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Department of Mechanical Engineering

To,

The Principal

Rajeev Institute of Technology

Hassan.

22/05/2023

Hassan

Through,

HOD

Department of Mechanical Engineering,

Rajeev Institute of Technology

Hassan

From,

Dr. Kuldeep B.

Associate Professor,

Department of Mechanical Engineering,

Rajeev Institute of Technology

Hassan

Respected Sir,

Subject: Research Publication Incentive Reg.

Pertaining to above subject, I have published a research article in "Journal of Alloys and Metallurgical Systems", Elsevier Publication. It is published on 17th April 2023. A copy of the published article is attached with this letter for your kind perusal. Please consider and do the needful.

Thanking You,

Yours faithfully,

22/05/23

Dr. Kuldeep B

Forwarded for Kind Consideration

22/05/2023

To, K.S.S.

23/5

(P.T.O)

Principal
Rajeev Institute of Technology
Hassan-573 201

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To,

Hon'ble President.

The article is published in Journal of Alloys and Metallurgical Systems in 2023. The details are enclosed. As per faculty incentive policy, the author is eligible for an incentive of Rs 1,000 under prorata basis.

20/10/2023

Incentives may be given to the above candidate as per the calculation.

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Investigation on the dynamic behaviour and corrosion characteristics of hexagonal boron nitride (h-BN) and zirconium dioxide (ZrO_2) reinforced Al7075 composite

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ABSTRACT

Stir casting was used to make Al7075 composites with 3% h-BN and different amounts of ZrO_2 (2%, 4%, and 6% by weight). Damping behaviour and corrosion resistance corresponding to the reinforcement percentage were investigated. Damping was evaluated using a dynamic mechanical analyzer (DMA) at varied frequencies and temperatures. Material loss due to corrosion was studied using the salt spray test for alkaline media and the immersion test for acidic media. Improvement in damping was observed with the inclusion of reinforcement in the composite. With frequencies, marginal variation in damping was observed at higher temperatures. Whereas with the increase in temperature, the damping capacity of the prepared material showed an increasing trend at all the test frequencies. The composite showed the highest value of damping capacity for 3% h-BN and 6% ZrO2 at 10 Hz and 300 °C. The corrosion resistance improved with the addition of reinforcement in both acidic and alkaline media, as the reinforcements are inert in both acidic and alkaline media. Scanning electron micrography was also performed to study the corroded surface of the specimen.

1. Introduction

The high strength-to-weight ratio of aluminium and its alloys makes them regarded as lightweight materials. The need for aluminium and aluminium-based composites is gaining more attention, especially in the sectors that demand lightweight materials [1,2]. However, the damping loss factor for aluminium is 0.0001 [3], which shows poor resistance to vibration; this disadvantage may be alleviated by the use of Al composites [4]. The capacity of a material to dissipate energy and cease vibrating when subjected to vibration is known as internal damping [5]. Materials with good damping capacity are competent to prevent failures due to vibration. The material's capacity to absorb or dissipate the vibration is necessary for the material to function properly [6]. According to Prasad and Shoba's [7], the stiffer a material, the lower will be its capacity for damping. Higher damping is observed in materials with low mechanical strength [8]. Composite materials are the solution to achieve better damping and strength. Metals reinforced with ceramics combine high strength and modulus characteristics while retaining the damping capacity [9]. Composites' ability to dampen is mostly dependent on the type of reinforcement used, which is correlated with each material's unique ability to dampen.

The influence of rice husk ash (RHA) on the damping behaviour of aluminium was studied by Siva Prasad and Shoba [10]. By adding RHA, grains become more refined, dislocation density rises, and damping is consequently improved. Zhang et al. [11] demonstrated that the incorporation of SiC and graphite particulates can enhance aluminium's dampening capacity. Recent studies have reported enhancement of the properties of the aluminium matrix by incorporating nitrides like aluminium nitride, boron nitride, and titanium nitride [12–14].

Aluminium being corrosive-resistant, Al7075 has good corrosion resistance because of zinc as an alloying element [15]. In aluminium metal matrix composite (AMMC), the corrosion behaviour is subject to

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many factors, like the reinforcements used, composition, distribution, size, the interface formed, and the fabrication method involved [16]. The corrosive nature of the material likely to encounter in different environments is one of the prime considerations in the selection of material. The addition of reinforcement may serve as a barrier for any protective layer that forms in response to the corrosion impact [17]. Corrosion in composites is due to electrochemical potential differences between the heterogeneities formed by inclusions, grain boundaries, the matrix/reinforcements interface, and the matrix [18]. Since, the studies on dynamic behaviour and corrosion resistance of nitride reinforcement on Al7075 alloy is scarce, the current work is concentrated on the dynamic behaviour and effect of zirconium dioxide and boron nitride on the corrosion resistance of Al7075 alloy, along with the impact of corrosion on damping.

2. Experimentation

2.1. Materials and methods

The hexagonal boron nitride and zirconium dioxide reinforcements are used due to the tribological properties of h-BN and the hardness of ZrO2, and Al7075 is used as the matrix. The different compositions prepared are computed and listed in Table 1. The thorough fabrication process and measures taken were presented in the author's earlier work [12]. A Hitachi SU3500 scanning electron microscope (SEM) was used to study the particle morphology of the zirconium dioxide and hexagonal boron nitride. For microstructural examinations (ASTM E3–11 [19]), specimens were cut from the centre of the cast sample and polished with emery paper of various grit sizes and polished with cloth. Keller's reagent was used to etch the specimen surface, and images were obtained using an optical microscope (NIKON Epiphot 200).

2.2. Dynamic mechanical analysis

DMA is the study of the response of a material to the applied oscillating force; a modulus, range of frequency, and temperature may be computed per sine wave [20]. The damping behaviour (tan δ) was evaluated using TA Instruments' Q800 (Fig. 1) dynamic mechanical analyzer in dual cantilever mode at a strain amplitude of 1 × 10–4, up to a temperature of 300 °C with a heating rate of 10 °C/minute, with a frequency range of 1–10 Hz (1, 5, 10 Hz). Samples of dimension 1.2 × 13 × 55 mm3 were used for damping measurement. The Q800 uses a non-contact, direct-drive motor that applies a sinusoidal deformation to the sample. The samples were subjected to controlled stress. For a given stress, the sample will then deform by a definite amount. The rate of deformation is proportional to its stiffness (modulus), by which DMA assesses the material properties as a function of time, temperature, and frequency.

2.3. Corrosion test

For the corrosion study, test specimens were polished using Emery papers of grit sizes 400–2000. Samples were cleaned using acetone and allowed to dry completely prior to the test and before each measurement. And samples were cleaned using the same procedure before being weighed at each stage of the test. In both the salt spray and immersion tests, the samples were measured at an interval of 60 h for a total of 240 h.

Table 1
Compositions in wt%.

Code	Proportion
A	100% Al7075
B	95% Al7075 + 3% h- BN + 2% ZrO_2
C	93% Al7075 + 3% h-BN + 4% ZrO_2
D	91% Al7075 + 3% h-BN + 6% ZrO_2

2.3.1. Salt spray test

A salt spray test was performed in accordance with ASTM-B117 standards [21]. Details of salt spray conditions are given in Table 2. The salt spray chamber used for the study is shown in Fig. 2. The salt spray test was used to simulate an oceanic atmosphere.

2.3.2. Immersion test

Immersion corrosion testing was conducted at room temperature as per ASTM G69–80 Standards [22]. The corrosion loss was evaluated using the typical weight-loss method. As an acidic medium, a test solution of 1 M HCl with a pH of around 0 is used. The samples were accurately weighed to a precision of three decimal places. HCl is generally used because it provides a high concentration of chloride ions, which destabilises the development of a protective layer.

2.4. Impact of corrosion on damping

To study the impact of corrosion on damping, damping tests (at 300 °C for 1, 5, and 10 Hz) were carried out on specimens that had been exposed to (5 ± 0.5) % NaCl and 1 M HCl solution prior to testing.

3. Results and discussion

3.1. Microstructural studies

Fig. 3 shows the morphology of BN and ZrO2 particles. It was found that the BN particles were spherical in shape, and the ZrO2 particles have an irregular shape, although many of them appear to be spherical in shape. Due to the spherical shape of BN particles, there will be less contact area among the particles, resulting in less rubbing [23] and less friction between the particles at lower frequencies. Whereas, at higher frequencies, there will be more rubbing because of the higher number of cycles per second, leading to increased dissipation of energy. Also, with temperature, the thermal movability of the particles could be enhanced, which eventually increases damping. The ZrO2 particles have an irregular shape, which boosts the damping at lower frequencies than at higher frequencies as the contact is not uniform at higher frequencies.

From the microstructure (Fig. 4) the grain refinement can be observed, which led to improvement in strength of composite. Fig. 4a shows comparatively larger grains, grain refinement occurs with the addition of reinforcements. In composition B, coarse grains are broken into many fine grains enclosed by few larger grains indicating heterogeneous bimodal structure as shown in Fig. 4b. Further grain refinement occurs with increased reinforcement proportion which is clear from Figs. 4c and d. At higher reinforcement proportion more homogeneity of structure was observed, due to increase in nucleation sites formed by reinforcement particles and also due to advanced rate of dislocation generation. Microstructure also comprises of fine particles scattered along the grain boundaries along with pores. In comparison, larger pores are seen at high reinforcement percentages due to the absorption of gases during agitation and pouring. Higher reinforcement percentages result in a greater quantity of pores formed due to increase in stirring time.

3.2. Damping capacity

Damping (tan δ) variation for different compositions at varied frequencies and temperatures is shown in Fig. 5. With frequency, the damping increases for all the combinations; comparatively, the improvement in damping with respect to frequency is greater at lower temperatures than at higher temperatures. At higher temperatures and frequencies, the contact between ZrO2 and Al7075 is less because of irregularities in the shape of ZrO2.

Damping was found to be 0.0017 and 0.0036 for the matrix at 1 Hz and 10 Hz, respectively, and 0.0243 and 0.0427 at 1 Hz and 10 Hz,

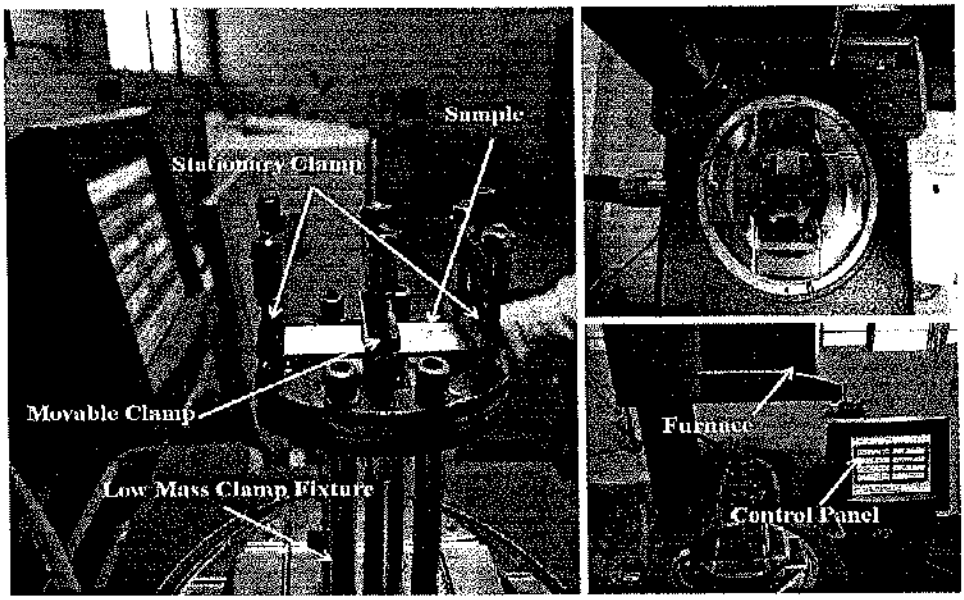

Fig. 1. Dynamic mechanical analyzer (DMA-TA Q800).

Table 2
Salt Spray Parameters.

Concentration of Test Solution	(5 ± 0.5) % NaCl
Volume of Solution collected/hr/80 cm^2 area	1.1 ml
Test Temperature	(35 ± 1) °C
pH of Test Solution	7.16
Exposure Time	240 hrs (at an interval of 60 hrs)

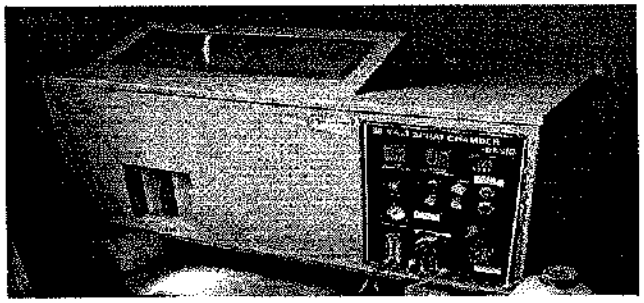

Fig. 2. Salt Spray chamber.

respectively, for Al7075–3% BN-6% ZrO2 at a temperature of 30 °C. Concerning temperature, as the temperature increases, the damping increases at all the test frequencies. The rise in damping with temperature is because of the low-temperature tail of grain boundary relaxation. Along with this, as the temperature increased, the loss modulus improved, whereas the storage modulus declined.

$$\mathrm{Tan}\delta = \frac{E''}{E'} \quad (1)$$

Equation 1 represents the damping capacity (tan δ) of the material [16], where is the loss modulus and is the storage modulus. With the addition of reinforcements, the damping capacity of the prepared samples showed an increasing trend. The overall damping capacity of AMMC is related to the intrinsic damping of each individual material. The increase in damping of composites may be attributed to grain refinement, interface damping, and also to increased dislocation density because of the thermal mismatch between the reinforcements and Al7075. Energy dissipation is related to grain boundary area per unit volume. Increased dislocation density increases energy dissipation sources, which leads to greater relative atomic movement by the dislocations in a crystal lattice [24]. Also, dislocation pinning improves the damping behaviour, according to the Granto-Luke mechanism [25]. Dislocations pinned between particulates act like a vibrating elastic string that dissipates energy [10].

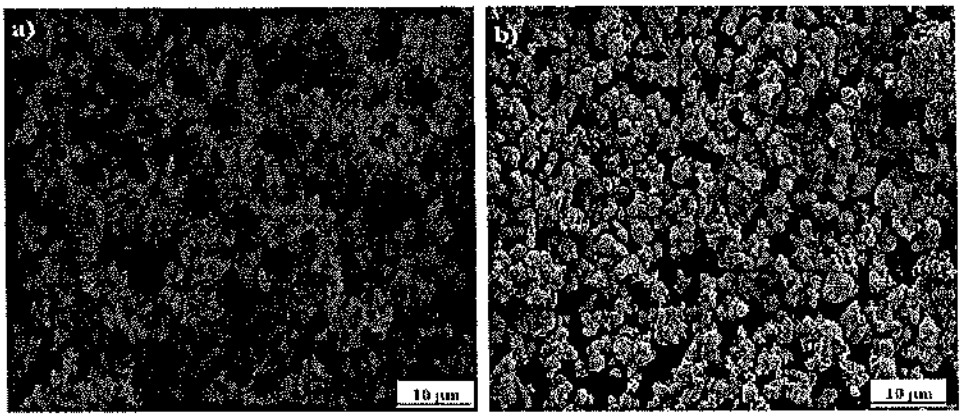

Fig. 3. SEM micrographs of a) h-BN b) ZrO_2 Particles.

