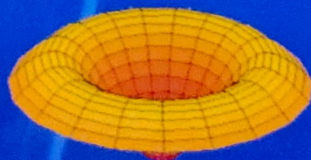


# JOURNAL OF VIBRATION ENGINEERING & TECHNOLOGIES

An Official Journal of the Vibration Institute of India

Annual Subscription (within India) for 2023 - INR 9000/-

Co-sponsored by  
IFTOMM



Krishna

 Springer

✓ 08.11.23

For circulation in India only

# Journal of Vibration Engineering & Technologies

Volume 11 · Number 5 · July 2023

## ORIGINAL PAPERS

**Computational Modeling and Investigation of the Vibro-Acoustic Effects Induced by Intracranial Stenosis in a Simplified Head Model**  
H.E. Salman 1973

**Ensemble Augmentation for Deep Neural Networks Using 1-D Time Series Vibration Data**  
A. Faysal · W.K. Ngui · M.H. Lim · M.S. Leong 1987

**Damped Chatter Resistant Boring Bar Integrated with an Absorber Working in Conjunction with an Eddy Current Damper**  
A. Patel · A. Yadav · M. Law · B. Bhattacharya · P. Wahi 2013

**New Numerical and Statistical Determination of Probes' Arrangement in Turbo-machinery**  
E.B. Tchawou Tchuisseu · P. Procházka · M.L. Mekhalfia · R. Hodbod' · D. Maturkanič · P. Russhard · M. Brabec 2025

**Design Synthesis of Vibration Isolation System Considering Host Structure, Damping Layer, and Resilient Mounts**  
S. Shi · P. Zhou · Z. Lü · J. Du 2037

**Fault Diagnosis of a Centrifugal Pump Using Electrical Signature Analysis and Support Vector Machine**  
Z. Araste · A. Sadighi · M. Jamimoghaddam 2057

**Solar Array Drive Assembly Disturbance Modeling, Jitter Analysis and Validation Tests for Precision Space-Based Operations**  
M. Sattar · M. Alzaid · N.U.R. Junejo · R.A. Malik · M. Tanveer · M. Latif 2069

**Adhesively Bonded Tubular Single Lap Joint Effects on the Free Vibration Analysis of Laminated Composite Circular-Cylindrical Shells**  
M. Meskini · A.R. Ghasemi 2081

**Free Vibration of a Timoshenko Beam with Arbitrary Nonuniformities, Discontinuities and Constraints**  
A. Sinha 2099

**Non-linear Vibration Response Analysis of Rolling Bearing for Data Augmentation and Characterization**  
M.S. Rathore · S.P. Harsha 2109

**Modeling and Simulation of Macroscopic Friction Coefficient of Brake Pair Considering Particle Flows and Interface Parameters**  
S. Liu · D. Wei · B. Zhang · L. Zhang · D. Wu · W. Wang 2133

**Analytical Approximate Solutions of a Magnetic Spherical Pendulum: Stability Analysis**  
G.M. Moatimid · T.S. Amer 2155

**Nonlinear Vibration and Internal Resonance Analysis of Microbeam with Mass Using the Modified Coupled Stress Theory**  
B.E. Yapanmuş 2167

**Design and Research of Active Noise Control Structure Based on NALMS Algorithm**  
R. Tang · B. Lin · H. He · Y. Wei · W. Zheng · Z. Chen 2181

**Couple of the Harmonic Balance Method and Gamma Function for the Helmholtz-Duffing Oscillator with Small Amplitude**  
P. Wu · J. He · M. Jiao 2193

**Out-of-Plane Strain Included Formulation for Free Vibration and Bending Analyses of a Sandwich GPL-Reinforced Microbeam Based on the MCST**  
K. Arshadi · M. Arefi 2199

**Dynamic Responses of Saturated Soil Foundation Subjected to a Moving Strip Load Based on the Nonlocal-Biot Theory**  
H. Ding · S. Xu · C. Xu · L. Tong · B. Zhu · Q. Yang 2215

**Particle Damping Vibration Absorber and Its Application in Underwater Ship**  
Y. Zhang · J. Cheng · W. Xu · C. Wang · J. Liu · Y. Li · S. Yang 2231

**Vibration Extraction for Melting Plastic Hydraulic Injection System with Stick Slip Vibration Analysis**  
M.O. Shaker · T.S. Amer · H.A. Dahab · M.A. Bek 2249

**An Expert Condition Monitoring System via Fusion of Signal Processing for Vibration of Industrial Rotating Machinery with Unseen Operational Conditions**  
M. Zarchi · M. Shahgholi 2267

# OUTLOOK BUSINESS

THINK BEYOND | STAY AHEAD.

