सत्यमेव जयते

Report summary of Webinar on

RISK OF URBANISATION ON HERITAGE: UNDERSTANDING IMPACTS AND ASSESSMENTS

17th February 2023

11:00 AM – 01:00 PM

Jointly organised by:

NATIONAL INSTITUTE OF DISASTER MANAGEMENT (NIDM)
(Ministry of Home Affairs, Government of India),
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&

INTACH, BENGALURU CHAPTER
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Contents

Introduction

Due to the rapid urbanisation of the cities, a significant amount of heritage goes missing, vandalised or erased to support the ever-growing demand for land and infrastructure projects. The rapid movement of the rural population to the urban centres, before proper planning imposes a lot of pressure leading to unregulated and unplanned development, in turn, causes the Risks of Urbanisation. The impact of Urbanisation can be seen in the cities in terms of the revitalisation of infrastructure, without consideration for heritage and neglect for the heritage of the cities as there is high pressure for development in such areas along with loss of historic fabric due to rising demand of real estate.

On another hand, historic monuments are at a risk from climate change such as prolonged precipitation. This becomes crucial as the higher rate of precipitation is causing flooding in the historic monuments which are close to water resources, a direct result of overflowing dams. Understanding the changing historic landscapes, and the impact of the changing climatic conditions to mitigate the effects and understand the impact of these effects in a catastrophic event, in the long run, to order to protect historic monuments.

Climate change, its impact on Monuments and preventive measures to combat the effects – Ms Chetana Hamsagar

India is the 7th most affected country due to climate change-led extreme weather events. Climate change is a popular topic in the current scenario and in the South Indian Context, the impact of climate change is still under-studied. The prolonged effects of monsoons, flooding of the heritage sites and the microclimatic impacts of such fluctuations on the historical monuments have still not drawn the eyes of academicians or heritage enthusiasts. Awareness of the climatic impact and assessment of the impact on the monuments and it's surrounding with the exploration of the indigenous and traditional methods to take care of the monuments with a vision of preventive conservation can be explored to reduce or minimise the damages on the historic monuments.

- **Safeguarding the inscription stones- Bengaluru, a case study – Mr Udaya Kumar PL**

Bangalore has an evidenced history of over 2500 years. Some 175 inscriptions in Kannada, Tamil and Telugu record the city's evolution over the past 1500 years. Of the 175 inscriptions

documented within city limits, sadly only about 100 are still intact today. The rest have been destroyed due to rampant urbanisation, apathy and ignorance.

#InscriptionStonesOfBangalore is a citizen heritage conservation team working to protect these incredible stones and build more awareness about them. Every taluk, district and state in India is similarly blessed with an incredible inscription stones heritage. These inscriptions narrate to us in an extraordinary manner ultra-local millennium-year history. However, rampant urbanisation, apathy, and ignorance just like in Bengaluru are destroying these inscription stones.

Using Bengaluru as an example, the talk will illustrate how these inscription stones can be safeguarded and celebrated.

- **Structural condition assessment of heritage buildings - a vital prerequisite for planning and executing infrastructure projects- Dr S Raghunath**

Heritage structures, in the proximity of infrastructure projects, are rendered vulnerable due to heavy construction activities such as tunnelling, pile driving, deep excavation, movement of heavy vehicles, deep foundation, landscape changes etc. A combination of these activities leads to unintended distress in heritage structures, especially in unreinforced masonry buildings. Quite often the level of distress that pre-exists is not mapped and documented adequately. There are instances of such heritage structures undergoing distress during the execution of infrastructure projects. Hence, it is important to assess the structural health and vulnerability of such buildings well in advance. While it is done on a case-by-case basis, there is a need to develop a rather generic protocol for the structural condition assessment of such heritage buildings. All the stakeholders need to be aware of this process and the document during the planning stage of the infrastructure projects. On one hand, this would help in deciding on conservation strategies, including possible retrofitting of the structure etc. and the other hand it could assist the stakeholders involved in the infrastructure project in planning the process. This presentation is intended to highlight the necessity for developing systematic protocols for ‘structural condition assessment of heritage structures’ that are relatively easy to implement.

