



Dr. Sahebrao B. Bagal
M.E. (E & TC), Ph.D. (E & TC)
Principal

Kalyanii Charitable Trust's

LATE G. N. SAPKAL COLLEGE OF ENGINEERING

(Accredited with Grade 'B' by NAAC)

- Affiliated to > Savitribai Phule Pune University (ID. No. PU/NA/Engg./152/2009 Ref.No.-CA/6501 Dated- 18/11/2009)
Approved by > A.I.C.T.E., New Delhi (F.N: 06/07/MS-Engg/2008/O-17, Dated- 11th June 2009)
> Govt. of Maharashtra (No. GEC-2009/(67/09)/T.E.- 4, Dated- 15th June 2009)
> D.T.E., M.S., Mumbai (No.2/NGC/Engg./Approval/2009/535, Dated - 23rd July 2009)
> AISHE CODE : C-42196



Dr. Ravindra G. Sapkal
Chairman & Managing Director
Kalyanii Charitable Trust

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding ("MoU") is made on 25 NOV, 2022.

Between

Kalyani Charitable Trust'S, Late Gambhirrao Natuba Sapkal College of Engineering, (LGNSCOE) Anjaneri, Trimbakeshwar Road, Nashik.

and

Loknete Gopinathji Munde Institute of Engineering Education & Research (LoGMIEER), Dist. Nashik, a College of Engineering registered under AICTE and Affiliated to PUNE University, Nashik, Maharashtra.

(LGNSCOE and LoGMIEER are hereinafter individually referred to as "Party" and collectively referred to as "Parties")

Terms and Conditions:

1. Duration

This MoU shall be valid for Five (5) years from 25 NOV 2022 and thereafter it may be renewed on mutually agreed terms.

2. Purpose

This MOU is for collaboration between the parties for mutual benefit where LGNSCOE and LoGMIEER to provide

1. Available facilities for faculties and students.
2. To establish a partnership for academic excellence through faculty and student exchange and joint research activities.

3. Late Gambhirrao Natuba Sapkal College of Engineering Standard of Performance:

LGNSCOE shall expend reasonable efforts as follows:

- LGNSCOE shall provide training / expert talks etc., lab visit permissions in such areas as may be mutually agreed between the parties, more particularly described in this agreement.
- LGNSCOE shall provide experts for the conduct of training at the LGNSCOE campus and or at the LoGMIEER premises.
- LGNSCOE shall provide College/students with the study material as agreed between the parties and the LoGMIEER shall use these as per LGNSCOE guidelines and policies.

- **CAMPUS :** Sapkal Knowledge Hub, Kalyanii Hills, Anjaneri-Wadholi, Trimbakeshwar Road, Nashik - 422 213. (India)
Tel.: + 91- 2594 - 220168/69/70 | Mob.: +91 9922252699 | Toll Free No.: 1800 233 2999 | **E-mail :** gns_engineering@sapkalknowledgehub.org
- **CORPORATE OFFICE :** Sapkal Knowledge Hub, 'Parag' 46, Ashwin Sector, Opp. Hotel Sai Palace, Mumbai-Agra Highway, Nashik - 422 009.
Tel.: +91 - 253 - 2392450 / 51 | **E-mail :** head.marketing@sapkalknowledgehub.org | **Website :** www.sapkalknowledgehub.org
- **MUMBAI OFFICE :** Sapkal Knowledge Hub, Unit No. 22, 1st Floor, Shubhada Tower Shopping Centre, Sir Pochkhanwala Road, Near R.T.O. Office, Worli, Mumbai - 400 030. Tel.: + 91 - 22 - 24938914 / 15 | **E-mail :** cmd@sapkalknowledgehub.org, ravi.sapkal@gmail.com

- LGNSCOE shall provide certificates/completion letter to all students who have successfully completed the training, projects conducted at LGNSCOE or at the LoGMIEER premises.