October 2023 | ₹100 | Subscription Copy Not For Resale | WWW.OUTLOOKBUSINESS.COM

*Duplicate*



# BLEISURE

(Stay a Little Longer)

We look at the trend, why it's on the rise and how to turn a business trip into a vacation

+

# 22

GOLFING  
DESTINATIONS  
AROUND THE  
WORLD

PG.82

*List*

TRAVEL  
FIRMS  
LED BY  
WOMEN



✓ 08.11.23

# Contents

VOLUME 18, ISSUE 10, OCTOBER 2023 | PUBLISHED ON OCTOBER 1, 2023



44

## Sustainability in Hospitality

Thanks to its heavy dependence on the environment and people, the tourism sector needs to adhere to global standards of sustainable business practices for its survival

82

## Exploring the charm of Golf Beyond the Game

92

## Airports Where Waiting is a Pleasure



18

## THE JOY OF BLEISURE TRAVEL

Taking time out for leisure activities on a business trip helps professionals not only unwind but also explore new places. Besides bringing in more revenue for the hospitality industry, it also boosts local economy

Inventi Impact

# Navigation & Observation



ISSN: 2277-629X

Volume 2023, Issue 3 | July-September 2023

✓ 08.11.23

## Volume 2023, Issue 3

(July-September 2023)

---

### 135-199 *Research*

- 135 **Sensitivity and Consistency Analysis of BDS-3 GEO Satellite Orbit Maneuver Detection**  
*Yage Miao, Rui Tu, Ju Hong, Shixuan Zhang, Fangxin Li, Mingyue Liu, Xiaochun Lu*
- 148 **Integrated Navigation Method of Aerospace Vehicle Based on Rank Statistics**  
*Jun Kang, Zhi Xiong, Rong Wang, Xinrui Zhang*
- 163 **Real-Time SLAM Mobile Robot and Navigation Based on Cloud-Based Implementation**  
*Jaafar Ahmed Abdulsahab, Dheyaa Jasim Kadhim*
- 180 **Improved HLLL Lattice Basis Reduction Algorithm to Solve GNSS Integer Ambiguity**  
*Kezhao Li, Chendong Tian, Yingxiang Jiao, Zhe Yue*
- 188 **Precise Point Positioning and Differential Solutions by Online GNSS Calculation Tools and RTKLIB: A Comparative Study**  
*Diogoye Diouf, Mapathé Ndiaye, Laurent Morel*
- v *Patent Watch*
- vi *Job Watch*
- x *Events*

# POWERLINE

www.powerline.net.in

**POWERLINE**

**Power Connections.**  
Check how renewable trade policy trade in South Asia

- 1. How to build a power transmission line for power transmission up to 2025-26
- 2. How to build a power transmission line for power transmission up to 2025-26
- 3. How to build a power transmission line for power transmission up to 2025-26
- 4. How to build a power transmission line for power transmission up to 2025-26

**POWERLINE**

**Time to Act.**  
We the world leaders on the climate change commitment

**COP27**

- 1. COP27: A landmark in the history of climate change negotiations
- 2. Interview with COP27: Global Security
- 3. Interview with COP27: A. C. Lakshminarayana
- 4. Interview with COP27: Shri. S. K. Chakravarty
- 5. Profile of COP27: Dr. S. K. Chakravarty

**POWERLINE**

**Green Shoots.**  
Only hope of climate improvement, but not necessary work for us

- 1. COP27: A landmark in the history of climate change negotiations
- 2. Interview with COP27: Global Security
- 3. Interview with COP27: A. C. Lakshminarayana
- 4. Interview with COP27: Shri. S. K. Chakravarty
- 5. Profile of COP27: Dr. S. K. Chakravarty

**POWERLINE**

**Changing Needs.**  
Electricity demand in India

- 1. How to build a power transmission line for power transmission up to 2025-26
- 2. How to build a power transmission line for power transmission up to 2025-26
- 3. How to build a power transmission line for power transmission up to 2025-26
- 4. How to build a power transmission line for power transmission up to 2025-26