Objective of the Program

- Understanding the structural condition assessment of heritage buildings
- Climate change and its impact on historic landscapes and its mitigation
- Understanding the value of inscriptions and how to preserve them

Program Team

Program Chairperson
Shri Rajendra Ratnoo, IAS, Executive Director, NIDM

Program Director
Prof. Santosh Kumar, Head, GIDRR, NIDM

Convenor
Dr Meera Iyer, INTACH Bengaluru Chapter

Co-Convenor
Mr Aravind C, INTACH Bengaluru Chapter

Technical Coordinator
Mr Pankaj Modi, INTACH Bengaluru Chapter

Coordinator
Mr Ali Haider, Junior Consultant, NIDM
Mr Vivek Sharma, Young Professional, NIDM
Ms Chetana Hamsagar, Conservation Engineer, INTACH Bengaluru Chapter

IT Support
NIDM IT Team

Summary of the session

The introductory session was presented by Mr. Ali Haider from National Institute of Disaster Management. The program briefing was done by Ms Chetana Hamsagar from INTACH. They welcomed all the dignitaries and introduced the patron of the webinar Mr Rajendra Ratnoo, IAS, Executive Director, NIDM along with the program directors Prof.Santosh Kumar, Head GiDRR, NIDM

Shri. Rajendra Ratnoo, Executive Director, NIDM, is an IAS officer of the 2001 Batch of Tamil Nadu Cadre. He is presently serving as Executive Director, National Institute of Disaster Management (NIDM), Ministry of Home Affairs, Govt. of India. Before joining NIDM, he was working as Joint Secretary at, Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry, Government of India, where he was looking after International Coordination with European Countries, including India's participation in World Economic Forum (Davos), National Industrial Corridor Programme, India International Convention Centre, Industrial Development Schemes for Jammu & Kashmir, Himalayan and North East states. He was also holding charge of Controller General of Patents, Designs and Trademarks (CGPDTM). He has served the state of Tamil Nadu in various capacities in different sectors including, Tsunami Rehabilitation, Rural Development, Fisheries, Shipping, Urban Governance, Technical & Higher Education, Disaster Management, etc. Shri Ratnoo brings with him a wealth of experience in managing a variety of disaster situations including Tsunami, Floods, Cyclones, Oil Spill, Risk mitigation for Chemical Disaster, Fire emergencies as well as health emergencies including swine flu, dengue and COVID-19.

Prof. Santosh Kumar, Head, GiDRR, NIDM, is a Disaster Risk Reduction, Policy Planning and Capacity Development expert, who has 35 years of experience in different positions in the Development Planning and DRR Sector. With a PhD. in Economics, he studied Gender & Development in IDS, Sussex, UK and received professional training in Disaster Risk Management from Israel, backed with international work exposure at the Work Bank and Inter-governmental body of SAARC. He has also worked at state levels in different capacities at UP Academy of Administration, Nainital and RIPA, Jaipur. He is an experienced hand in designing, Planning and implementing mitigation and long-term disaster recovery plan and projects. His experience of working at the grass root to national to international level in all aspects spanning DRR is an added value. He specializes in disaster management planning, post-disaster loss and need assessment, Recovery and inclusive Disaster Risk Reduction. At the international level, he has been contributing to shifting International and national policies by engaging himself in dialogues, and negotiations and participating in international strategic conferences.

The first technical session began where the panellist provided insight on the topic –
Climate change, its impact on Monuments and preventive measures to combat the effects

Ms Chetana Hamsagar, Conservation Engineer working at INTACH for the past 4 years has her bachelor's degree in Civil Engineering from Sri Jayachamarajendra College of Engineering (SJCE), Mysore and a Master's degree in Architectural Conservation from the University of Edinburgh, Scotland.

At INTACH Bengaluru, for 4 years worked on the restoration of heritage buildings like Fort High School, KR Market, Bengaluru, Octroi Building, C.A.R Police Quarters, Bengaluru, The great Trigonometrical Survey Observatory, Hennur, Bengaluru, Government Mines Middle School, Shivamogga, Chamaraja Memorial Hall, Shivamogga, Devanahalli and Avatihalli Railway stations.

