Conference Report

An international conference on "Safety Health Analytics-Driven Governance for Sustainable Development (SHADG 2024)" from 29th to 30th Jan 2024

Organized by

Centre of Excellence in Safety Engineering and Analytics (CoE-SEA), IIT Kharagpur



With academic collaborator as

Indian Universities and Institutions Network on Disaster Risk Reduction (IUINDRR-NIDM) National Institute of Disaster Management (NIDM)





Collaborators

Safety, Health and Analytics-Driven Governance for Sustainable Development

(SHADG 2024)

Organized by Centre of Excellence in Safety Engineering and Analytics (CoE-SEA) Indian Institute of Technology Kharagpur

Academia











UINDRR-NIDM

Transportation Research and Injury Prevention Centre



Subir Chowdhury School

of Reliability and Quality

Dept. of Humanities

and Social Sciences



Dept. of Industrial and Systems Engineering

Resilient India - Disaster free India

Dept. of Mining Engineering

Dept. of Chemical Engineering

Industry



Collaborators



Prof. Santosh Kumar delivering a talk on Disaster Risk Reduction: Application of Science and Technology Perspective



All guests with the Director of IIT Kharagpur at 'networking lunch'



Group Photo @ IIT Kharagpur

Preface

Governments, industries and organizations across the world are facing stiff challenges in meeting the safety requirements of the stakeholders. Government of India has stated taking several national level initiatives that emphasised on (i) micro hazard mapping and management, (ii) behaviour based safety, (iii) prevention through design (PtD), (iv) safety performance indicators to understand the weakness and effectiveness of risk control systems, (v) safety analytics, (vi) industry 4.0 safety requirements, and (vii) research on various aspects of safety.

IIT Kharagpur having a number of experts across the departments/centres/schools with proven knowledge, expertise, and consulting and research experiences has taken a lead in establishing the Centre of Excellence in Safety Engineering and Analytics (CoE-SEA) in July 2020 for offering world-class education, training, consulting and research in safety engineering, human factors, risk management, analytics, and allied disciplines.

Under the Disaster Management Act 2005, NIDM has been assigned nodal responsibilities for human resource development, capacity building, training, research, documentation, and policy advocacy in the field of disaster management. The Indian Universities and Institutions Network on Disaster Risk Reduction (IUINDRR-NIDM) has been established by NIDM pursuant to Government of India directions and more specifically in conformity to the agenda-6 of the 10 point agenda for Disaster Risk Reduction(DRR) by the Honorable Prime Minister of India, Global issues on Climate Change Adaptation (CCA), Sendai Framework for Disaster Risk Reduction (2015- 2030),and Sustainable Development Goals(SDG), for promoting education, innovative technology and research, facilitate capacity development, and contribute to decision making for addressing local risks and the needs of the most vulnerable sections of community affected by various disasters. IUINDRR-NIDM envisions in building nations and communities safe and resilient to disasters, through education, knowledge creation, research, technology, and dissemination. The network also aims to exchange information among the universities and develop a pool of experts in the areas of disaster management.

IIT Kharagpur successfully organized an international conference on "Safety Health Analytics-Driven Governance for Sustainable Development (SHADG 2024)" with IUNDRR-NIDM as one of the key academic collaborators. **Brochure**



SHADG 2024

HYBRID MODE International Conference January 29 & 30, 2024

International Conference on Safety, Health and Analytics-Driven Governance for Sustainable Development (SHADG 2024)

The Centre of Excellence in Safety Engineering and Analytics (COE-SEA), IIT Kharagpur is organizing SHADG 2024 in collaboration with academic and industry partners. SHADG 2024 aims to provide an inter and multi-disciplinary forum for knowledge sharing, dissemination, networking and international collaboration in fields of safety, health, sustainability, human factors and analytics-driven governance.

About CoE-SEA

The CoE-SEA has been established in July 16, 2020 in IIT Kharagpur under the Institute of Eminence (IoE) scheme of Govt. of India. The CoE-SEA embodies to act as the hub for learning and practice, knowledge creation, standardization, repository, and dissemination of knowledge and information covering the broad domain of safety engineering and management, occupational and environmental health, human factors and industrial ergonomics, disaster management, and allied disciplines. It is a first of its kind focusing in safety analytics and analytics driven governance to protect people and property and promote sustainable development.

Opportunities and Benefits

Inspirational Keynotes: Renowned experts and thought leaders will deliver inspiring keynotes, offering insights into the latest trends, challenges, and innovations.

Thought-Provoking Sessions: Engage in in-depth discussions through a range of interactive sessions, workshops, and panel discussions led by industry experts.

Cutting-Edge Research: Explore the latest research findings and case studies that showcase real-world applications.

World - Best Practices: Witness the world - known best practices from renowned industry professionals.

Networking Opportunities: Connect with like-minded professionals, researchers, and practitioners from various fields to foster collaborations and exchange ideas.



