

Proceedings of the 2nd International Conference on Modern Trends in Engineering Technology and Management

Editors:

- Divya G.
- Lekshmi Priya R.
- Chaithra S.
- Abey Vishnu Narayana

ICMEM 2023

Organized by
Sree Narayana Institute of Technology
Adoor-691554, Kerala, India

4-6 May, 2023

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Divya G.
Lekshmi Priya R.
Chaithra S.
Abey Vishnu Narayana
(Editors)

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ICMEM 2023 (4-6 May 2023)

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Proceedings of the 2nd International Conference on Modern Trends in Engineering Technology and Management
ICMEM 2023 (4-6 May 2023)

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ICMEM 2023

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Foreword

It is a great honor for us to present the proceedings of ICMEM 2023 to the authors and delegates of the event. We hope you find it useful, valuable, aspiring, and inspiring. Proceedings involve the formal activities carried out during conferences, seminars, meetings, or assemblies. They include presentations, discussions, debates, voting, and decision-making processes to achieve specific objectives or reach a consensus on certain matters.

ICMEM 2023 aimed to provide a forum for the exchange of ideas, issues, challenges, discoveries, opportunities, and applications of Modern Trends in Engineering Technology and Management. The ever-changing scope and rapid development of science and technology generate new problems, questions, and curiosity, necessitating the exchange of brilliant ideas and raising awareness of this vital research field in a variety of directions. We promise to create a colorful picture and a charming landscape for Engineering Technology and Management. Our expectations were far exceeded by the outpouring of enthusiastic support. As a result, as we approach the end of this journey, we are filled with a sense of accomplishment and aspiration.

We are grateful to the Chairman, Academic Advisors, and Technical Advisors for their assistance in making the conference a success. We would like to express our appreciation to the eminent guest speakers whose valuable ideas elevated the conference to a higher level, making it meaningful and a huge success. We would also like to express our gratitude and appreciation to all of the reviewers who assisted us in maintaining high-quality manuscripts for the proceedings, which are published by ICMEM 2023 SNIT Adoor. We are hopeful that the proceedings of ICMEM 2023 will be widely distributed and cross-referenced. We also appreciate the authors of ICMEM 2023's efforts. We do our best to increase the popularity of their papers and wish them the best of luck in their future endeavors. We would also like to thank the members of the organizing members for their efforts.

Ms. Lekshmi Priya R.
(Editor)

About the Conference

The Second ICMEM 2023 is an International Conference on Modern Trends in Engineering Technology and Management organized by the Department of Civil Engineering, Electrical and Electronics Engineering, Electronics and Communication Engineering, Mechanical Engineering, Mechanical Automobile Engineering, and Business Administration, of SNIT Adoor. ICMEM 2023 was conducted on 4th, 5th, and 6th of May 2023. The conference focuses on Modern Trends in Engineering Technology and Management. This conference provides opportunities for industrialists, research scholars, students, and teachers to exchange modern trends, innovative solutions, research ideas, and applications through keynotes, paper presentations, and discussions.

TRACK 1 – CIVIL ENGINEERING	
<ul style="list-style-type: none"> • Advanced Technology of Engineering Structures. • Construction Safety & Fire Engineering. • Construction Management • Innovative Structural Designs • Renewable Energy Technologies • Modern Construction Materials • Retrofitting/ Rehabilitation of Structure • Earthquake Resistant Design Practices • Environmental Engineering & Management • Foundations in Problematic Soils • Behaviour of Structures. 	<ul style="list-style-type: none"> • Water Resources Management • Special concrete • Sustainable Development & Construction • Transportation Engineering & Traffic Planning • Energy Conservation Systems • Green Building • Solid Waste Management • Bridge Engineering • Optimization Techniques • Climate Change Aspects • GIS & Remote Sensing • Ground Improvement Techniques
TRACK 2 – MECHANICAL ENGINEERING	
<ul style="list-style-type: none"> • Instrumentation and Control • Automation and Mechatronics • System Dynamics and Simulation • Aerodynamics • Turbulence • Heat and Mass Transfer • Acoustics and Noise Control 	<ul style="list-style-type: none"> • Applied Mechanics • Machinery and Machine Design • Computational Mechanics • Mechanical Design • Dynamics and Vibration • Manufacturing and Production Processes

