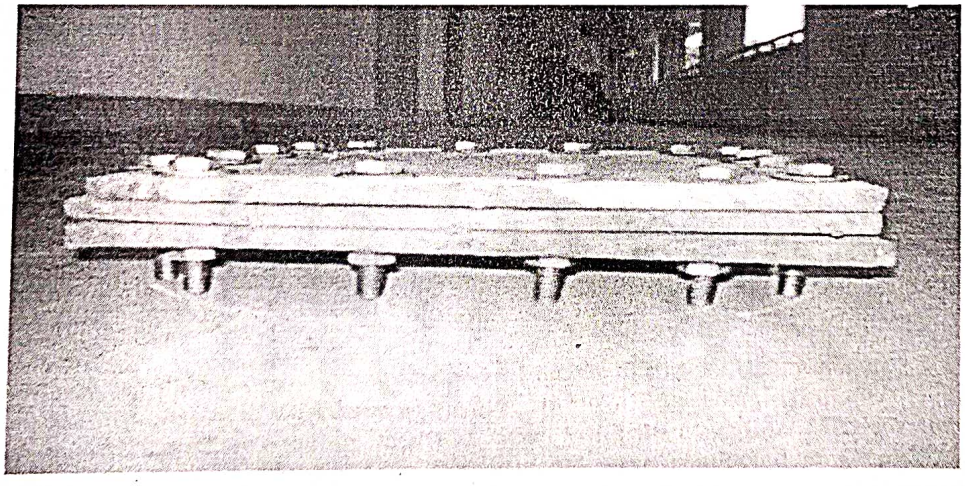

Fig. 3 Preparation of the composite

4. Characterizations of composite materials

4.1. Determination of Water Absorption behaviour of Composite

The water absorption characteristics of luffa fibre and Ground nut reinforced polymer composite were studied by immersion in distilled water at room temperature for 12, 24, 48, 72 hours. The test specimen size (5 mm x 5 mm) is prepared as per ASTM D-570 for water absorption test. Edges of the sample were sealed with polyester resin. Samples were dried for 24 hours at 50^{o}C. After 24 hours samples were weighed accurately. Sealed samples were then immersed in distilled water at room temperature for 12, 24, 48, 72 hours. Samples were taken out of water after appropriate time and wiped with a tissue paper to remove surface water. The moisture absorption in the composite was measured by weighing the material in periodic intervals [13-14]. The ratio of increase in mass of the specimen to the initial mass gives as the percentage moisture absorption.

4.2. Tensile and compressive test

The tensile tests were conducted according to ASTM D 3039-76 standard on a computerized Universal Testing Machine. The loading arrangement for the specimen and the photograph of the machine used are shown in figure 4. The specimens with dimensions of length 300mm and width 25 mm were used. The test was conducted at a crosshead speed of 5 mm/min using 10 kg load cell. In each case, 3 samples were used and the average values were reported. The compressive strength is usually obtained experimentally by means of a compressive test with using UTM.

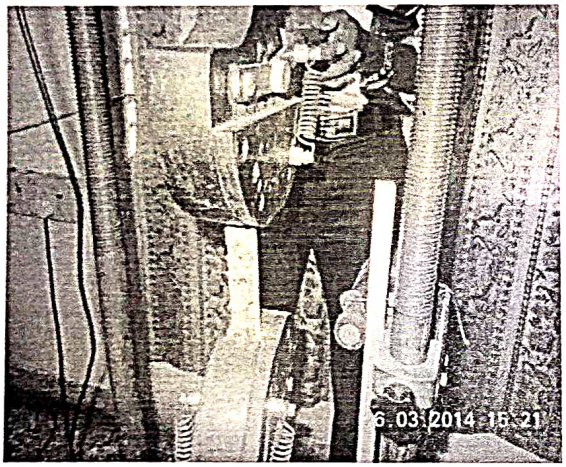

Fig. 4 UTM machine Sample loaded condition for tensile testing

Fig. 5 UTM machine Sample loaded condition for Flexural testing.

4.3. Flexural and Impact Test

Flexural strength of the composites was determined from the three point bend technique. It can be carried out in the modified UTM machine in accordance with ASTM D790-03. The loading arrangement for the specimen and the photograph of the machine used are shown in figure 5. All the composite specimens were of rectangular shape having length 80mm x 15mm x 5mm. Experiments were conducted at a cross head speed of 0.5 mm/min. Then flexural strength was calculated using simple bending moment diagram of simply supported beam at central point load. The impact strength values were calculated by charpy impact test using specimens of dimension

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65mm x 12mm x 5mm.

4.4. Scanning electron microscopy (SEM)

The morphological characterization of the composite fracture surface was carried out using SEM. The samples were gold sputter coated to improve electrical conductivity.

5. Results and discussion

5.1. Water Absorption behaviour of Composite

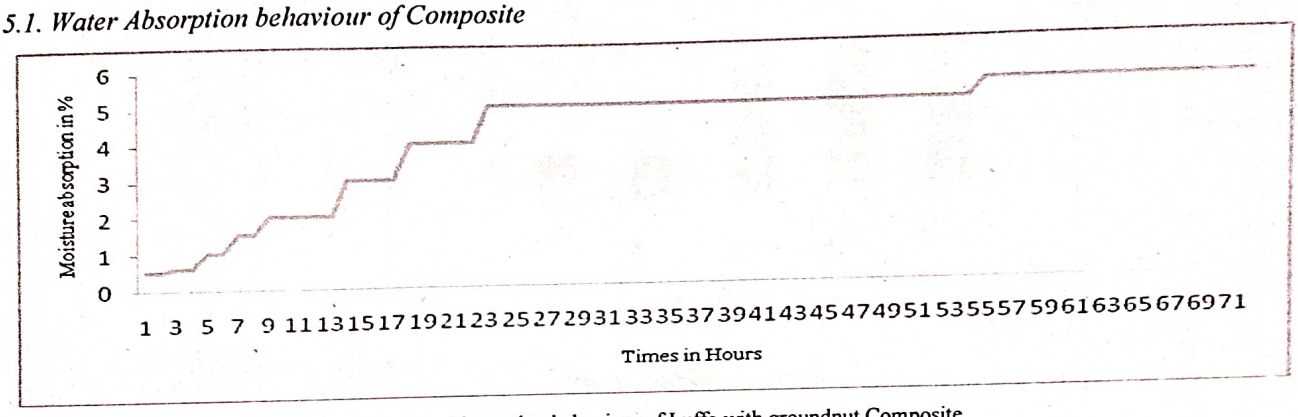


Fig.6 Water Absorption behaviour of Luffa with groundnut Composite

Water absorption is one of the major concerns in using natural fibre composites in many applications. The water absorption in hybrid composites in 24 hours, maximum and minimum water uptake was shown in the fig. 6. Water absorption after 10 hrs increases at the rate of 1% - 5.5%.

5.2. Impact strength

The variation of impact strength with the fibre content, in case of ground nut fiber composite is presented in figure 7. In this case, the ground nut fiber-luffa composites exhibited better impact properties. The impact strength increases with increasing volume fraction of fibres, reaching a maximum value at 30%. Beyond 30%, the impact strength shows a decreasing trend. The maximum impact strength of the composites varies between 0.6 Joules to 1.3 Joules. Alkali treated luffa fibers and groundnut shells showed improved impact strength. This result was in line with the findings of Varada Rajulu et al [15] and Ramachandra reddy et al [16]. They have carried out the research on characterization of bamboo composites.

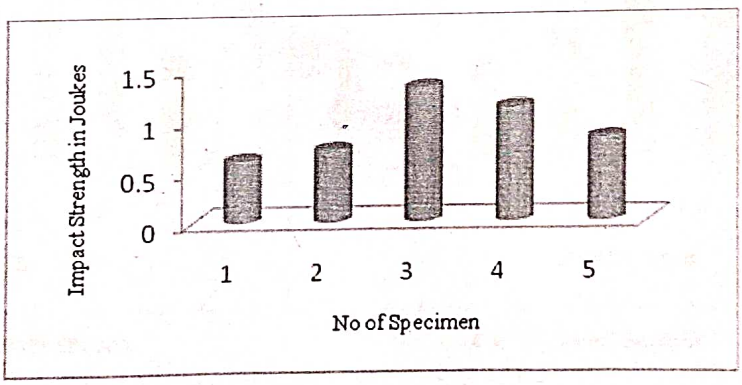
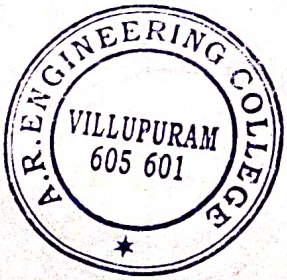


Fig. 7 Impact Strength



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5.3. Compressive strength

The variation of compressive strength with the fiber content on the alkali treated composites is shown in figure 8. The luffa-ground nut fiber composite material was tested and the compressive strength was calculated. Three specimens were tested, with different fiber volume fractions and average compressive strength was reported. The compressive strength was increasing steadily upto 30% and beyond that the change was very marginal. The compressive strength of the luffa with ground nut fiber varies from 26.66 MPa to 52.22 MPa.

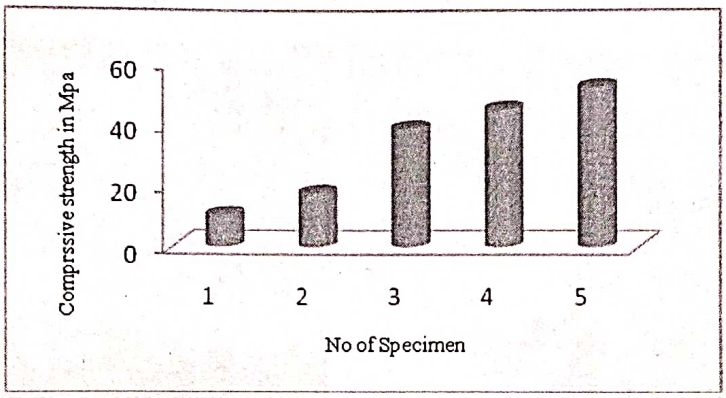

Fig. 8 Compressive Strength

5.4. Tensile and Flexural strength

Fiber content and fiber strength are influencing parameters for the strength related properties of the composite. Hence the strength variation with different volume fractions of fibre loading showed differently. This variation in tensile and flexural strength of the composites with 10%, 20%, 30%, 40% and 50% of fibre content are shown in figures 9 and 10 respectively. These figures clearly indicate the gradual increase in both tensile strength and flexural strength for 30% and 40% fibre content. However there is a decrease in both tensile and flexural strength of the composite with 50% fibre content. Similar observations were reported by Noorunisa Khanam et al. [17]. They have experimented with Sisal/Silk reinforced hybrid poly-ether-ketone composite.