	Themes
Track – I	Safety, Security and Analytics (SSA)
Track – II	Reliability, Maintenance and Analytics (RMA)
Track – III	Health, Epidemiology and Analytics (HEA)
Track – IV	Risk, Resilience, Sustainability and Analytics (RRSA)
Track – V	Human Factors / Ergonomics and Analytics (HFEA)
Track - VI	Analytics-Driven Governance (ADG)



Tracks

Track I Safety, Security and Analytics (SSA)

Safety Engineering, Safety Management, Safety Analytics; Prevention Through Design (PtD); Hazard identification, Probabilistic Risk Assessment, Uncertainty Analysis; Safety Economics; Personal Protective Equipment (PPE); Transportation and Logistics Safety, Fire Safety, Construction Safety, Electrical Safety, Process Safety, Mine Safety, Manufacturing Safety; Nuclear Fuel Cycle Facility Safety; Chemical, Oil and Natural Gas Safety, Structural Safety; Cyber-security, Cyber-risk Management; Industry 4.0/5.0 Technologies, Data, Tools and Techniques for Safety and Security Analysis and Management; Disaster Management: Early Warning System, Emergency Response System, Challenges and Updates in Emergency.

Track II Reliability, Maintenance and Analytics (RMA)

Reliability Engineering, Reliability Assessment and Management, Reliability Design, Reliability prediction; Maintenance Engineering, Preventive and Predictive Maintenance, Remaining Useful Life (RUL), Condition Monitoring, Condition based Maintenance, Fault Diagnosis & Prognosis, Intelligent Asset Maintenance; Life Cycle Cost, Facility Integrity, Asset Management; Reliability and Maintenance Optimization; Industry 4.0/5.0 Technologies, Data, Tools and Techniques for Reliability and Maintenance Analysis and Management.

Track III Health, Epidemiology and Analytics (HEA)

Occupational Health, Industrial Hygiene, Health Analytics; Global Health Challenges; Environmental Health Risks, Climate Change and Health; Epidemiology, Injury Prevention, Accidental Injury and Damage, Sustainable Healthcare Systems, Affordable Healthcare, Musculoskeletal Disorders, Occupational Diseases, Job Stress, Noise and Hearing Loss; Tools and Techniques for Safety and Security Management; Industry 4.0/5.0 Technologies, Data, Tools and Techniques for Health Engineering and Management; Trauma and Critical Care during Disaster, Health Emergency Scenarios Among Health Care Settings.

Track IV Risk, Resilience, Sustainability and Analytics (RRSA)

Business and Industrial Risk, Risk Perception, Risk-based Decisions; Resilience Engineering, Complexity and Emergence, Organizational Resilience and Risk Management; Economic, Social and Environmental Sustainability; Impact of Safety, Security and Disaster Management; Agile system, Sustainable Supply Chain; System Analysis Methods, Life Cycle Assessment and Management; Environmental, Social and Governance (ESG) and Sustainable Development; Industry 4.0/5.0 Technologies, Data, Tools and Techniques for Resilience and Sustainability Engineering and Management.

Track V Human Factors / Ergonomics and Analytics (HFEA)

Human Factors Engineering, Human Competency and Capability, Human Error and Behaviour, Cognitive Ergonomics; Digital Human Modelling, Human-Centric Design and User Experience (UX); Human Factors in Technology and Digital Interfaces; Workplace Ergonomics and Productivity; Public Policy and Health Economics; Disability Risk Prediction and Explanatory Models, Work Disability Prevention; Situational Awareness, Human sensing Technology, Cognitive information Processing; Industry 4.0/5.0 Technologies, Data, Tools and Techniques for Human Factors Engineering and Management.

Track VI Analytics-Driven Governance (ADG)

Leadership, Policy, Planning and Shared Decision-making; Monitoring, Evaluation and Learning (MEL); Standards, Acts, Audit, Management Information System (MIS); Resource Optimization; Real-time Monitoring, Decision Support System; Cyber Physical System Support, Artificial Intelligence and Intelligent System, Safety Technology, Smart Safety and Health; Smart Transport and Logistics, Intelligent Asset Management; Industry 4.0/5.0 Technologies, Data, Tools and Techniques for Governance.

Venue



Vikramshila Building, IIT Kharagpur, Kharagpur, West Bengal 721302 January 29 – 30, 2024

Centre of Excellence in Safety Engineering and Analytics 2nd floor, J C Bose Annex Building, Ramanujan Complex Indian Institute of Technology Kharagpur, Kharagpur 721302, West Bengal, India

Submission Guidelines:

- Paper should be up to 6 pages length, including references and appendices with a clear abstract (150-250 words) outlining the objectives, methodology, key findings, and contributions of the paper.
- If interested only in submitting the extended abstract, it should not exceed one A4 size page (printable area) with Times New Roman style with font size of 12 and 1.5 spacing.
- Prepare your paper in .pdf format for submission.
- Electronic paper to be submitted at the following URL: www.coesea.iitkgp.ac.in/shadg24/

Publication:

Accepted full papers will be published in the conference proceedings or as a book chapter in edited books (based on further peer reviews and acceptance). Some selected papers may be published in the international journal of repute, subjected to further blind review and acceptance.



Contact Us:

Ms. Sween Josco, Event Manager, mailtosween@gmail.com Mr. Pritam Ash, JA, ashpritam@adm.iitkgp.ac.in For more information and updates please visit SHADG2024 website: www.coesea.iitkgp.ac.in/shadg24

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CONFERENCE COMMITTEE

The SHADG 2024 conference was headed by a patron, organizing chair & convenor, and organized by teams headed by co-convenors, organizing secretaries and student secretaries.