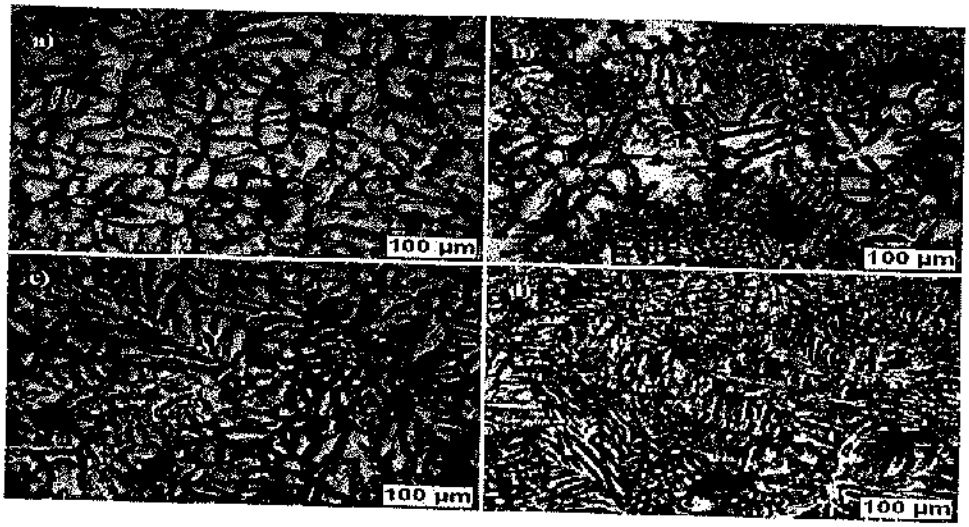

Fig. 4. Microstructure of a) A, b) B, c) C and d) D.

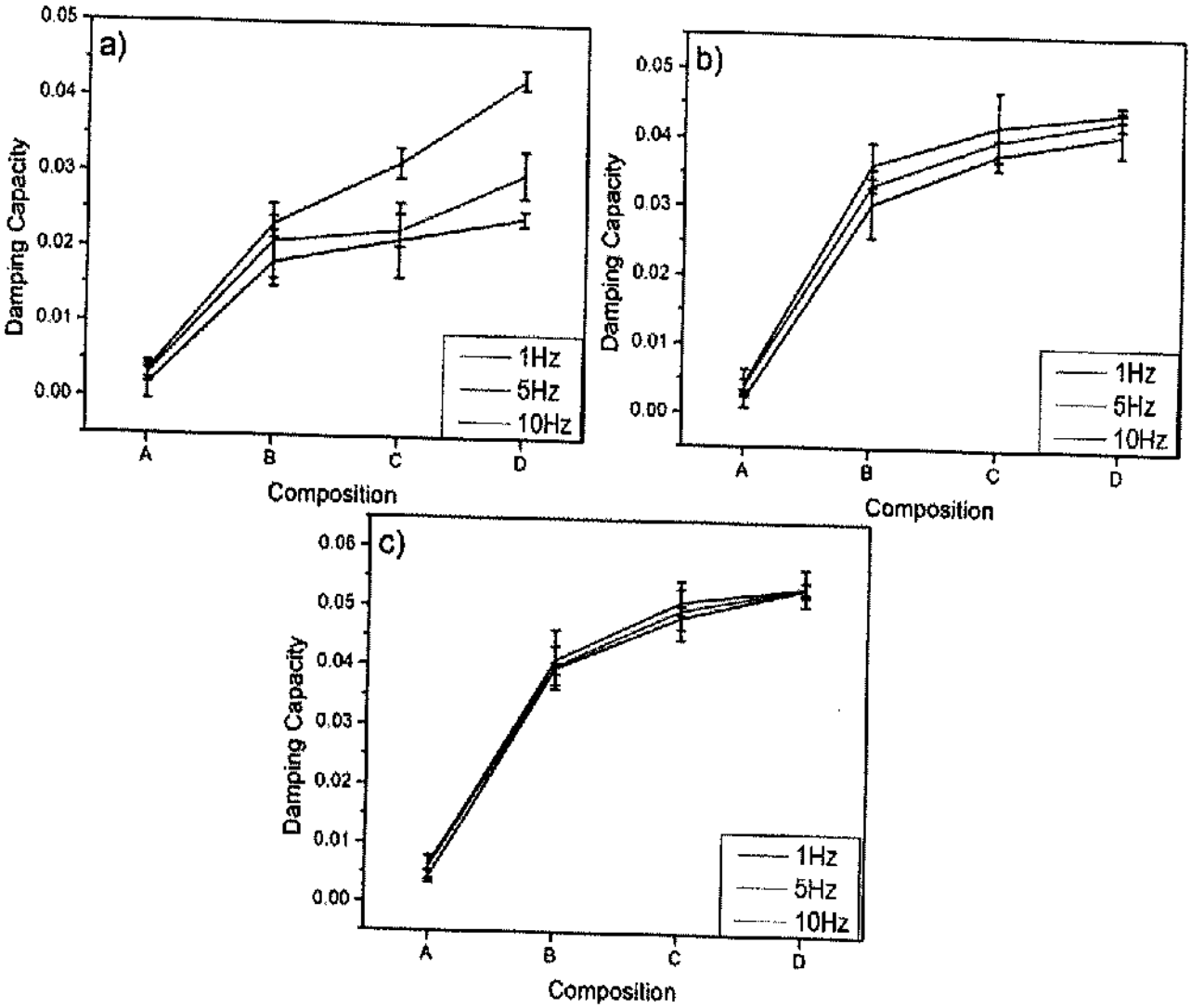

Fig. 5. Comparison of damping capacity with the composition at different frequencies a) at 30 °C b) at 150 °C and c) at 300 °C temperature.

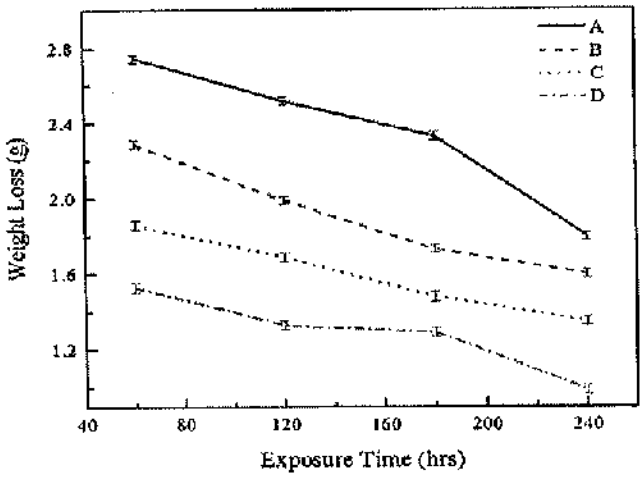

Fig. 6. Weight loss V/S Exposure time of specimens subjected to the salt spray test.

The damping and grain sizes are inversely proportional to each other [26], and with grain refinement, the damping increases. With grain refinement, the interfacial reaction between the grain boundary and vibration wave increases, resulting in an improved damping nature [27]. Based on Schoech's theory [28], the interface enhances internal friction, which is proportional to the volume and shape of the precipitates, and along with these, defects play a prominent role in damping. According to Zhang et al. [29], bulk defects are accountable for high damping due to the relative motion of reinforcements in the defect zone. Higher porosity leads to higher damping, and poorly bonded interfaces contribute to damping by means of internal friction. Also, the addition of reinforcements leads to an increased plastic zone, which increases the damping property of the material [30,31]. The overall improvement in damping is a result of all these factors. But at high temperatures, the damping mainly depends on the microstructure rather than its mechanical properties [32]. Based on all these mechanisms, maximum damping was observed for Al7075–3% BN-6% ZrO2.

3.3. Corrosion test

Al7075 and composites both showed good corrosion resistance in both salt spray and immersion tests. Compared to the base metal, the produced composite showed better resistance to corrosion (Figs. 6 and 8). Grain refinement happens when reinforcements are added to composites. These reinforcements act as nucleation points for grain refinement, which makes composites more resistant to corrosion. Fine grains offer good surface coverage, which restrains the rupture of the protective layer further and lessens the corrosion rate. In a few zones, reinforcements interfered with the development of an aluminium oxide protective layer over the surface, but still prepared composites showed better resistance because of the inertness of the reinforcements added and also because the addition of reinforcements reduced the exposure of the metallic area to corrosive attack.

3.3.1. Salt spray test

In the tested samples, pitting and accelerated corrosion were observed [33]. Pitting corrosion started to appear over the sample surface at the early stages of the salt spray. With time, the pitting increased gradually and merged at a later stage to form corrosion pits. The surface morphologies of the specimens after corrosion are shown in Fig. 7.

The aluminium alloy was easily passivated to form pitting in the Cl-active anion environment. In natural conditions, the aluminium

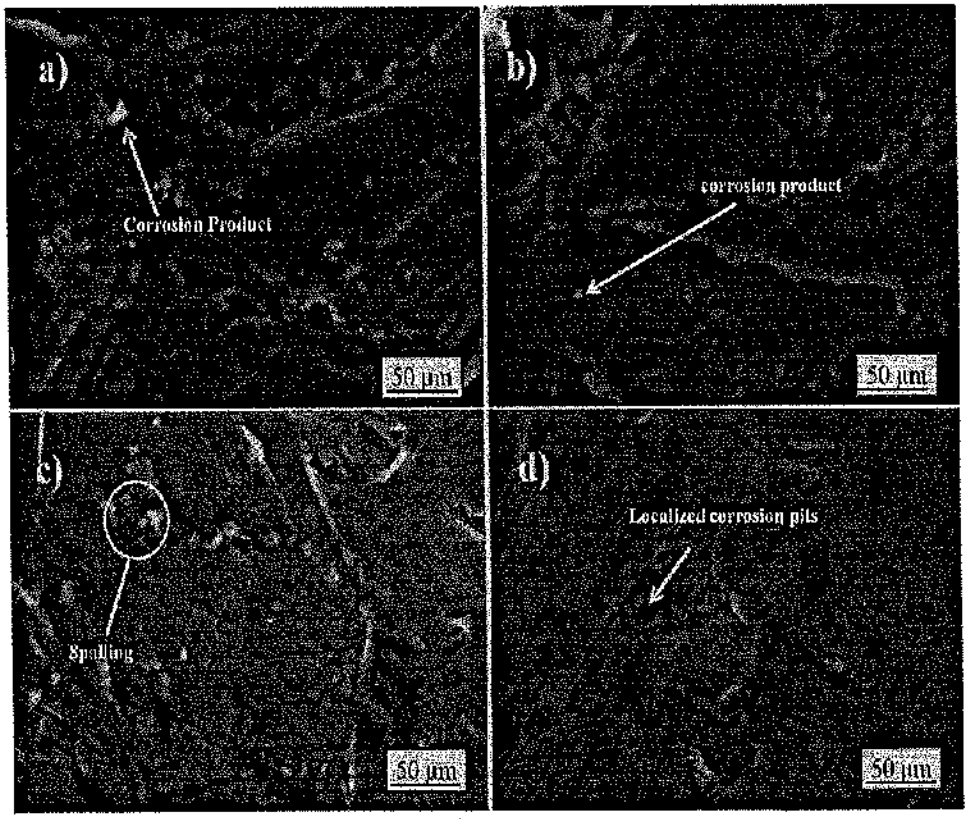

Fig. 7. SEM images of specimens after salt spray test a) A, b) B, c) C and d) D.

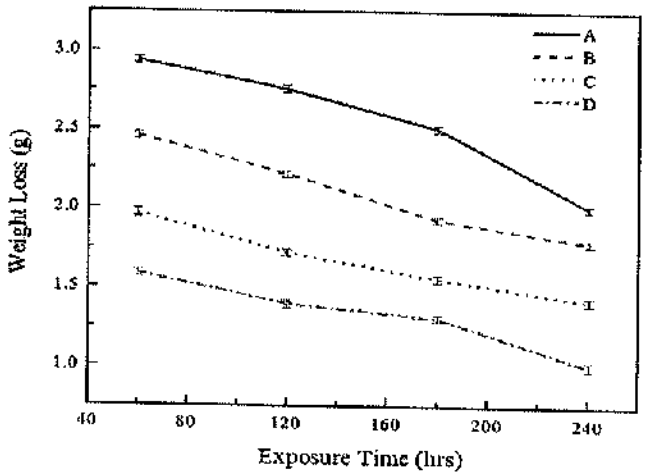

Fig. 8. Weight loss V/S Exposure time of specimens subjected to the immersion test.

generally forms a protective layer of alumina. Incomplete zones and defects in the layer formed are the zones that initiate corrosion, and the matrix-reinforcement interface is the primary zone of initiation of corrosion. Active anions such as cl- accelerate the destruction of a protective layer, resulting in the formation of corrosion pits and the subsequent dissolution of aluminium in the corrosion pits [34].

3.3.2. Immersion test

Even in the immersion test, pitting was the main cause of corrosion (see Fig. 9), which led to the loss of material. The corrosion rate decreased with test duration. When exposed to an acidic medium, the weight loss is noticeably greater during the first few hours of the test and then gradually decreases over time; Sharma et al. [35] and Sadanand Sarapure et al. [36] both noted a similar trend. The gradual decrease in corrosion rate is due to aluminium, which forms a protective layer of alumina, which is stable in the acidic medium [37]. Zirconium dioxide and boron nitride are inert in the usual acids, which counteract corrosion in an acidic medium.

Weight loss in metals and composite materials is due to the emergence of surface pits and cracks. The severity of the acid used in the case of the base material was higher; however, in the case of the composites, the inert ceramics demonstrated stronger resilience to the acidic medium [38]. As the composition of the reinforcement increased, the occurrence of pits and cracks decreased. In contrast to composites, where the pits originate at the intersection of the matrix and reinforcement, the pits in the alloy are crack-induced. Enhancement of corrosion resistance of composites was also due to refinement in grain structure, which may be due to improvements in the formation of the protective layer and adhesion due to improved grain boundary density [39,40].

3.4. Impact of corrosion on damping

Pits and cracks formed due to corrosion act as defects, which enhance the damping capacity (Fig. 10). The amount of damping in a material is affected by corrosion in a big way. Also, apart from the defects, the kind of protective layer formed, reactions, products formed, and the shape and size all determine the amount of impact on damping. Higher pits and cracks produce higher damping; the average damping capacity increased by pits and cracks increases by the square of the defect rate. If the defects are doubled, the damping quadruples [26].

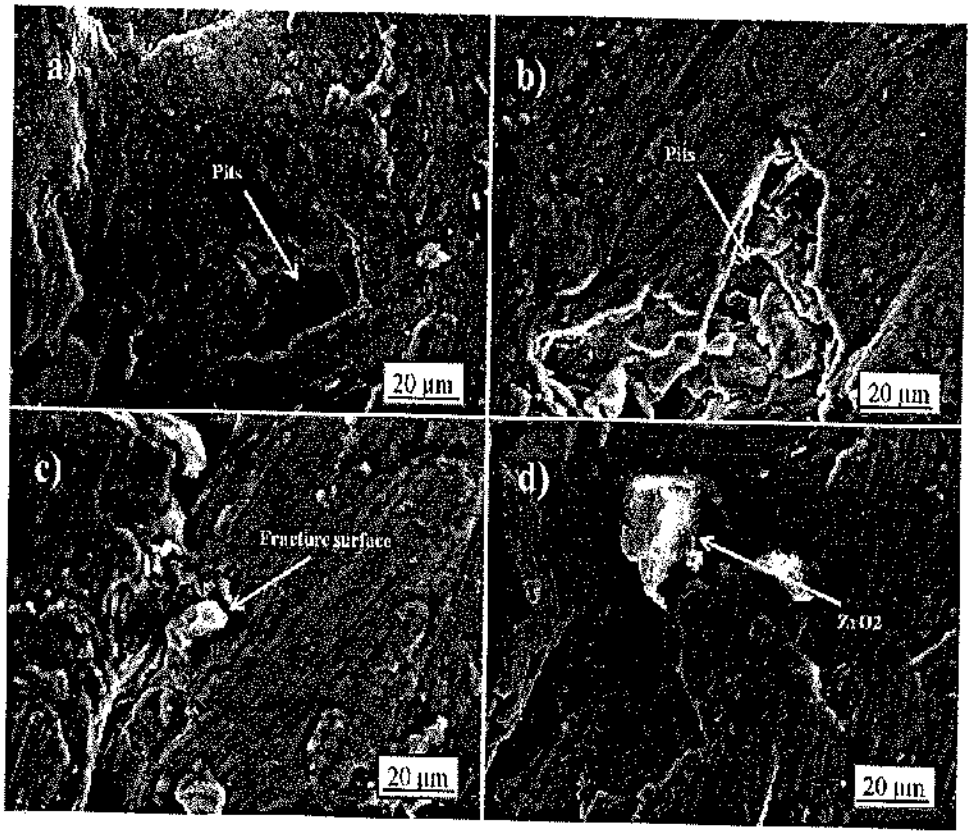

Fig. 9. SEM images of specimens after immersion test a) A, b) B, c) C and d) D.