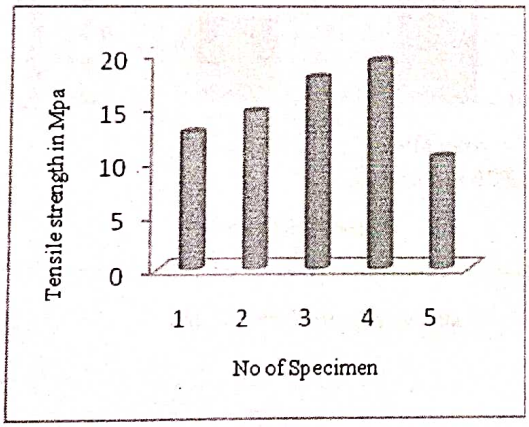

Fig. 9 Tensile Strength

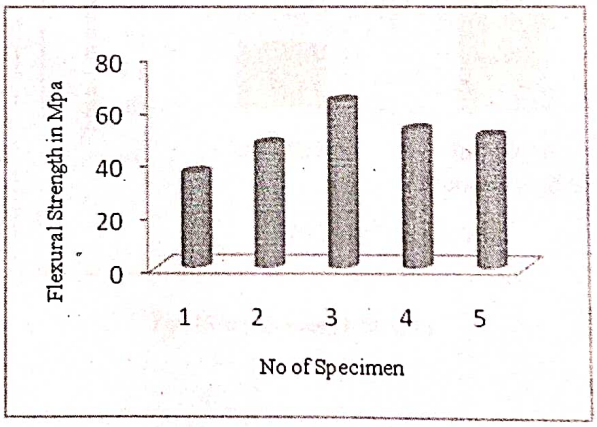

Fig. 10 Flexural Strength

5.5. Morphology Test on Cross Sections of Fractured Surface

The analysis of the micrographs of the composites prepared under the fractography of alkali treated luffa fiber and groundnut reinforced polymer composites are presented in figure 11. These fractography were recorded at two different regions at x35 and x300 magnifications. From these micrographs, it is clearly evident that the surface of the fibers becomes rough after alkali treatment. The elimination of hemi-cellulose from the surface of the luffa fiber may be responsible for the roughening of the surface. As a result of improvement in fibre matrix adhesion, fiber pull out is reduced.

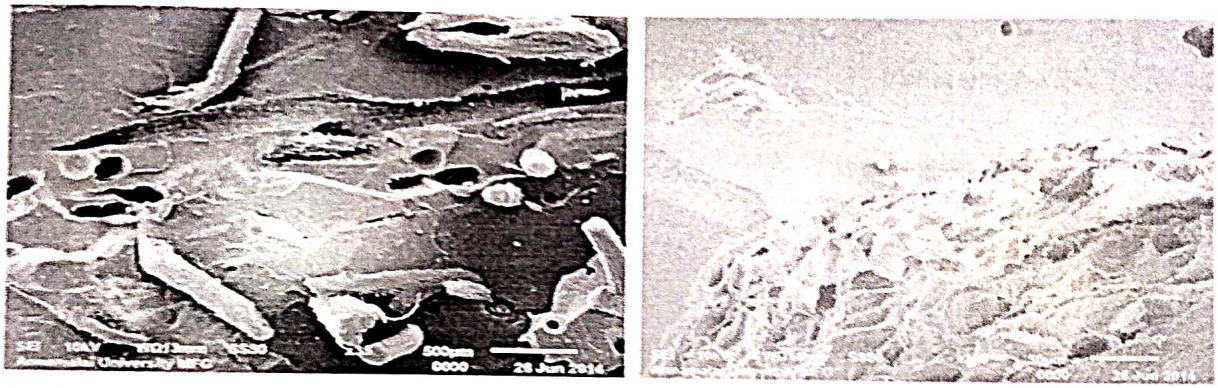

Fig. 11 SEM image of impact fractured surface of Luffa and Ground nut composites

5.6. Comparison for mono poly with hybrid polymer composites

It clearly shows that luffa with groundnut polymer exhibited higher mechanical properties when compared to luffa polymer composites. These figures clearly indicate that there is a marginal increase in tensile, flexural, compressive and impact strength of 30% and 40% volume fractions of fibers.

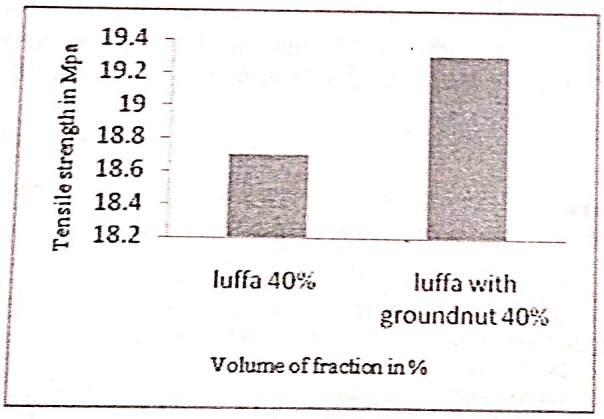

Fig. 12 Tensile strength for luffa

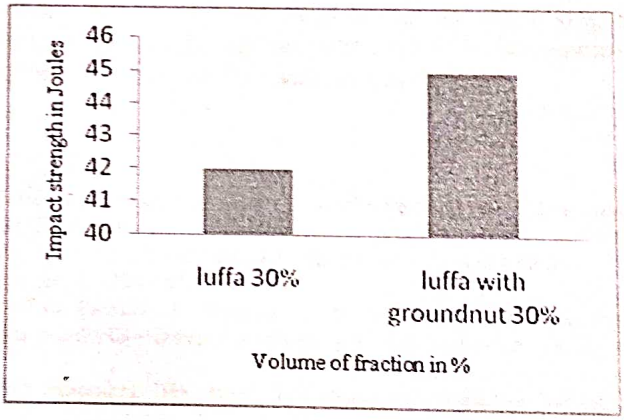

Fig. 13 Impact strength for luffa

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605 601

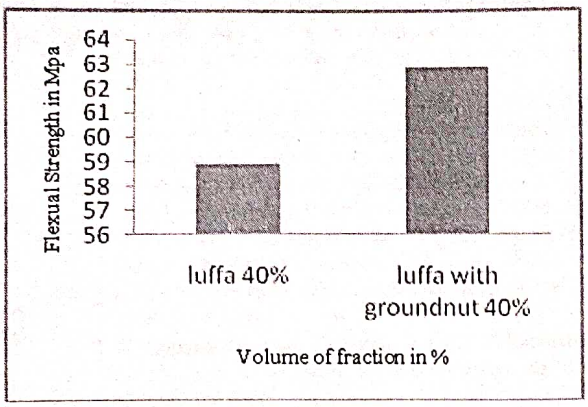

Fig. 14 Flexural strength for luffa

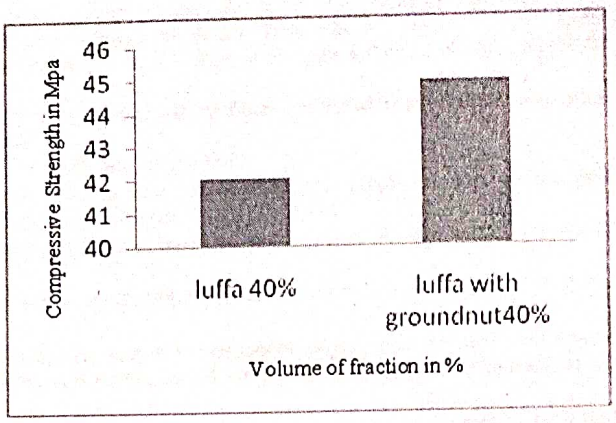

Fig. 15 Compressive strength for luffa

6. Conclusion

The variation of compressive, impact, tensile and flexural properties of the luffa fiber and groundnut reinforced epoxy polymer hybrid composites for 10%, 20%, 30%, 40%, and 50% fibers content were studied as a function of alkali treatment. It is reported that composites having 40% treated fiber content exhibited higher values for the fore mentioned properties than luffa groundnut fiber polymer composites with 30% and 50% fibre contents. The mechanical property values of luffa – groundnut reinforced composite were slightly higher than that of luffa fibre reinforced composite. After the alkali treatment, it was found that, treated composites possessed higher values of aforementioned mechanical properties because the alkali treatment improves the adhesive characteristics of the surface of the luffa fibers and groundnut by removal of hemicelluloses, waxes, impurities and lignin from the fibers.

In the present work, it was found that optimum values and significant improvements were at 40% treated fiber reinforced composites. The morphology of fractured surface observed by SEM suggests that the networking of structure restricts the pull out of fiber, which is responsible for higher mechanical properties for 40 % fiber content. The decrease in strength at 50% fiber content is due to insufficient wetting of fiber with the matrix.

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INNOVATIVE PROJECT

Several inovative projects are done by our A.R. students, some of them are.,

DESIGN AND FABRICATION OF AUTOMATED DOUBLE HACKSAW MACHINE

E.Arun Kumar, R.Dhinesh, S.Senthamizh Selvan, S.SELVA of Mechanical Department designed a Double Hacksaw Machine under the guidence of Mr.S.Ramamoorthy,

Professor of Mechanical Engineering during the Academic year of 2019-2020. This mechanism is designed and developed in order to makes the cutting operations much easier and also reduce the production time.Handling of this machine is very much simple.

EXPERIMENTAL SETUP

The prototype model of the double power hacksaw machine is attached below

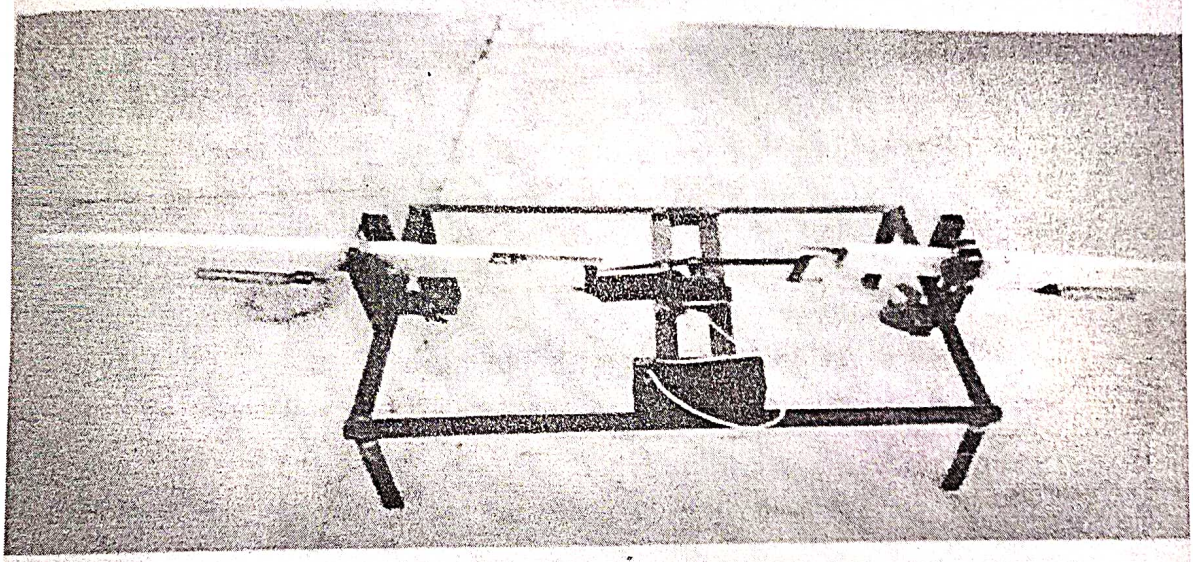

Figure 6.1 Experimental Setup

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DESIGN AND FABRICATION OF SEMI AUTOMATED DOUBLE HACKSAW MACHINE

A PROJECT REPORT

Submitted by

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DHINESH R	-	420316114010
SENTHAMIZH SELVAN S	-	420316114031
SELVA S	-	420316114307

In partial fulfillment for the award of the degree

Of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

A.R ENGINEERING COLLEGE, VILLUPURAM – 605 601

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ABSTRACT

The objective of this work is to fabricate the double power hacksaw machine in order to achieve high productivity of work-pieces than the power hacksaw machine using a single hacksaw blade. An DC motor is used to bring about the reciprocating motion required for cutting the work-pieces. With the help of this double power hacksaw machine, the two metal bars can be cut simultaneously to get the high-speed cutting rate and to achieve mass production for maximum profit in related companies. In this double hacksaw machine we can able to cut materials such as wood, steel, etc. This machine makes the cutting operations much easier and also reduce the production time. The handling of this machine is very much simple.