PATRON:

Prof. Virendra Kumar Tewari Director, IIT Kharagpur



Prof. Virendra Kumar Tewari is the Director of IIT Kharagpur and he is an agricultural engineer and professor at Agricultural department of IIT Kharagpur. He is known for his pioneering studies on Farm Machinery & Power. His core research areas include Tractor system design, Ergonomics and industrial safety, Design of agricultural machines, Precision agriculture and Machinery system management. Among his key research projects, the Centre of Excellence for Digital Farming Solutions for Enhancing Productivity by Robots, Drones and AGVs, National Agricultural Higher Education Project (NAHEP) deserves special mention. In addition, he is leading several projects by the Central Institute of Agricultural Engineering, Indian Council of Agricultural Research, Ministry of Agriculture and Farming Welfare, Department of Agriculture, Cooperation and Farmers Welfare by Govt. of India. Prof. Tewari has been conferred with several awards by Indian Society of Agricultural Engineers, Indian Society for Technical Education, National Research Development Corporation. To name a few ISAE Gold Medal, Jawaharlal Nehru Award, etc. for his contributions in the field of agricultural mechanization.

ORGANIZING CHAIRMAN & CONVENER:

Prof. Jhareswar Maiti Chairman CoE-SEA, IIT Kharagpur



Prof. Jhareswar Maiti is the Founder Chairman of the Centre of Excellence in Safety Engineering & Analytics (CoE-SEA) and Head and Professor of the Department of Industrial and Systems Engineering, Indian Institute of Technology Kharagpur has over 20 years of teaching, research and consulting work in the fields of applied data analytics and multivariate statistical modelling; safety science, engineering and analytics; quality engineering and

analytics; engineering ergonomics and analytics. He is pioneer in making Safety Analytics as core area of research in the broad domain of Safety Science. He has established a unique world class laboratory called "Safety Analytics and Virtual Reality Laboratory" at IIT Kharagpur. He is currently serving the Editorial Board of Safety Science (as Associate Editor), International Journal of Injury Control and Safety Promotion (as Associate Editor) and Safety and Health at Work (as Member). He has received several awards and recognitions for his research works and contributions to the society.

CONVENER:

Dr. O Bala Krishna Advisor CoE-SEA, IIT Kharagpur



Dr. O B Krishna is the Advisor of CoE-SEA and with 37 years of experience in engineering, manufacturing and commissioning of steel plant equipment, maintenance of integrated steel plants including open cast and underground mining equipment, safety and health engineering (including process safety) and management systems, human factors engineering (macro and micro ergonomics), job stress and business processes reengineering. He was champion in establishing the present OHS MS (Occupational Safety and Health Management System) at Tata Steel during 2004-2010. During his tenure as the Head of Corporate Safety of Tata Steel India and South East Asia, he established the OHS MS in their overseas plants at Thailand, Singapore and seven other countries. He has helped 16 of their associated companies to establish OSH MS. As a consultant to DuPont Sustainability Services (DSS), Dr. Krishna provided consultancy in design and implementation of modules like employee safety, mechanical integrity and quality assurance (MICA). high risk containment, process safety management, construction safety management and safety management assessment and implementation to industries like Hyundai Steel (South Korea), Emirates Global Aluminium (Dubai and Abu Dhabi), RIL Jamnagar, ABG India, Godrej etc. He was associated with Department of Industrial and Systems Engineering, IIT Kharagpur as a faculty since 2016 to 2023.

The international conference on "Safety Health Analytics-Driven Governance for Sustainable Development (SHADG 2024)" was planned to bring together stakeholders from various sectors to explore the intersection of safety, health, analytics, and governance in driving sustainable development initiatives. This event was designed to serve as a platform for exchanging ideas, sharing best practices, and fostering collaboration to address contemporary challenges in safety, health, and sustainability.

Centre of Excellence in Safety Engineering and Analytics (CoE-SEA) of IIT Kharagpur successfully organized the conference from 29th to 30th Jan 2024 that brought together many international experts, researchers, and professionals from diverse fields. The conference was organized in collaboration with the industry partners- Tata Steel, Adani Group, and SAIL and the Academic partners which include TRIPC, IIT Delhi, DART lab, IIT Madras, NIDM, European University Cyprus, Lulia University of Technology, Sweden, and Mary Kay O' Connor Process Safety Center at Texas A&M, US. The IIT Kharagpur Academic partners included Department of Industrial & Systems Engineering, Subir Chowdhury School of Quality and Reliability, Department of Mining Engineering, Department of Chemical Engineering and Department of Humanities and Social Sciences.

Total 130 presentations were scheduled in the conference in hybrid mode, however, 102 presentations were hosted in 2 days. One third of the presentations were by Industry professionals from Tata Steel, Adani, SAIL, NIDM, GAIL, Vedanta, IFFCO, etc. Significant number of industry personnel had attended the conference to listen to various speeches and the research work of others.