TRACK 3- AUTOMOBILE ENGINEERING	
<ul style="list-style-type: none"> • Automotive Ergonomics • Mobility Technology • Automotive cyber security • Multiphase flow analysis in the automobile 	<ul style="list-style-type: none"> • Vehicular automation • Automotive materials and manufacturing • Automotive fuel storage and sloshing
TRACK 4- ELECTRICAL AND ELECTRONICS ENGINEERING	
<ul style="list-style-type: none"> • Advanced Power Converters • Power Semiconductor Devices • Control of Power Converters • Electric Drives and Applications • HVDC Transmission • FACTS Devices 	<ul style="list-style-type: none"> • Power Quality Issues • Hybrid Electric Vehicles • Power Systems • Renewable Energy Systems • Soft Computing Techniques andControl
TRACK 5- ELECTRONICS AND COMMUNICATION ENGINEERING	
<ul style="list-style-type: none"> • Communication • Image Processing • Embedded Systems 	<ul style="list-style-type: none"> • AI and Neural Networks • Nano Electronics • Machine Learning and Cyber Security
TRACK 6 -BUSINESS ADMINISTRATION	
<ul style="list-style-type: none"> • Human Resource Management • Marketing Management • Financial Management • Operations Management 	<ul style="list-style-type: none"> • Systems Management • General Management • Disaster Mitigation & Management

About SNIT

Sree Narayana Institute of Technology, Adoor is a college synonymous with knowledge empowerment that began under the tutelage of the Pattayil Kunjukunju Memorial Charitable Trust. It is situated in Theppupara, Adoor, Pathanamthitta District of Kerala state. SNIT began its journey with Engineering courses as its primary concentration. SNIT offers undergraduate programs in five branches of Engineering viz: Civil Engineering, Mechanical Engineering, Mechanical Automobile Engineering, Electrical & Electronics Engineering, and Electronics & Communication Engineering. SNIT offers postgraduate programs such as, Structural Engineering & Construction Management, and Machine Design in technological areas. MBA is added to the college academic programs to meet the growing global importance of business education. SNIT also offers Artificial Intelligence & Machine Learning, Cyber Forensics & Information Security, and Automation & Robotics as Diploma programs. SNIT is approved by the AICTE and affiliated with the APJ Abdul Kalam Technological University.

About the Editors



Dr. Divya G. is now working as an Assistant Professor in the Department of Electronics and Communication Engineering, Sree Narayana Institute of Technology Adoor. She pursued her PhD in Electronics and specialized in thin film technology from School of Technology and Applied Sciences, Mahatma Gandhi University, Kottayam. She published 7 journal publications and attended 23 national and international conferences on her area of interest. She has about 4 years of working experience in academics, research & field practice ranging from the remote rural area to the typical urban centres in Kerala. She is a reviewer in Materials Today: Proceedings of Elsevier.



Ms. Lekshmi Priya R. is currently working as an Assistant Professor in the Department of Civil Engineering at Sree Narayana Institute of Technology in Adoor, Kerala. She earned her M.Tech in Structural Engineering in 2010 from Karunya University in Coimbatore. With 13 years of teaching experience, her primary area of expertise is Structural Engineering. She has actively participated in numerous conferences over the course of her career and has published over 24 articles on the subject of structural engineering. She has also coordinated approximately 56 postgraduate student projects and guided around 110 undergraduate and postgraduate students. In addition to her contributions to research and education, she has taken up organizational duties for conferences at the national and international levels, successfully leading these events to completion. She has also served as a reviewer and editor for papers related to Structural Engineering, showcasing her expertise in the field.



Ms. Chaithra S. is an accomplished Assistant Professor in the Civil Engineering Department at Sree Narayana Institute of Technology, Adoor. Her educational background includes a Master's degree (M.Tech) in Structural Engineering and Construction Management, which she pursued at Mahatma Gandhi University in 2016. She has an impressive 8 years of experience in teaching Civil Engineering students, with a specific focus on Structural Engineering. She has successfully supervised and mentored 30 undergraduate and postgraduate students, providing them with valuable guidance in their academic pursuits. In addition to her teaching career, Ms. Chaithra has made significant contributions to the field of Structural Engineering through her publications. Her research and expertise have led to the publication of more than 22 research papers in reputed journals. Beyond academia, Ms. Chaithra has also been actively involved in structural consultancy works.