**POWERLINE**

**Unlocking PSP Potential.**  
PSP issues guidelines to promote pumped storage projects

- 1. How to build a power transmission line for power transmission up to 2025-26
- 2. How to build a power transmission line for power transmission up to 2025-26
- 3. How to build a power transmission line for power transmission up to 2025-26
- 4. How to build a power transmission line for power transmission up to 2025-26

**POWERLINE**

**Pulling Out All the Stops.**  
NTPC's multi-pronged strategy to cope with the summer peak

- 1. How to build a power transmission line for power transmission up to 2025-26
- 2. How to build a power transmission line for power transmission up to 2025-26
- 3. How to build a power transmission line for power transmission up to 2025-26
- 4. How to build a power transmission line for power transmission up to 2025-26

**POWERLINE**

**Decarbonising the Sector.**  
Nuclear power: not a silver bullet

- 1. How to build a power transmission line for power transmission up to 2025-26
- 2. How to build a power transmission line for power transmission up to 2025-26
- 3. How to build a power transmission line for power transmission up to 2025-26
- 4. How to build a power transmission line for power transmission up to 2025-26

**POWERLINE**

**Electricity Market Design.**  
Guidelines to build an efficient, robust and resilient power market

- 1. How to build a power transmission line for power transmission up to 2025-26
- 2. How to build a power transmission line for power transmission up to 2025-26
- 3. How to build a power transmission line for power transmission up to 2025-26
- 4. How to build a power transmission line for power transmission up to 2025-26

**POWERLINE**

**Balancing Distribution.**  
COP27 action plan: a starting point for action

- 1. How to build a power transmission line for power transmission up to 2025-26
- 2. How to build a power transmission line for power transmission up to 2025-26
- 3. How to build a power transmission line for power transmission up to 2025-26
- 4. How to build a power transmission line for power transmission up to 2025-26

**POWERLINE**

**Differential Pricing.**  
The electricity market: a starting point for action

- 1. How to build a power transmission line for power transmission up to 2025-26
- 2. How to build a power transmission line for power transmission up to 2025-26
- 3. How to build a power transmission line for power transmission up to 2025-26
- 4. How to build a power transmission line for power transmission up to 2025-26

**POWERLINE**

**A Just Transition.**  
COP27 action plan: a starting point for action

- 1. How to build a power transmission line for power transmission up to 2025-26
- 2. How to build a power transmission line for power transmission up to 2025-26
- 3. How to build a power transmission line for power transmission up to 2025-26
- 4. How to build a power transmission line for power transmission up to 2025-26