The inaugural ceremony witnessed the presence of Mr. Rajiv Mangal, Vice-President, Safety, health and sustainability, Tata Steel Limited who spoke about the engagement of Tata steel with CoE-SEA. Dr. B K Verma, Joint President, Corporate Safety, Adani Group discussed the successful story of LPSE course delivered by CoE-SEA and the commitment of the department to deliver safety through application-based training. The special guest of honours included Dr. Imtiaz Ali Khan, Director, Directorate of Human Space Flight Program – Gaganyaan, ISRO who delivered keynote on "Safety, Reliability and Data Analytics from Indian Human Spaceflight Programme- Gaganyaan" and Dr. Anirudh Goutam, PED, RDSO, Lucknow who delivered keynote on the "Implementation and RAMS and PHM for the Rolling Stock of Indian Railways". In addition, the dias was graced by Prof. V K Tewari, Director, IIT Kharagpur who portrayed his visionary leadership for the institute and the centre, Prof. J. Maiti, Chairman, CoE-SEA who explained the inspiration behind the conference, also highlighting the centre's achievements and the upcoming unique industry-academia focussed M.Tech. programme and the vote of thanks was delivered by Prof, O.B. Krishna, Advisor, CoE-SEA.





The keynotes were followed by 12 online plenary keynotes and 16 offline plenary keynotes in parallel sessions. The online plenary keynote speakers on the first day included Prof. Geetam

Tiwari discussed the Traffic safety science: its current relevance and challenges. Prof. Santosh Kumar shared his extensive experience on the topic Disaster Risk Reduction: Application of Science and Technology Perspective, Prof. Gopi Chattopadhyay gave useful insights on the Asset Risk Management. Prof. K.R. Rao noted the importance of centering the pedestrians in urban road safety designs. Highlights of Prof. Valerio Cozzani's talk on technological Risk deriving from Natural Events: Natech Risk in the framework of Climate Change, reflected the role of safety systems and safety barriers and of their possible degradation in complex accident sequences will also be evidenced, as well as the increased relevance of common cause failures deriving from the failure of auxiliary systems and utilities, and Prof. Neil Mansfield who spoke on Predicting and improving the physical environment of future passenger aircraft cabins. His talk gave useful insights on the dynamic environment experienced in aircraft and discuss the challenge faced by aircraft operators and designers to optimize a complex environment for passengers. The second day online keynotes were delivered by Prof. Faisal Khan who spoke about the Safety and Security in Evolving Energy Systems. His concept of creating a dynamic risk profile for a processing system encompasses the likelihood and consequences of a given abnormal event. Was appreciated by the audience, Prof. Srinivas Pulugurtha who gave insightful talk on Contemporary Approaches and Trends in Data and Analytics for Enhancing Road Safety, Prof. Rajagopalan Srinivasan who spoke on ensuring Worker Safety and Health in Manufacturing Facilities through Cognitive Engineering and Analytics, Prof. Gaurav Nanda who addressed the audience with insightful discussion on AI Applications for Improving Injury Surveillance and Safety and Mr. Sameer Abdul Azeez who shared his experience on the Evolving Role & Relevance of Human Factors Engineering.

The offline keynotes on the first day included talks by Mr. Rajiv Mangal spoke on safety, emissions, biodiversity and circularity- insights from Tata Steel's initiatives towards sustainable development, Mr. N. K. Lohia shared the insights on the evolution of Fire-Retardant Safety Garments in India , Prof. P.K. Ray discussed Ergonomic/Human Factors Design of Products in Mechanical Systems Engineering: Few Applications, Prof. Aurobinda Routray spoke on the Safety Devices for Operators in critical tasks , Dr. B. K. Verma shared his vision on Developing future ready capability in safety, Prof. Sudip Mishra gave a talk on the role of IoT in Healthcare: Opportunities and challenges.

The second day offline plenary talks were delivered by Mr. Neeraj Kumar Sinha who spoke on leveraging digital and Technology for influencing positive safety culture, Dr. Chitta Ranjan

who shared futuristic insights on solutions in complexities – pusing the boundaries for solving complex problems in safety and health, Prof. Siddhartha Mukhopadhyay spoke on Looking for the Magic of SURRYA Energy: Into the Pensieve of Data, Dr. Ashis Bhattacharjee shared his experience with working on Whole-body vibration exposure and ergonomic issues of heavy earth moving machine operators in surface mines: a major health concern and Prof. A. R. Mohanty shared his perspectives on digital technology for health monitoring of large engineering systems.



The conference featured six comprehensive tracks-, each focusing on distinct aspects critical to fostering sustainable development.

The Safety, Security, and Analytics track 1, served as a cornerstone of the conference, encompassing a broad spectrum of topics related to safety, security, and advanced analytics. Participants engaged in discussions spanning safety engineering, safety management, and safety analytics. Key areas included Prevention Through Design (PtD), Hazard Identification, and Probabilistic Risk Assessment (PRA). The track explored industry-specific safety measures, ranging from transportation and logistics safety to fire safety, construction safety, and electrical safety.



The Reliability, Maintenance, and Analytics track 2, provided a comprehensive exploration of reliability engineering, maintenance optimization, and analytics-driven approaches. Participants engaged in discussions covering reliability assessment, management, and design. The track underscored the significance of predictive maintenance, preventive and condition-based maintenance, and the determination of Remaining Useful Life (RUL). Real-world case studies and success stories demonstrated the tangible benefits of adopting analytics-driven strategies in ensuring the reliability.