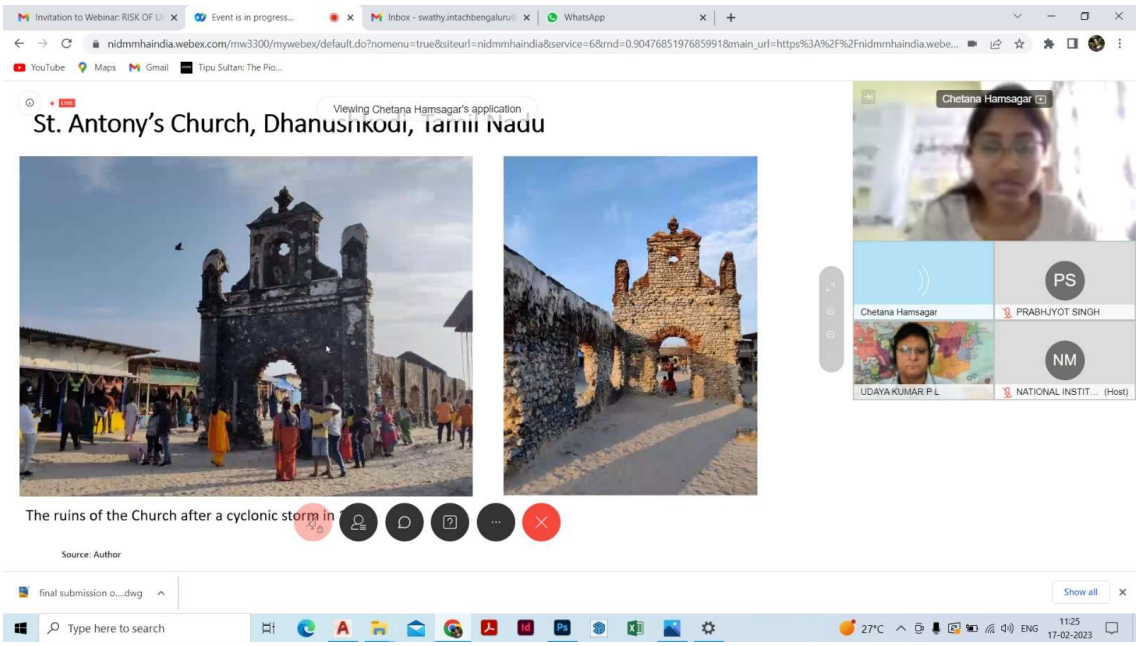
Climate change is a global phenomenon and the effects of climate change are witnessed in places like flooding in Venice, Italy and flash flooding seen in Petra, Jordan. Hampi and Pattadakal are the UNESCO nominated properties which attract huge crowds due to its cultural and historical significance. The rivers swell during the monsoon due to their higher levels of precipitation and due to a dam constructed ahead along the river which causes an overflow in the monsoons. In Hampi, there is also a significant increase in the groundwater table. A few issues of the water damage on the stones were also discussed such as in Hampi and Pattadkal. Sometimes, natural calamities also help in discovering monuments such as the ones in Mahabalipuram. The Preventive Conservation approach for monuments is as follows

- Recording of the monuments
- Monitoring of the monuments
- Structural Analysis of the monuments
- Photographic documentation and records of the monuments can help in understanding the conservation of the monuments
- Hydrological and survey and water management play an important role in the preservation of the monuments
- GIS data Interpretation of the monuments can help to understand both the atmosphere and influences.
- Archaeological sites can reveal how past societies adapted to the changing climate and environmental conditions.

Ways to combat climate change were also discussed such as

- reducing greenhouse gases
- adapting to the impacts of the climate change
- Collaborating internationally
- Raising awareness and promoting behaviour change

- Investing in research and innovation



Safeguarding the inscription stones- Bengaluru, a case study

Mr Udaya Kumar P L is the Project Director (Honorary) & Founder, The Bengaluru Inscriptions 3D Digital Conservation at the Mythic Society, Bengaluru. He has his Bachelor's degree in Mechanical Engineering from RV College of Engineering and a Masters in Technology from the Indian Institute of Technology, Chennai.