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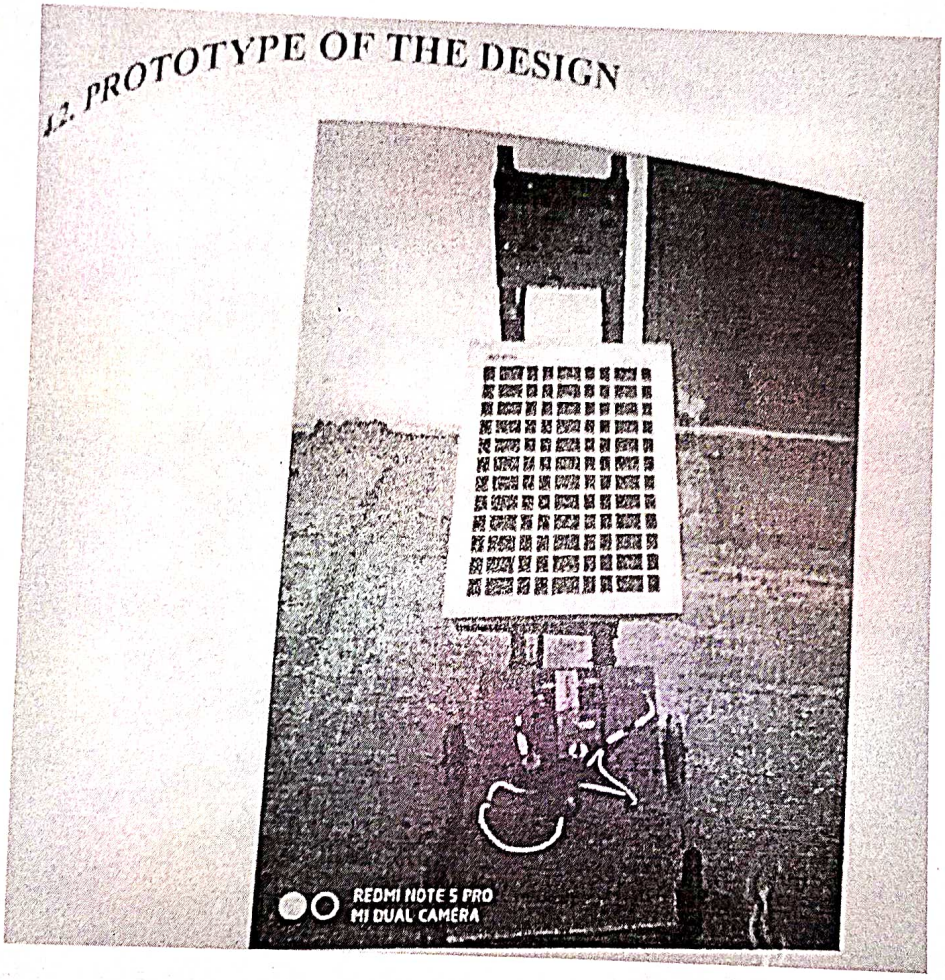
DESIGN AND FABRICATION OF SOLAR BASED GRASS CUTTER

M.Mathivathanan, P.Muthuvel, M.Suriyaprakashraj, R.vignesh SELVA of Mechanical Department designed a Double Hacksaw Machine under the guidence of Mr.S.Anandhakumar,Professor of Mechanical Engineering during the Academic year of 2019-2020. This mechanism is designed and developed in order to make the grass cutter which operates on solar energy hence save the electricity and reduces environmental Pollution.This model is also Economical.

4.2. PROTOTYPE OF THE DESIGN



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DESIGN AND FABRICATION OF SOLAR BASED GRASS CUTTER

A PROJECT REPORT

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MUTHUVEL P	-	420316114020
SURIYAPRAKASHRAJ M	-	420316114034
VIGNESH R	-	420316114308

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ABSTRACT

Now a days grass cutter machines are becoming very popular today. Pollution is man made, which we can be seen in our daily life. In old model grass cutter IC engine was used and hence because of its environmental impact pollution level rises IC engine driven cutter is more costly. Maintenance of such conventional machine is more. To avoid these drawbacks we plan to build new type of grass cutter which runs on solar energy and this model is also economical.

The aim of our project is to make the grass cutter which operates on solar energy hence save the electricity and reduces environmental pollution.

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DESIGN AND FABRICATION OF AUTOMATIC HAND BREAKING SYSTEM USING KEY

M.Gilbert, A.Muralidharan, N.Patchaiyappan, S.Sathish of Mechanical Department designed a Double Hacksaw Machine under the guidence of Mr.S.Ramamoorthy,

Professor of Mechanical Engineering during the Academic year of 2019-2020.This mechanism is designed in order to provides totally lever-less operation which saves the effort as well as the space utilization of the Vehicle.Generally the hand break is manually operated whereas in our project, we have developed an automatic handbrake release mechanism for safety purpose.

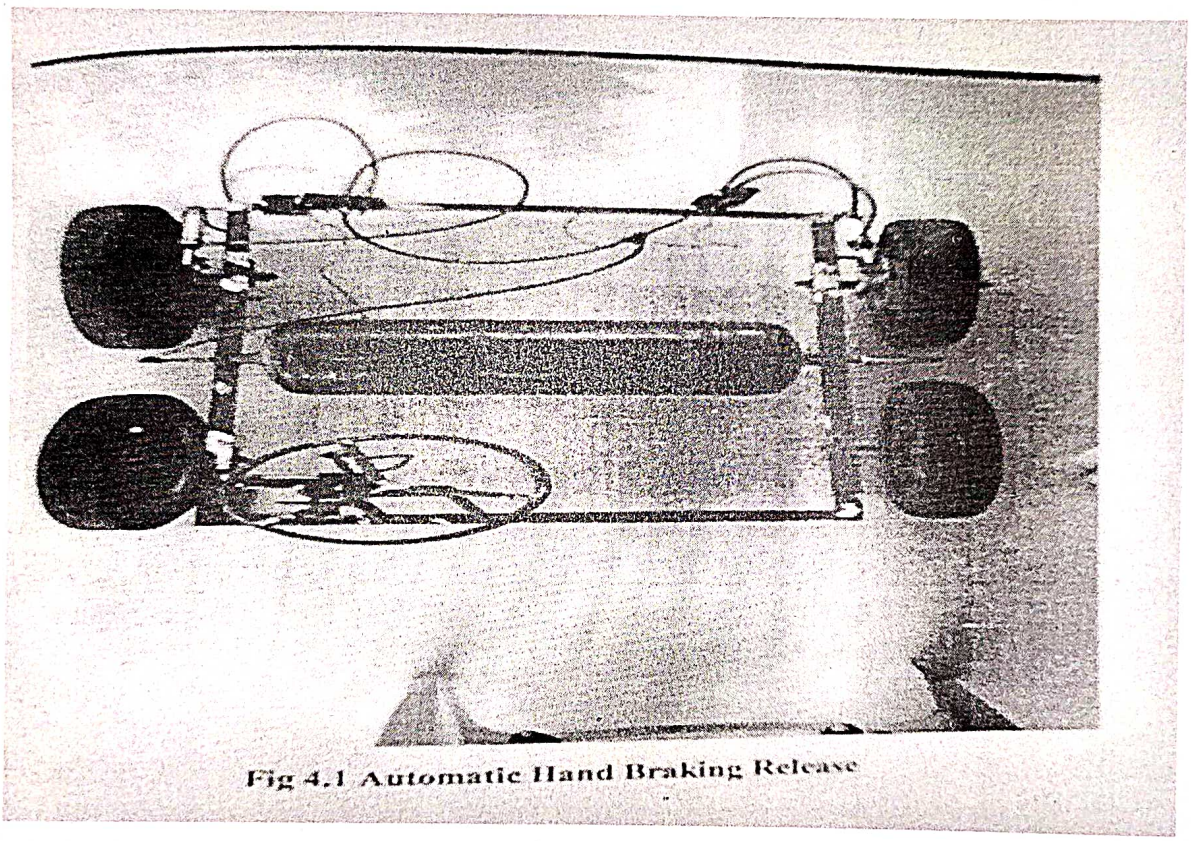

Fig 4.1 Automatic Hand Braking Release

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ABSTRACT

Now a days grass cutter machines are becoming very popular today. Pollution is man made, which we can be seen in our daily life. In old model grass cutter IC engine was used and hence because of its environmental impact pollution level rises IC engine driven cutter is more costly. Maintenance of such conventional machine is more. To avoid these drawbacks we plan to build new type of grass cutter which runs on solar energy and this model is also economical.

The aim of our project is to make the grass cutter which operates on solar energy hence save the electricity and reduces environmental pollution.