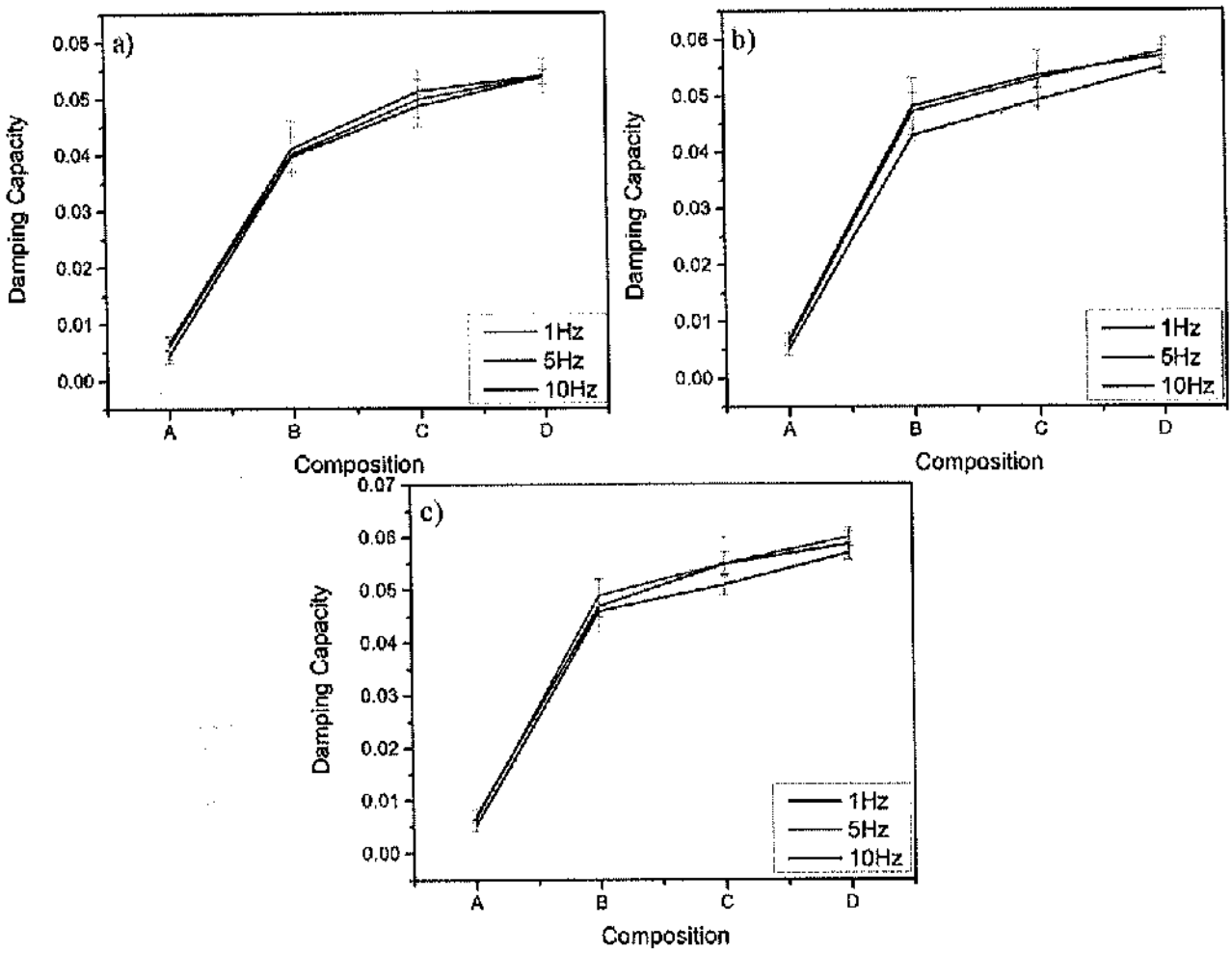

Fig. 10. Comparison of damping capacity of specimens subjected to corrosion at different frequencies at 300 °C temperature a) Before corrosion, b) after salt spray test and c) after immersion test.

4. Conclusions

The dynamic behaviour and corrosion characteristics of the base material and the composite samples were studied, and the following conclusions were drawn:

- The incorporation of h-BN and ZrO2 improved the damping capacity of Al7075. Damping increased with the increase in reinforcement percentage, due to the increased dislocation density, porosity, and defects. Maximum damping was observed in a material with a composition of 91% Al7075, 3% h-BN, and 6% ZrO2.
- Frequency and temperature influenced the damping capacity. The damping capacity of base metal and composites increased with a rise in frequency and temperature because of the low-temperature tail of grain boundary relaxation and increased interatomic movement at higher frequencies.
- Pits and cracks are the primary causes of material loss in corrosive environments, and the corrosion rate decreases as the test duration increases. Due to their inertness, the additions of zirconium dioxide and boron nitride increased the corrosion resistance.
- Corrosion also impacts the damping nature of the material because of its increased porosity and defects.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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To,
The Principal,
Rajeev Institute of Technology,
Hassan.

Date: 22/03/2024
Place: Hassan

From,
Dr. Kuldeep Basavarajappa,
Associate Professor & Head,
Department of Mechanical Engineering,
Rajeev Institute of Technology,
Hassan.

Respected Sir,

Subject: NITTT Exams fee reimbursement Reg.

Pertaining to the above subject, as per the circular, dated: 05/01/2022, I have applied NITTT exams for 3 modules and cleared the exams conducted on 16/09/2023 and 21/09/2023. Also, remaining 5 modules between 10/02/2024 to 18/02/2024. I have cleared all the modules and I have attached the results sheet along with this letter for your kind perusal. Kindly consider my request for fee reimbursement and do the needful.

Thanking You,

Yours Faithfully,

Dr. Kuldeep B
22/03/24

To,
The Hon'ble President
Incentive for clearing
NITTT Exams is Rs 2,500. I request
your approval to release the
Incentive.

15/04/2024

Approved

Principal
Rajeev Institute of Technology
Hassan-573 201

MAHESH P K
04.06.2024 15:58
Digitally Signed by
Principal

Ministry of Education

NATIONAL TESTING AGENCY

All India Council for Technical Education (AICTE)

National Initiative for Technical Teachers Training (NITTT-2023)- Batch 7

Online Based Test-Remote Proctored (RP-OBT)

SCORE CARD

Roll Number	2023071436	Registration ID	20232121378	
Candidate's Name	KULDEEP BASAVARAJAPPA	Father's Name	Basavarajappa B	
Gender	Male	Date of Birth	9-Jan-1990	
Person with Disability (PWD)	No			

Module	Module Name	Exam Date	Maximum Marks	Marks Obtained
Module 1	Orientation Towards Technical Education and Curriculum Aspects	16-September-2023	100	76
Module 2	Professional Ethics & Sustainability	16-September-2023	100	76
Module 3	Communication Skills, Modes & Knowledge Dissemination	17-September-2023	100	NA
Module 4	Instructional Planning and Delivery	17-September-2023	100	NA
Module 5	Technology Enabled Learning & Life Long Self Learning	21-September-2023	100	89
Module 6	Student Assessment and Evaluation	21-September-2023	100	NA
Module 7	Creative Problem Solving, Innovation and Meaningful R & D	22-September-2023	100	NA
Module 8	Institutional Management & Administrative Procedures	22-September-2023	100	NA

Result Date: 30-10-2023

Senior Director

INSTRUCTIONS:

1. This Score Card is issued in accordance with the provisions of the National Initiative for Technical Teachers Training (for Inductee Teacher) (NITTT) Scheme 2020 of AICTE
2. Particulars of candidates have been indicated in the Score Card as mentioned by him/her in the online application form. NTA disclaims any liability that may arise to a candidate due to incorrect information provided by him/her in his/her online application form.
3. The Score Card is provisional subject to compliance with the eligibility requirements laid down.
4. The Score indicated above relates to the written exam conducted by National Testing Agency (NTA) in the Internet Based Test mode (remote proctored) in September 2023 under the NITTT Scheme of AICTE for Inductee Teachers.
5. Final Score, after combining the marks obtained in the written exam conducted by NTA and the marks obtained in the Continuous Assessment, will be prepared by NITTTR, the Co-ordinating Institute for the NITTT Scheme as per its policy, and displayed on their website https://nitttr.ac.in
6. Detection of instances of incorrect information and process violation by a candidate at any stage will lead to disqualification of the candidate. NITTT Score of such candidates who are disqualified will become null and void.
7. Role of NTA is limited to issue of admit cards, conduct of exam, process and declare results of the written exam conducted by it.
8. Candidates are advised to contact NITTTR-C for queries regarding issue of the Final Score Card/ Course Completion Certificate.

NITTT Website: https://nitttr.nta.ac.in/

Principal
Rajeev Institute of Technology
Hassan-573 201

MAHESH P K
04.06.2024 15:58
Digitally Signed by Principal

Ministry of Education
Government of India

राष्ट्रीय परीक्षा एजेंसी
National Testing Agency

All India Council for Technical Education (AICTE)

National Initiative for Technical Teachers Training (NITTT) - 2024 - Batch 8

Orientation Course - Remote Proctored (ROAD8)

Score Card

Roll Number	2024082198	Registration ID	20232121378
Candidate's Name	KULDEEP BASAVARAJAPPA	Father's Name	Basavarajappa B
Gender	Male	Date of Birth	9-Jan-1990
Person with Disability (PWD)	No		

Module	Module Name	Exam Date	Maximum Marks	Marks Obtained
Module 1	Orientation Towards Technical Education and Curriculum Aspects	10.02.2024	100	NA
Module 2	Professional Ethics & Sustainability	10.02.2024	100	NA
Module 3	Communication Skills, Modes & Knowledge Dissemination	11.02.2024	100	70
Module 4	Instructional Planning and Delivery	11.02.2024	100	59
Module 5	Technology Enabled Learning & Life Long Self Learning	17.02.2024	100	NA
Module 6	Student Assessment and Evaluation	17.02.2024	100	73
Module 7	Creative Problem Solving, Innovation and Meaningful R & D	18.02.2024	100	67
Module 8	Institutional Management & Administrative Procedures	18.02.2024	100	68

Result Date: 22-March-2024

Senior Director

INSTRUCTIONS:

1. This Score Card is issued in accordance with the provisions of the National Initiative for Technical Teachers Training (for Inductee Teacher) (NITTT) Scheme 2020 of AICTE.
2. Particulars of candidates have been indicated in the Score Card as mentioned by him/her in the online application form. NTA disclaims any liability that may arise to a candidate due to incorrect information provided by him/her in his/her online application form.
3. The Score Card is provisional subject to compliance with the eligibility requirements laid down.
4. The Score indicated above relates to the written exam conducted by National Testing Agency (NTA) in the Internet Based Test mode (remote proctored) in February 2024 under the NITTT Scheme of AICTE for Inductee Teachers.
5. Final Score, after combining the marks obtained in the written exam conducted by NTA and the marks obtained in the Continuous Assessment, will be prepared by NITTR, the Co-ordinating Institute for the NITTT Scheme as per its policy, and displayed on their website https://nitttrc.ac.in
6. Detection of instances of incorrect information and process violation by a candidate at any stage will lead to disqualification of the candidate. NITTT Score of such candidates who are disqualified will become null and void.
7. Role of NTA is limited to issue of admit cards, conduct of exam, process and declare results of the written exam conducted by it.
8. Candidates are advised to contact NITTTR-C for queries regarding issue of the Final Score Card/ Course Completion Certificate.

NITTT Website: http://nittt.nta.ac.in/

Principal
Rajeev Institute of Technology
Hassan-573 201

MAHESH P K
04.06.2024 15:58
Digitally Signed by Principal

Date: 15-12-2023

From,
Dr. Sharath M N
Associate Professor
Department of ISE
Rajeev Institute of Technology, Hassan

To,
The Principal
Rajeev Institute of Technology, Hassan

Respected Sir,

Subject: Regarding research incentives.

As pertaining to the above subject, I am happy to inform you that I have got Design patent grant certificate (**Design No: 380418-001**) and published 3 Utility patents (**202141029669 A, 202241077262 A** and **202341021786 A**).And also i have published 1 paper in Multimedia Tools and Applications (Unpaid Scopus Q1, SCI).With respect to this kindly permit me to avail research incentives. Kindly consider this letter.

Thanking you,

Yours faithfully

[SHARATH M N]

Forwarded
Ap-Bi
15/12/23

To, Hon'ble president

As per the employee handbook faculty is eligible for Rs 8000/- (Rs 5000 + Rs 3000). I request your kind approval.

16/3/2024

Approved (Rs8000/-)

20/3/2024

Principal
Rajeev Institute of Technology
Hassan-573 201

MAHESH P K
04.06.2024 15:58
Digitally Signed by Principal

ORIGINAL

मूलप्रति / Original

भारत सरकार
GOVERNMENT OF INDIA
पेटेंट कार्यालय
THE PATENT OFFICE
डिजाइन के पंजीकरण का प्रमाणपत्र
CERTIFICATE OF REGISTRATION OF DESIGN

डिजाइन सं. / Design No. 380418-001

तारीख / Date 28/05/2023

पारस्परिकता तारीख / Reciprocity Date

देश / Country

प्रमाणित किया जाता है कि संलग्न प्रति में अंकित डिजाइन जो DEVICE FOR IDENTIFYING OBJECT AT SECURITY GATE से संबंधित है, का पंजीकरण वर्ग 10-05 में Mr.Sharath M N 2. Dr. Rajesh T M के नाम में उपरोक्त संख्या और तारीख से कर लिया गया है।

Certified that the design of which a copy is annexed hereto has been registered as of the number and date given above in class 10-05 in respect of the application of such design to DEVICE FOR IDENTIFYING OBJECT AT SECURITY GATE in the name of 1.Mr.Sharath M N 2. Dr. Rajesh T M.

डिजाइन अधिनियम, 2000 तथा डिजाइन नियम, 2001 के अध्यधीन प्रावधानों के अनुसरण में।
In pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

दिनांक के नियंत्रक जनरल के आदेश से / 28/05/2023

नियंत्रक जनरल पेटेंट, डिजाइन और व्यापार चिह्न
Controller General of Patents, Designs and Trade Marks

पंजीकरण की अवधि पंजीकरण की तारीख से 10 वर्ष तक है। डिजाइन का स्वामित्व बनाए रखने के लिए हर पांच साल में नवीनीकरण शुल्क का भुगतान करना होगा। यदि नवीनीकरण शुल्क का भुगतान नहीं किया जाता है तो पंजीकरण समाप्त हो जाएगा।
The registration is valid for ten years from the date of registration. Renewal fee has to be paid every five years to maintain ownership of the design. If renewal fee is not paid, the registration will lapse.