Mr. Abey Vishnu Narayana is a dynamic and enthusiastic individual working as an Assistant Professor at Sree Narayana Institute of Technology in Adoor. He is driven by research and a strong passion for teaching. His academic background includes a Master's degree (M.Tech) in Advanced Manufacturing and Mechanical Systems Design, which he completed at APJ Abdul Kalam Technological University. Mr. Narayana's interest in research is evident through his active involvement in numerous research projects. However, he found his true calling in teaching and decided to pursue it as his career path in 2021. Since then, he has been

dedicated to guiding and mentoring students, assisting them in their main projects, and coordinating minor projects across various streams. This hands-on experience in mentoring students has allowed him to play a crucial role in their academic and research development and has published 9 papers. His area of expertise and interest lies in welding and he has reviewed and edited numerous papers in the field of manufacturing, particularly welding.

Message from Managing Director



I extend a warm welcome to all of you for the 2nd International Conference on Modern Trends in Engineering Technology and Management (ICMEM 2023) on 4th, 5th and 6th of May 2023 conducted by SNIT Adoor. This conference is being held in association with the open source AIJR journal. AIJR is an international scholarly publisher dedicated to providing the best possible open-access publishing service to the academia & research community. Education has always been a catalyst for development and growth, encouraging continuous learning and research. A research-oriented approach is essential in shaping society and fostering innovation. As the world embraces technological changes, thinking in innovative and novel ways becomes imperative. This conference serves as a platform for scholars to engage in thoughtful

discussions on various advanced engineering subjects exploring numerous aspects of education through the advancement of technology.

I am delighted to witness the enthusiastic response from contributors and the educational community, showcasing their keen interest in this conference. The presentation of research papers holds immense value for research scholars, and it serves as a source of inspiration for us to organize such conferences regularly in the future. I express my sincere gratitude to all those who have contributed through their valuable research papers at the conference. Our primary objective is to provide a suitable platform for learning and experiencing the latest advancements in the field of industry. We believe that this conference will fulfill its purpose and foster an environment of intellectual growth and exchange of ideas. Behind the successful organization of such events, there lies the cohesive efforts of a dedicated and committed team, and we are fortunate to have such a hardworking team with us.

I wholeheartedly wish for the grand success of the 2nd International Conference on Modern Trends in Engineering Technology and Management (ICMEM 2023). Let us engage in fruitful discussions, gain insights, and together, explore the frontiers of industry in this rapidly evolving technological landscape.

Thank you, and I hope you have a fruitful and enjoyable experience at the conference.

Sri. Abyin Ampadiyil

Managing Director

SNIT Adoor

Message from Principal



I am extremely happy that the 2nd International Conference on Modern Trends in Engineering Technology and Management (ICMEM 2023) on the 4th, 5th, and 6th of May 2023 is conducted by SNIT Adoor. Research is a never-ending process; the main input to the research is contributed by thorough knowledge in the particular field through immense learning. Immense learning can be brought about by attending various forums related to the subject. Hence it becomes essential to conduct conferences of this sort to contribute to the field of research and technology.

The field of engineering is a vast area, including various disciplines, and its applications keep increasing to deal with the automated era. To keep the knowledge shared and updated it is essential to bring the students, faculty members, and researchers from various institutes, nationwide into a common platform. Conferences are vital platforms that foster intellectual exchange, collaborative learning, and the dissemination of groundbreaking research. Our institution takes immense pride in providing a space for scholars, researchers, and practitioners to engage in meaningful conversations and contribute to the ever-evolving landscape. I hope this conference brings this to reality by uniting participants from different places to present their research works and exchange their ideas.

I wish all the participants to have a good learning experience throughout the conference.

Dr. Shaji Mohan B.

Principal
SNIT Adoor

Message from Academic Chairman



It is with great pleasure and anticipation that I look forward to the proceedings of the conference "ICMEM 2023". As we embark on this intellectual journey, we are reminded of the profound impact that collaborative knowledge-sharing can have on our rapidly evolving world.