**27TH ANNIVERSARY ISSUE**

✓ 08.11.23

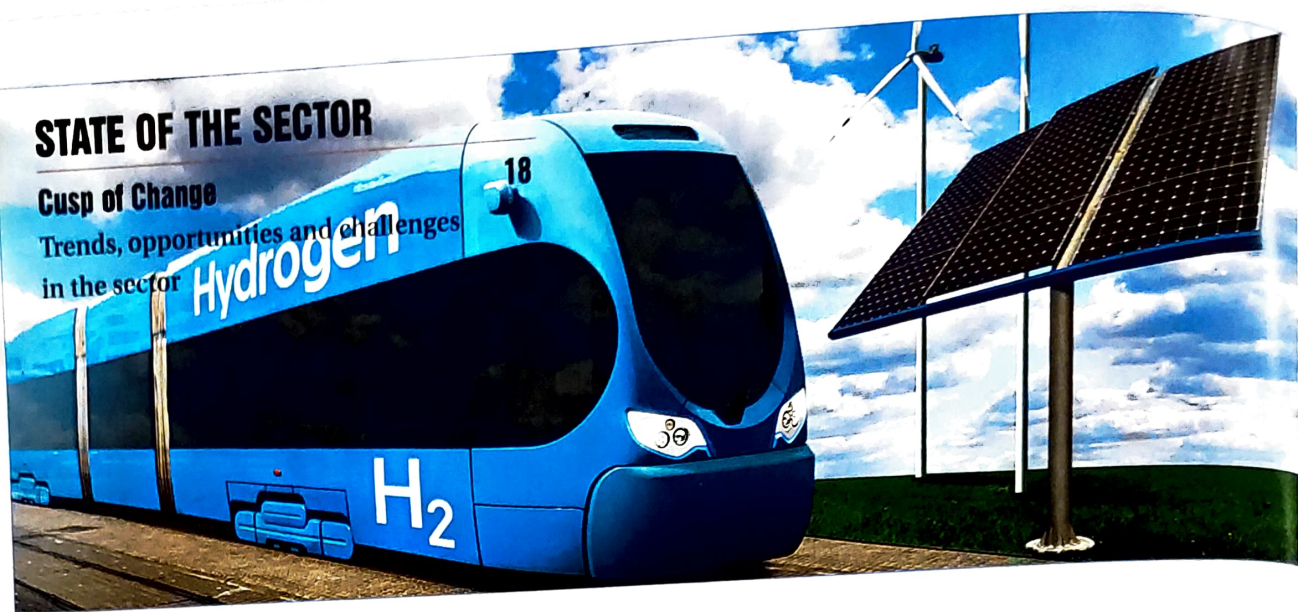
## STATE OF THE SECTOR

## Cusp of Change

Trends, opportunities and challenges  
in the sector

Hydrogen

18

H<sub>2</sub>

## NEWS BRIEFS

STATE OF THE SECTOR: SEGMENT  
REVIEW

## Cusp of change

Trends, opportunities and challenges  
in the sector

## Big shifts

Evolving dynamics in the generation  
segment

## Grid upgrade

Trends and developments in the  
transmission sector

## Reform efforts

Concerted attempts to improve  
discom performance

## Green transition

Renewable energy segment takes  
centre stage

## A pivotal role

Renewed focus on hydropower

## Policy priorities

Key measures and recent initiatives  
for sector growth

## Trading update

Key trends and developments in the  
segment

## COMPANIES

## Company highlights

Key developments over the past  
12 months8 **Positive trends** 188  
Operational performance of utilities22 **Key statistics** 192  
Financial performance of power  
companies during 2021-22 and 2022-23

## FINANCE

26 **Financing trends** 194  
Surge in sanctions, disbursements  
and clean energy investments30 **Stock movement** 196  
Market update of BSE Power Index  
companies34 **Key financings** 198  
Major debt and equity moves

## PEOPLE

42 **Changes at the top** 204  
Key appointments in the power sector

## POWER DATA

46 **Generation status** 208  
Capacity installed over the past  
10 years, by fuel and sector52 **Generation trends** 209  
Growth and PLF status over the past  
10 years58 **Power supply position** 210  
Energy requirement and peak demand  
during 2022-23178 **Transmission statistics** 211  
Growth in line length and transformer  
capacity212 **Renewables update**  
Annual and state-wise trends214 **Distribution performance**  
Trends in financial performance and  
AT&C losses216 **Discom overdues**  
State-wise outstandings by discoms  
to gencos218 **Smart metering progress**  
Sanctions and installations219 **Fuel trends**  
Coal and gas consumption220 **Power trading**  
Volumes and prices in the short-term  
market221 **Power trading**  
At the Indian Energy Exchange, Power  
Exchange India Limited and Hindustan  
Power Exchange in August 2023222 **Power generation**  
Total power generation in July 2023

## FORM IV

Publisher	Alok Brara
Printer	Alok Brara
Owner	India Infrastructure Publishing Pvt. Ltd.
Editor	Alok Brara
Printing Press	Thomson Press (India) Limited, 18/35, Delhi Mathura Road, Faridabad
Place of Publication	B-17, Qutab Institutional Area New Delhi 110016

For advertising in the magazine, please email  
us at [advertising@indiainfrastructure.com](mailto:advertising@indiainfrastructure.com) or  
call +91 8130 919 700

BHADRAPAD - ASHWIN 1945, SEPTEMBER 2023  
VOL. 19 ISSUE 89

www.scienceindiamag.in

PUBLISHED BY VIJNANA BHARATI  
₹ 30



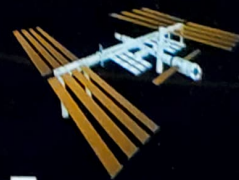
INDIA

राष्ट्रहिताय विश्वमङ्गलाय

Connecting science and people with an Indian perspective



**ADITYA-L1**  
**MISSION**  
**REACHING**  
**FOR THE SUN**



The successful launch of Aditya-L1, India's maiden flight to the Sun, coming soon upon the triumphant Chandrayaan 3, fortifies its position as a top space nation of the world



www.scienceindiamag.in

## PATRONS

Prof Anil Kakodkar, Former Chairman, Atomic Energy Commission  
 Dr Vijay P Bhatkar, Former Chancellor, Nalanda University & Mentor, VIBHA  
 Prof K I Vasu, Founder President VIBHA