The Health, Epidemiology, and Analytics track 3, addressed the intricate relationship between health, epidemiology, and analytics in the pursuit of sustainable development. Occupational health, industrial hygiene, and health analytics were central themes, emphasizing the need for data-driven approaches to enhance overall well-being. The integration of Industry 4.0/5.0 technologies played a pivotal role in discussions related to health engineering and management.

The Risk, Resilience, Sustainability, and Analytics track 4, provided a platform for in-depth discussions on business and industrial risk, resilience engineering, and sustainability considerations. Participants engaged in conversations about risk perception, risk-based decision-making, and the evolving landscape of risk in modern industries. Resilience engineering, complexity, and emergence emerged as critical aspects in building robust systems capable of withstanding unforeseen challenges. The integration of Industry 4.0/5.0 technologies and advanced analytics tools was a recurring theme, emphasizing their transformative impact on resilience and sustainability engineering and management.

The fifth track on Human Factors/Ergonomics and Analytics track was centred on human factors engineering, exploring aspects of human competency, capability, and behaviour in various contexts. Workplace ergonomics and productivity were key considerations, with

discussions addressing human error and behaviour in technology and digital interfaces. Public policy and health economics were explored, emphasizing the role of analytics in shaping policies that promote well-being and productivity. Situational awareness and the application of human sensing technology in cognitive information processing were central themes. Industry 4.0/5.0 technologies were integrated into discussions, highlighting their role in advancing human factors engineering and management practices.

The Analytics Driven Governance track 6, encapsulated discussions on leadership, policy, planning, and shared decision-making in the context of safety, security, and health governance. Participants explored monitoring, evaluation, audit, and management within the conference themes of safety, health and sustainability towards efficient governance.



Besides these, three track workshops were hosted in the conference. First workshop focussed on Epidemiology in road traffic injuries, delving deeper into road safety, delivered by Prof. Rahul Goel, Prof. Deepty Jain and Prof. Lokesh Kalahasthi of TRIPC, IIT Delhi. The second workshop was delivered by Prof. Prantik Banerjee and Prof. Krittika Banerjee of Department of Humanities and Social Sciences, IIT Kharagpur on the topic Econometric Methods in Risk and Sustainability with Applications in Policy Making. The third workshop was Hands on training on Prognostics and Health Management of Industrial Gearbox Systems delivered by Prof. R.N. Rai, Subir Chowdhury School of Quality and Reliability, IIT Kharagpur.



Three student competitions were organized by the CoE-SEA and ISE team on ForeSightFury-Predictive Modelling, VR Simulation Challenge, and CodeCanvas focussed on creating software app-based solution for safety issues.



Conference also gave an avenue to B.Tech. students from other institutes to learn from IIT fraternity free of cost, through workshop on Natural Language Processing based predictive Modelling and developing Virtual reality-based safety assessment software.

The conference concluded with insightful panel discussion by esteemed panellists Dr. Anirudh Gautam, Mr. Neeraj Kumar Sinha, Mr. Ajay Paul, Prof. S.K. Chaturvedi, Prof. J. Maiti and Prof P.K. Mahapatra. The discussion was moderated by Prof. O.B. Krishna. During the panel discussion, Mr. Neeraj Kumar Sinha highlighted his thoughts on role of data analytics in steel industry, process safety engineering and problem related to Indian railway. He also focused on the importance of human science, digital transformation and the need to study more case studies of related subject for better safety in the following sector.

Stressing on the India's upcoming transformation in rail sector, Dr. Anirudh Gautam discussed how there is paradigm shift by Vande Bharat to make India one metropolitan city, reducing distance and surpass the Chinese without neglecting the safety. He also shared his thought how CoE- SEA can play a vital role in improving the safety in railway sector. He also proposed to develop an application that can capture safety data.

Further, Mr. P.K Mahapatra (IFFCO) shared the role of safety in his sector, highlights the hazard present and how they are dealing with. He also described how efficient design and knowledge in the particular field can avoid accident and ensure safety.

Appreciating the conference as a truly unique platform, Mr. Shashi Vashista (SAIL) liked the interaction between industry and academia through this conference. Describe the role of safety during project management, during design stage of product the role of data analytics to find the root cause of incident, effective use of data in near miss condition and to develop to roadmap for safety in every sector. Adding to this, Mr. Ajoy Kumar told that he had 500 learning hours by attending the conference and liked the presentations. He told safety to be the biggest challenge in today's time and wants human heart and mind in safety. Giving his perspective on reliability and its importance in the conference theme, Prof. S.K Chaturvedi highlighted about the source of data, action that should be taken during design stage and also tells safety incomplete without sustainability and performability.



Prof. J Maiti finally shared the need for keeping six tracks in the conference, how reliability and quality are the dimensions of safety. He highlighted the importance of quality data in safety and impact of safety on life of people, property and environment. He encouraged the interaction between industry and academia to improve the safety and make this era~ "The era of safety". He insisted the long-term interaction with the industries and investment by the industries with academia to create ownership among industry professionals for the collaborative solutions developed for real problems in safety engineering. He also iterated that those industries should have the courage to have meaningful collaborations with academia and own their initiatives financially.21st Century is going to be an era of Safety and Sustainability and CoE-SEA will contribute for the same. Experience lies with industry but they need prime institutes like IIT for creation and dissemination of knowledge. Industry professionals and leadership reciprocated with their interest in funding collaborative research which can have real have real impact and save lives.