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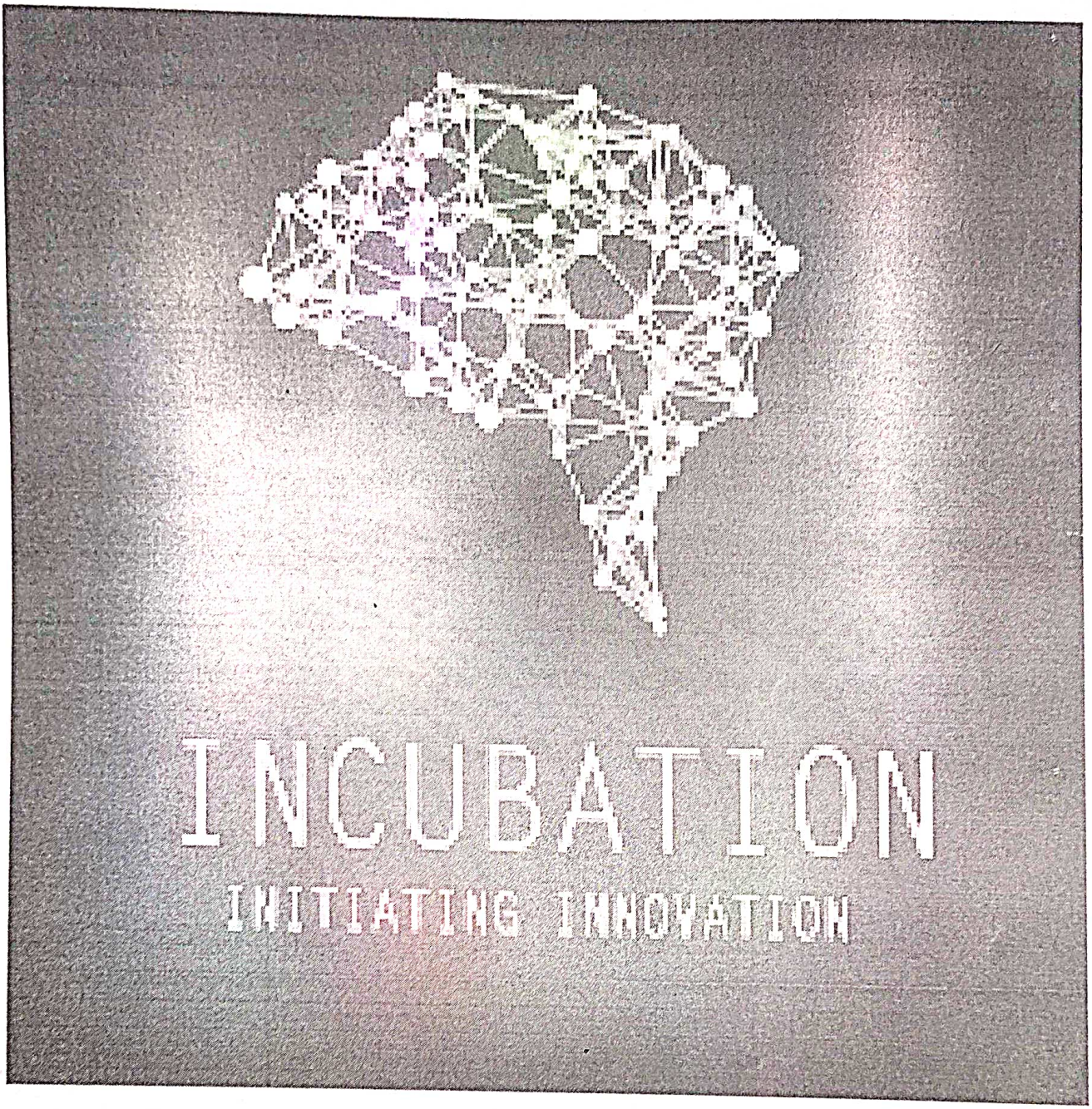

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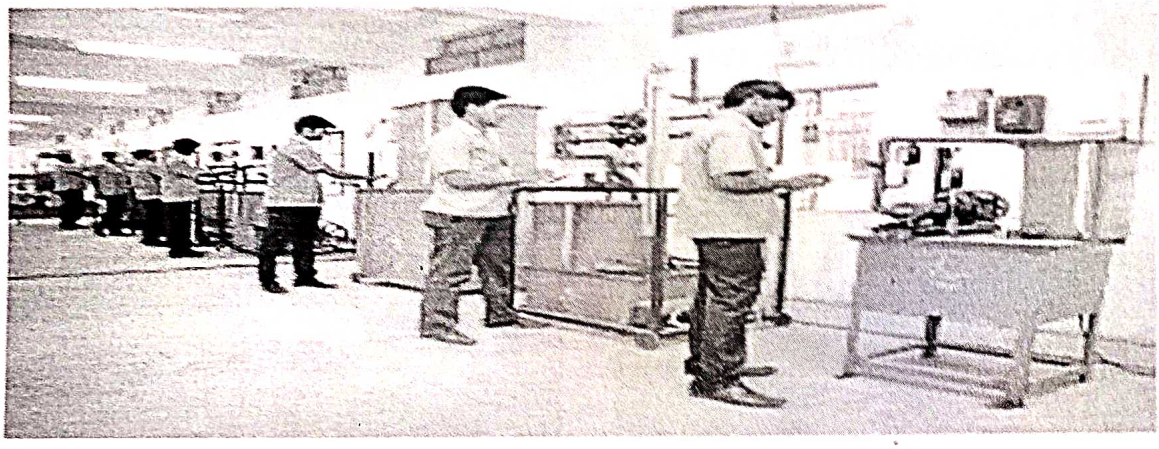

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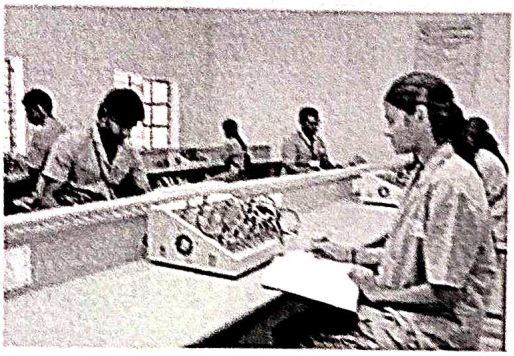
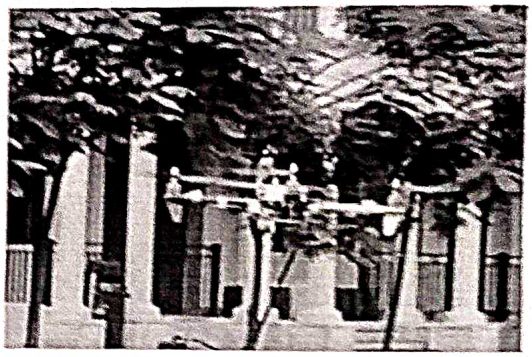

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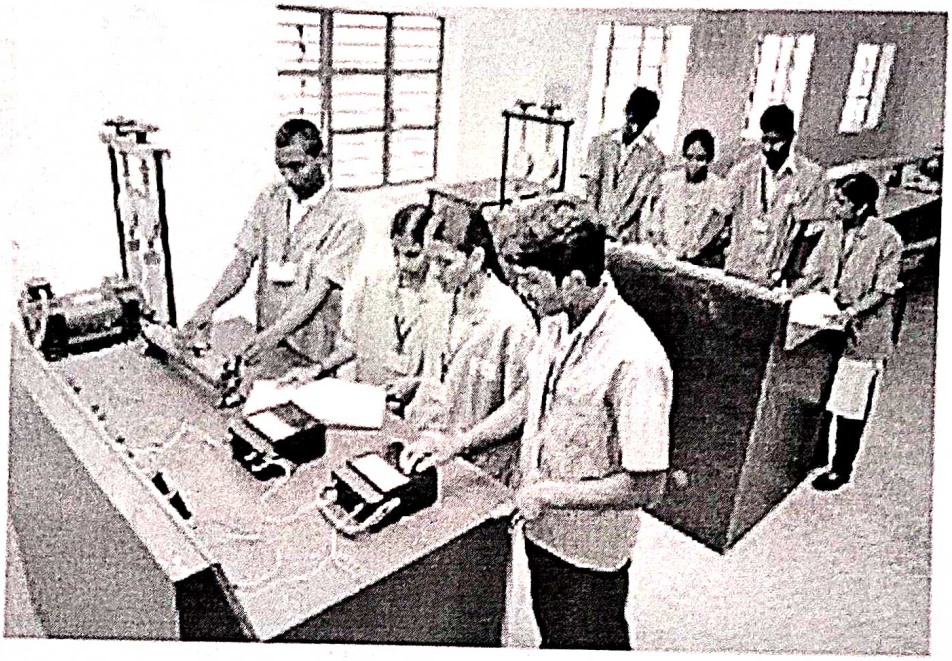

INCUBATION CENTER FOR ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT

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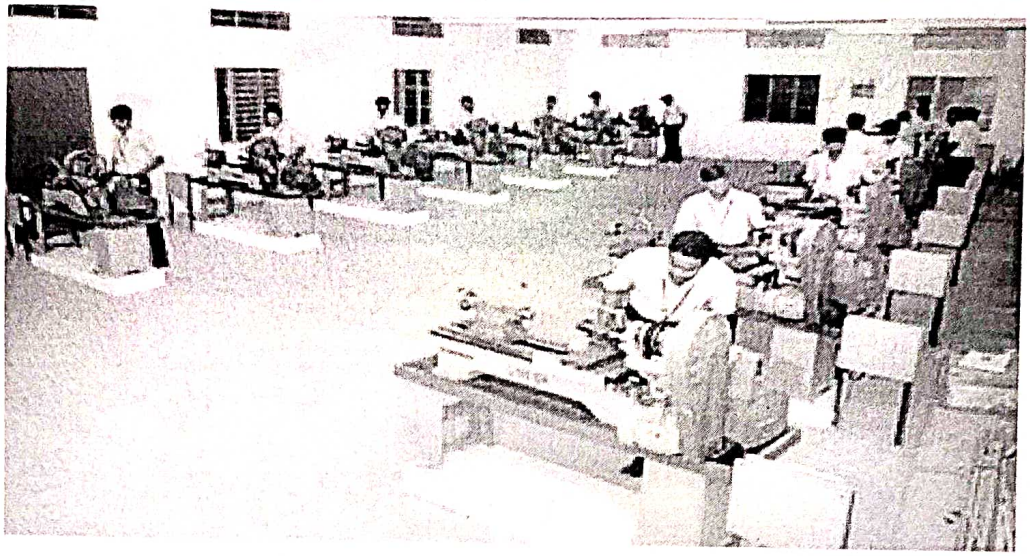

INCUBATION CENTER FOR MECHANICALDEPARTMENT (WORKSHOP LAB)

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RESEARCH AND DEVELOPMENT CELL

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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15.09.21

From:

R.Udhayakumar,HOD/EEE.,
R&D Coordinator
A.R.Engineeing college,
Kappiyampuliyur.

To:

The Principal,
A.R.Engineering colllege,
Kappiyampuliyur.

Sub:Request permission to conduct seminar on"VLSI Design approach of technique behind research methodology

Respected Sir,

It is a pleasure to inform you the research and development cell has planned to conduct seminar on"VLSI Design approach of technique behind research methodology"at 9.00 am to 1.00 pm on 15th September.2021` win the aim to know about the process of very large scale integretion(VLSI) In creating an integrated circuit (IC) by connecting thousands of transister into a single chip.Through this program the student can practise the way in which design methods are used in the context of the organisation.the projects,the products,all stakeholders.and all other aspects that influence the development.So kindly we request you to grant us permission to conduct the programme is enclosed with this letter for your kind permission.