In today's interconnected landscape, where innovations and changes are constant companions, the conference stands as a beacon of insight, analysis, and vision. Our collective pursuit of understanding and adaptation to the challenges of our times holds the potential to shape the trajectory of Science, Engineering, Management, Industries, Societies, and the Global Community as a whole.

Throughout the conference, we witnessed and had the privilege of engaging with a diverse array of thought-provoking presentations, discussions, and interactions. The amalgamation of multidisciplinary perspectives has illuminated new pathways and encouraged innovative solutions. The depth and breadth of research showcased there remind us that, while the road ahead may be uncertain, our commitment to intellectual rigor and collaboration empowers us to stride confidently into the future.

I appreciate and acknowledge the efforts unleashed by the authors, presenters, reviewers, and organizers who have dedicated their time, expertise, and passion to make the conference a resounding success. Those efforts are the bedrock upon which the edifice of knowledge stands, and your enthusiasm ignites the flame of inspiration that drives progress.

As these proceedings become a repository of the collective wisdom shared during the event, may they continue to serve as a source of inspiration and reference for scholars, practitioners, and all those who seek to push the boundaries of human achievement.

I hope that you will carry forward the momentum gained, forging ahead with renewed vigor, empathy, and a sense of purpose. The challenges of tomorrow demand innovative solutions, and it is our duty to rise to the occasion, armed with the insights and connections forged during this conference.

I wish that the bonds formed, and the ideas germinated resonate through the corridors of academia, industry, and society at large, propelling SNIT Adoor and the world toward a brighter, more informed, and harmonious future.

Dr. Keshav Mohan
Academic Chairman
SNIT Adoor

Message from Vice Principal



It's my pleasure to welcome the participants for International Conference on Modern Trends in Engineering Technology and Management (ICMEM) 2023 organized in our college. I am proud to be a part of a engineering college that strives and achieves excellence, while providing students with opportunities that foster life-long skills to prepare them for career goal. I am sure that the conference will provide an opportunity to interact and share your knowledge and ideas with peers, to create new collaborations and partnerships to create a better tomorrow. I hope all the participants will have the benefit of the conference. My best wishes to the organizers and team members of ICMEM 2023 for a grand success.

Prof. Dr. M. D. Sreekumar

Vice Principal

SNIT Adoor

Message from Academic Coordinator



It gives me a great pleasure to know that SNIT Adoor is organizing the 2nd International Conference on Modern Trends in Engineering Technology and Management (ICMEM) during 4-6 May 2023. The conference would provide a common platform to the scientist, academicians, students and industry personnel for interactions and deliberations on Modern Trends in Engineering Technology and Management. A word of thanks to the eminent speakers for accepting our invitation to be a part of the conference and for agreeing to hold deliberations on the theme of the conference. I express gratitude to all the participants, and delegates from all over India for their overwhelming response and scientific contribution in form of oral and poster presentations. I extend my best wishes to all the participants for a motivating and fruitful experience and hope for many more partnerships in future. Hope the knowledge and experiences shared would go a long way in building a prosperous, strong, and healthy nation.

Wishing the conference, a Great Success.

Prof. N. Radhakrishnan Nair

Academic Coordinator

SNIT Adoor

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6. Dr. Veena Raj, Faculty of Integrated Technologies University of Brunai Darussalam
7. Dr. Samson Mathew, Director, KSCSTE-NATPAC & Professor, Department of Civil Engineering, NIT Trichy.
8. Dr. B. Sunil Kumar, Director, IHC, Chavara.
9. Dr. Anil Joseph, Managing Director, Geo Structural (P) Ltd.
10. Dr. Kishore P., Director, Habilete Learning Solutions.
11. Dr. P. G. Bhaskaran Nair, Former PG Dean, SNIT Adoor & Principal, NSS College of Engineering, Palakkad.
12. Dr. Sunilkumar N., Professor & Head, Civil Engineering Department, Cochin University College of Engineering, Kuttanad .
13. Dr. Lakshman R., Post Doctoral Fellow, IIT Madras.
14. Dr. Lekshmi Gangadhar, Director, Nanodot Research Pvt. Ltd., Nagercoil, Tamil Nadu.
15. Dr. Sabeena Beevi K. HoD & Associate Professor, Department of Electrical & Electronics Engineering, TKM College of Engineering, Kollam.
16. Dr. Binu G. S., Professor, Department of ECE, NSS College of Engineering, Palakkad.
17. Dr. Lillykutty Jacob, Principal, Amal Jyothi College of Engineering, Kanjirappally, Kottayam.
18. Dr. Sunilkumar P. R., Professor, Department of Electrical & Electronics Engineering, RIT, Kottayam.