The valedictory session of the conference was graced by Prof. Andrew Page and Prof. Suman Chakraborty who spoke about affordable technological solutions towards the conference theme.

Prof. Maiti presented the update on conference engagements and learning opportunities provided to the conference participants through this platform and Prof. Krishna gave the closing remarks highlighting the unique industry participation and knowledge sharing in this conference platform and the tireless work of the organizing team in making this a successful event.

Sl. No.	Name	Designation	
	CO-CO	NVENERS	
1	Prof. Sanjay Kumar Chaturvedi	Professor, Subir Chowdhury School of Quality and	
2		Kenability (SCSQK), III Kharagpui	
2	Prof. Bibnuti Bhusan Mandai	Kharagpur	
3	Prof. Bhim Charan Meikap	Professor, Chemical Engineering, IIT Kharagpur	
4	Prof. Kishor Goswami	Professor, Humanities and Social Sciences, IIT Kharagpur	
	ORGANIZINO	G SECRETARIES	
1	Prof. Harshad Shrigondekar	Assistant Professor, CoE-SEA, IIT Kharagpur	
2	Prof. Richa Ahuja	Assistant Professor, CoE-SEA, IIT Kharagpur	
3	Prof. Balagopal G Menon	Assistant Professor, Department of Industrial and	
4	Prof Abbishal Sharma	Aggistent Drofogger Industrial and System	
4	1101. Adhishek Sharma	Engineering, IIT Kharagpur	
5	Prof. Rajiv Nandan Rai	Associate Professor, Subir Chowdhury School of Ouality and Reliability (SCSOR), IIT Kharagpur	
6	Prof. Heeralal Gargama	Assistant Professor, Subir Chowdhury School of Quality and Reliability, IIT Kharagpur	
7	Prof Prantik Bagchi	Assistant Professor, Humanities and Social	
		Sciences, IIT Kharagpur	
8	Prof. Krittika Banerjee	Assistant Professor, Humanities and Social	
	5	Sciences, IIT Kharagpur	
9	Prof. Deepty Jain	Assistant Professor, Transportation Research and	
	1 2	Injury Prevention Centre, IIT Delhi	
10	Prof. Lokesh Kalahasthi	Assistant Professor, Transportation Research and	
		Injury Prevention Centre, IIT Delhi	
11	Prof. Sunita Mishra	Assistant Professor, Department of Mining	
		Engineering, IIT Kharagpur	

Details of others in the organizing committee:

Details of session chairs and co-chairs are given below:

Sl. No.	Name Designation		
	SESSION CHAIRS		
1	Senior Programme Consultant, National Institute		
	Dr. Preeti Soni Disaster Management, Delhi		
2		Associate Vice President and Chief Operating Officer,	
	Mr. Ajay Pandey	Vedanta Resources Limited	
3	Prof. Bhargab Maitra	Professor, Dept. of Civil Engineering, IIT Kharagpur	
4		Associate Professor, Dept. of Mining Engineering, IIT	
	Prof. Bibhuti Bhusan Mandal	Kharagpur	
5	Prof Brajesh Kumar Dubey	Professor, Dept. of Civil Engineering, IIT Kharagpur	
6		Associate Professor, Subir Chowdhury School of Quality	
	Prof. Rajiv Nandan Rai	and Reliability, IIT Kharagpur	
7		Professor, Dept. of Humanities and Social Sciences, IIT	
	Prof. Kishor Goswami	Kharagpur	
8	Mr. V K Singh	Deputy General Manager, Adani Enterprises Limited	
9	Prof. Bhim Charam Meikap	Professor, Dept. of Chemical Engineering, IIT Kharagpur	
10	Dr. Chitta Ranjan	Applied Science Manager, Amazon	
11		Professor, Dept. of Industrial and Systems Engineering,	
	Prof. Biswajit Mohanty	IIT Kharagpur	
12		Professor, Dept. of Industrial and Systems Engineering,	
	Prof. Mamata Jenamani IIT Kharagpur		
13		Professor, Dept. of Humanities and Social Sciences, IIT	
	Prof. Pulak Mishra	Kharagpur	
14	Prof. Biswajit Samanta	Professor, Dept. of Mining Engineering, IIT Kharagpur	
15	Prof. Debasish Chakravarty	Professor, Dept. of Mining Engineering, IIT Kharagpur	
16		Professor, Subir Chowdhury School of Quality and	
	Prof. S K Chaturvedi	Reliability, IIT Kharagpur	
17		Professor, Subir Chowdhury School of Quality and	
	Prof. V N A Naikan	Reliability, IIT Kharagpur	
	SE	SSION CO-CHAIRS	
1		Assistant Professor, Dept. of Mining Engineering, IIT	
	Prof. Sunita Mishra	Kharagpur	
2		Assistant Professor, Dept. of Humanities and Social	
	Prof. Krittika Banerjee	Sciences, IIT Kharagpur	
3		Assistant Professor, Subir Chowdhury School of Quality	
	Prof. Neeraj Kumar Goyal	and Reliability, IIT Kharagpur	
4		Assistant Professor, Dept. of Industrial and Systems	
	Prof. Abhishek Sharma	Engineering, IIT Kharagpur	
5		Assistant Professor, Dept. of Industrial and Systems	
	Prof. Anand Jacob Abraham	Engineering, IIT Kharagpur	
6		Assistant Professor, Subir Chowdhury School of Quality	
	Prof. Heeralal Gargama	and Reliability, IIT Kharagpur	
7		Assistant Professor, Subir Chowdhury School of Quality	
	Prof. Indranil Hazra	and Reliability, IIT Kharagpur	
8		Assistant Professor, Dept. of Industrial and Systems	
	Prof. Goutam Sen	Engineering, IIT Kharagpur	