Thank you

The principal

R&D Coordinator

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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VILLUPURAM-605 601.

RESOURCE PERSON PROFILE

Name of the resource person	:Dr.M.Surendar
Designation	:Assistant Professor/ECE
Working Experience	:17 years
Educational qualification	:Ph.D
College name	:NIT,Puducherry

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From:

R.Udhayakumar.,HOD/EEE,
R&D Coordinator,
A.R.Engineeing college
Kappiyampuliyur.

15.09.21

To:

The Principal,
A.R.Engineering colllege
Kappiyampuliyur.

Respected sir,

Sub:Inviting as a resource person for Research and Development Cell – Reg

I am writing this invitation letter to you to formally invite you to the R&D programme of "VLSI Design Approach of Techniques behind Research Methodology" Which has been scheduled on 15th September 2021 from 9:30 a.m to 1.00 p.m,

In this regard, we woud like to request you to be as a guest speaker for the said event to sharp your knowledge to all of the education participants.

Your favorable response regarding this request will be highly appreciated.

Thaking you

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
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RESEARCH AND DEVELOPMENT CELL

R.ef: AREC/R&D/2021-2022/001 Date:15.09.2021

CIRCULAR

It is herby informed that our college is going to conduct a programme **"VLSI Design approach of Technique Behind Research Methodology"** for all final year students at 09:30 a.m to 1:00 p.m on 15.09.2021. All the students and faculty members are cordially invited to attend thid seminar.All the students and staff members are expected to give their fullest c0-operation towards the smooth conduction of programme.

Copy to

1. Prinicipal
2. All Department HOD's
3. All Class Tutor
4. Main notice Board/Library Notice Board/Office Notice Board

Circular to:

1. All Staff Members
2. All final year Students

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
A.R.ENGINEERING COLLEGE
VADAKUCHIPALAYAM,
KAPPIYAMPULIYUR POST,
VILLUPURAM-605 601.

A.R.ENGINEERING COLLEGE

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Vadakuchipalayam, Kappiyampuliyur post, Villupuram-605601, Tamilnadu.

EVALUATION MODEL FOR RESEARCH AND DEVELOPMENT COMMERCIALIZATION CAPABILITY

ATTENDANCE SHEET

Date:15.09.2021

S.NO	REG.NO	STUDENT NAME	Dept/year	SIGNATURE
1	420318114001	AJITH M	Mech/IV	M. AJITH
2	420318114002	AJITHKUMAR M	Mech/IV	
3	420318114003	ARULKUMAR S	Mech/IV	
4	420318114006	DINESHKUMAR M	Mech/IV	
5	420318114007	DINESHKUMAR V	Mech/IV	
6	420318114009	EZHILMULLAIARASU M	Mech/IV	
7	420318114010	GURUMOORTHI S	Mech/IV	
8	420318114011	JAYAMOORTHY J	Mech/IV	
9	420318114015	NIJANTHAN J	Mech/IV	Nijanthan
10	420318114017	RAGURAMAN R	Mech/IV	Raguraman R
11	420318114018	RAJ A	Mech/IV	Raj -
12	420318114019	RAKESH R	Mech/IV	Rakesh. R
13	420318114020	RAMPRASATH D	Mech/IV	
14	420318114021	RANGARAJAN R	Mech/IV	
15	420318114023	TAMILSELVAM S	Mech/IV	Tamilselvam S
16	420318114024	UDHAYAKUMAR M	Mech/IV	
17	420318114027	VIGNESHWARAN M	Mech/IV	
18	420318114028	YUVARAJ P	Mech/IV	YUVARAJ P
19	420318114029	YUVARAJ T	Mech/IV	

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Vadakuchipalayam, Kappiyampuliyur post, Villupuram-605601, Tamilnadu.

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420318104001	ADITHA A	CSE/IV	Aditha A
2	420318104002	AMIRTHALAKSHMI V	CSE/IV	Amirthalakshmi
3	420318104003	ANANDHI S	CSE/IV	Anandhi
4	420318104004	BHUVANESHWARI G	CSE/IV	Bhuvaneshwari
5	420318104005	GIRIPRASATH K	CSE/IV	Giri
6	420318104007	GUNASEELAN G	CSE/IV	Gunaseelan G
7	420318104008	KAVITHENDRAL K	CSE/IV	kavithendral
8	420318104009	KAVITHRA K	CSE/IV	kavithra K
9	420318104010	MANGALAMBIGAI A	CSE/IV	Mangai
10	420318104011	SANTHI J	CSE/IV	Santhi
11	420318104012	STEPHENRAJ R	CSE/IV	Stephen
12	420318104013	SUJATHA A	CSE/IV	Sujatha A
13	420318104014	SWARNALAKSHMI B	CSE/IV	Swarnalakshmi
14	420318104016	VARADHARAJA PERUMAL L	CSE/IV	Varadharaja
15	420318104018	YUVARAJ V	CSE/IV	Yuvaraj.V

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420318106001	BALAJI S	ECE/IV	Balaji-S
2	420318106002	HARISHANKAR V	ECE/IV	Harishankar
3	420318106004	SHAKI P	ECE/IV	Shakthi
4	420318106005	SUVASRI S	ECE/IV	Suvasri S
5	420318106006	VANISRI S	ECE/IV	Vanisri-S

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420318105001	DHARANEESHKUMAR R	EEE/IV	Dharaneeshkumar
2	420318105002	GAYATHRI M	EEE/IV	Gayathri

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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KAPPIYAMPULIYUR P.O.,
VILLUPURAM 605 601.

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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

Date:15.09.2021

REPORT OF THE PROGRAME

Ref.: AREC/R&D/2021-2022/001

Name of the programme	:**"VLSI Design approach of Technique Behind Research Methodology"**
Beneficiaries	:B.E. Students [All Final year]
No.of. Participants	:41
Date & Time	:15.09.2021 & 9:30 A.M to 01.00 P.M
Resource Person	:Dr.M.Surendar,M.E Ph.D.,/ECE NIT,Puducherry.
Program Coordinator	:R.Udhayakumar HOD,/EEE R&D coordinator

A.R.Engineering college organised Seminar on Structured Approach of Techniques behind Research Methodology at 9.30 am to 1.00pm on 15.09.2021 in college premises. The session commenced with the welcome address. He gradually delivered his valuable knowledge to students aboyut the Very-large-scale integration (VLSI) which is the process of creatin an integrated circuit (IC) by combining thousands of transistors into a single chip. Design methodology stresses the use of brainstorming to encourage innovative ideas and collaborative thinking to work through each proposed idea and arrive at the best solution. Meeting the needs and wants of the end user is the most critical concern.

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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(Approved by AICTE, New Delhi & Affiliated to Anna university, Chennai)
Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

From:

R.Udhayakumar,HOD/EEE.,
R&D Coordinator,
A.R.Engineeing college
Kappiyampuliyur.

Date:06.04.22

To:

The Principal,
A.R.Engineering colllege,
Kappiyampuliyur.

Respected sir,

Sub: Request permission to conduct a programme **"Use of Online Resource in Research"** for all final year students –reg.

It is pleasure to inform you that the Research and Development cell has planned to conduct a programme "Use of online Resourse in Research" for all final year Students at 9:30 a.m to 1.00pm on 06.04.2022. This programme is very helpful to the students to make usr of online resources. Students will learn about the wide range of material,which makes it easier for researchers to communicate and wiork together,and makes it possible to employ online research tools. Sowe kindly request you to grant us permission to conduct the programme. The schedule and proposal of the programme is enclosed with this letter for your kind permission. Kindly do the needful.

Thanking you

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
A.R.ENGINEERING COLLEGE
VADAKUCHIPALAYAM
KAPPIYAMPULIYUR POST,
VILLUPURAM-605 601.

RESOURCE PERSON PROFILE

Name of the Resourse person	:Dr.S.Mary Saira Bhanu
Designation	:Associate Professor/CSE
Working Expereince	:20years
Educational Qualification	:Ph.D
College Name	:NIT,Tiruchirapalli

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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KAPPIYAMPULIYUR POST,
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A.R.ENGINEERING COLLEGE

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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601, Tamilnadu.

Date:06.04.2022

From:

R.Udhayakumar,HOD/EEE.,
R&D Coordinator,
A.R.Engineering college
Kappiyampuliyur.

To:

Dr. S.Mary Saira Bhanu/CSE
Associate Professor,NIT,
Tiruchirapalli -620015.

Respected sir,

Sub: Inviting as a resource person for Research and Development cell –Reg

I am writing this invitation letter to you to formally invite you to the R&D programme of "Use of Resource in Research" Which has been schedaled on 06.04.2022 from 09.30 am to 04.30 pm.

Your favorable response regarding this request will be highly appreciated.

Thanking you

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
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RESEARCH AND DEVELOPMENT CELL

R.ef.: AREC/R&D/2021-22/001 Date:06.04.2022

CIRCULAR

It is herby informed that our college is going to conduct a programme "Use of Online Resources in Research" for all final year Students at 09.30am to 4.30 pm on 06.04.22. All the students and faculty members are cordially invited to attend this seminar. All the students and staff members are expected to give their fullest co-operation towards the smooth conduction of programme.

Copy to:
1.Chairman
2.Principal
3.All Department HOD's
4.All Class Ad
5.Main Notice Board/Library Notice Board/Office Notice Board

Circular to:

1. All Staff Members
2. All final year Students

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
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KAPPIYAMPULIYUR POST,
VILLUPURAM-605 601.

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VILLUPURAM
605 601

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Vadakuchipalayam, Kappiyampuliyur post, Villupuram-605601, Tamilnadu.

EVALUATION MODEL FOR RESEARCH AND DEVELOPMENT COMMERCIALIZATION CAPABILITY

ATTENDANCE SHEET

Date:06.04.2022

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	20319114001	ENIYAN P	MECH/IV	Eniyan.P
2	20319114002	MOHAN D	MECH/IV	Mohan.D
3	420319114301	RAJAN R	MECH/IV	Rajan.R.
4	420319114302	VINAYAGAMOORTHI V	MECH/IV	Vinayagam
5	420319114501	SRIDHAR M	MECH/IV	Sridhar

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420319104001	CHANDRU M	CSE/IV	Chandru
2	420319104002	GOPINATH K	CSE/IV	Gopinath
3	420319104003	REVATHY E	CSE/IV	Revathy
4	420319104501	JAYASRI V	CSE/IV	jayasri
5	420319104701	IYYAPPAN B	CSE/IV	Iyappan

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420319106001	TAMILARASAN S	ECE/IV	Tamilarasan
2	420319106002	VINOTHINI V	ECE/IV	Vinothini
3	420319106301	SANTHOSH T	ECE/IV	Santhosh

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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KAPPIYAMPULIYUR POST,
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Vadakuchipalayam, Kappiyampuliyur post, Villupuram-605601, Tamilnadu.