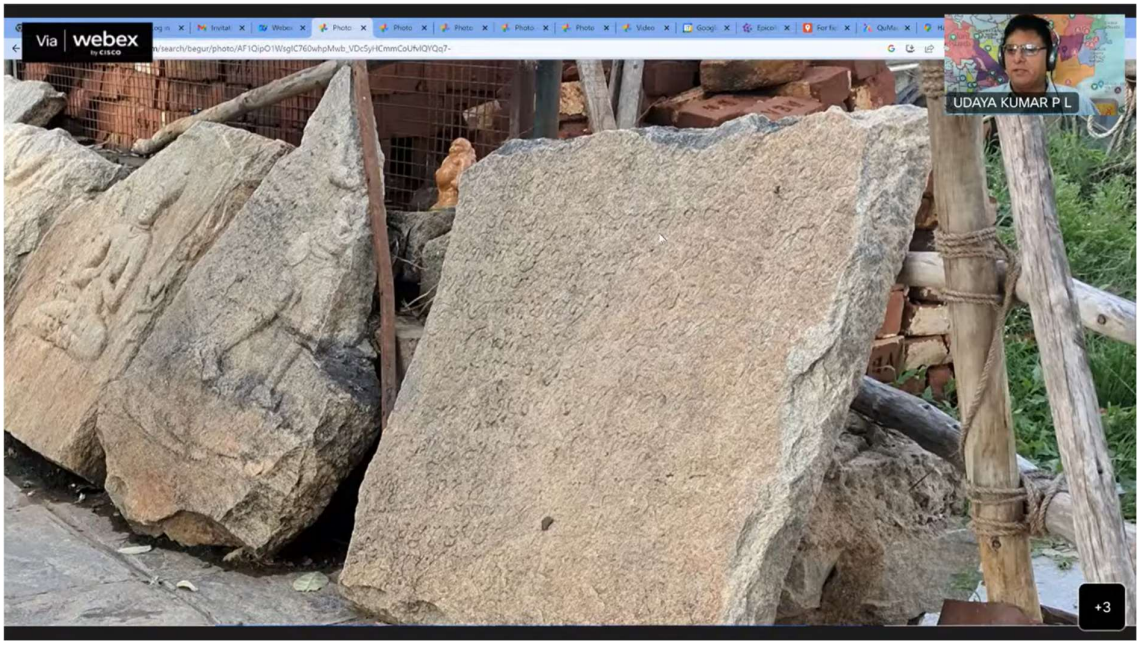
The Mythic Society Inscriptions 3D Digital Conservation Project aims to digitally conserve 1500 stone inscriptions found in Bengaluru Urban, Bengaluru Rural, and Ramanagara districts using modern technologies such as 3D digital scanning, modelling, and visual computing. The project has already digitally conserved over 400 inscriptions and hopes to conserve over 1000 more in 2022. The conservation status and information about all inscriptions are shared on a publicly accessible Google map. This project has been extensively featured in the media for its interdisciplinary approach and use of cutting-edge technology to preserve and unravel the history of Bengaluru.

Mr Udaya Kumar works on the recording of the inscriptions around Bengaluru. He mentioned that stone inscriptions are one of the least appreciated and understood layers of history that are mostly forgotten and give a lot of insight regarding the history or significance of the period when it was inscribed. Monuments like forts, temples palaces will end up catching everyone's attention yet inscriptions don't tend to catch anyone's attention. The stone slabs have inscriptions a faint scripture from our one such inscription on hero stones from the 8^{th} to 11^{th} century on a stone from the city of Bengaluru. Bengaluru is assumed to be a modern settlement, but there are a lot of such inscriptions found most surprising fashion.

The inscriptions can be ultra local explaining the context of the place. One such inscription was found at the Nageshvara temple at Begur, Bengaluru. There is an important stone inscription which mentions a place called Bengaluru and by this, we know Bengaluru existed for a long time, of which the major population of Bengaluru is completely unaware. This Begur inscription and many other hero stones which were near to the temple were ignored and uncared for and only recently they have been erected close to the temple with information boards around it for the people to read and understand.

Similarly, a hero stone was buried below the earth and mentions the place called Hebbal, a locality in Bengaluru. Another stone inscription found in the graveyard mentions the construction of a lake in 1028 AD. It also mentions the person who donated land and money for the construction of the lake. Due to urbanisation, these stones go missing which would be placed at the entrance of the town or human settlement. There is another inscription which talks about the place being given as a gift on a Solar Eclipse Day which was considered a holy act. The place called Virupakshapura is now called Kodigehalli, which means a land given as a gift. Such anecdotes add to the history of the location. It is placed at the junction of privately owned land and on the main road. There are chances that the inscriptions can be taken off due to the widening of the road or worst, used for construction.