## ADVISORY BOARD MEMBERS

Prof VPN Nampoori Emeritus Professor, Cochin University of Science & Technology  
 Prof T. G. Sitharam, Chairman, AICTE  
 Shri Praveen Ramdas, Secretary, VIBHA  
 Shri Vivekananda Pai, Secretary, VIBHA  
 Dr. Arvind C. Ranade, Director, National Innovation Foundation & Secretary, VIBHA

## CHIEF EDITORIAL ADVISOR

Dr Shekhar Mande, Former Director General, CSIR & President VIBHA

## EDITORIAL DIRECTOR

Dr Sumit Kumar Mishra, National Physical Laboratory, New Delhi

## EDITOR

Debobrat Ghose

## ASSOCIATE EDITOR

Sonam Singh Subhedar

## DESIGN HEAD

P K Singh

## PRINTED & PUBLISHED BY

Dr Sudhir S Bhadauria  
 Owned by Swadeshi Science Movement, Kerala (A unit of Vijnana Bharati) Sastra Bhawan, B 4, Fourth Floor, Mather Square, Town Railway Station Road, Kochi — 682 018, Kerala

## ADMINISTRATIVE OFFICE SCIENCE INDIA

Vijnana Bharati Headquarters  
 A-4, Block A, Gulmohar Park, New Delhi- 110049  
 Phone: 011-41040846  
 OFFICE: Manager & Advt: Vipin Rawat  
 Sales: Suraj Pandey  
 Accounts: Ankit Singh

Published from New Delhi  
 Printed at Innovative Designers & Printers,  
 E-41, Sector 6, Gautam Budh Nagar, Noida-201301.  
 Tel No.: 020-4269987/ 9810145783



# 10 INDIA'S GIANT STEP TOWARDS THE SUN

## 6 Need to Understand Nipah Virus

Experts assure there is no need to panic on the recent Nipah outbreak but research must go on to tackle this risk

## 8 Shanti Swarup Bhatnagar Awards

Top honours at the most prestigious awards this year showcase the direction Indian science is taking right now

## 18 Science Diplomacy

A string of recent, successful events featuring India prove the brilliant conception and execution of its diplomacy

## 22 Solar Energy for the Masses

As we reach for the Sun, it is important to tap unlimited solar energy for the benefit of our vast population

## 28 Yoga's Homage to the Solar Deity

The Sun has enjoyed supremacy in our civilisation, of which Surya Namaskar is a remarkable manifestation

## 33 Land of Abundance and Deficiency

Despite blessed with abundant sunshine, India faces a health crisis due to alarming rates of Vitamin D deficiency

## 36 Revolutionising Geospatial Landscape

We do not realise how integral a part we are of complex geospatial ecosystem, which is now governed by a policy

## 41 Book Review: Controlling Diabetes

India is the diabetes capital of the world, yet measures to tackle the condition are surprisingly near at hand

Cover image courtesy: Shutterstock

✓ 08.11.23

Volume 17, Number 1  
January-June 2023

ISSN 0973-2667

# International Journal of Oceans and Oceanography



**Editor-in-Chief:**  
**Professor Dr. Hyo Choi**

**RIP** Research India Publications  
<http://www.rippublication.com>

✓ 08.11.23

## *Contents*

- Geospatial Data Based Modelling For Evaluation of Soil Properties:  
A Modal Study** 1-14  
*G. S. Sarma, SS. Asadi and S. Lakshmi Narayana*
- An Experimental Approach towards Energy Sustainability in  
University Communities** 15-30  
*Ekanath Rangan and Krishna Das*
- Estimation of Hourly Global Solar Radiation Using MSG-HRV images** 31-48  
*Kada Bouchouicha, Abdelhak Razagui, Nour El Islam Bachari  
and Nouar Aoun*
- Daily Precipitation Concentration Index In Bangi, Malaysia** 49-60  
*Firdaus Mohammad Hamzah, Najwa Zainal and Othman Jaafar*
- Use of SAR and Optical Satellite Data for Land Use and Land Cover  
Classification in the Songkhla Lake Basin, Thailand** 61-72  
*Narissara Nuthammachot and Dimitris Stratoulas*
- The Role of Complex Compost in Remediation of Soils in Cultivated Lands** 73-89  
*Ivan S. Belyuchenko*
- The Dual Relational Research of Sports Development and Natural  
Environment** 91-97  
*Hengtao Guo*