4. LoGMIEER's Standards of Performance:

LoGMIEER shall expend reasonable efforts as follows:

- LoGMIEER shall provide necessary infrastructure like Computers with necessary legal software & hardware configuration, Labs, Class rooms, Electricity, UPS, and Internet etc. as may be required for carrying out technical training, Project work and such other agreed training at College premises.
- LoGMIEER shall share the data base of the students with LGNSCOE for the adequate promotion of the training and or recruitments.
- LoGMIEER shall provide all such marketing and publication support as may be required to ensure sufficient number of students for the training, recruitment to be conducted at the LGNSCOE premises or LoGMIEER premises.
- LoGMIEER and LGNSCOE shall extend all such necessary co-operation for smooth conduct of above mentioned activities and training.

5. Mutual Obligations:

- Both the parties shall appoint one person as one point of contact for smooth execution of the MOU.
- This collaboration shall not be exclusive to both parties and shall not disallow each party from having similar collaboration with others. Except as expressly stated in this MOU, there shall be no obligation on any party to compensate the other in any manner or to make any claim.
- Each party shall respect the other's intellectual property.
- Nothing contained in this MoU shall be construed as resulting in the creation of a relationship of both the Principal's between LGNSCOE and LoGMIEER. LGNSCOE and LoGMIEER are not authorized to make any representation, contract, or commitment on behalf of LoGMIEER / LGNSCOE without the prior written consent of other party.
- The decision regarding introduction of new course, revision in fees etc. shall be mutually taken by both the parties.

6. Limitation and Warranties:

- Each party shall ensure that the other is not put to any liability for any act of the respective party under this MoU.
- Each party represents that they have full power and authority to enter into this MOU in general.

7. Commercial:

- LGNSCOE & LOGMIEER will design programs on mutual understanding and decide fees if any to be charged to the students.
- The training, Lab visit shall be conducted at the LGNSCOE facility in a time bound manner as per availability and schedule of both parties.

8. General:

- Both the parties may receive information proprietary to other party (the "Confidential Information") in the course of performance of their obligations under this MoU. Confidential Information is not meant to include any information which (a) is publicly available (b) is rightfully received by the parties from third parties without accompanying secrecy obligations; (c) is already in either party's possession and was lawfully received from sources other than the parties or (d) is independently developed by the parties. The two bodies understand and acknowledge that the Confidential Information is valuable and confidential and agrees that it will at all times be kept in trust, to be disclosed only to such persons as have a "need to know" the same for the effective implementation of this MOU and that it will only be used by the parties for the benefit of others.
- Both the parties understand and agree that all written or other tangible data and documentation developed or procured by the other party in performing its obligations under this MoU, whether in printed or electronic form, belongs to other party.
- Both parties shall not use the name and brand of the other party in any advertisement or make any public announcement without the prior written approval of the other.
- Both parties have the right to accept and implement the syllabus/curriculum as per the advice of the statutory bodies.
- Each party shall be at liberty to terminate this MoU with a written notice period of one (1) month to the other party without any compensation.
- Any and all disputes or differences between LGNSCOE and LoGMIEER arising out of or in connection with this MoU or its performance shall, so far as it is possible, be settled by negotiations between the Parties amicably through consultation & understanding.

• Indemnification :

Both the parties shall indemnify and hold each other harmless from and against any claim, loss, liability, or expense, including, but not limited to, damages, patent and trademark infringement, costs.

- **Copyrights and Ownerships:**


- All the course material/ courseware/ books and such other training material provided by LGNSCOE and allowed for distribution are its sole property (hereinafter referred as "Training Material").
- LOGMIEER and/ or its faculty's, students etc. shall not claim ownership of such course material/ courseware/ books etc. or its customization.
- Intellectual Property Rights i.e. copyrights, trademarks, patents etc. of Training Material, any changes, enhancements, upgrades, customization etc. shall always remain with LGNSCOE.
- Any changes in implementation procedures which are not as per the present MoU will be discussed and will be incorporated in agreement with two parties.

In witness whereof, both parties put their hard seal on the day, month and year herein mentioned.

IN WITNESS WHEREOF, to show their assent, the duly authorized representative of the parties here to have signed the Agreement and set their seals as below:-

Signed for and on behalf of for

**KCT's Late Gambhirrao Natuba Sapkal
College of Engineering, Anjaneri, Nashik.**


**Prof. (Dr.) S. B. Bagal
Principal**

**Prof. (Dr.) Sahebrao B. Bagal
Principal**

Late G. N. Sapkal College of Engineering
Anjaneri, Nashik-422 213.



