Government of Nepal
Ministry of Infrastructure
Development (MOID)

Society of Transport
Engineers Nepal
(SOTEN)

Eastern Asia Society for
Transportation Studies
(EASTS)

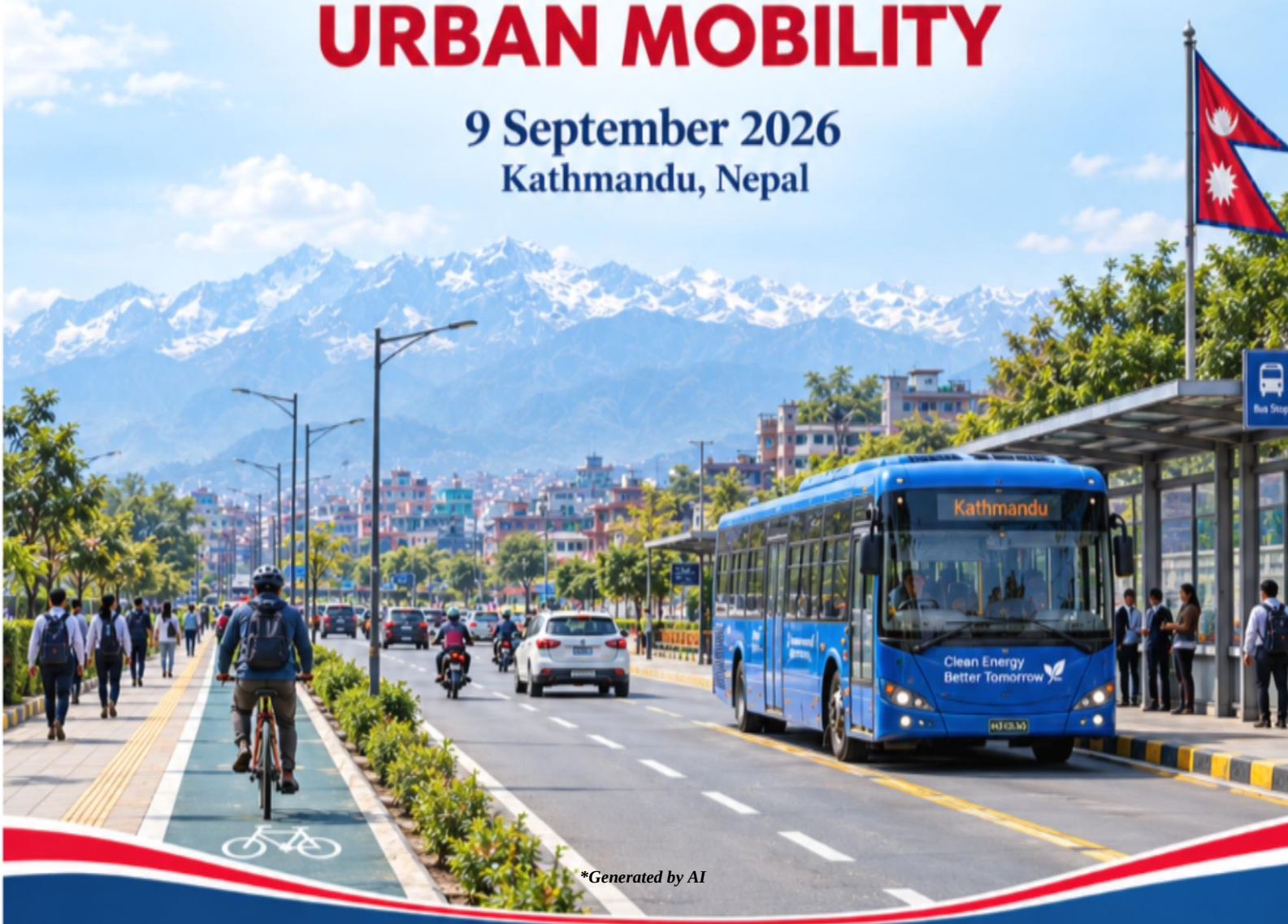
PROCEEDINGS

of the

International Symposium 2026

SUSTAINABLE TRANSPORT & URBAN MOBILITY

9 September 2026
Kathmandu, Nepal



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Message from Secretary
Ministry of Infrastructure Development (MOID)



On behalf of the Ministry of Infrastructure Development, I am pleased to extend my congratulations to the Society of Transport Engineers Nepal and the Eastern Asia Society for Transportation Studies on the successful organization of the International Symposium 2026 on Sustainable Transport and Urban Mobility.

The symposium was held at a particularly significant moment for Nepal's transport sector, in the aftermath of one of the most severe disasters in our recent history. Against this backdrop, the discussions and deliberations of the symposium carried a heightened sense of urgency, addressing many of the critical challenges that the Ministry confronts in its efforts to develop a transport system that serves the people of Nepal safely, sustainably, and resiliently.