Principal
Rajeev Institute of Technology
Hassan-573 201

MAHESH P K
04.06.2024 15:58
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Principal

Multimedia Tools and Applications (2023) 82:25197–25216
https://doi.org/10.1007/s11042-023-14420-2

A novel encryption with bacterial foraging optimization algorithm based pixel selection scheme for video steganography

M N Sharath[1] · T M Rajesh[2] · Mallanagouda Patil[3]

Received: 23 May 2022 / Revised: 6 October 2022 / Accepted: 21 January 2023 /
Published online: 14 February 2023

Abstract
In the digital era, security is a challenging problem due to the drastic increase in the utilization of the Internet, personal computers, smartphones, etc. for communication purposes. A major issue in the data hiding process lies in the way of embedding the secure data by maintaining the quality of a cover object that necessitates complex techniques that conceal a massive quantity of payload and the robustness of these approaches over hackers. Video steganography is considered an effective way of securing data transmission, which encompasses two processes namely embedding and extraction. Several existing video steganography techniques hide the secret message with no selection of optimal pixels where the proper choice of pixels to hide data helps to improve quality and robustness. Therefore, this article introduces novel encryption with bacterial foraging optimization algorithm-based pixel selection scheme for video steganography (EBFOA-PSVS) technique. The hidden message will be successfully concealed in the cover video utilizing the proposed EBFOA-PSVS technique, which also uses the best possible BFOA pixel selection. The best pixels are then chosen using BFOA to produce the highest peak signal-to-noise ratio (PSNR). Finally, the cover video contains the hidden image that has been encrypted. The EBFOA-PSVS approach has improved in terms of various parameters, according to a thorough comparison investigation of the findings on benchmark test movies.

Keywords Security · Video steganography · PNSR · Optimal pixel selection · Encryption · Embedding process · The extraction process

✉ M N Sharath
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Mallanagouda Patil
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1 Dayanada Sagar University, Rajeev Institute of Technology, Hassan, India

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3 Department of Computer Science and Engineering, RVITM, Bengaluru, India

(12) PATENT APPLICATION PUBLICATION

(19) INDIA

(22) Date of filing of Application :30/12/2022

(21) Application No.202241077262 A

(43) Publication Date : 06/01/2023

(54) Title of the invention : An efficient Optimal Metaheuristics based Pixel Selection for Video Steganography using Homomorphic Encryption approach

(51) International classification	:H04L0009000000, G06T0001000000, H04L0009080000, B68G0007020000, B02C0013260000
(86) International Application No Filing Date	:PCT// :01/01/1900
(87) International Publication No	: NA
(61) Patent of Addition to Application Number Filing Date	:NA :NA
(62) Divisional to Application Number Filing Date	:NA :NA

(71)**Name of Applicant :**

1)Mr. Sharath M N

Address of Applicant :Research Scholar, Dayananda Sagar University, Assistant Professor, Rajeev Institute of Technology, Hassan Pin: 573201 ---------- ----------

2)Dr. Rajesh T M

3)Dr. Mallanagouda Patil

Name of Applicant : NA

Address of Applicant : NA

(72)**Name of Inventor :**

1)Mr. Sharath M N

Address of Applicant :Research Scholar, Dayananda Sagar University, Assistant Professor, Rajeev Institute of Technology, Hassan Pin: 573201 ---------- ----------

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Address of Applicant :Associate Professor, Dayananda Sagar University, Bengaluru Pin: 560068 ---------- ----------

3)Dr. Mallanagouda Patil

Address of Applicant :Associate Professor, RV Institute of Technology and Management, Bengaluru Pin: 560076 ---------- ----------

(57) Abstract :

An efficient Optimal Metaheuristics based Pixel Selection for Video Steganography using Homomorphic Encryption approach Abstract Presently, the technological advancements in electronics and networking fields have resulted in the massive rise in the communication of digital information, especially videos. Since users access Internet in an open channel, the digital data can be altered or tampered with easily. Therefore, encryption and steganography techniques have been developed to ensure secure communication. In video steganography technique, the optimal pixels in the cover video are chosen and the encrypted secret message can be embedded into the chosen pixels, resulting in the generation of stego video. Keeping this in mind, this paper introduces an optimal metaheuristics based pixel selection with homomorphic encryption technique for video steganography (OMPS-HEVS) technique. The proposed OMPS-HEVS technique initially performs frame conversion process and applies a two-dimensional discrete wavelet decomposition (2D-DWT) process. Besides, the optimal pixel selection process takes place using the glowworm swarm optimization (GSO) algorithm. Moreover, Optimal Homomorphic encryption (OHE) with Jaya Optimization Algorithm (JOA) is applied to encode the secret message. The design of optimal key generation process of OHE using JOA helps to accomplish improved security. The experimental validation of the OMPS-HEVS technique on the benchmark test video exhibited the superior performance of the OMPS-HEVS technique over the other existing techniques.

No. of Pages : 22 No. of Claims : 8

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :27/03/2023

(21) Application No.202341021786 A
(43) Publication Date : 26/05/2023

(54) Title of the invention : SYSTEM AND METHOD FOR DATA HIDING IN VIDEO COMMUNICATION USING STEGANOGRAPHY

(51) International classification :G06T 010000, G10L 190180, H04N 013200, H04N 071400, H04N 194670
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

(71)Name of Applicant :
1)Dayananda Sagar University
Address of Applicant :Dayananda Sagar University Kudlu Gate, Hosur Main Road, Bengaluru- 560068, Karnataka, India Bangalore ---------- ----------
Name of Applicant : NA
Address of Applicant : NA
(72)Name of Inventor :
1)Rajesh TM
Address of Applicant :# 42, Lakshmi Nagar, Opp RBI layout,JP Nagar 7th Phase, Bengaluru -560078 , Karnataka , India Bangalore ---------- ----------
2)Sharath M N
Address of Applicant :Mahadevarahally, Koravangala Post, Dudda Hobli, Hassan Taluk, Hassan District- 573118, Karnataka , India Mahadevarahally ---------- ----------
3)Shaila S G
Address of Applicant :# 1284, 2nd Main, 5th Cross, BTM 4th Stage Bangalore - 560076, Karnataka, India Bangalore ---------- ----------
4)Tina Babu
Address of Applicant :Flat No 11M, B Block, Lake View County Apartments, Manipal county Road, Singasandra, Bangalore - 560068, Karnataka, India Bangalore ---------- ----------

(57) Abstract :
Title: SYSTEM AND METHOD FOR DATA HIDING IN VIDEO COMMUNICATION USING STEGANOGRAPHY ABSTRACT Disclosed is a system (100) for data hiding in video communication by way of steganography, the system (100) includes a data processing apparatus (106) includes processing circuitry (208) that is configured to (i) obtain a video data stream, (ii) divide the video data stream into one or more frames, (iii) select a secret message to be embedded into the video data stream, (iv) generate a knight tour path for each frame of the video data stream, (v) embed the secret message into the 7th bit of the pixel values along the Knight tour path for each frame of the video data stream, and (vi) transmit the video data stream with the embedded secret message to a recipient. The present disclosure also relates to a method (300) of hiding data in video communication by way of steganography. <>

No. of Pages : 26 No. of Claims : 10

RAJEEV INSTITUTE OF TECHNOLOGY
HASSAN- 573 201, KARNATAKA
(Affiliated to VTU, Belagavi., Approved by AICTE, New Delhi.)
DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

Date: 22-03-2024

From,
Dr. Sharath M N
Associate Professor
Department of ISE
Rajeev Institute of Technology, Hassan

To,
The Principal
Rajeev Institute of Technology, Hassan

Respected Sir,

Subject: Regarding incentives.

As pertaining to the above subject, I am happy to inform you that I have successfully cleared NITTT all 8 modules in a single stretch with an average of 78%. I would like to request your consideration for incentives. I look forward to hearing from you regarding my request.

Thanking you,

Yours faithfully
[SHARATH M N]

To,
The Hon'ble President
Incentive for clearing NITTT exam is Rs 4,000. I request your approval to release the incentive.
18/4/2024

Forwarded

Approved

RIT office : 08172-243160 & 08172-243181
E-mail : ishod@rithassan.ac.in, web : www.rithassan.ac.in

Principal
Rajeev Institute of Technology
Hassan-573 201

MAHESH P K
04.06.2024 15:58
Digitally Signed by
Principal

Ministry of Education
Government of India

राष्ट्रीय परीक्षा एजेंसी
National Testing Agency

All India Council for Technical Education (AICTE)

National Initiative for Technical Teacher Training (NITTT - 2020) Batch 1
Online Based Test Remote Proctored (NITTT-2024)
SCORE CARD

Roll Number	2024082501	Registration ID	20232128559	
Candidate's Name	SHARATH MN	Father's Name	Nagaraju MS	
Gender	Male	Date of Birth	6-Nov-1989	
Person with Disability (PWD)	No			

Module	Module Name	Exam Date	Maximum Marks	Marks Obtained
Module 1	Orientation Towards Technical Education and Curriculum Aspects	10.02.2024	100	90
Module 2	Professional Ethics & Sustainability	10.02.2024	100	76
Module 3	Communication Skills, Modes & Knowledge Dissemination	11.02.2024	100	82
Module 4	Instructional Planning and Delivery	11.02.2024	100	58
Module 5	Technology Enabled Learning & Life Long Self Learning	17.02.2024	100	77
Module 6	Student Assessment and Evaluation	17.02.2024	100	84
Module 7	Creative Problem Solving, Innovation and Meaningful R & D	18.02.2024	100	74
Module 8	Institutional Management & Administrative Procedures	18.02.2024	100	83

Result Date: 22-March-2024

Senior Director

INSTRUCTIONS:

1. This Score Card is issued in accordance with the provisions of the National Initiative for Technical Teachers Training (for Inductee Teacher) (NITTT) Scheme 2020 of AICTE.
2. Particulars of candidates have been indicated in the Score Card as mentioned by him/her in the online application form. NTA disclaims any liability that may arise to a candidate due to incorrect information provided by him/her in his/her online application form.
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6. Detection of instances of incorrect information and process violation by a candidate at any stage will lead to disqualification of the candidate. NITTT Score of such candidates who are disqualified will become null and void.
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NITTT Website: http://nittt.nta.ac.in/

Principal
Rajeev Institute of Technology
Hassan-573 201

MAHESH P K
04.06.2024 15:58
Digitally Signed by Principal

Ministry of Education
Government of India

राष्ट्रीय परीक्षा एजेंसी
National Testing Agency

National Institute of Technical Teachers Training
February 2024 Examination

ADMIT CARD - PROVISIONAL

Registration Number	202232126559	Roll Number	2024082501	
Candidate's Name	SHARATH M N	Father's Name	Nagaraju M S	
Gender	Male	Date of Birth	6-Nov-1989	
PwD	No	Scribe	NA	Sharath

Exam Details

Module No.	Module Name	Exam Date	Exam Time	Reporting Time	Login ID	Password
1	Orientation Towards Technical Education and Curriculum Aspects	10.02.2024	10:00 AM-1:00 PM	9:30 AM	111600836	06-Nov-1989
2	Professional Ethics & Sustainability	10.02.2024	2:30 PM-5:30 PM	2:00 PM	121602888	06-Nov-1989
3	Communication Skills, Modes & Knowledge Dissemination	11.02.2024	10:00 AM-1:00 PM	9:30 AM	131605098	06-Nov-1989
4	Instructional Planning and Delivery	11.02.2024	2:30 PM-5:30 PM	2:00 PM	141607233	06-Nov-1989
5	Technology Enabled Learning & Life Long Self Learning	17.02.2024	10:00 AM-1:00 PM	9:30 AM	151609768	06-Nov-1989
6	Student Assessment and Evaluation	17.02.2024	2:30 PM-5:30 PM	2:00 PM	161611991	06-Nov-1989
7	Creative Problem Solving, Innovation and Meaningful R & D	18.02.2024	10:00 AM-1:00 PM	9:30 AM	171614513	06-Nov-1989
8	Institutional Management & Administrative Procedures	18.02.2024	2:30 PM-5:30 PM	2:00 PM	181617206	06-Nov-1989

Senior Director

*Reporting Time is 30 Minutes prior to commencement of Exam

Principal
Rajeev Institute of Technology
Hassan-573 201

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04.06.2024 15:58
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Principal

RAJEEV INSTITUTE OF TECHNOLOGY

HASSAN-573201, KARNATAKA

(Affiliated to VTU, Belagavi., Approved by AICTE New Delhi.)

Department of Civil Engineering

Date: 17.02.24

To

The Principal
RIT, Hassan

Respected Sir,

Subject: Regarding the consideration of request for reimbursement of conference registration fee- Mr.Raghunandan Yadav C

With reference to the above subject, **Mr.Raghunandan Yadav** had applied for Journal Paper in **International Conferfence on Eco-friendly Fibres and Polymeric Materials** which will be held at **King Mongkut's University of Technology, North- Bangkok** and his paper has been accepted.

In this regard, I kindly request you to do the needful for providing incentives to him under Clause 5.2(b)Research Incentive Policy of RIT.

Registration Amount Paid by the Faculty: 100 USD (Rs. 8326/-)

Thanking You,

Your's Faithfully,

17/2/24

Head of the Department
Head of the Department
Department of Civil Engineering
Rajeev Institute of Technology
HASSAN

To,
Hon'ble President

As per the Research incentive policy, faculty is eligible for Rs. 4158 incentive towards conference registration fee. I request you to kind approval to release the incentive.

Approved (Rs 41
21/03/202

Principal
Rajeev Institute of Technology
Hassan-573 201

MAHESH P K
04.06.2024 15:58
Digitally Signed by Principal

Principal : 08172-243180,HOD: 8971522223
E-mail : cvhod@rithassan.ac.in, web : www.rithassan.ac.in

To,
The Principal
RIT, Hassan

From,
Raghunandan Yadav C
Department of Civil Engineering,
RIT, Hassan

Respected Sir,

Subject: Regarding the reimbursement of conference registration fee.

As mentioned above subject, I have applied for the **International conference on Eco-friendly Fibers and Polymeric Materials**, which will be held at King Mongkut's University of Technology North Bangkok, and the paper was accepted which will be indexed in Scopus. I have paid the conference amount of 100 USD (8,326/-). I am requesting you to reimburse the registration amount. So kindly accept my request and do the needful.

Thanking you

Date: 02/02/2024
Place: Hassan

yours faithfully

(Raghunandan Yadav C)

Principal
Rajeev Institute of Technology
Hassan-573 201

MAHESH P K
04.06.2024 15:58
Digitally Signed by Principal

CERTIFICATE OF APPRECIATION

This is to certify that

Raghunandan Yadav C, Sujay S, Nudi Shree, Anand HR, Shailesh M. Golabbhanvi, Kuldeep B

has participated and delivered an oral presentation entitled

Studies on mechanical behaviour of basalt fiber reinforced cement concrete

in International Conference on
Eco-friendly Fibers and Polymeric Materials – EFPM (Hybrid Mode)
Bangkok, Thailand
19th – 20th February 2024

Assoc. Prof. Dr. Sanjay Mavinkere Rangappa
Chairman of EFPM

Prof. Dr.-Ing. habil. Suchart Siengchin
President of KMUTNB

Asst. Prof. Preecha Ong-aree
Director of KMUTNB Techno Park

On the occasion of 65th anniversary

King Mongkut's University of Technology North Bangkok

In association with

KMUTNB Techno Park

International Conference on *Eco-friendly Fibers and Polymeric Materials*

(Hybrid Mode)

19th & 20th February 2024 | Bangkok, Thailand

About the Conference

International Conference on "Eco-friendly Fibers and Polymeric Materials" aims to bring researchers in and around th globe to exchange new ideas, share knowledge and explore recent developments in the area of eco-friendly fibers and bi based polymeric materials.

Conference Themes (including, but not limited to)

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- 3D printing of polymers
- Recycling of polymers and composites
- Self-healing biopolymers and biocomposites
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Prof. Dr. Mohini M. Sain
University of Toronto, Canada

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National University of Singapore, Singapore

Prof. Dr. Mohammad Jawaid
University Putra Malaysia, Malaysia

Prof. Dr. Hom Dhakal
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Prof. Dr. Jyotishkumar P
Alliance University, India

Patron

Prof. Dr.-Ing. habil. Suchart Siengchin

Conference Chair

Assoc. Prof. Dr. Sanjay Mavinkere Rangappa

Conference Co-Chair

Dr. Indran Suyambulingam

Conference Convenors

Dr. Sathish Kumar Palaniappan
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Accompanying Person	: 200 USD

*This includes registration, presentation, certificate & two-days accommodation with foo

Important Dates

Last date for submission of abstract	: 01st October 2023
Intimation of abstract acceptance	: 15th October 2023
Last date for registration & fee payment	: 15th November 2023

Publication

All the accepted and presented papers will be published in SCOPU indexed journals, free of cost.