The mapping from the Mythic society of Bengaluru on inscriptions colour coded based on the period in which the inscription was inscribed, and these records are accessible to the public in the public domain. The inscriptions are extremely important to understand the context of the place and we have documented more than 15,000 such inscriptions in and around Bengaluru for the people of Bengaluru. All the inscriptions are scanned using a 3D scanner and uploaded such that a common man can connect and relate to these inscriptions.



Structural condition assessment of heritage buildings - a vital prerequisite for planning and executing infrastructure projects

Dr Raghunath S, professor at BMS College of Engineering, Bengaluru, has completed Bachelor of Engineering and Masters of Engineering in Civil Engineering from UVCE and Ph.D. from Indian Institute of Science, Bengaluru. With a keen interest in teaching, his research interests are as follows: Structural Masonry, Experimental Dynamics, Earthquake Resistant Buildings, Alternative Building Materials and Methods, Energy and buildings, Masonry Domes and Vaults, Restoration and Structural Strengthening of Heritage Building. He has worked as a consultant for various Heritage building conservation/ restoration projects and assisted with structural issues and provide insight on repair methodology.

In the technical session, case studies where the practical problems of Infrastructure development projects are near of a heritage building exist, the various methods of assessment of such issues were discussed such as the Jaipur Metro, Rippon building which was in close proximity to the Chennai metro station along with assessment of All Saints Church at Bangalore close to Bengaluru metro station.

Structural analysis and design parameters for a new building, the parameters of the are in control of the engineer in new construction and execution of the construction can happen as how it was modelled to be. In the case of an existing building, the analysis or understanding of the building becomes a little challenging as it is difficult to ascertain the material property, load pattern and the way of construction of the building. The load path has to be understood from other factors and relies on a lot of other assumptions and they can influence the outcome of the factors.

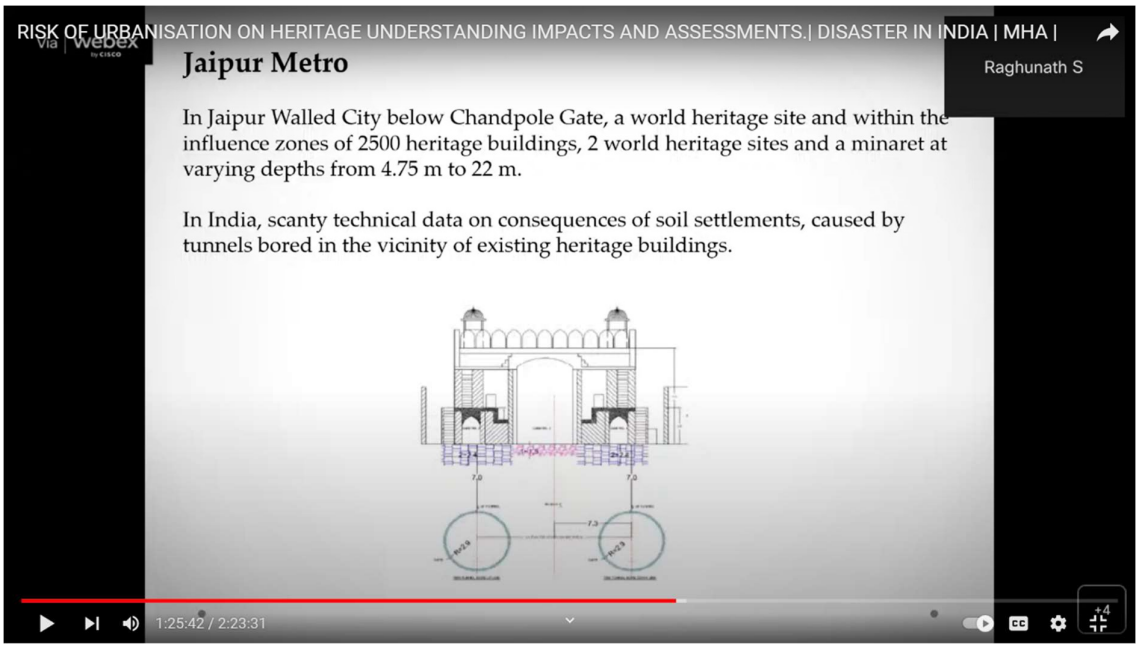
The first case study is the Jaipur Metro station which was planned underground of around 2500 heritage buildings and 2 world heritage sites. There were a lot of debates related to the tunnelling operations which were proposed under these heritage monuments. The technical data on the consequences of soil settlement in India is scanty on the tunnelling activity. A Vulnerability Assessment was carried out for the various heritage building where all the vulnerable structures were monitored before and during tunnelling work. Alarm and trigger levels were established for different types of structures. Structural condition assessment played a key role in deciding on the type of monitoring and mitigating damages or disasters.