Signed for and on behalf of for

**KVN's Loknete Gopinathji Munde
Institute of Engineering Education &
Research, Dist. Nashik.**


Prof. (Dr.) K. V. Chandratre

PRINCIPAL

LOKNETE GOPINATHJI MUNDE
Institute of Engineering Education & Research
Canada Corner, Nashik-422 002




Witness :

1] **Late Gambhirrao Natuba Sapkal College of Engineering,
Anjaneri, Nashik.**

2] **Loknete Gopinathji Munde Institute of Engineering
Education & Research, Dist. Nashik.**

Sign







Application Details

APPLICATION NUMBER	202541032678
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	02/04/2025
APPLICANT NAME	1 . Dr. Rahul R. Chakule Associate Professor Dept.of Mech 2 . Dr. Dipak S. Patil Assistant Professor Dept.of Mech 3 . Dr. Kailas V. Chandratre Principal 4 . Prof. Trinkle Y. Saindane Workshop Superintendent Dept.of Mech 5 . Prof. Poonam S. Talmale Assistant Professor Dept.of Mech
TITLE OF INVENTION	Method and Apparatus for Optimizing Mechanical Component Design Using Topology Optimization and 3D Printing
FIELD OF INVENTION	MECHANICAL ENGINEERING
E-MAIL (As Per Record)	ipoindiaoffice@gmail.com
ADDITIONAL-EMAIL (As Per Record)	
E-MAIL (UPDATED Online)	
PRIORITY DATE	
REQUEST FOR EXAMINATION DATE	--
PUBLICATION DATE (U/S 11A)	02/05/2025



ORIGINAL RESEARCH ARTICLE

Experimental Investigation of CuO Nanofluid Minimum Quantity Lubrication Grinding Process

Rahul Chakule, Sharad Chaudhari, Kailas Chandratre, and Poonam Talmale

Submitted: 5 July 2024 / Revised: 8 February 2025 / Accepted: 19 April 2025

The lubricating and cooling performance is important role in the reduction of high temperature in the cutting zone. The nanofluid significantly improves the heat transfer capacity and lubricating performance of the base fluid. In the present work, the lubricating and grinding performance of water-based copper oxide (CuO) nanofluid under minimum quantity lubrication (MQL) for AISI D3 material grinding was evaluated under different conditions of lubrication. The macro- and micro-evaluation parameters were considered for finding the lubricating performance of nanofluid at the wheel/workpiece contact interface. The experimental finding shows improvement of surface grinding process by CuO nanofluid using 0.2 volume% concentrations under MQL. The coefficient of friction is reduced by 29.94%, tangential force by 22.22%, temperature at the wheel/workpiece contact interface by 17.42%, surface roughness by 15.69%, and specific energy by 23.41% compared to MQL grinding. The scanning electron microscope images of debris and workpiece surfaces confirmed the lubricating effect of nanofluid and the efficiency of the nanofluid MQL process. Moreover, nanofluid MQL serves the purpose of environment-friendly machining and to produce economical quality production using small quantity of nanofluid.

Keywords CuO nanofluid, grinding, lubricating performance, nanofluid MQL

1. Introduction

The tribological performance of the cutting fluid is important to confirm the efficiency and effectiveness of the cutting fluid system. In machining, the friction and wear problem is reduced significantly by coolant. However, the consumption of coolant is huge in conventional machining, specially grinding process that gives unhealthy working environment and costly production. The suggested lubrication techniques, like minimum quantity lubrication (MQL) and nanofluid MQL, are better alternatives for industries to produce quality production economically. Recently, nanofluid MQL and hybrid nanofluid MQL lubricating techniques have been widely used, and researchers are focusing on these techniques for different machining processes and materials to achieve eco-friendly, sustainable production (Ref 1).