Technical Committee

Civil Engineering

1. Dr. Hridya P., Scientist, CIDRIE, Muthoot Institute of Technology and Science
2. Dr. Sajeeb R., HoD, Department of Civil Engineering, TKM College of Engineering, Kollam
3. Dr. Dhanya Sathyan, Associate Professor Department of Civil Engineering, Amrita School of Engineering, Coimbatore
4. Dr. Hari G., Associate Professor, Saintgits College of Engineering, Kottayam
5. Dr. A.V. Rahul, Assistant Professor, Department of Civil and Environmental Engineering, IIT Tirupati.

Mechanical Engineering

1. Dr. Vikas Rajan, Assistant Professor, Mechanical Engineering, Amritapuri
2. Dr. Shan M. Assis, HoD & Associate Professor, Department of Mechanical Engineering, Musaliar College of Engineering & Technology, Pathanamthitta, Kerala
3. Dr. Govindan P., Associate professor, Dept. of Mechanical Engineering, Gov. College of Engineering, Kannur.

Automobile Engineering

1. Dr. Jinsha B.S, Assistant Professor, TKI, Kollam
2. Dr. Bibin K. S., Assistant Professor, Mangalam College of Engineering, Kottayam
3. Dr. Renjith Krishnan, Assistant Professor, Biomechanical Engineering, MITS, Karnataka
4. Dr. Jeess George, Assistant Professor, Department of Mechanical Engineering Automobile, Amal Jyothi College of Engineering, Kanjirappally, Kottayam.

Electrical and Electronics Engineering

1. Dr. Sarika E. P., Assistant Professor, Division of Electrical & Electronics, Cochin University College of Engineering, Kuttanad
2. Dr. Fossy Mary Chacko, Assistant Professor, Department of Electrical & Electronics Engineering, Saintgits College of Engineering, Kottayam
3. Dr. Sabeena Beevi K. Associate Professor & HoD Department of Electrical & Electronics Engineering, TKM College of Engineering, Kollam
4. Dr. J. Divya Navamani, Associate Professor, SRM University
5. Prof. Fathima M. Kasim, Assistant Professor, Department of Electrical & Electronics Engineering, TKM College of Engineering.

Electronics and Communication Engineering

1. Dr. B. Premlet, Professor (Retd.), Department of Physics, TKM College of Engineering, Kollam
2. Dr. Lija Arun, Assistant Professor, Department of ECE, NSS College of Engineering, Palakkad
3. Dr. Sindhu S., Principal, College of Applied Science, Marayoor
4. Dr. Silpa S. Prasad, Assistant Professor, Department of ECE, College of Engineering, Kidangoor
5. Dr. Divya G., Assistant Professor, Department of ECE, SNIT Adoor.

Business Administration

1. Dr. Veto Dey, Associate Professor, T. John College, Bangalore
2. Dr. Harikrishnan U., Department of Social Work, Don Bosco Arts and Science College, Kannur, Kerala.
3. Dr. Kumar Saurabh, Assistant Professor, Management, Maharashtra National Law University, Aurangabad.
4. Dr. Rosewine Joy, Associate Professor, Presidency University, Bangalore

Chief Guest



Dr. E. Sreedharan

The Metro Man

Dr. E. Sreedharan, also known as the "Metro Man," is an Indian engineer and civil servant who is widely recognized for his contributions to the development of infrastructure projects, particularly in the field of transportation. He was born on June 12, 1932, in Palakkad, Kerala, India.