Rippon Building in Chennai which was 100 meters from the Chennai metro has seen a lot of distress and one portion of the building displays a lot of cracks propagating from the floor to the second floor. In such cases, detailed geotechnical investigation, structural Analysis-settlement as a load-case scenario. Structural health monitoring is very important when such a massive structural shift happens in the soil close to the heritage building.

In Bengaluru, the assessment of the All Saints Church was taken up for the fact that the Metro is proposed in a close proximity. It was necessary to understand the impact of the

metro construction and the tunnelling process. Different structural elements such as Arches, openings, trusses and foundations of the building were given modelling equivalents. All the critical locations need monitoring, vibration along the trench and the building to be monitored and ground acceleration of adjacent to the building to be monitored in real-time. The three displacement components have to be monitored in three locations and care is to be taken when deep excavations are done.

The guidelines are proposed by various charters based on the inspection, repair, maintenance, retrofitting and conservation such as from ICOMOS Burra Charter, ICARSH etc. Various factors influence the choice of technology for repair, maintenance, strengthening, retrofitting, and conservation. Conservation is multi-disciplinary and it must include people with different skillset before infrastructure works are taken up in nearby.



Webinar and Registration Details

The webinar would be conducted on the WebEx Platform. Interested participants may register through the NIDM training portal at the link: https://training.nidm.gov.in/. The joining link for the webinar will be available at the NIDM training portal and would also be sent individually to the registered email addresses

Questions addressed to Dr S Raghunath : In Navi Mumbai there was a fall of a heritage building during restoration. A small monument called as fort was not considered heritage previously was demolished, post demolition, there was article on it. So, who should take responsibility for the collapse of the building ?

Dr S Raghunath : Unfortunately, it is very difficult and not fair to blame any parties involved. As Mentioned in the presentation, heritage restoration is a multi-disciplinary work and all assessment has to be done prior taking up restoration works. It's a systemic failure

and not blame any one party. India is still emerging with guidelines when it comes to conservation practices. Such cases must be taken as examples and ensure these things don't happen again.

Key Takeaway

- Impact of the urbanisation can result in loss of historic and cultural monuments/ buildings/ inscriptions
- Monitoring and assessment of the structures helps better to take the right approach at the right time
- Conservation involves many stakeholders and is a multi-disciplinary in nature

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Poster of the Webinar

Session Plan (Agenda)

Session Theme/ Topic	Resource Persons	Time and Duration
Introductory session	Mr. Ali Haider, Junior Consultant, NIDM	11:00 – 11:05 AM
Program briefing	Ms Chetana Hamsagar Conservation Engineer, INTACH Bengaluru Chapter	11:05- 11-15 AM
Inaugural address	Mr. Ali Haider, Junior Consultant, NIDM	11:15 – 11:20 AM
Technical Session		
Climate change, its impact on Monuments and preventive measures to combat the effects	Ms Chetana Hamsagar Conservation Engineer, INTACH Bengaluru Chapter	11:20-11:50 PM
Safeguarding the inscription stones- Bengaluru, a case study	Mr Uday Kumar P L Project Director (Honorary) & Founder, Bengaluru Inscriptions 3D Digital Conservation Project	11:50- 12:15 PM
Structural condition assessment of heritage buildings - a vital prerequisite for planning and executing infrastructure projects	Dr. Raghunath S Professor, B.M.S. College of Engineering, Bengaluru	12:15- 12:40 PM
Open house discussion	Ms Chetana Hamsagar, INTACH Bengaluru Chapter	12:40 - 12:50 PM
Concluding remark	Mr. Ali Haider, Junior Consultant, NIDM	12:50 - 12:55 PM
Vote of thanks	Ms Chetana Hamsagar, INTACH Bengaluru Chapter	12:55 - 01:00 PM