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International Conference on

ECO-FRIENDLY FIBERS AND POLYMERIC MATERIALS

King Mongkut's University of Technology North Bangkok, Thailand

SUBJECT: LETTER OF ACCEPTANCE FOR YOUR TALK IN THE EFPM'2024

Dear Dr. Kuldeep B,

We are pleased to inform you that your abstract **"Studies on mechanical behaviour of basalt fiber reinforced cement concrete"** for talk in the upcoming "*International Conference on Eco-friendly Fibers and Polymeric Materials" 2024* has been accepted. Congratulations!

Your dedication to your field and your eagerness to contribute to our conference is truly commendable. We believe your insights and contributions will greatly enrich the discussions and interactions during the event.

International Conference on Eco-friendly Fibers and Polymeric Materials aims to bring researchers in and around the globe to exchange new ideas, share knowledge and explore recent developments in the area of eco-friendly fibers and polymeric materials. The conference includes keynote and invited lectures by an array of eminent speakers from reputed international organizations and institutions. The conference endeavors to encourage exchange of innovative ideas and facilitate future academic collaborations.

Here are some important details:

Conference Date: 19 -20 February 2024
Registration deadline: 15 November 2023
Venue: King Mongkut's University of Technology North Bangkok

For any further information, feel free to contact our conference coordination team at efpm@op.kmutnb.ac.th

Once again, congratulations on your acceptance, and we look forward to your valuable talk in the EFPM'2024. Together, we can make this event a resounding success.

Best Regards,

EFPM'2024 Team

Assoc. Prof. Dr. Sanjay Mavinkere Rangappa
(Conference Chair)

Prof. Dr.-Ing. habil. Suchart Siengchin
(President of KMUTNB)

ECO FRIENDLY FIBERS AND POLYMERIC MATERIALS

Organized by: KMUTNB TECHNO PARK

E-mail: efpm@op.kmutnb.ac.th

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(Affiliated to VTU, Belagavi., Approved by AICTE, New Delhi., Recognized by Govt. of Karnataka)
Department of Mechanical Engineering

To,

The Principal

RIT, Hassan

Through
H.O.D

Department of Mechanical Engineering.

RIT, Hassan.

From,
ANAND .H.R

Department of Mechanical Engineering.

RIT, Hassan

Respected sir,

Subject: Incentive for Research Articles, Reg.

As mentioned in the above subject, I have published three research papers indexed in Scopus. I have attached the proof of publication for your kind perusal. So kindly consider and do the needful.

1. Anand, H. R., Govardhan Goud, KN Madan Kumar, and L. Vinay. "Influence of surface treatment on mechanical properties of Roystonea-regia/banana fibre reinforced hybrid polyester composites." *Materials Today: Proceedings*, 24 June 2023. [**scopus, Q2, SNIP: 0.774**]
2. H R Anand, Govardhan Goud, & Kuldeep B. "Investigation of Physical, Di-electric and hydrophobicity properties of Roystonea Regia/Banana fibre polyester composites in both Alkali treated and untreated conditions." *Engineering Research Express* , Vol-5, 7 September 2023. [**scopus, Q3, SNIP: 0.578**]

Forwarded for kind Consideration

Thanking you

To,
Hon'ble President

Yours faithfully
24/09/23

The articles are published in Materials Today: Proceedings and Engineering Research Express in 2023 and details are enclosed. As per the incentive policy, the author is eligible for an incentive of Rs 2917 (Rs 1250 + Rs 1667)

Principal: 08172-243180, Registrar : 08172-243181
E-mail:MAHESH@rithassan.ac.in,web:www.rithassan.ac.in

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Hassan-573 201

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20/11/2023

Incentives may be given according to the calculation made to the above candidates.

15/11/2023

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Engineering Research Express

PAPER

Investigation of physical, Di-electric and hydrophobicity properties of roystonea regia/banana fibre polyester composites in both alkali treated and untreated conditions

RECEIVED
3 May 2023

REVISED
20 August 2023

ACCEPTED FOR PUBLICATION
30 August 2023

PUBLISHED
7 September 2023

H R Anand[1], Govardhan Goud[2] and B Kuldeep[1]

[1] Department of Mechanical Engineering, Rajeev Institute of Technology, Hassan, Visvesvaraya Technological University, Belagavi, Karnataka, 590018 - India
[2] Department of Mechanical Engineering, Bahubali College of Engineering, Hassan, Visvesvaraya Technological University, Belagavi, Karnataka, 590018 - India

E-mail: kuldeeph.deep@gmail.com

Keywords: dielectric strength, roystonea-regia fibre, banana fibre, hydrophobicity, shore D hardness, hand-layup technique

Abstract

Natural fibre-based hybrid composites have attracted a lot of attention in recent years due to their potential as environmentally friendly substitutes for synthetic fibres. When two or more types of natural fibres are combined to form a hybrid, the resulting material can have novel electrical properties. The study of Roystonea Regia fibre with other natural fibres as hybridization is very scarce, so in this context, the physical, di-electric and hydrophobicity properties of Roystonea Regia/Banana fibre hybrid composites have been studied. Experiments are conducted to demonstrate the dielectric strength, hardness, and hydrophobicity of polyester composites reinforced with a hybrid of Roystonea-Regia fibres and banana fibres in both treated and untreated conditions. This goal is reached through the fabrication of hybrid composites with varying proportions via the hand-lay-up technique and subsequent testing. The composition of 15% Roystonea-Regia alkali-treated polyester composites has a dielectric strength of 2.5 kV mm^{-1} in air, which is much lower than that of the untreated composites, which is 12.2 kV mm^{-1}. Due to the increase in soaking time, percentage of hydroxyl group in treated fibres increases, which in turn reduced the dielectric strength. And also, the dielectric constant and electrical conductivity vary with the change in frequency. The alkali-treated fibre shows an increase in Shore D hardness when compared with the untreated fibres. The highest contact angle of 88.85° for 10% Roystonea-Regia fibre and 5% Banana fibre was observed, whereas the lowest contact angle of 65.14° was observed for 5% Roystonea-Regia fibre and 10% Banana fibre.

1. Introduction

Cellulose-based natural fibres derived from plants are being considered as a possible reinforcement in the production of low-cost polymer composite materials due to their high strength-to-weight ratio, low cost, abundance, and renewability. Hemp, jute, rice straw, wood, and bamboo are just some of the natural fibres that have shown promise as polymer composite reinforcements [1]. The use of natural fibre as reinforcement in a polymer matrix is a significant difficulty due to the weak adhesion that exists between the natural fibre and the matrix [2]. Because of the weak connection that exists between the fibre and the matrix, there will be a reduced load transfer from the matrix to the fibre. The composites end up having weaker strength as a direct consequence of this. In order to solve this issue, researchers have proposed modifying the fibre's surfaces using a variety of chemical processes [3–8].

Composites are increasingly being used in place of traditional dielectric materials [9]. Therefore, it is crucial to investigate the dielectric properties of fibre-reinforced polymer composites. Despite the fact that many reports on fibre-reinforced polymer composites already exist, insulators serve both mechanical and electrical purposes in electricity distribution networks [10]. The outdoor insulators are built to last in harsh conditions,

Materials Today: Proceedings xxx (xxxx) xxx

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Influence of surface treatment on mechanical properties of Roystonea-regia/banana fibre reinforced hybrid polyester composites

H.R. Anand [a,*], Govardhan Goud [b], K.N. Madan Kumar [c], L. Vinay [a]

[a] Department of Mechanical Engineering, Rajeev Institute of Technology, VTU, India
[b] Department of Mechanical Engineering, Bahubali College of Engineering, VTU, India
[c] Department of Mechanical Engineering, Adichinchunagiri Institute of Technology, VTU, India

ARTICLE INFO

Article history:
Available online xxxx

Keywords:
Roystonea-regia
Polyester composites
Banana fiber
Alkali & Silane treatment

ABSTRACT

An effort has been made in the current research to analyse the influence of alkali and saline treatments on the mechanical properties of Roystonea-regia (RR)/banana (BA) fibre reinforced hybrid polyester composites. Composites were prepared using both treated and untreated fibres using hand layup technique. Total reinforcement content in the hybrid composites was limited to 15 wt%. Prepared specimens were tested for tensile, flexural and impact properties as per ASTM standards. Highest tensile and flexural properties were obtained for the composites reinforced with 5 wt% RR fibres and 10 wt% of BA fibres for both treated and untreated conditions. Alkali treated specimens exhibited superior tensile and flexural properties in comparison to untreated and silane treated specimens. However, composite reinforced with untreated fibres showed better impact strength.

Selection and peer-review under responsibility of the scientific committee of the 4th International Conference on Materials, Manufacturing and Modelling.

1. Introduction

In the present scenario, researchers are moving towards replacing synthetic fibres with natural fibres. Demand to natural fibres has increased in industries, attracted material scholars and experts because of their explicit properties in comparison to traditional synthetic fibres [1]. Numerous natural fibres possess low density, renewability, high stiffness, high flexibility, and biodegradability properties [2,3]. They are easily available and economical. Hydrophilic property and poor adhesion behaviour of natural fibres with the matrix restricts the usage as reinforcements within the composites [4]. To overcome these restrictions, the researchers are subjecting the natural fibres to surface treatment that helps to reduce the hydrophilic behaviour and enhances the adhesion property with the matrix [5]. Different areas of engineering like marine, structural, automotive, sports, etc are using polymer composites reinforced with natural fibres for various applications based on requirement. Few natural fibres like jute, banana, bamboo, sugarcane, sisal, kenaf, flax, etc. are reinforced with polymer composites [6]. To broaden the applications of natural fibre, the researchers are going for hybridization process adding two or more natural fibres or synthetic fibres forming hybrid natural or synthetic polymer composites [7].

Among natural fibres, nowadays researchers are interested in usage of Roystonea-regia (RR) and banana (BA) fibres in polymer composites. Ravi et al., used Roystonea-regia as reinforcement in polypropylene matrix to evaluate mechanical properties. Results show that the flexural and tensile properties of the epoxy composite were improved with increased percentage of fibre content [8]. Ratna et al., processed banana fibres and used as a reinforcement in polyester matrix and found improvement in tensile behaviour and flexural modules with increasing fiber content [9]. Murali et al., attempted fabricating a composite using vakka fibre and found improvement in tensile, dielectric and flexural properties with increment in percentage of vakka fibre distribution in the matrix in comparison to bamboo, sisal and banana fibre [10]. Goud and Rao worked on biodegradable composites using Roystonea regia in epoxy composite with alkali treatment. Results show that, alkali treated fibres exhibited greater tensile properties in comparison with untreated fibres and also flexural properties of alkali

Abbreviations: RR, Roystonea-Regia; BA, Banana; PR, Polyester-Regia; PRB, Polyester-Regia-Banana; TM, Tensile Modulous; TS, Tensile Strength; UT, Untreated; AT, Alkali Treated; ST, Silane Treated.

* Corresponding author.
E-mail address: anandahr@gmail.com (H.R. Anand).

https://doi.org/10.1016/j.matpr.2023.06.099

Selection and peer-review under responsibility of the scientific committee of the 4th International Conference on Materials, Manufacturing and Modelling.

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Materials Today: Proceedings

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Influence of surface treatment on mechanical properties of Roystonea-regia/banana fibre reinforced hybrid polyester composites

H.R. Anand [a], Govardhan Goud [b], K.N. Madan Kumar [c], L. Vinay [a]

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Abstract

An effort has been made in the current research to analyse the influence of alkali and saline treatments on the mechanical properties of Roystonea-regia (RR)/banana (BA) fibre reinforced hybrid polyester composites. Composites were prepared using both treated and untreated fibres using hand layup technique. Total reinforcement content in the hybrid composites was limited to 15wt%. Prepared specimens were tested for tensile, flexural and impact properties as per ASTM standards. Highest tensile and flexural properties were obtained for the composites reinforced with 5wt% RR fibres and 10wt% of BA fibres for both treated and untreated conditions. Alkali treated specimens exhibited superior tensile and flexural properties in comparison to untreated and silane treated specimens. However, composite reinforced with untreated fibres showed better impact strength.

Introduction

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Among natural fibres, nowadays researchers are interested in usage of Roystonea-regia (RR) and banana (BA) fibres in polymer composites. Ravi et al., used Roystonea-regia as reinforcement in polypropylene matrix to evaluate mechanical properties. Results show that the flexural and tensile properties of the epoxy composite were improved with increased percentage of fibre content [8]. Ratna et al., processed banana fibres and used as a reinforcement in polyester matrix and found improvement in tensile behaviour and flexural modules with increasing fiber content [9]. Murali et al., attempted fabricating a composite using vakka fibre and found improvement in tensile, dielectric and flexural properties with increment in percentage of vakka fibre distribution in the matrix in comparison to bamboo, sisal and banana fibre [10]. Goud and Rao worked on biodegradable composites using Roystonea regia in epoxy composite with alkali treatment. Results show that, alkali treated fibres exhibited greater tensile properties in comparison with untreated fibres and also flexural properties of alkali treated epoxy composite enhanced with increment in fibre wt.% [11]. Balaji and Goud reinforced RR and glass fibres into epoxy composite. It was reported that, the enhancement of tensile and hardness behaviour was observed in the fabricated composites [12]. Goud and Rao treated Roystonea regia with alkali and silane solution before fabricating the epoxy composites. Treated fibres were reinforced into epoxy composite to evaluate

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Department of Mechanical Engineering

To,

The Principal

RIT, Hassan

Through
H.O.D

Department of Mechanical Engineering.

RIT, Hassan.

From,
ANAND .H.R

Department of Mechanical Engineering.

RIT, Hassan

Respected sir,

Subject: Incentive for Research Articles, Reg.

As mentioned in the above subject, I have published three research papers indexed in Scopus. I have attached the proof of publication for your kind perusal. So kindly consider and do the needful.

1. H R Anand, Govardhan Goud, Karthik S, Madhu P, "Influence of Water Absorption on Mechnical and Morphological Behaviour of Roystonea-Regia/Banana Hybrid Polyester Composites", Applied Science and Engineering Progress, Vol.17, 4 October 2023. **[scopus, Q2, SNIP: 0.894]**.

Thanking you

Yours faithfully

To,
Hon'ble President,

The article is published in Applied Science and Engineering progress Journal. The details are enclosed. As per the incentive policy, the author is eligible for an incentive of Rs 1,250 under provoth basis.

Forwarding for kind consideration

4/10/2023

20/10/2023

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Incentives may be cleared as per calculation & Mr. Anand.

17/11/2023

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Principal

Research Article

Influence of Water Absorption on Mechanical and Morphological Behaviour of Roystonea-Regia/Banana Hybrid Polyester Composites

Anand Hassan Rajamudi Gowda
Department of Mechanical Engineering, Rajeev Institute of Technology, Hassan, Visvesvaraya Technological University, Belagavi, Karnataka, India

Govardhan Goud
Department of Mechanical Engineering, Bahubali College of Engineering, Shravanabelagola, Visvesvaraya Technological University, Belagavi, Karnataka, India

Karthik Sathynarayana
Department of Mechanical Engineering, The National Institute of Engineering, Mysuru, Visvesvaraya Technological University, Belagavi, Karnataka, India

Madhu Puttegowda*
Department of Mechanical Engineering, Malnad College of Engineering, Hassan, Visvesvaraya Technological University, Belagavi, Karnataka, India

* Corresponding author. E-mail: pm@mcehassan.ac.in DOI: 10.14416/j.asep.2023.10.003
Received: 10 July 2023; Revised: 1 August 2023; Accepted: 28 August 2023; Published online: 4 October 2023

Abstract

This study investigated the properties of hybrid composites made from Roystonea-Regia and banana fibers for potential applications in industries requiring lightweight, environmentally favorable, and mechanically strong materials. The analysis of density and void fraction revealed that the addition of banana fibers increased the composite's density, despite the fact that the actual density was slightly lower than the theoretical density due to confined gases during fabrication. The results of tensile tests revealed that water absorption negatively affected tensile strength, whereas alkali treatment and hybridization enhanced performance. The composition of 10 wt % Roystonea-Regia and 5 wt % banana had the highest tensile strength of 64.76MPa, which was attributable to the hydrophilicity and hydration content of the banana fiber. Further flexural and impact experiments confirmed that the influence of water absorption of composites showed a decrement in mechanical properties. The highest impact strength of 45.28 J/m and flexural strength of 75.6MPa were noted for 10 wt % Roystonea-Regia and 5 wt % banana. In addition, Scanning Electron Microscopy (SEM) analysis revealed that alkali treatment improved fiber-matrix interface bonding and roughened fiber surfaces, thereby enhancing the composites' overall performance. The study provides precious insights into the potential of Roystonea-Regia and banana hybrid composites for industrial applications as lightweight, environmentally friendly, and mechanically robust materials.