9		Assistant Professor, Dept. of Humanities and Social
	Prof. Prantik Bagchi	Sciences, IIT Kharagpur
10		Assistant Professor, Dept. of Chemical Engineering, IIT
	Prof. Suverna Trivedi	Kharagpur
11		Associate Professor, Dept. of Industrial and Systems
	Prof. Jitendra Kumar Jha	Engineering, IIT Kharagpur
12		Assistant Professor, Centre of Excellence in Safety
	Prof. Richa Ahuja	Engineering and Analytics, IIT Kharagpur
13		Assistant Professor, Dept. of Mining Engineering, IIT
	Prof. Heeralal Gargama	Kharagpur
14		Assistant Professor, Dept. of Mining Engineering, IIT
	Prof. Sunita Mishra	Kharagpur
15		Assistant Professor, Centre of Excellence in Safety
	Prof. Harshad Shrigondekar	Engineering and Analytics, IIT Kharagpur
16		Assistant Professor, Transportation Research and Injury
	Prof. Rahul Goel	Prevention Centre, IIT Delhi
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SHADG 2024: Conference Schedule

29th January 2024	Day 1	Parallel
8:30 AM to 9:30 AM	Registration	
9:30 AM -10:30 AM	Inauguration	
10:30 AM-11:15 AM	Keynote	
		Student
11:15 AM -11:30 AM	High Tea	Competition
11:30-1:00 PM	Offline Plenary Keynotes	
1:00 PM-1:45 PM	Networking Lunch	
	_	Student
1:45 PM -3:45 PM	Session 1	Workshop
3:45 PM - 4:00 PM	Tea Break	
4:00 PM-6:00 PM	Session 2	
6:00 PM -8:00 PM	Online Plenary Keynotes	
8:30 PM-10:00 PM	Gala Dinner	

30 th January 2024	Day 2	Parallel
7:30 AM	Registration	
8:00 AM - 9:30 AM	Online Plenary Keynotes	
9:30 AM- 10:15 AM	Keynote	
10:15 AM- 11:45 AM	Offline Plenary Keynotes	
11:45 AM- 12:00 PM	Tea Break	
12:00 PM - 1:00 PM	Session 3	
1:00 PM- 1:45 PM	Networking Lunch	
1:45 PM -3:45 PM	Track Workshops	
3:45 PM- 4:00 PM	Tea Break	
4:00 PM - 5:00 PM	Panel Discussion	
5:00 PM - 6:00 PM	Valedictory Session	
6:00 PM - 6:30 PM	Closing Ceremony	
6: 30 PM- 7:30 PM	High Tea and Networking	

Sl. No.	Name	Designation	Торіс
		KEYNOTE SPEECHES	
1	Anirudh Goutam	Executive Director, Research Designs & Standards Organization	Indian Railways- Transitioning to Predictive Maintenance for higher Safety and Availability
2	Imtiaz Ali Khan	Director, Directorate of Human Space flight Programme, Gaganyaan, ISRO	Safety, Reliability and Data analytics: Experiences from Indian Human Spaceflight Programme - Gaganyaan
		PLENARY KEYNOTE SPEECH	IES
1	Prof. Santosh Kumar	Senior Advisor, National Institute of Disaster Management, Ministry of Home Affairs, Govt. of India	Disaster Risk Reduction: Application of Science and Technology Perspective
2	Mr. Rajiv Mangal	Vice President, Safety, Health & Sustainability, Tata Steel Limited	Safety, Emissions, Biodiversity and Circularity- Insights from Tata Steel's Initiatives towards Sustainable Development
3	Prof. P K Ray	Emeritus Professor, Department of Industrial and Systems Engineering (ISE), IIT Kharagpur	Ergonomic/Human Factors Design of Products in Mechanical Systems Engineering: Few Applications
4	Prof. Aurobindo Routray	Professor, Department of Electrical Engineering, IIT Kharagpur	Safety Devices for Operators in critical tasks
5	Dr. Birendra Kumar verma	Joint President and group Head, Corporate Safety, Adani Enterprises Limited	Analytics Driven Governance Process for Organization Cultural Shift on Health, Safety and Sustainability
6	Prof. Sudip Mishra	Professor, Dept. of Computer Science Engineering, Adani Enterprises Limited	IoT in Healthcare: Opportunities & Challenges
7	Neeraj Kumar Sinha	Chief Safety Officer, Tata Steel Limited	Leveraging Digital & Technology for Influencing Positive Safety Culture
8	Mr. Avisek Biswas	Senior Manager - Corporate Safety, Adani Enterprises Limited	Safe Transit- A Journey through Logistics & Road Safety
9	Dr. Chitta Ranjan	Applied Science Manager, Amazon	Solutions in Complexities- Pushing the Boundaries for Solving Complex Problems in Safety and Health
10	Prof. Siddhartha Mukhopadhyay	Professor, Department of Electrical Engg., IIT Kharagpur	Looking for the Magic of SURRYA Energy: Into the Pensieve of Data
11	Prof. Ashis Bhattacharjee	Visiting Professor, Indian Institute of Engineering Science and Technology, IIEST Shibpur	Whole-body Vibration Exposure and Ergonomic Issues of Heavy Earth Moving Machine