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420319105301	BALAKRISHNAN V	EEE/IV	Balakrishnan
2	420319105302	KRISHNARAJ R	EEE/IV	Krishnaraj
3	420319105303	LASARVIJAY B	EEE/IV	Lasarvijay

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
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KAPPIYAMPULIYUR POST,
VILLUPURAM-605 601.

A.R.ENGINEERING COLLEGE

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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

Date:15.09.2021

REPORT OF THE PROGRAME

Ref: AREC/R&D/2021-2022/001

Name of the programme :**"USE OF ONLINE RESOURCES IN RESEARCH"**

Beneficiaries	:B.E. Students [All Final year]
No.of. Participants	:16
Date & Time	:15.09.2021 & 9:30 A.M to 01.00 P.M
Resource Person	:Dr.s.Mary Saira Bhanu/CSE,Associate Professor,NIT Tiruchirapalli - 620015
Program Coordinator	:R.Udhayakumar HOD,/EEE R&D coordinator

Research and Development cell of A.R.Engineering College Organized the programme of Use of Online Resources in Research for all final year students on 06.04.22 by Dr.S.Mary Saira Bhanu, Professor.Computer Science and Engineering,National Institute of Technology,Tiruchirapalli was the resourse person of the seminar programme. The Session Commenced with the welcome address. The resource person graced the session with different online sources.Some examples include blos,websites,online,online articles,online journal articles, and any website a writer could find online.The Internet is a useful tool for research because it gives access to a wide range of material,makes it easier for researchr to communicates and work together,and makes it possible to employ online research tools.

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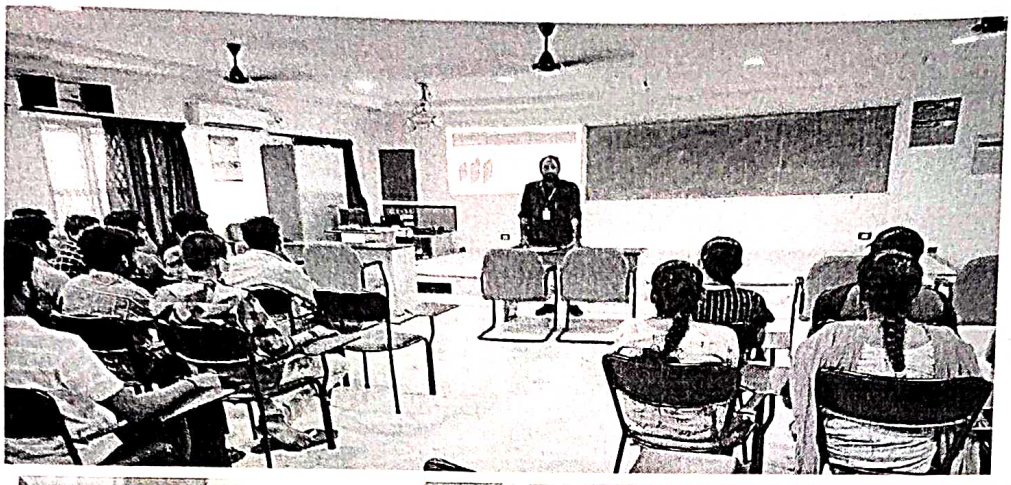
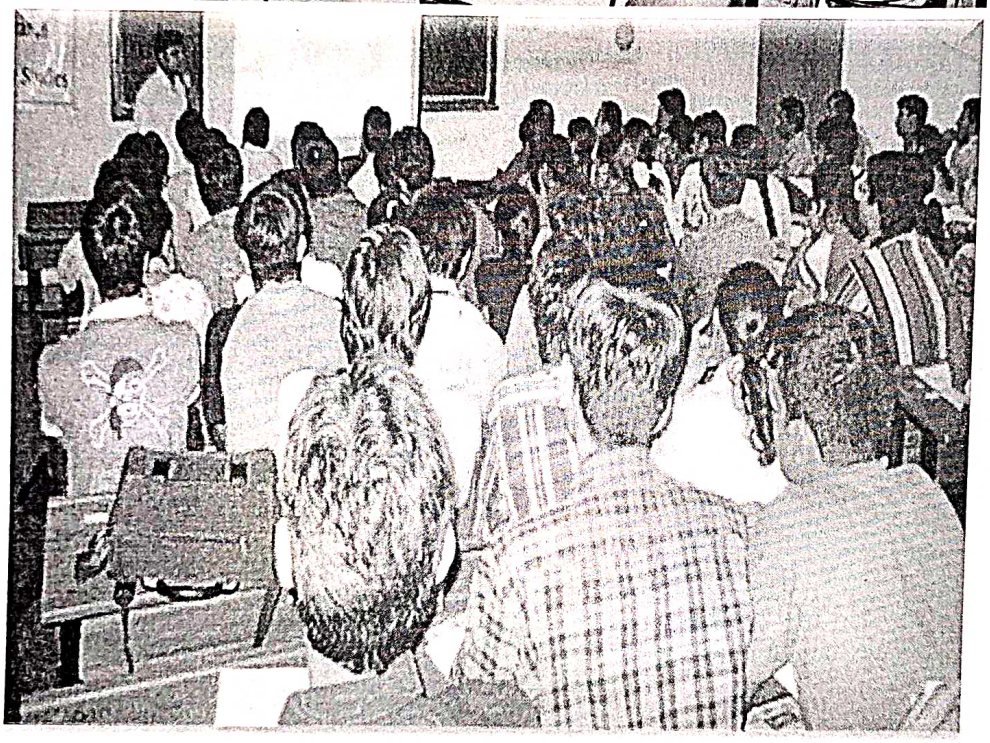
Snapshots





Dr.R.PANNEERDHASS,M.E.,Ph D.,
PRINCIPAL
A.R.ENGINEERING COLLEGE
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KAPPIYAMPULIYUR POST,
VILLUPURAM-605 601.

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

ENTREPERNEUR DEVELOPMENT CELL

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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PRINCIPAL
A.R.ENGINEERING COLLEGE
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KAPPIYAMPULIYUR POST,
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FROM

Mrs.S.SARANYA,ECE.,
ED Cell Coordinator,
A.R.Engineering College,
Kappiyampuliyur.

To:

The Principal,
A.R.Engineering colllege,
Kappiyampuliyur.

Respected sir,

Sub; Request permission to conduct a **"A Training program onYouth Leadership Program"**conducted by EDC Cell-Ref

It is pleasure to inform you that the Enterpreneurship Development has planned to conduct a seminar on
"A Training program on Youth Leadership Program" at 10.00 A.M to 04.00 P.M on 11.10.2022.
so I kindly request you to grant us permission to conduct the programme. Kindly do the needful.

Thank you

ED cell Coordinator

Principal

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
A.R.ENGINEERING COLLEGE
VADAKUCHIPALAYAM,
KAPPIYAMPULIYUR POST,
VILLUPURAM-605 601.

RESOURCE PERSON PROFILE

Name of the resource person	:Dr.R.Sivakumar,
Designation	:Assistant professor/Department of MBA
Working Experience	:06 years
Educational qualification	:M.E.,Ph.D.,
Company Name	:Sri Manakula Vinayagar Engineering College Madagadipet, Puducherry 605107.

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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KAPPIYAMPULIYUR POST,
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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

FROM

Mrs.S.SARANYA,ECE.,
ED Cell Coordinator
A.R.Engineering College,
Kappiyampuliyur.

To:

Dr. R.Sivakumar
Assistant Professor/Department of MBA
Sri Manakula Vinayagar Engineering College
Madagadipet,Puducherry 605107.

Respected sir,

Sub; Inviting as a resource person for the programme **"A Training program on Youth Leadership Program"** conducted by EDC Cell-Ref

I am writing this invitation to you to formally invite you to the EDC programme of **"A Training program onYouth Leadership"** which has beenscheduled on 11.10.2022 from 10.00A.M to 4.00P.M. In this regard, we would like to request you to be as a guest speaker for the said event to share your knowledge to all of the education participants,Your favorable response regarding this request will be highly appreciated.

ED Cell Coordinator

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
A.R.ENGINEERING COLLEGE
VADAKUCHIPALAYAM,
KAPPIYAMPULIYUR POST,
VILLUPURAM-605 601.

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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

21.10.2021

CIRCULAR

Ref:AREC/EDC/2021-2022/001

It is hereby informed that our college is going tio conduct a programme on 21.10.2021 at 10.00A.m to 4.00P.M in the topic of **"A Training program on Youth Leadership Program"**through EDC.Through this program ,all the Final year students and staff members are expected to give their fullest co-operation towards the smooth conduction of programme.

ED Cell Coordinator

COPY TO
1.Principal
2.All Department Hod's
3.All Class Tutors
4. Main Notice Board,Office Notice Board, Library Notice Board

CIRCULAR TO:

3. All Staff Members
4. All final year Students

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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VADAKUCHIPALAYAM,
KAPPIYAMPULIYUR POST,
VILLUPURAM-605 601.

A TRAINING PROGRAM ON YOUTH LEADERSHIP PROGRAM

DATE:11.10.2022

ATTENDANCE SHEET

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420318104001	ABITHA A	CSE/IV	Abitha-A
2	420318104002	AMIRTHALAKSHMI V	CSE/IV	V. Amirthalakshmi
3	420318104003	ANANDHI S	CSE/IV	S. Anandhi
4	420318104004	BHUVANESHWARI G	CSE/IV	G. Bhuvaneshwari
5	420318104005	GIRIPRASATH K	CSE/IV	Giriprasath. K
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7	420318104008	KAVITHENDRAL K	CSE/IV	K. Kavithendral
8	420318104009	KAVITHRA K	CSE/IV	Kavithra. K.
9	420318104010	MANGALAMBIGAI A	CSE/IV	Mangalambigai. A
11	420318104012	STEPHENRAJ R	CSE/IV	R. Stephen
12	420318104013	SUJATHA A	CSE/IV	Sujatha. A
13	420318104014	SWARNALAKSHMI B	CSE/IV	Swarnalakshmi B
14	420318104016	VARADHARAJA PERUMAL L	CSE/IV	L. Varadharaja Perumal
15	420318104018	YUVARAJ V	CSE/IV	Yuvaraj. V

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KAPPIYAMPULIYUR POST,
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S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420318105001	DHARANEESHKUMAR R	EEE/IV	
2	420318105002	GAYATHRI M	EEE/IV	