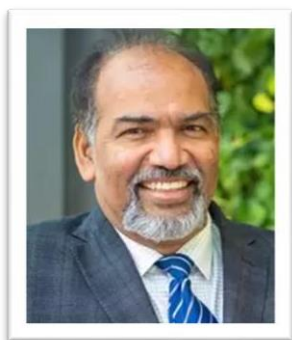
Dr. E. Sreedharan gained prominence for his successful leadership in executing the Konkan Railway project in the 1990s. The project involved constructing a 760-kilometer railway line along the west coast of India, connecting Maharashtra, Goa, and Karnataka. Under Sreedharan's leadership, the Konkan Railway was completed within the stipulated time and budget, and it stands as a testament to his project management skills.

Sreedharan's most notable achievement is the successful implementation of the Delhi Metro, a rapid transit system serving the National Capital Region of India. He was appointed as the managing director of the Delhi Metro Rail Corporation (DMRC) in 1995 and played a pivotal role in its planning and execution. The Delhi Metro project is hailed as a remarkable example of efficient urban transportation infrastructure in India.

Due to his exceptional contributions to the field of civil engineering and transportation, Dr. E. Sreedharan has received numerous accolades and awards throughout his career. He was honoured with the Padma Shri (2001) and the Padma Vibhushan (2008), two of India's highest civilian awards. In 2017, he was appointed as the principal advisor to the proposed Ahmedabad-Mumbai High-Speed Rail project (also known as the Bullet Train project).

Dr. E. Sreedharan has also been involved in several other infrastructure projects across India, including the Kochi Metro and the Lucknow Metro. His dedication to efficiency, integrity, and timely completion of projects has earned him a reputation as one of India's most respected engineers and administrators.

Keynote Speakers



Dr. Muralee Thummarukudy

Director, G20 Global Initiative Coordination
Office, UNCCD, Germany



Prof. Ahmed Murad

Associate Provost for Research United Arab
Emirates University, UAE



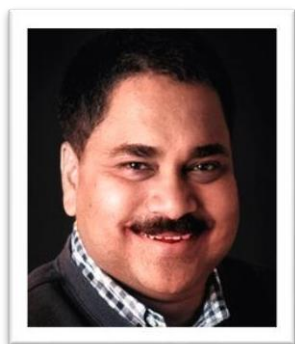
Dr. A. Dennyson Savariraj

Asst. Prof., Dongguk University,
South Korea



Dr. Pradeep S.

Asst. Prof., SRM Institute of Science and
Technology, ASCE President,
India Section Southern Region



Dr. Vinod Balakrishnan
Principal Scientist,
Photoshop Engineering, Adobe Systems,
Cupertino, California,
United States of America



Dr. Anish Nair
Assoc. Prof., Kalasalingam Academy of
Research and Education, Tamil Nadu
Researcher, Cracow University of
Technology, Poland



Dr. Ameena Al Sumaiti
Assoc. Prof., Khalifa University of
Science and Technology, Abu Dhabi,
UAE



Dr. Anurita Selvarajoo
Assistant Professor
University of Nottingham
Malaysia

Plenary Note



Dr. N. Sunilkumar
Professor and HoD, Dept. of
CE, College of Engineering,
Kuttanad



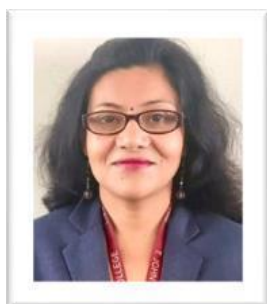
Dr. Kishore P.
Managing Director, HABLETE Learning
Solutions Treasurer, ASCE,
India Section Southern Region



Dr. Samson Mathew
Director, KSCSTE-NATPAC, Prof., Dept.
of CE, NIT, Trichy



Dr. Harikrishnan U.
Dept. of Social Work, Don Bosco Arts and
Science College, Kannur



Dr. Veto Dey
Assoc. Prof., Management Studies, T. John
College, Bengaluru



Dr. M.V. Rajesh
Assoc. Prof., Dept. of ECE, College of
Engineering, Chengannur



Dr. Parvathy A. R.
Asst. Prof., Division of ECE, College of
Engineering, Kuttanad



Dr. Govindan P.
Assoc. Prof., Dept. of ME, College of
Engineering, Kannur



Dr. Sarika E. P.
Asst. Prof., Division. of EEE, College of
Engineering, Kuttanad

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