Details of keynote speeches and plenary keynote speeches

			Operators in Surface Mines: A
			Major Health Concern
12		Professor, Mechanical	Some Perspectives on Digital
	Prof. A R	Engineering Dept., IIT Kharagpur	Technology for Health
	Mohanty		Monitoring of Large
			Engineering Systems
13	Prof Geetern	Professor, Department of Civil	Traffic Safety Science: Its
	Timori	Engineering, IIT Delhi	Current Relevance and
	liwali		Challenges.
14	Mr. N.V. Lahia	Managing Director, Tara Lohia	The evolution of Fire-Retardant
	Mr. N K Lonia	Pvt. Ltd	Safety Garments in India
15		Senior Lecturer, Maintenance and	
	Prof. Gopinath	Reliability Engineering,	Asset Risk Management
	Chattopadhyay	Federation University, Australia	C C
16		Professor, Chemical Engineering	Pedestrian Safety in the
_	Prof. K R Rao	Dept., IIT Delhi	Infrastructure Design
17		Professor. Chemical Engineering	Technological Risk deriving
- /	Prof. Valerio	Dept. University of Bologna	from Natural Events: Natech
	Cozzani	Italy	Risk in the Framework of
	COLLUIII	Tury	Climate Change
18		Founder and President The	MIRCE Science Archive of
10	Dr Jezdimir	MIRCE Academy	Safety Reliability and
	Knezevic	WINCE Academy	Maintenance for Analytics-
	KIICZEVIC		Driven Decisions
10		Executive Dean of Research and	Predicting and improving the
19	Prof. Neil	International Population	physical anyironment of future
	Mansfield	Nottingham Trant University UV	physical environment of future
20		Chair Professor and Director	
20		Mary Kay O'Company Process	Sofatry and Samuelty in Engagery
	Prof. Faisal Khan	Sofety Conter Taxos A & M	Transition
		Safety Center, Texas A&M	Transition
21		Drofogon and Descent Director	
21		Professor and Research Director,	Contemporary Approaches and
	Prof. Srinivas	Dept. of Civil and Environmental	Trends in Data and Analytics for
	Pulugurtha	Engg., University of North	Enhancing Road Safety
22		Head of the American Express	Ensuring Worker Safety and
	Prof. Rajagopalan	Lab for Data Analytics, Risk &	Health in Manufacturing through
	Srinivasan	Technology (DART Lab), IIT	Cognitive Engineering and
		Madras	Analytics
23	Prof. Gaurav	Assistant Professor, School of	AI Applications for Improving
	Nanda	Engineering Technology, Purdue	Injury Surveillance and Safety
	1 validu	University	
24		Counsellor (Defence Technology),	From Coffee Cup Lids to
	Mr. Sameer	Embassy of India, Moscow	Submarine Command Controls:
	Abdul Azeez		The Evolving Role & Relevance
			of Human Factors Engineering

					Instation	
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More photographs of the event



Dr. Preeti Soni as a session chair in one of technical sessions



Group photo



Dr. Preeti Soni being felicitated at the end of the technical session by Prof. Krittika Banerjee





Felicitation of the Chief Guest at valedictory function

Mr. V Singh (the participant) providing positive feedbacks

The outcome of the conference

The conference concluded with several significant outcomes and key takeaways aimed at advancing safety and health initiatives in various industries such as,

1. It a platform for professionals, researchers, policymakers, and stakeholders to exchange knowledge, share best practices, and collaborate on safety and health-related issues. Attendees had the opportunity to learn from each other's experiences and expertise, fostering a culture of continuous improvement.

2. Through presentations, discussions, and workshops, participants identified and discussed emerging risks, new technologies, and methodologies.

3. It facilitated brainstorming sessions and workshops focused on developing innovative solutions and strategies to address identified challenges related to all six themes.

4. It provided networking opportunities for attendees to connect with peers, mentors, and industry leaders. These connections fostered collaborations, mentorship relationships, and knowledge-sharing networks that will continue beyond the conference, supporting ongoing professional development and growth.

5. As discussed in the panel discussion, both industry professionals and academicians emphasized on the need of joining hand for improved safety. The action plan would be decided on mutual understanding, strengths and weaknesses for the mutual benefit. Participants were energized and motivated to take action to improve safety and health outcomes in their respective organizations and industries.

Overall, the conference was a resounding success, bringing together diverse perspectives, expertise, and experiences related to Safety Health Analytics-Driven Governance for Sustainable Development.