S.NO	REG.NO	STUDENT NAME	Dept/year	SIGNATURE
1	420318114001	AJITH M	Mech/IV	
2	420318114002	AJITHKUMAR M	Mech/IV	
3	420318114003	ARULKUMAR S	Mech/IV	
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5	420318114007	DINESHKUMAR V	Mech/IV	
6	420318114009	EZHILMULLAIARASU M	Mech/IV	
7	420318114010	GURUMOORTHI S	Mech/IV	
8	420318114011	JAYAMOORTHY J	Mech/IV	
9	420318114015	NIJANTHAN J	Mech/IV	
10	420318114017	RAGURAMAN R	Mech/IV	
11	420318114018	RAJ A	Mech/IV	
12	420318114019	RAKESH R	Mech/IV	
13	420318114020	RAMPRASATH D	Mech/IV	
15	420318114023	TAMILSELVAM S	Mech/IV	
16	420318114024	UDHAYAKUMAR M	Mech/IV	
17	420318114027	VIGNESHWARAN M	Mech/IV	
18	420318114028	YUVARAJ P	Mech/IV	

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
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S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420318106001	BALAJI S	ECE/IV	Balaji S
2	420318106002	HARISHANKAR V	ECE/IV	Harishankar.V
3	420318106004	SHAKI P	ECE/IV	Shaki. P
4	420318106005	SUVASRI S	ECE/IV	Suvasri.S
5	420318106006	VANISRI S	ECE/IV	Vanisri.S

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
A.R.ENGINEERING COLLEGE
VADAKUCHIPALAYAM,
KAPPIYAMPULIYUR POST,
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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

DATE:11.10.2022

Ref.: AREC/EDC/2022-2023/001

REPORT OF THE PROGRAME

Name of the programme :**"A Training program on Youth Leadership Program"**

Beneficiaries :B.E. Students [All Final year]

No.of. Participants :38

Date & Time :11.10.2021 & 10:00 A.M to 04.00 P.M

Resource Person:Dr.R.Sivakumar
Assistant Professor/Department of MBA
Sri Manakula Vinayagar Engineering College
Madagadipet,Puducherry 605107.

Program Coordinator :Mrs.S.SARANYA,ECE.,
E&D coordinator

Entrepreneurship Development cell of A.R.ENGINEERING COLLEGE organised the seminar on **'"A Training program Youth Leadership Program"** on 11.10.2022 by Dr. R.Sivakumar,Assistant Professor/ Department of MBA,Sri Manakula Vinayagar Engineering College,Madagadipet,puducherry 605107.was the resource person of the seminar programme.The session commenced with the welcome address. The resource person graced the session in celebration of the day. A day which has been coined to celebrate innovation and empowernment of Entrepreneurship and leadership throughout the world.

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
A.R.ENGINEERING COLLEGE
VADAKUCHIPALAYAM,
KAPPIYAMPULIYUR POST,
VILLUPURAM-605 601.

A.R.ENGINEERING COLLEGE

(Approved by AICTE, New Delhi & Affiliated to Anna university, Chennai)
Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

FROM

Mrs.S.SARANYA,ECE.,
ED Cell Coordinator,
A.R.Engineering College,
Kappiyampuliyur.

To

Mrs.A.Chitra,
Assistant Director,
AD Office, Tiruvanamalai.

Respected Madam,

Sub: Inviting as aresource person for the programme"**WORLD ENTREPRENEURSHIP DAY**"which has been scheduled on 23st August,2022 from 1.00p.m to 2.30p.m. In this regard,We would like to request you to be as a guest speaker for the said event to share your knowledge to all of the education participants, your favorable response regarding this request will be highly appreciated.

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
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A.R.ENGINEERING COLLEGE

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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

RESOURCE PERSON PROFILE

Name of the Resource Person	:Mrs.A.Chitra,
Designation	:Assistant Director/Department of MBA
Working Experience	:MBA
Company Name	:AD Office,Tiruvannamalai.

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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Vadakuchipalayam, Kappiyampuliyur post, Villupuram-605601, Tamilnadu.

FROM

Mrs.S.SARANYA,ECE.,
ED Cell Coordinator,
A.R.Engineering College,
Kappiyampuliyur.

To

The Principal,
A.R.Engineering colllege,
Kappiyampuliyur.

Respected sir,

Sub: Request permission to conduct a **"WORLD ENTREPERNEURSHIP DAY"**

It is pleasure to inform you to that the Entrepreneurship Development has planned to conduct a seminar on **"WORLD ENTREPERNEURSHIP DAY" at 1.00p.m to 2.30 p.m on 23rd August,2022.** So,I kindly request you to grant us permission to conduct the programme. Kindly do the needful.

Thank you

ED Cell Coordinator

Principal

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
A.R.ENGINEERING COLLEGE
VADAKUCHIPALAYAM,
KAPPIYAMPULIYUR POST,
VILLUPURAM-605 601.

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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

Date:23.08.2022

CIRCULAR

Ref.; AREC/EDC/2022-23/001

It is hereby informed that our college is going to conduct a programme on 23.08.22 at 1.00p.m to 2.30p.m. in the topic of "World Entrepreneurship day" through EDC. Throught this program. All the final year students and staff members are expected to give their fullest co-operation towards the smooth conduction of programme.

ED Cell Coordinator

COPY TO
1.Principal
2.All Department Hod's
3.All Class Tutors
4. Main Notice Board,Office Notice Board, Library Notice Board

CIRCULAR TO
1.All Staff Members
2.All Final Year Students

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
A.R.ENGINEERING COLLEGE
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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

A TRAINING PROGRAM ON ENTERPRENEURSHIP DAY

DATE:23.08.2022

ATTENDANCE SHEET

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420318106001	BALAJI S	ECE/IV	S. Balaji
2	420318106002	HARISHANKAR V	ECE/IV	Harishankar.V
3	420318106004	SHAKI P	ECE/IV	shaki P
4	420318106005	SUVASRI S	ECE/IV	Suvasri.S
5	420318106006	VANISRI S	ECE/IV	Vanisri S

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420318105001	DHARANEESHKUMAR R	EEE/IV	Dharaneeshkumar.R
2	420318105002	GAYATHRI M	EEE/IV	Gayathri.M

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420318104001	ABITHA A	CSE/IV	Abitha
2	420318104002	AMIRTHALAKSHMI V	CSE/IV	V. Amirthalakshmi
3	420318104003	ANANDHI S	CSE/IV	Anandhi
4	420318104004	BHUVANESHWARI G	CSE/IV	Bhuvaneshwari.G
5	420318104005	GIRIPRASATH K	CSE/IV	Giriprasath.K
6	420318104007	GUNASEELAN G	CSE/IV	G. Gunaseelan
7	420318104008	KAVITHENDRAL K	CSE/IV	K. Kavithendral
8	420318104009	KAVITHRA K	CSE/IV	Kavithra.K
9	420318104010	MANGALAMBIGAI A	CSE/IV	A. Mangalambigai
10	420318104011	SANTHI J	CSE/IV	Santhi j
11	420318104012	STEPHENRAJ R	CSE/IV	Stephenraj.R
12	420318104013	SUJATHA A	CSE/IV	Sujatha
13	420318104014	SWARNALAKSHMI B	CSE/IV	Swarnalakshmi.B
14	420318104016	VARADHARAJA PERUMAL L	CSE/IV	L. Varadharaja Perumal
15	420318104018	YUVARAJ V	CSE/IV	Yuvaraj.V

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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PRINCIPAL
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VADAKUCHIPALAYAM,
KAPPIYAMPULIYUR POST,
VILLUPURAM-605 601.

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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

S.NO	REG.NO	STUDENT NAME	Dept/year	SIGNATURE
1	420318114001	AJITH M	Mech/IV	M. Ajith
2	420318114002	AJITHKUMAR M	Mech/IV	Ajithkumar M
3	420318114003	ARULKUMAR S	Mech/IV	S. Arulkumar
4	420318114006	DINESHKUMAR M	Mech/IV	Dineshkumar M
5	420318114007	DINESHKUMAR V	Mech/IV	V. Dinesh
6	420318114009	EZHILMULLAIARASU M	Mech/IV	M. Ezhilmullaiarasu.
7	420318114010	GURUMOORTHI S	Mech/IV	S. Gurumoorthi
8	420318114011	JAYAMOORTHY J	Mech/IV	Jayamoorthy J
9	420318114015	NIJANTHAN J	Mech/IV	J. Nijanthan
10	420318114017	RAGURAMAN R	Mech/IV	R. Raguraman.
11	420318114018	RAJ A	Mech/IV	A. Raj
12	420318114019	RAKESH R	Mech/IV	Rakesh R
13	420318114020	RAMPRASATH D	Mech/IV	Ramprasath D
14	420318114021	RANGARAJAN R	Mech/IV	R. Jayakumar.
15	420318114023	TAMILSELVAM S	Mech/IV	Tamilselvam S
16	420318114024	UDHAYAKUMAR M	Mech/IV	Udhayakumar M
17	420318114027	VIGNESHWARAN M	Mech/IV	Vigneshwaran M
18	420318114028	YUVARAJ P	Mech/IV	P. Yuvaraj
19	420318114029	YUVARAJ T	Mech/IV	T. Yuvaraj

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

DATE:23.08.2022

Ref.: AREC/EDC/2022-2023/001

REPORT OF THE PROGRAME

Name of the programme	:**"WORLD ENTREPERNEURSHIP DAY"**
Beneficiaries	:B.E. Students [All Final year]
No.of. Participants	:41
Date & Time	:23.08.2022 & 01:00 P.M to 2.30. P.M
Resource Person	:Mrs.A.Chitra,Assistant Director, AD Office, Tiruvannamalai,
Program Coordinator	:Mrs.S.SARANYA,ECE., E&D Cell coordinator

Entrepreneurship Development cell of A.R.ENGINEERING COLLEGE organised the seminar on **"WORLD ENTREPERNEURSHIP DAY"**on 23.08.2022 by Mrs.A.Chitra,Assistant Director, AD Offfice, Tiruvannamalai.was the resource person of the seminar programme .The session commenced with the welcome address. The resource person graced the session in celebration of the day. A day which has been coined to celebrate innovation and empowernment of Entrepreneurship and leadership throughout the world.

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

FROM

Mrs.S.SARANYA,ECE.,
ED Cell Coordinator,
A.R.Engineering College,
Kappiyampuliyur.

To:

The Principal,
A.R.Engineering colllege,
Kappiyampuliyur.

Respected sir,

Sub; Request permission to conduct a **"A Training program on Entrepreneurship Awareness camp"**

It is pleasure to inform you that the Enterpreneurship Development has planned to conduct a seminar on
"A Training program on Entrepreneurship Awareness camp" at 10.00 A.M to 04.00 P.M on 28.06.2022. so I kindly request you to grant us permission to conduct the programme. Kindly do the needful.

Thank you

ED cell Coordinator

Principal

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
A.R.ENGINEERING COLLEGE
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KAPPIYAMPULIYUR POST,
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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

RESOURCE PERSON PROFILE

Name of the resource person	:Mr.S.Johnson,,
Designation	:Application Engineer
Working Experience	:07 years
Educational qualification	:M.E.,Ph.D.,
Company Name	:C cube Technologies,
	&Mr.Kumaran,Bussiness Development Manager

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

FROM

Mrs.S.SARANYA,ECE.,
ED Cell Coordinator
A.R.Engineering College,
Kappiyampuliyur.