Keywords: Banana fibers, Density, Hybrid composites, Roystonea-Regia fibers, Tensile strength, Water absorption

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DEPARTMENT OF CIVIL ENGINEERING

Date: 27/10/2023
Place: Hassan

From,
Madhu K M
Department of Civil Engineering.
RIT, Hassan

To,
The Principal
RIT, Hassan

Respected sir,

Subject: Incentive for Research Articles, Reg.

As mentioned in the above subject, I have published a research papers in this academic year. I have attached the proof of publication for your kind perusal. So kindly consider and do the needful.

1. Jayanth, J., Ravikiran, H. K., & Madhu, K. M. (2023). Classification of Crops through Self-Supervised Decomposition for Transfer Learning. Journal of Aridland Agriculture, 9, 81–91. https://doi.org/10.25081/jaa.2023.v9.8566. [**SNIP: 0.116**].

Thanking you

Yours faithfully,
Madhu K M
[Madhu K M]

through HOD, CV
27/10/23

To, Hon'ble President
The article is published in Journal of Aridland Agriculture in 2023 and the details are enclosed. As per the incentive policy, the author is eligible for an incentive of Rs 1667 under prorata basis.

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Incentive may be given as per the calculation to the above candidate.

16/4/2023

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Journal of Aridland Agriculture 2023, 9: 81-91
doi: 10.25081/jaa.2023.v9.8566
https://updatepublishing.com/journal/index.php/jaa

Research Article

ISSN: 2455-9377

Classification of Crops through Self-Supervised Decomposition for Transfer Learning

J. Jayanth[1]*, H. K. Ravikiran[2], K. M. Madhu[3]

[1]Department of Electronics and Communication Engineering, GSSS Institute of Engineering & Technology for Women, Mysore-570016, Karnataka, India, [2]Department of Electronics and Communication Engineering, Navkis College of Engineering, Hassan-573217, Karnataka, India, [3]Department of Civil Engineering, Rajeev Institute of Technology, Hassan-573201, Karnataka, India

ABSTRACT

The 2S-DT (Self-Supervised Decomposition for Transfer Learning) model, created for crop categorization using remotely sensed data, is a unique method introduced in this paper. It deals with the difficulty of incorrectly identifying crops with comparable phenology patterns, a problem that frequently arises in agricultural remote sensing. Two datasets from Nanjangudu taluk in the Mysore district, which has a widely varied irrigated agriculture system, are used to assess the model. Using self-supervised learning, the 2S-DT model addresses the misclassification issue that frequently occurs when working with unlabeled classes, especially in high-resolution images. It uses class decomposition (CD) layer and a downstream learning approach. Using the model's learning and the particulars of each geographical context, this layer improves the information's arrangement. Our model architecture's foundation is ResNet, a well-known deep learning framework. Each residual block in our ResNet architecture is made up of two 3x3 convolutional layers. Each convolutional layer is followed by batch normalization and Rectified Linear Unit (ReLU) activation functions, which improve the model's capacity for learning. We utilized a 7x7 convolutional layer with 64 filters and a stride of 2 for Conv1 in ResNet18, resulting in an output size of 112x112x61. Conv2, which consists of Res2a and Res2b, generated an output with the dimensions 48x48x64. Conv3, which included Res3a and Res3b, produced an output with the dimensions 28x28x128. These architectural selections were made with our experimental needs in mind. The 2S-DT model's newly added features make it easier to identify classes and update weights, improving the stability of the features' spatial and spectral data. Extensive tests performed on two datasets show the model's viability. Overall accuracy has improved significantly, with the 2S-DT model surpassing comparable models like TVSM, 3DCAE, and GAN Model by obtaining 95.65% accuracy for dataset 1 and 88.91% accuracy for dataset 2.

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Accepted: October 3, 2023
Published: October 17, 2023

***Corresponding Author:**
J. Jayanth
E-mail: ravikiranhsn@gmail.com

KEYWORDS: Self-Supervised (2S) Transfer Learning, High-Resolution Image Classification, Spectral Features, TVSM, 3DCAE, GAN Model

INTRODUCTION

The potential use of remote sensing in the classification of crops over a broad area has been broadly investigated on the basis of the classification and mapping of croplands (Arel *et al.*, 2010; Radford *et al.*, 2015). Using remote sensing data, the Department of Agriculture and Cooperation (DAC), Ministry of Agriculture, Govt. of India, initiated steps to set up a center for routine check-up of crop statistics using AWIFS and LISS III data 20. The Mahalanobis National Crop Forecast Centre (MNCFC) was set up by the Govt. of India, New Delhi, for estimating the crop yield and its planting area using land use (LU)/Land Cover (LC) data.

Initially, high-resolution RS data such as LISS IV, PAN, Landsat 8, and Sentinel-2 act as the main data source for information on crop area (Bolton & Friedl, 2013; Esch *et al.*, 2014; Gao *et al.*, 2017). As is for the most part the case with measurable testing, the more preparation sets that are not entirely settled, the more noteworthy the probability of getting the right characterization exactness; this assumption is also true with MLC. Parametric classifiers fail to classify when there is insufficient training data and when they are unable to satisfy the rule of thumb defined for training data set size (Gallego *et al.*, 2012; Hedhli *et al.*, 2016).

Deep learning-based pixel-wise classifiers have acquired consideration in RS data classification (Kussul *et al.*, 2017). Even though a nonparametric classifier algorithm's accuracy is less compared to TVSM, RNN, 2D TVSM and others, the main disadvantage associated with them is that they are either expensive in computation or complex in execution because

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Journal of Aridland Agriculture

Scopus coverage years: from 2018 to Present

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E-ISSN: 2455-9377

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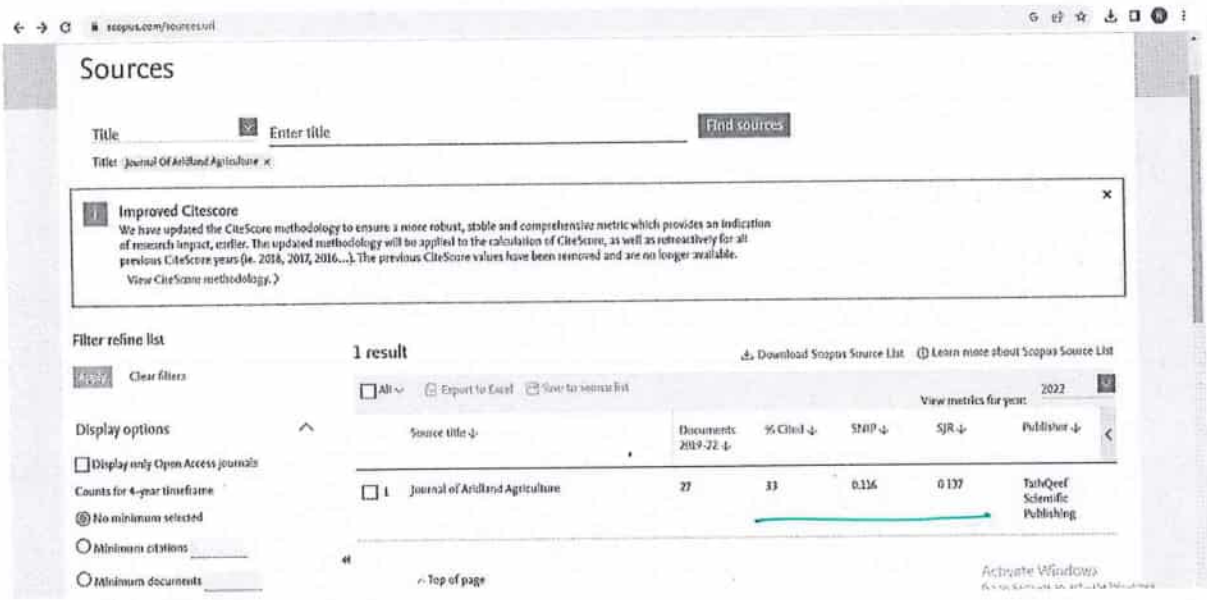

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File No: IR-12

Date: 07/06/2023

Forwarded to the Honorable President RET, Hassan for kind approval:

Subject : Estimated expenditure for international Conference on Advances in Computing, Control and Telecommunication Technologies ACT 2023 on June 15th & 16th at RIT

Requisition No. : RIT/2023/03
Academic year : 2022-23
Date of Request : 06/05/2023
Amount : ₹ 7, 80,250/-
Priority : Urgent / Ordinary
Contact Person : Mr. Arjun B C, Professor, Department of Information Science & Engg.

Note:

Our college is organizing international Conference on Advances in Computing, Control and Telecommunication Technologies ACT. It is planned to conduct conference on June 15th & 16th, 2023. We have received 45 papers from outside and 34 papers from our faculty and 28 papers from our students, altogether we have received Rs. 5,68,300/-. **Total institution contribution estimation is Rs. 2,11,950/-**

Remarks of the Principal:

Forwarded to Hon'ble President for kind approval. Please find the attachment containing

1. Request Letter containing budget to conduct the ACT Conference on June 15th & 16th.
2. Details of papers registered for conference.

Signature of Principal

Remarks of the Hon'ble President

1. Budget to conduct the ACT conference approved signed.
2. Release payment of Rs 4,68,800 towards publication charges, Rs 25,500/- towards plagerism check.
3. To prepare PO for 75 conference bags as per the quotation given.

9/06/2023

E-Mail : principal@rithassan.ac.in, web : www.rithassan.ac.in

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3. To prepare PO for 75 conference bags as per the quotation given.

9/06/2023

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Rajeev Institute Of Technology, Hassan

Management scholarship for International Conference(ACT) June 2023

Sl NO	Paper Name	Actual Fees per paper	Fee Paid by Faculty/Students	Management sponsorship
1	ACT-RIT-187	8000	5000	3000
2	ACT-RIT-199	8000	5000	3000
3	ACT-RIT-105	8000	5000	3000
4	ACT-RIT-5	3000	2000	1000
5	ACT-RIT-10	3000	2000	1000
6	ACT-RIT-155	3000	2000	1000
7	ACT-RIT-167	3000	2000	1000
8	ACT-RT-123	8000	5000	3000
9	ACT-RIT-116	8000	5000	3000
10	ACT-RIT-138	8000	5000	3000
11	ACT-RIT-117	8000	5000	3000
12	ACT-RIT-129	8000	5000	3000
13	ACT-RIT-97	3000	2000	1000
14	ACT-RIT-98	3000	2000	1000
15	ACT-RIT-104	3000	2000	1000
16	ACT-RIT-107	3000	2000	1000
17	ACT-RIT-112	3000	2000	1000
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Date: 31/03/2023

International Conference on Advances in Computing, Control, and Telecommunication Technologies - ACT 2023

Dear All Students and faculties of RIT,

Sub: International Conference *"ACT 2023"*

We are pleased to inform you that our college is organizing an International Conference on *"Advances in Computing, Control, and Telecommunication Technologies – ACT 2023"* on 15th and 16th June 2023. A cluster of eminent professionals from R & D centers and Academic Institutions will deliver the lectures during the Conference.

All the accepted, registered and presented papers will be published by the Grenze Scientific Society and it will be made available in the GRENZE International Journal of Engineering and Technology (GIJET). **The same papers will be then indexed in Scopus as Conference Proceedings.**

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We will be greatly honored if faculties and students may kindly accept our invitation and present papers in the conference.

Note: The registration fees concession will be given for students and faculties of Rajeev Institute of Technology.

Thanking you,
With best regards,

31/3/23

Dr. Arjun B C
Organizing Chair,
Assoc.Prof. & Head, Dept. of ISE,
Rajeev Institute of Technology,
Hassan

Dr. Mahesh P.K.
Principal,
Rajeev Institute of Technology, Hassan

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Date: 04/04/2024

To,

The Principal
Rajeev Institute of technology
Hassan

From,

Ravi L.S
Asst. Professor
Dept of ECE
Rajeev Institute of technology
Hassan

Through HOD,
Dept of ECE
Rajeev Institute of technology
Hassan

Respected Sir,

Sub: Regarding Sanction of Paper Publication amount.

With respect to the above subject, I have Published Four papers [1-Journal, 3-Conference]. The Details of the Publication is attached with this letter. I request you to Sanction Publication amount.

Thanking you

Date: 04/04/2024
Place: Hassan

Yours faithfully

[Ravi L.S]

forwarded to the principal
for consideration

HOD
04/04/2024

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Sl.No.	Journal/Conference	Registration amount	TA/DA
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2.	IEEE Conference	~~6500~~ 6500 X 3 papers	250 - DA 200 - TA

* All with RIT affiliation.
* one Journal & one conference with Mr. Ravi. L.S & his PhD Guide.
* Two conference with multiple authors.
* Journal is having SNIP 0.342
  Author: Mr. Ravi. L.S & PhD Guide.
* Conference ~~is~~ author details:

  ICRASET 2023:
  - Mr. Ravi. L.S & PhD Guide → 01 paper
  - Mr. Ravi. L.S as second author & remaining from other institute & department → 01 paper.
  - Mr. Ravi. L.S as sixth author → 01 paper.

To,
The Hon'ble President,
As per the research incentive policy, Faculty is eligible for ~~Rs~~ Rs. 9,200 (Rs 5000(J) + Rs 4000(C) + Rs 200(TA)). Requesting your kind approval for the incentive.

Approved
[signature]
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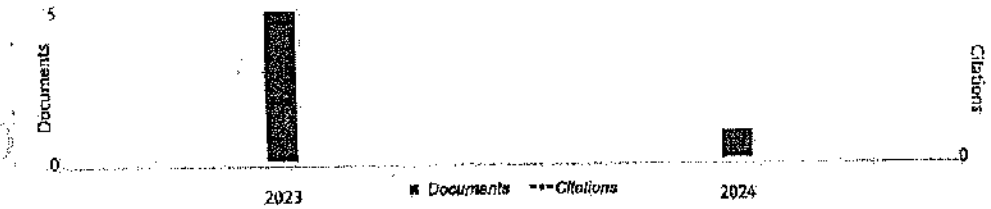

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14th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2023, 2023, 2023-June, pp. 1781–1788

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International Journal of
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IJISAE

ISSN:2147-6799 www.ijisae.org Original Research Paper

Efficient Design of Configurable Logic Block with Customized LUT using Reversible Fault Tolerant Gates

Ravi L. S.*[1], Dr. Naveen K. B.[2]

Submitted: 10/12/2023 Revised: 14/01/2024 Accepted: 31/01/2024

Abstract: The parity of the input vector must match the parity of the output vector in a fault-tolerant reversible logic gate circuit. It enables the circuit's problem to be discovered. As a result, parity-preserving reversible logic will assist in the development of fault-tolerant systems for nanotechnology. It is commonly recognized that fault-tolerant (FT) reversible logic gates (RLG) are compatible with revolutionary computing paradigms such as optical and quantum computing. We presented reversible fault-tolerant lookup tables (LUTs) in this paper, which are employed in the development of Configurable logic blocks (CLB). CLB architecture employs fault-tolerant reversible logic components such as D-Latch, MS-Flip-flop, and Multiplexer. The suggested architecture is simulated, tested logically, and implemented using an FPGA Spartan 3. The simulation findings and implementation demonstrate the reversible fault tolerant gate design's functioning. The power dissipation and delay in reversible fault tolerant gates are found to be less, with a power reduction of around 95.5 % at 90 nm CLB technology.