THE 100 MOST INFLUENTIAL PEOPLE IN ARTIFICIAL INTELLIGENCE

# TIME 100/AI



+  
**ELON MUSK'S FIGHT FOR THE FUTURE OF AI**  
By WALTER ISAACSON



08.11.23

PHOTO: TAYAN, PFE 300.00  
THAILAND 5515.00  
SINGAPORE 5515.00  
MALAYSIA 5515.00  
JAPAN 5515.00  
KOREA 5515.00



## CONTENTS

### 11 The Brief

Director **Martin Scorsese** and actor **Lily Gladstone** on the set of *Killers of the Flower Moon*

Photograph courtesy of **Apple**

### 22 The Musk Factor

Inside the efforts of the world's richest man to both save humanity from artificial intelligence, and get in on it

By **Walter Isaacson**

### TIME100/AI

#### 30 Leaders

Dario and Daniela Amodei, Alex Karp, Lila Ibrahim, and more

#### 34 Shapers

Alondra Nelson, Ian Hogarth, Audrey Tang, Elham Tabassi, and more

#### 38 Innovators

Ted Chiang, Holly Herndon, Pelonomi Moiloa, Charlie Brooker, and more

#### 42 Thinkers

Geoffrey Hinton, Kate Crawford, Kalika Bali, Ilya Sutskever, and more

### 47 Time Off

Martin Scorsese on his relentless quest to open the world by making movies

By **Stephanie Zacharek**

# FRONTLINE

NOVEMBER 3, 2023 • LEADING THE DEBATE SINCE 1984 • WWW.FRONTLINE.THEHINDU.COM • ₹ 125



## CASTE comes back

The release of the Bihar caste survey report, which puts the State's backward castes at 63.14%, threatens the BJP's carefully nurtured "Hindutva unity" and brings caste right back into the political fray

**A new low in the state's attacks on media**

**Power, piety, and politics in Karnataka's maths**

**Fight to the death in Gaza**



## COVER STORY

# Genie is out of the bottle

**12/** The Nitish Kumar-led Bihar government's decision to release the results of a caste survey comes as a game changer, catapulting the OBCs into the mainstream political discourse once again and putting the BJP's Hindutva unity agenda on a sticky wicket.

### Related stories

- 14/ The Karnataka conundrum
- 20/ The BJP's dilemma
- 23/ Interview with Akhilesh Yadav, SP leader
- 25/ Is this Mandal 2.0?
- 30/ Interview with Ali Anwar Ansari, head of Pasmada Muslim Mahaz
- 31/ Inclusive Hindutva vs real social justice
- 35/ Lingering inequalities

## MEDIA

- 38/ Crackdown on NewsClick
- 42/ Interview with Paranjy Guha Thakurta

## POLITICS

- 48/ **Tamil Nadu:** The BJP-ALDMK divorce
- 52/ Power politics of Karnataka's maths

## WORLD AFFAIRS

- 60/ **Gaza crisis:** A fate foretold

## SANATANA DHARMA

- 68/ Debate, not diatribe

Cover Design: R. Inbaraj  
Caricatures: Satish Acharya

## NOBEL PRIZE | MEDICINE

- 75/ A thumbs up for basic science

## TRIBUTE

- 79/ **M.S. Swaminathan:** rice man of India

## INTERVIEW

- 83/ Swati Nayak, recipient of Norman Borlaug Award

## ENVIRONMENT

- 87/ Environmental clearance for a stillborn hydropower project in Arunachal
- 90/ Dams spell doom in Himalayan region

## BOOKS

- 94/ In review



- 08/ The Fortnight

## SHORT STORY

- 110/ A Herd of Men

## COLUMN

- 44/ N. Ram
- 50/ Saba Naqvi
- 58/ C.P. Chandrasekhar
- 92/ Prathyush Parasuraman
- 06/ Letters
- 109/ On our bookshelf
- 112/ Staying In
- 113/ Stepping Out
- 114/ Back page

# FRONTLINE

OCTOBER 20, 2023 • LEADING THE DEBATE SINCE 1964 • WWW.FRONTLINE.THEHINDU.COM • ₹ 125

## PRELUDE TO 2024

The five upcoming State elections are widely seen as key to setting the broader narrative for the general election next year