The tribological study shows the improvement of the thermal performance of the base fluid by mixing different nanoparticles. The heat transfer and tribological results of base fluid depend on the morphology of nanoparticles and the

mechanism for nanofluid preparation. The parameters related to nanoparticle and nanofluid preparation, such as nanoparticle type and quantity, surfactants, shape and size, temperature, sonication time, and pH value, need to be focused on in order to enhance the thermal conductivity of nanofluid. The different techniques of synthesizing the nanofluid are explained (Ref 2, 3). The improvement of thermal conductivity by 22% using water-based titanium oxide (TiO_2) nanofluid is obtained when nanoparticles of size 5 nm are added to the base fluid (Ref 4). The deterioration of the natural convection heat transfer coefficient of water-based aluminum oxide (Al_2O_3) nanofluid with increased volume fractions is investigated (Ref 5). The effect of viscosity on Brownian motion showed that the effectiveness of Brownian motion which decreases with an increase in fluid viscosity is discussed (Ref 6). The importance of nanoparticles and nanofluid parameters such as size, type of base fluid, concentration, and surfactants, on the stability and thermal properties of nanofluid, is summarized. The study also focused on techniques of mono- and hybrid nanofluid preparation, characterization, and thermal properties (Ref 7). The thermal conductivity ratio enhanced by 19.74% and 36.21% using Al_2O_3 and CuO nanofluids with 1 volume percent (vol.%) concentration, whereas absolute viscosity ratio found increased by 29.77% and 48.71%, respectively (Ref 8). The unique feature of nanofluid, namely the improvement of thermal conductivity, heat transfer, surface volume ratio, and Brownian motion, is reviewed (Ref 9). The applications of nanofluid and the importance of parameters such as nanoparticle size, concentration, lubrication system, nozzle position, and air pressure for improving machining results are reviewed (Ref 10). The effect of nanofluid-related parameters such as ultrasonication time, pH values, and concentration on the suspension stability of Al_2O_3 nanofluid is explained when mixing 0.5 weight percent (wt.%) concentration. The findings show better suspension stability when the ultrasonication time

Rahul Chakule and Kailas Chandratre, Department of Mechanical Engineering, Loknete Gopinathji Munde Institute of Engineering Education & Research, Nashik 422005, India; Sharad Chaudhari, Department of Mechanical Engineering, Yashwantrao Chavan College of Engineering, Nagpur 441110, India; and Poonam Talmale, Department of Mechanical Engineering, Late G. N. Sapkal College of Engineering, Nashik 422005, India. Contact e-mail: r_chakule@rediffmail.com.



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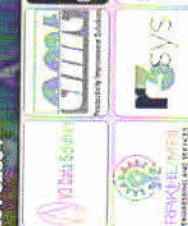
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This is to certify that

Mr./Ms. Mairkar Pooja Nilash from Z. & N Sapkal COE
Nashik has participated / worked as Volunteer in Mechanical Project Competition

State level competition during "**LOGMIER Techfest 2k25**" organized by Loknete Gopinathji Munde

Institute of Engineering Education and Research on 1st March, 2025.


Prof. H. P. Bhamburda
(Event Co-ordinator)


Prof. T. V. Saindane
(Event Co-ordinator)


Dr. K. V. Chandratre
Principal



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This is to certify that

Mr./Ms. Atan Fashan Katik from Z. G. N. Sapkal COE

Nashik has participated / worked as volunteer in Mechanical Project Competition

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Institute of Engineering Education and Research on 1st March, 2025.

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(Event Co-ordinator)

Prof. T. V. Saindane
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(Degree, Diploma Engineering & MBA)

Krantiveer Vasanttrao Naik Marg, Canada Corner, Sharanpur Road, Nashik.

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Mr./Ms. Patel Md. Gaus Jameer from Sapkal COE, Nashik

has participated / worked as Volunteer in Mechanical Project Competition

State level competition during "LOGMIEER Techfest 2K25" organized by Loknete Gopinathji Munde

Institute of Engineering Education and Research on 1st March, 2025.


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Prof. T. V. Sandane
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This is to certify that

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Prof. H. P. Bhadbad
(Event Co-ordinator)

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Mr./Ms. Attar Farhan Rafik from Sopkal COE, Nashik


has been awarded as Winner/Runner-up in Assembly - Disassembly
(Mechanical Event)

State level competition during "LOGMIEER Techfest 2K25" organized by Loknete Gopinathji Munde

Institute of Engineering Education and Research on 1st March, 2025.


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(Event Co-ordinator)


Prof. T. V. Sandane
(Event Co-ordinator)


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