Keywords: Look-Up Table, FPGA, Fault Tolerant, Reversible Logic, Low Power Dissipation, Garbage Output

1. Introduction

Energy is dissipated as a result of irreversible hardware computing, regardless of how it is realized due to the loss of information, is shown by R. Landaurer's research in early 1960. Each k: T: ln2 joule of information is dissipated, where k is the Boltzman constant is denoted by k and absolute temperature is denoted by T [1, 2]. The huge energy dissipation is avoided by using reversible logic gates for making a circuit, as shown by Benett demonstrated in 1973. A system to continue to function successfully by using the Fault tolerance even if any of its components fail (due to one or more faults). FPGAs are typically made up of a set of customizable I/O blocks, interconnects, and logic blocks [3,4]. The FPGA can be customized to meet the needs of any application. FPGAs have evolved from simple logic to extremely sophisticated programmable fabrics as a result of the same semiconductor technological advancements which have brought processors to their performance limits. Plessy logic blocks and Lookup-Table (LUT) are the most common logic blocks. A LUT can use fewer logic blocks to implement more logic with more inputs. As a result, it aids in a smaller routing area [5,6]. The area and delay performance are increased by using the 3 to 4 input LUT size shown by the authors in the paper. As a result, we'll examine a generic 4-input LUT-based logic block.

The main objective of the project work are as follows:

- To create a Configurable Logic Block (CLB) based on Reversible Fault Tolerant Gates (RFTG)
- Design of Reversible Fault Tolerant (RFT) D-latch, Master Slave Flip Flop and Multiplexer using our proposed gate, which aims for the shortest unit delay, the lowest quantum cost, and the smallest number of gates.
- A novel RFT multiplexer with a number of gates, unit latency, and lower quantum cost has been presented.
- The unit delay, quantum cost, garbage, and the number of gates is minimized by using the enhanced RFT LUT-based FPGA CLB.
- The CLB Models' performance evaluation is determined by using the FPGA technology with 90nm (Backend) logic.

The following is the structure of this paper, the previous understanding of FPGA and reversible logic design as well as a review of relevant research are shown in section 2. Section 3 shows an enhanced architecture of a RFT 4 to 1 multiplexer, master slave flip flop and D-latch. The simulation result and performance analysis are discussed in Section 4. Finally, the paper is concluded in the last Section.

2. Basic Definitions and Literature Survey

The terms quantum cost, LUT, unit delay, garbage output, reversible fault tolerant gate is defined in this section. In

[1]Research Scholar, Dept. of Electronics and Communication Engg., B.G.S Institute of Technology, Adichunchanagiri University, B.G. Nagara, [1]Assistant Professor, Rajeev Institute of Technology, Hassan.
ORCID ID : https://orcid.org/0009-0005-8405-5977
[2]Professor, Dept. of Electronics and Communication Engg., B.G.S Institute of Technology, Adichunchanagiri University, B.G. Nagara.
Email: naveenkb@bgsit.ac.in
* Corresponding Author Email: ravigowda1234@gmail.com

Seller Username	professionalproofreadservices
Seller Email Address	professionalproofreadservices@gmail.com
Seller GSTIN	27AABCY2815P1ZV

Purchase Details

Payment ID	MOJO4201V05A31756759
Buyer Name	Ravi L.S
Buyer Email Address	ravigowda1234@gmail.com
Buyer Phone Number	9738271329
Purchase Date	Feb. 1, 2024
Price	INR. 40000.00
Total Purchase Amount	INR. 40947.54

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About the Institution

Sri Adichunchanagiri Mahasamsthana Math, Karnataka is an ancient Religious Center, which has the history of 1800 years to its credit. With the Divine Blessings of His Holiness Jagadguru Bhairavaikya Padmabhushana Sri Sri Sri Dr. Balagangadharanatha Mahaswamiji, 71st Pontiff, and His Holiness Jagadguru Sri Sri Sri Dr. Nirmalanandanatha Mahaswamiji, the present Pontiff, set up more than 475 Educational Institutions with more than one lakh students strength across the State of Karnataka and other parts of the country, of which about 85 percent are established in rural areas.

BGS Institute of Technology was established by Sri Adichunchanagiri Shikshana Trust in the year 2005, sprawling over an area of 25 acres on Bengaluru - Mangalore National Highway (NH 75), B G Nagar. It provides an inspiring academic ambience amidst abundant greenery and serenity. It is affiliated to Adichunchanagiri University (from 2018) approved by All India Council for Technical Education, New Delhi, and recognized by Government of Karnataka. The Institution is located equidistant from Bengaluru, Mysuru, Mandya, Tumkur and Hassan with 90 kilometres. It is near to Sri Kshetra Adichunchanagiri within 10 kilometres distance.

About the Department

The Department of Electronics and Communication Engineering is well equipped with state-of-the-art laboratories and an enabled environment is created to conduct practical & projects in Digital Electronics, Analog Electronics, Digital Signal Processing, Microwave & Antenna, AI & ML, IOT, VLSI, Microcontroller, Embedded controller laboratories, etc. Various faculty programs, seminars, workshops, technical talks, Industrial Visits and FDP's are being regularly organized to improve the technical skill of both faculty and students. Received grants from various sectors & patents have been filed. Faculties and students have registered and organise events under various professional bodies. Department of ECE is offering the post-graduation course M.Tech in VLSI Design and Embedded Systems and Ph.D. in Electronics & Communication.

About the Conference

There has been rapid research and development in technologies related to Science and Technologies such as Electrical, Electronics, Communication, Computation and its allied areas during the past few years and the way they impacted human lives. The scope for further development is always ample and this conference would provide the opportunity to discuss the state of art research, contributions and to explore the avenues for future work which would help the society. This conference is aimed to bring researchers, practicing engineers, faculty members and students across the globe on a common platform to share their research ideas, innovative thinking's that would pave way for solutions to the various real time problems. Many eminent researchers from different countries are expected to participate and interact with the young students and budding researchers of various institutions who are expected to be a part of this conference.

Call for papers

Authors are solicited to contribute to the conference by submitting articles that illustrate research results, projects, surveying works and industrial experiences that describe significant advances in the following areas, but are not limited to, the following:

Track I : Electronics and Communication, Networks, Signal Processing, Power System Stability, Electrical Drives and Technology	Track II : Advances in Computer Science, Information Technology, Artificial Intelligence, IoT, Cloud Computing, Operating Systems
VLSI Design and Application Embedded System Design Antenna and Microwave Engineering [illegible]	Block Chain Cyber Security Artificial Intelligence and Machine Learning Networking Data Mining [illegible] Big Data Analytics Cloud Computing Deep Learning Natural Language Processing IoT and Industry 4.0 [illegible]

International Advisory Committee :
[illegible]

National Advisory Committee :
Prof. K. Byrappa, Pro Vice Chancellor, Adichunchanagiri University
[illegible]

Important Dates

Call for Papers	01-06-2023
Full Paper Submission	15-08-2023
Acceptance Notification	30-09-2023
Final Paper Submission	22-10-2023
Conference Date	23rd and 24th November 2023

Payment details :

Region	Category	Non IEEE Member	IEEE Member
Indian	UG/PG Students/ Research Scholars	6500 INR	5200 INR
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	Industry Persons	8000 INR	6400 INR
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2023 International Conference on Recent Advances in Science & Engineering Technology (ICRASET)

Digital System Design of ALU using Reversible Logic Gates

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***Abstract*— In the integrated circuit designs, the Area, Power dissipation and Time delay will play an important role. The Speed will rises with decreasing the size of a computing element and mean while heat dissipation will lowers with decreasing power dissipation. Future technologies for quantum computing will involve reversible logic, and reversible logic gates reduce leakage power usage. Reversible logic gates were used to design the arithmetic and logical unit (ALU) in this research work. Electronic unit such as ALU's are built upon conventional or irreversible logic gates. Due to the saturation of Moore's law, alternating ways are formed where new semiconductor materials and new methodologies have been implemented. One such way is to use reversible logic gates instead of irreversible logic gates. In this application of VLSI design, reversible logic has significantly emerged in power optimization technology. To validate functionality, each suggested design was analyzed and simulated using cadence virtuoso.**

Keywords*— *Reversible Logic, Garbage Outputs, ALU, Quantum Cost.

I. INTRODUCTION

The advancement of computer equipment has been extremely successful during the last decade. Conventional technologies, like MOS transistors, would reach new heights as transistor density increased exponentially, especially as power dissipation increased. To improve the processing capability of the present generation, many choices are necessary. Reversible logic is a technology, which results in low leakage power dissipation in CMOS circuits, low quantum technology and optical computing. Garbage outputs and quantum costs will be decrease in the reversible logic. Power dissipation is the major issue in the conventional logic. Landauer, created a computer device to handle the degrees of freedom that would operate as a heat sink for the energy needed for calculations, leading to mistakes in the calculations. Here, 1-Bit of information is lost will result in the dissipation of KT*ln2 amount joules of energy, where T is the temperature and K is defined as Boltzmann's constant. In the combinational circuits, information will lost due to more heat energy and hence once information is lost, it cannot recover back in the conventional logic. The power dissipation is directly related to number of bits lost in the digital circuit throughout the operation and thus it yields in circuit complexity [1].

Reversible logic circuits can be used to overcome the complexity in the digital circuits. It accelerates the precise computations and reduces the energy dissipation, if the circuits are logically reversible. The reversible logic is used in designing the logical circuits to reduce the power dissipation. The Arithmetic and logic unit outputs are designed from reversible logic.

II. DEFINETIONS ESSENTIAL RELATED TO REVERSIBLE LOGIC

A. Garbage Outputs

The number of inputs and outputs can be balanced by adding additional inputs or outputs as necessary to achieve reversibility in certain situations. The quantity of outputs needed to build a reversible n-input and k-output function is known as garbage [2]. The relationship between the quantity of garbage outputs and constant inputs is demonstrated by the straight forward formula below.

$$Input + Constant\ i/p = output + Garbage\ o/ \quad (1)$$

B. Quantum Costs

The quantum cost of the circuit is its cost expressed in terms of a basic gate.

C. Gate Level

This is a reference to how many circuit levels are necessary to carry out the specified logic functions.

D. Logic Complexity

This is the total amount of logic operations that make up a circuit is used to describe how many AND, OR, and EXOR operations there are overall in a circuit.

The following are the main limitations on reversible logic circuit design.

- Fan-outs are not permitted with reversible logic gates.
- Reversible logic circuits ought to be as inexpensive as possible.
- The design may be optimized to yield the fewest number of trash outputs.
- For reversible logic circuits, a single constant input is the minimum quantity needed.

III. REVERSIBLE LOGIC

Equal numbers of input and output lines with one-to-one correspondence between the input and output lines are defined as reversible logic gates. Here the output is defined by inputs and in the same way inputs can also retrieve from the outputs, hence this logic is said to be reversible and all reversible logic gates have equal number of input lines in the circuit and output lines [3] in the

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Study on VGG16 Transfer learning Model for Goat/Sheep Image Classification

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***Abstract*- The utilization of deep learning and transfer learning methodologies in the realm of image classification has resulted in notable progress across diverse domains. This research paper presents an analysis of the performance of VGG16 model when incorporating transfer learning techniques in conjunction with various regularization techniques for the purpose of image classification of goat and sheep images. By employing the technique of transfer learning, we have successfully fine-tuned the VGG16 models on a dataset comprising six distinct classes of goats and sheep. This process has enabled the models to adapt their pre-existing features, which were initially trained on a different task, to the specific requirements of our target task. Performance metrics such as accuracy, precision, and recall rate are employed in the evaluation of a model's capabilities. Although each strategy had its own distinct advantages, the strategies that consistently yielded balanced precision, recall, F1-scores, and accuracy were a dropout rate of 0.5 and L2 regularization. Whereas L2 Regularization outperformed the other models with a testing accuracy of 0.839.**

Keywords*— *VGG16 mode, Transfer learning, Regularization Techniques, CNN, Sheep Classification, Goat Classification.

I. INTRODUCTION

The increasing pace of technological advancements in recent times has led to a substantial surge in the need for proficient methods of image classification and recognition. Convolutional Neural Networks (CNNs) have been identified as a prominent and effective approach for addressing the challenges associated with image data classification tasks. The domain of deep learning, which is a crucial component of artificial intelligence applications, is experiencing a growing significance owing to its diverse capabilities across various domains, including but not limited to optical character recognition and facial recognition. The field of computer vision has witnessed remarkable advancements, particularly in the domain of image classification, thanks to the remarkable achievements of deep learning. As a consequence, the interest and enthusiasm surrounding deep learning have been steadily increasing. Deep learning has found a wide range of applications, and one area where Convolutional Neural Networks (CNNs) have particularly excelled is image classification. CNNs have consistently shown remarkable performance in accurately categorizing images. Convolutional neural networks (CNNs) are a type of artificial neural network that has gained significant attention in the field of computer vision. These networks are specifically designed to process and analyze visual data, such as images. One of the key characteristics of CNNs is their layered structure, where each layer consists of interconnected neurons. These neurons are equipped with adjustable biases and weights, which allow them to learn and extract meaningful features from the input images. This ability to automatically extract relevant features has made CNNs highly effective in various image-related tasks, such as object recognition, image classification, and image segmentation. Overall, CNNs have proven to be a powerful tool for feature extraction in the domain of computer vision[1][2].

The research conducted in the study [3] utilizes state-of-the-art deep learning algorithms and computer vision methodologies to accurately categorize various dog breeds based on images. The study explores the effectiveness of hybrid models, specifically the combination of Inception-v3 and Xception, as well as EfficientNetV2M, NASNetMobile, Inception, and Xception. Among these hybrid models, Inception-v3 and Xception achieve the highest accuracy rate of 92.4%. This hybrid model demonstrates superior performance compared to standalone approaches and surpasses existing models in terms of accuracy. The aforementioned findings serve to emphasize the efficacy of hybrid architectures in achieving precise identification of dog breeds. The study [4] utilizes VGG16 convolutional neural network to facilitate the identification of field weeds. This is achieved through the implementation of transfer learning techniques. The adaptable architecture of the VGG16 model allows for the flexibility to modify and fine-tune it to suit different datasets. The present study involves the utilization of a computational model on a dataset obtained from a Kaggle competition. This dataset comprises a total of 3,500 images depicting various types of weeds, which have been classified into 12 distinct categories. By making the first 14 layers of the model a fixed part and then adding more layers for feature extraction, pooling, convolution, dropout, and classification, a full 19-layer model can be made. The obtained results exhibit a notable level of performance, with a training accuracy of 98.99% and a verification accuracy of 91.08%. These outcomes highlight the system's capability to accurately identify crop weeds and its potential to enhance agricultural practices through improved precision and refinement. The present study [5] focuses on the complex task of employing image analysis techniques to classify Arabian camel breeds. This classification process holds immense significance in various domains such as breeding management, genetics,

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Gray Level Image Contrast Enhancement Using Hybrid BAT and Moth Flame Optimization

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***Abstract*— This study presents a novel hybrid method that optimizes contrast stretching parameters for image enhancement by combining the Bat algorithm (BA) and Moth Flame Optimization (MFO). The method described in this study leverages the exploratory capabilities of the BA and the exploitation strengths of MFO in order to achieve an optimal balance between exploration and exploitation. The BA employs echolocation-inspired movements and randomization factors to explore the search space, while the MFO exploits locally optimal solutions guided by light sources. By integrating BA and MFO, the algorithm achieves a balance between exploration and exploitation, leading to improved solution quality and faster convergence. The algorithm iteratively moves the bats and moths, applies contrast stretching using updated positions, and evaluates the fitness value. The best solutions are identified and stored throughout the iterations. The algorithm extracts the optimal contrast stretching parameters from the best solution and applies them to enhance the input image. The experimental results demonstrate the algorithm's effectiveness in improving image quality by 7.5 % and 24.2% with respect to BA and MFO. Thus the proposed hybrid algorithm offers a promising approach for image enhancement for various applications.**

Keywords*— *BAT Algorithm, Moth Flame Optimization,

I. INTRODUCTION

The process of image enhancement holds considerable significance across various academic areas, such as medical imaging, surveillance, and digital photography. The basic aim of image enhancement is to augment the visual characteristics of images, encompassing contrast, brightness, and sharpness, with the idea of enhancing their overall quality and interpretability. Among the various techniques used for image enhancement, contrast stretching stands out as a widely employed approach. Contrast stretching expands the dynamic range of pixel intensities, effectively improving the overall contrast and revealing more details in the image.