To:

Mr.S.Johnson,
C cube Technologies,
&Mr.Kumaran,Bussiness
Development Manager

Respected sir,

Sub: Inviting as a resource person for the programme **"A Training program on Entrepreneurship Awareness camp"** conducted by EDC Cell -Reg

I am writing this invitation to you to formally invite you to the EDC programme of **"A Training program on Entrepreneurship Awareness camp"** which has beenscheduled on 28.06.2022 from 10.00A.M to 4.00P.M. In this regard, we would like to request you to be as a guest speaker for the said event to share your knowledge to all of the education participants,Your favorable response regarding this request will be highly appreciated.

ED Cell Coordinator

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
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VADAKUCHIPALAYAM,
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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

28.06.2021

CIRCULAR

Ref:AREC/EDC/2021-2022/001

It is hereby informed that our college is going tio conduct a programme on 21.10.2021 at 10.00A.m to 4.00P.M in the topic of **"A Training program on Enterpreneurship Awareness camp"**through this program ,all the Final year students and staff members are expected to give their fullest co-operation towards the smooth conduction of programme.

ED Cell Coordinator

COPY TO
1.Principal
2.All Department Hod's
3.All Class Tutors
4. Main Notice Board,Office Notice Board, Library Notice Board

CIRCULAR TO:

1. All Staff Members
2. All final year Students

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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PRINCIPAL
A.R.ENGINEERING COLLEGE
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Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

Date:28.06.2022

A Training program on Enterpreneurship Awareness camp

ATTENDANCE SHEET

S.NO	REG.NO	STUDENT NAME	Dept/year	SIGNATURE
1	420318114001	AJITH M	Mech/IV	Ajith.M
2	420318114002	AJITHKUMAR M	Mech/IV	AjithKumar
3	420318114003	ARULKUMAR S	Mech/IV	Arulkumar.S
4	420318114006	DINESHKUMAR M	Mech/IV	Dineshkumar.M
5	420318114007	DINESHKUMAR V	Mech/IV	Dhineshkumar
6	420318114009	EZHILMULLAIARASU M	Mech/IV	Ezhilmullaiarasu
7	420318114010	GURUMOORTHI S	Mech/IV	Gurumoorthi.S
8	420318114011	JAYAMOORTHY J	Mech/IV	Jayamoorthi
9	420318114015	NIJANTHAN J	Mech/IV	Nijanthan S
10	420318114017	RAGURAMAN R	Mech/IV	Raguraman.P
11	420318114018	RAJ A	Mech/IV	Raj A
12	420318114019	RAKESH R	Mech/IV	Rakesh.R
13	420318114020	RAMPRASATH D	Mech/IV	Ramaprasath
14	420318114021	RANGARAJAN R	Mech/IV	Rangarajan.R
15	420318114023	TAMILSELVAM S	Mech/IV	Tamilselvam.S
16	420318114024	UDHAYAKUMAR M	Mech/IV	Udhayakumar.M
17	420318114027	VIGNESHWARAN M	Mech/IV	Vigneshwaran.M
18	420318114028	YUVARAJ P	Mech/IV	Yuvaraj.P
19	420318114029	YUVARAJ T	Mech/IV	Yuvaraj.T

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420318106001	BALAJI S	ECE/IV	Balaji S
2	420318106002	HARISHANKAR V	ECE/IV	Harishankar.V
3	420318106004	SHAKI P	ECE/IV	Shaki.P
4	420318106005	SUVASRI S	ECE/IV	Suvasri.S
5	420318106006	VANISRI S	ECE/IV	Vanisri S

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420318104001	ABITHA A	CSE/IV	Abitha.A
2	420318104002	AMIRTHALAKSHMI V	CSE/IV	Amirthalakshmi.V
3	420318104003	ANANDHI S	CSE/IV	Anandhi.S
4	420318104004	BHUVANESHWARI G	CSE/IV	Bhuvaneshwari.G

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

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VADAKUCHIPALAYAM,
KAPPIYAMPULIYUR POST,
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5	420318104005	GIRIPRASATH K	CSE/IV	K. Giriprasath
6	420318104007	GUNASEELAN G	CSE/IV	Gunaseelan G
7	420318104008	KAVITHENDRAL K	CSE/IV	K. Kavithendral
8	420318104009	KAVITHRA K	CSE/IV	Kavithra.K.
9	420318104010	MANGALAMBIGAI A	CSE/IV	A. Mangalambigai.
10	420318104011	SANTHI J	CSE/IV	Santhi
11	420318104012	STEPHENRAJ R	CSE/IV	R. Stephenraj
12	420318104013	SUJATHA A	CSE/IV	Sujatha.A
13	420318104014	SWARNALAKSHMI B	CSE/IV	B. Swarnalakshmi
14	420318104016	VARADHARAJA PERUMAL L	CSE/IV	Varadharaja Perumal. L
15	420318104018	YUVARAJ V	CSE/IV	Yuvaraj.V

S.NO	REG NO	NAME	Dept/year	SIGNATURE
1	420318105001	DHARANEESHKUMAR R	EEE/IV	Dharaneeshkumar. R
2	420318105002	GAYATHRI M	EEE/IV	Gayathri.M

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr R.PANNEERDHASS,M.E.,Ph.D.,
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Vadakuchipalayam, Kappiyampuliyur post, Villupuram-605601, Tamilnadu.

DATE:21.10.2021

REPORT OF THE PROGRAME

Ref : AREC/EDC/2021-2022/001

Name of the programme :**"A Training program on Enterpreneurship Awareness camp**

Beneficiaries :B.E. Students [All Final year]

No.of. Participants :41

Date & Time :21.10.2021 & 10:00 A.M to 04.00 P.M

Resource Person:Mr.S.Jhonson,Application Engineer,c cube Technologies,
& Mr.Kumaran, Business development manager.

Program Coordinator :Mrs.S.SARANYA,ECE.,
E&D coordinator

Entrepreneurship Development cell of A.R.ENGINEERING COLLEGE organised the seminar on **"A Training program on Enterpreneurship Awareness camp"** on 21.10.2021.The session commenced with the welcome address. The resource person graced the session in celebration of the day. A day which has been coined to celebrate innovation and empowernment of Entrepreneurship and leadership throughout the world.

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

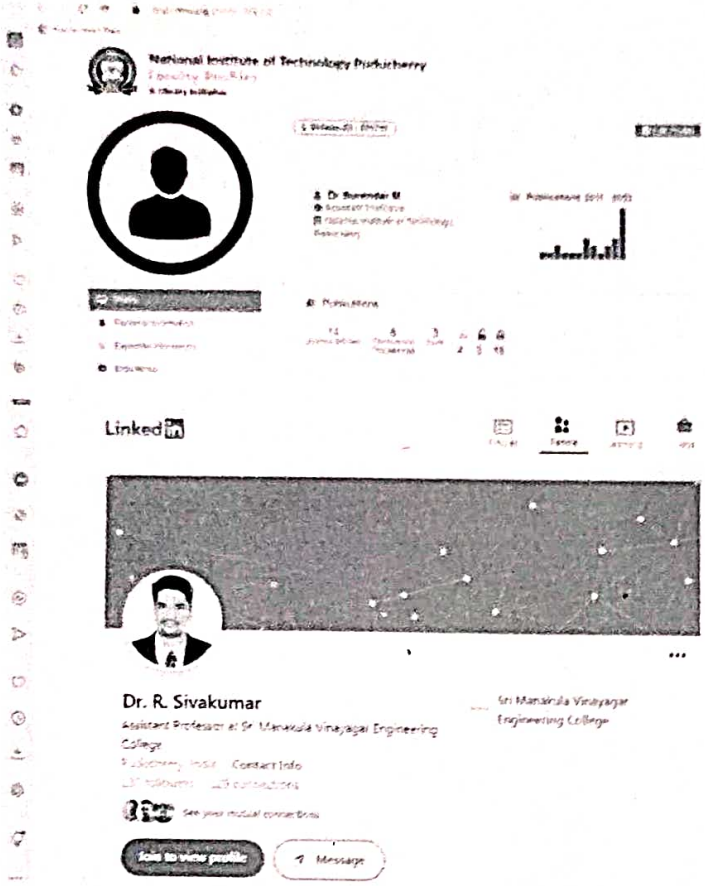
Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
A.R.ENGINEERING COLLEGE
VADAKUCHIPALAYAM,
KAPPIYAMPULIYUR POST,
VILLUPURAM-605 601.

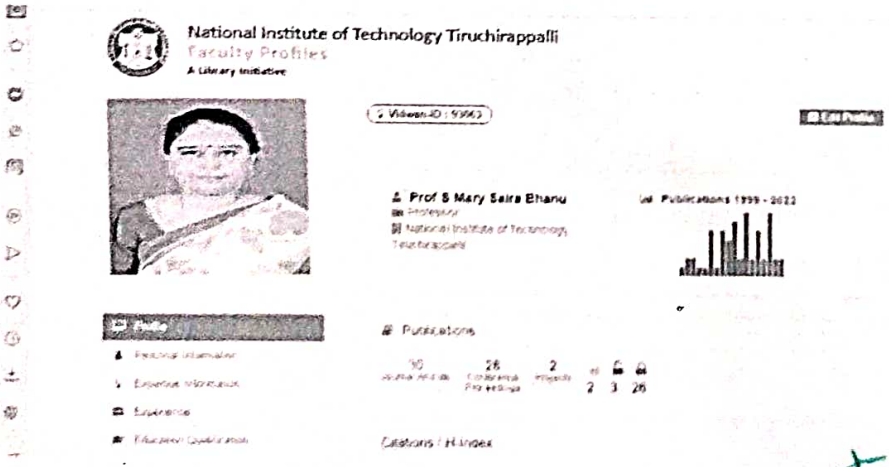
SNAPSHOTS:

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
A.R.ENGINEERING COLLEGE
VADAKUCHIPALAYAM,
KAPPIYAMPULIYUR POST,
VILLUPURAM-605 601.

RESOURCE PERSONS PROFILE:





A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr. R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
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A.R.ENGINEERING COLLEGE

(Approved by AICTE, New Delhi & Affiliated to Anna university, Chennai)
Vadakuchipalayam, Kappiyampuliyur post,Villupuram-605601,Tamilnadu.

Name :	**Dr.A.Chitra**
Designation :	Associate Professor
Educational Qualification :	MBA., MPhil., SET, Ph.D.
Experience (in Years) :	Teaching: 14 Years,
Area of Specialization :	Finance & Human Resource
E-Mail ID :	acmba@kiot.ac.in
Publications :	IC:2, NC: 5, IJ: 17

A.R.ENGINEERING COLLEGE VILLUPURAM 605 601

Dr.R.PANNEERDHASS,M.E.,Ph.D.,
PRINCIPAL
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KAPPIYAMPULIYUR POST,
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