The future of  
social justice  
politics

POLITICS ▶ PAGE 44

IMEC: A  
corridor of  
possibilities

WORLD AFFAIRS ▶ PAGE 55

Fan films  
on a device  
near you

CULTURE ▶ PAGE 65



# FRONTLINE

Volume 40 – Number 20 – October 7–October 20, 2023 – ISSN 0970-1710 – [www.frontline.thehindu.com](http://www.frontline.thehindu.com) – 118 pages



5



## CONTROVERSY

**55/** Indian children in foster care systems abroad

## WORLD AFFAIRS

**62/** The India-Canada imbroglio

**69/** IMEC: Full of possibilities

## PHOTO ESSAY

**76/** The Bells of Sarthebari

## CULTURE

**82/** Buddhist art with a southern twist

**90/** Reaction videos: The new fan fad

## BOOKS/ESSAY

**97/** Story of a film studio

## BOOKS

A Times Group publication

ULTIMATE GUIDE TO PROFITABLE MANUFACTURING

# THE MACHINIST

RNI No 71129/98

Volume 18 Issue 9 • September 2023 • Rs 75

www.themachinist.in

**ENERGY**  
POWERING BUSINESSES AND  
INSTITUTIONS WITH  
ENERGY-EFFICIENT STABILIZERS

**SUSTAINABILITY**  
FROM WASTE TO RESOURCE:  
RECYCLED WATER'S ROLE IN  
EFFICIENT MANUFACTURING

**SPECIAL FEATURE**  
INDIA'S AEROSPACE  
'ISRO'CKING

**"THERE IS A DEMAND FOR  
ENERGY-EFFICIENT APPLIANCES  
AND WE SEE THIS AS AN OPPORTUNITY"**

A dive into how Kent manages to keep expanding its presence while also adapting to the latest technologies and evolving itself with changing customer demands.

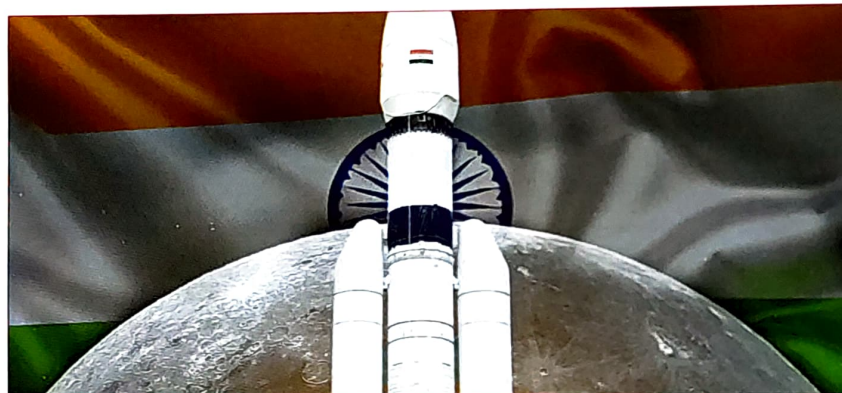
✓08.11.23

# CONTENTS



## COVER STORY

“There is a demand for energy-efficient appliances and we see this as an opportunity” ..... **26**



## SPECIAL FEATURE

India’s Aerospace ‘ISRO’cking ..... **39**

Editorial ..... **4**

News ..... **8**

### EV myths:

Here is what you didn’t know about EV Charging ..... **22**

### Data Security:

Our ‘Key Management System’ will enhance the security measures at ISRO’s Satish Dhawan Space Centre ..... **37**

### Energy Efficiency:

“Our efficiency policies aim to cut an additional 110 Mt of CO<sub>2</sub> by 2030” ..... **43**

### Metal Cutting:

ISCAR’s promising segment endmills ..... **45**

Products ..... **47**



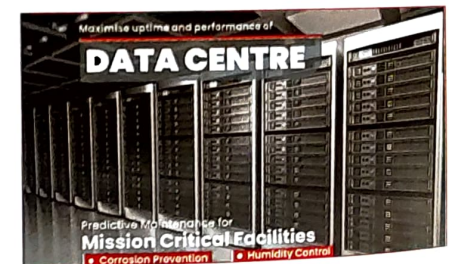
## AUTOMATION & ROAD CONSTRUCTION

How automated machinery can speed up road construction in our cities? ..... **14**



## SUSTAINABILITY

From Waste to Resource: Recycled water’s role in efficient manufacturing ..... **18**



## DATA CENTRE

How the protection of data centres is crucial for India’s tech-driven growth? ..... **32**



## ENERGY

Powering Businesses and Institutions with Energy-Efficient Stabilizers - **34**