The effectiveness of contrast enhancement heavily relies on the selection of appropriate parameter values. These parameters directly impact the degree and nature of enhancement applied to the image. One such parameter is the stretch factor, which determines the amount of expansion in the intensity range. A higher stretch factor leads to a more significant enhancement, resulting in a wider range of pixel intensities. However, an excessively high stretch factor may lead to the loss of details and introduce artifacts or noise into the image.

Another crucial parameter is the shift factor, which controls the shifting of pixel intensities after stretching. This factor determines the mapping of the original intensity values to the enhanced range. By adjusting the shift factor, it is possible to enhance specific intensity regions while preserving the overall tonal balance. A careful selection of the shift factor is essential to avoid over-amplification of noise or distortion of the image [1] [2].

The Genetic Algorithm (GA) for enhancing image contrast is introduced in [3]. The present study utilizes a genetic algorithm (GA) in order to find the most optimal mapping of gray levels in input images to novel gray levels. The objective of this mapping is to increase the contrast in the image, therefore enhancing the dynamic range and ultimately enhancing the quality of the image. The application of particle swarm optimization (PSO) for image enhancement has been proposed in the study cited as [4]. The PSO method is a search strategy that utilizes a multi-agent framework, taking inspiration from the social behaviour found in fish schooling and bird flocking. The algorithm utilizes a transformation function that considers both the local and global information present in the input images. The research work outlined in reference [5] proposes the Artificial Bee Colony (ABC) algorithm as a technique for image enhancement. The optimization problem pertaining to the enhancement of image contrast is conceptualized as a foraging operation carried out by a collective of bees. The Cuckoo Search (CS) technique, which is utilized for enhancing image contrast, has been explored in reference [6]. The CS algorithm is based on the reproductive technique exhibited by the cuckoo bird, which is known for its parasitic breeding behaviour. In this study, CS is utilized within the framework of optimizing the fitness function. In the study [7], a novel methodology referred to as HWOA is introduced, which integrates the Whale Optimization Algorithm (WOA) with the Chameleon Swarm Algorithm (CSA). The primary aim of the HWOA is to efficiently determine the most suitable parameters of the incomplete beta function for the task of enhancing image contrast. Following this, the utilization of bilateral gamma correction (BGC) is implemented in order to improve the contrast and brightness, preserving the accuracy of edge details. The present study, as conducted by [8], aimed to perform a comparative analysis on three distinct algorithms, including the BA, the CSA, and the interior search algorithm, in order to evaluate their effectiveness in enhancing contrast. The

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Date: 15/5/24

From

REKHA M G
Assistant professor
E&C department
RIT, Hassan

To

The principal
RIT, Hassan

Through

HOD, E&C dept.,
RIT, Hassan

Sub: Request for financial assistance

Respected Sir,

I have attended FDP on "Introduction to Internet of things", NPTEL course, and qualified the exam with a score of 86% on 10/5/24. The details of the FDP are attached with this form. Kindly Sanction the financial assistance for the same.

Thanking you,

Yours Sincerely

Rekha M.G

Forwarded to the principal:

Mrs. Rekha has completed a SWAYAM/NPTEL course on Jan-Apr 2024 slot. The certificate and fee paid is attached.

15/05/2024

Principal
Rajeev Institute of Technology
Hassan-573 201

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P.T.O.

Forwarded to Hon'ble President

As per the employee handbook, the faculty is eligible for 50% of the registration fee (Rs 1125/-)

15/5/2024

Approved

Principal
Rajeev Institute of Technology
Hassan-573 201

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04.06.2024 15:58
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Elite

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

REKHA M G

for successfully completing the course

Introduction to Internet of Things

with a consolidated score of **86** %

Online Assignments	24.56/25	Proctored Exam	61.5/75

Total number of candidates certified in this course:**32882**

Jan-Apr 2024

(12 week course)

Prof. Haimanti Banerji
Coordinator, NPTEL
IIT Kharagpur

Indian Institute of Technology Kharagpur

swayam

Roll No: NPTEL24CS35S557100033 To verify the certificate No. of credits recommended: 3 or 4

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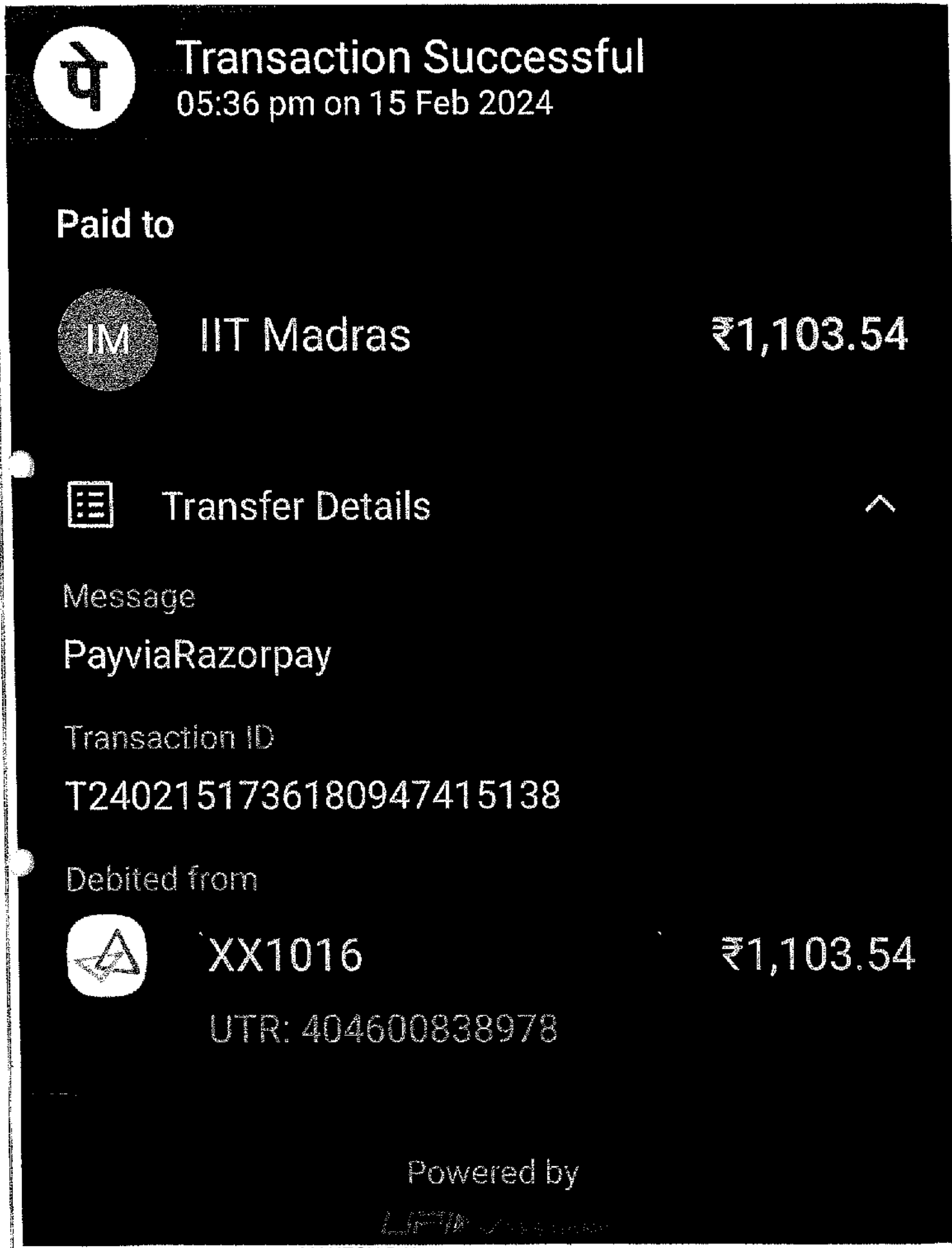

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Principal

To,
The Principal,
Rajeev Institute of Technology,
Hassan.

Date: 22/12/2024
Place: Hassan

Through,
HOD,
Department of Mechanical Engineering,
Rajeev Institute of Technology,
Hassan.

From,
Mr. Dharanesh OH,
Assistant Professor,
Department of Mechanical Engineering,
Rajeev Institute of Technology,
Hassan.

Respected Sir,

Subject: NITTT Exams fee reimbursement Reg.

Pertaining to the above subject, as per the circular, dated: 05/01/2022, I have applied NITTT exams for 1 module and cleared the exams conducted on 16/09/2023. I have attached the results sheet along with this letter for your kind perusal. Kindly consider my request for fee reimbursement and do the needful.

Thanking You,

Yours Faithfully,

Mr. Dharanesh OH

Forwarded for kind consideration

To,
The Hon'ble President
Incentive for clearing NITTT Exam is Rs 500. I request your approval to release the incentive.

15/4/2024

Approved

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Rajeev Institute of Technology
Hassan-573 201

MAHESH P K
04.06.2024 15:58
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Ministry of Education

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SCORE CARD

Roll Number	2023071438	Registration ID	20232124470	
Candidate's Name	DHARANESH G H	Father's Name	Huchegowda GR	
Gender	Male	Date of Birth	1-Apr-1991	
Person with Disability (PWD)	No			

Module	Module Name	Exam Date	Maximum Marks	Marks Obtained
Module 1	Orientation Towards Technical Education and Curriculum Aspects	16-September-2023	100	50
Module 2	Professional Ethics & Sustainability	16-September-2023	100	NA
Module 3	Communication Skills, Modes & Knowledge Dissemination	17-September-2023	100	NA
Module 4	Instructional Planning and Delivery	17-September-2023	100	NA
Module 5	Technology Enabled Learning & Life Long Self Learning	21-September-2023	100	NA
Module 6	Student Assessment and Evaluation	21-September-2023	100	NA
Module 7	Creative Problem Solving, Innovation and Meaningful R & D	22-September-2023	100	NA
Module 8	Institutional Management & Administrative Procedures	22-September-2023	100	NA

Result Date: 30-10-2023

Senior Director

INSTRUCTIONS:

1. This Score Card is issued in accordance with the provisions of the National Initiative for Technical Teachers Training (for Inductee Teacher) (NITTT) Scheme 2020 of AICTE
2. Particulars of candidates have been indicated in the Score Card as mentioned by him/her in the online application form. NTA disclaims any liability that may arise to a candidate due to incorrect information provided by him/her in his/her online application form.

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3. The Score Card is provisional subject to compliance with the eligibility requirements laid down.

4. The Score indicated above relates to the written exam conducted by National Testing Agency (NTA) in the Internet Based Test mode (remote proctored) in September 2023 under the NITTT Scheme of AICTE for Inductee Teachers.

5. Final Score, after combining the marks obtained in the written exam conducted by NTA and the marks obtained in the Continuous Assessment, will be prepared by NITTTR, the Co-ordinating Institute for the NITTT Scheme as per its policy, and displayed on their website https://nitttrc.ac.in

6. Detection of instances of incorrect information and process violation by a candidate at any stage will lead to disqualification of the candidate. NITTT Score of such candidates who are disqualified will become null and void.

7. Role of NTA is limited to issue of admit cards, conduct of exam, process and declare results of the written exam conducted by it.

8. Candidates are advised to contact NITTTR-C for queries regarding issue of the Final Score Card/ Course Completion Certificate.

NITTT Website: http://nittt.nta.ac.in/

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0	4	0	4	2	0	2	4
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Department of Mechanical Engineering

To,
The Principal
RIT, Hassan

Date: 20/10/2023
Place: Hassan

Through,
H.O.D
Department of Mechanical Engineering.
RIT, Hassan.

From,
Dr. Kuldeep B
Department of Mechanical Engineering.
RIT, Hassan

Respected sir,

Subject: Incentive for Research Articles, Reg.

As mentioned in the above subject, I have published Four research papers in this academic year. I have attached the proof of publication for your kind perusal. So kindly consider and do the needful.

1. H R Anand, Govardhan Goud, & Kuldeep B. "Investigation of Physical, Di-electric and hydrophobicity properties of Roystonea Regia/Banana fibre polyester composites in both Alkali treated and untreated conditions." *Engineering Research Express* , Vol-5, 7 September 2023. https://doi.org/10.1088/2631-8695/acf54b. [**SNIP: 0.578**].
2. Kuldeep Basavarajappa; Mallesh Jakanur; Mohammed Faheem; Maughal Ahmed Ali Baig; K. Srinivas Rao. "Evaluation of properties of Zirconium dioxide reinforced AA7075 composites fabricated via stir casting". AIP Conference Proceedings. *AIP Conf. Proc.* 2477, 030076 (2023) https://doi.org/10.1063/5.0125476. [**SNIP: 0.247**].
3. Kuldeep B, Ravikumar K.P, Pradeep S, Gopi K.R., Amriya Tasneem H.R., Manu S.S. "Investigation on the dynamic behaviour and corrosion characteristics of hexagonal boron nitride (h-BN) and zirconium dioxide (ZrO2) reinforced Al7075 composite" Journal of Alloys and Metallurgical Systems, Volume 1, March 2023, 100004. https://doi.org/10.1016/j.jalmes.2023.100004. [**SNIP: 0**].
4. B. Kuldeep , K.P. Ravikumar, B.S. Guruprasad, H.R. Amriya Tasneem, H.S. Ashrith, Nudi Shree, Muhammad Mahmood Ali, Muhammad Nasir Bashir, Tansir Ahamad. "A Novel Composite Connecting Rod: Study on Mechanical and Dynamic Behaviour Through Experimental and Finite Element Approach" Composites Part C: Open Access. Available online 18 October 2023, 100413, https://doi.org/10.1016/j.jcomc.2023.100413. [**SNIP: 1.489**].

Thanking you

Forwarding for kind consideration

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Yours faithfully,
20/10/23
[Dr. Kuldeep B]

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P.T.O

To,

Hon'ble President

The articles are published in reputed Journals and the details are enclosed. As per the incentive policy, the author is eligible for an incentive of Rs 3,558 on prorata basis.

Article 1 – Rs 1667

Article 2 – Rs 1000

Article 4 – Rs 889

Dulv
27/10/2023

Incentive of Rs 3558 may be cleared to the above authors.

RL
15/11/2023

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View metrics for year: 2022

	Source title	Documents 2019-22	% Cited	SNIP	SJR	Publisher
1	Composites Part C: Open Access *Open Access*	310	79	1.489	0.699	Elsevier
2	Engineering Research Express	703	54	0.578	0.275	Institute of Physics Publishing
3	AIP Conference Proceedings	43,416	30	0.247	0.164	

All

View metrics for year: 2022

	Source title	CiteScore	Highest percentile	Citations 2019-22	Documents 2019-22	% Cited
1	Composites Part C: Open Access *Open Access*	4.7	72% 175/631 Mechanical Engineering	1,453	310	79
2	Engineering Research Express	1.9	47% 158/302 General Engineering	1,323	703	54
3	AIP Conference Proceedings	0.7	15% 203/240 General Physics and Astronomy	31,947	43,416	30

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