The recent flooding across our highway network has served as an urgent reminder to the Ministry that climate resilience is not an abstract or distant policy concern, but an immediate matter of human safety, economic continuity, and national connectivity. Progress in transport engineering can no longer be measured solely by the kilometres of road constructed; it must also be measured by how effectively each corridor, slope, and bridge is designed and strengthened to withstand the climate hazards increasingly affecting Nepal's young and geologically active terrain. At the same time, Nepal's rapid urbanization demands a fundamental shift in how we approach urban mobility. We must plan not simply for the movement of vehicles, but for the movement of people, prioritizing high-capacity public transport, universal accessibility, and streets that are safe and inclusive for pedestrians and cyclists as well as those travelling by private vehicles.

The Ministry's work rests on three pillars that this symposium addressed directly. The first is strengthening collaboration with international partners, including through the JICA-supported urban transport master plan for Kathmandu Valley, to advance dedicated transit corridors and modern, scheduled public transport operations. The second is accelerating the electrification of the transport sector by leveraging Nepal's expanding hydropower capacity to reduce dependence on imported fossil fuels. The third is modernizing infrastructure planning, procurement, and maintenance by shifting from reactive post-disaster response toward proactive, data-driven resilience planning.

I extend my sincere appreciation to SOTEN and EASTS for convening a forum that addressed these issues not as separate agendas, but as components of a single, integrated challenge. I also thank all international and domestic experts who contributed their knowledge and expertise throughout the day. The resolutions emerging from this symposium will provide valuable input as the Ministry continues to translate policy commitments into concrete engineering standards, procurement practices, and implemented projects.

Mr. Gopal Prasad Sigdel
Secretary
Ministry of Infrastructure Development
Government of Nepal

Message from President
Society of Transport Engineers Nepal (SOTEN)



It is our great pleasure to present the Proceedings of the International Symposium 2026 on **"Sustainable Transport & Urban Mobility,"** jointly organized by the Society of Transport Engineers Nepal (SOTEN), Ministry of Infrastructure Development (MOID) and the Eastern Asia Society for Transportation Studies (EASTS) on 9 September 2026 in Kathmandu.

Transport is at the centre of economic and social development, yet cities and transport systems today face increasingly complex challenges arising from dense and compact orientation of cities, changing mobility patterns, climate change, technological advancement, congestion, and the need for safer and more inclusive mobility. These challenges require us to move beyond conventional approaches and develop transport systems that are sustainable, resilient, efficient and responsive to the needs of people.

The symposium provided an important platform for sharing international experiences and discussing practical approaches relevant to Nepal. The keynote address on **"The Future of Urban Mobility"**, international experiences from Singapore and Yangon, and discussions on public transport and multimodal integration offered valuable perspectives on the transformation of urban mobility. The sessions on the regional and national context of urban mobility and on resilient and sustainable transport infrastructure further highlighted the importance of integrated planning, evidence-based investment, climate resilience and effective disaster management.

For Nepal, these discussions are particularly timely. Our cities require better integration of land use and transport planning, improved public transport, multimodal connectivity, greater attention to walking and cycling, appropriate application of emerging technologies, and transport infrastructure capable of withstanding increasing climate and disaster risks. Achieving these objectives will require not only investment in infrastructure but also stronger institutions, professional capacity, sound policies and effective implementation.

The symposium also strengthened professional and academic cooperation between Nepal and the wider international transport community. The continued collaboration between SOTEN and EASTS provides an important avenue for sharing knowledge, experience and innovation across the region. I hope that the ideas and recommendations presented through this symposium, including the **Symposium Resolution**, will contribute to further research, policy development and professional practice in Nepal and beyond.

I sincerely thank all keynote speakers, distinguished guests, session chairs, presenters, panellists and participants for their valuable contributions. Special thanks to the hardworking team of symposium convenor and other members of organizing team for their untiring effort. I also express my appreciation to EASTS for its collaboration and support.

I hope this proceeding will serve as a useful reference for policymakers, planners, engineers, researchers, academics and transport professionals, and contribute to our shared goal of building safe, sustainable, resilient and people-centred transport and urban mobility systems.

Dr. Hare Ram Shrestha
President
Society of Transport Engineers Nepal (SOTEN)

Message from President
Eastern Asia Society for Transportation Studies (EASTS)



On behalf of the Eastern Asia Society for Transportation Studies (EASTS), it is my distinct honor to address this international symposium held in Kathmandu.

Following the moment of silence observed, I wish to offer my deepest condolences to those who tragically lost their lives in the recent Glacial Lake Outburst Flood (GLOF) in Nepal. I extend my heartfelt sympathy to their families, the affected communities, and all who have suffered from this devastating disaster. On behalf of EASTS, I express our firm solidarity with the people of Nepal and our sincere hope for the earliest possible recovery of all affected areas.

Regrettably, Nepal is not alone in these struggles. Over recent months, we have witnessed severe natural disasters across Asia—the Kumamoto Earthquake in Japan, the GLOF in Nepal, and a recent volcanic eruption in Indonesia. Though varying in nature, these events remind us of one common reality: natural disasters represent a shared challenge for all of us in Asia.

Facing these recurrent climate-induced hazards requires stronger regional partnerships and actionable knowledge-sharing across academic, governmental, and institutional boundaries. Standing together across national borders allows us to pool expertise, exchange vital insights on post-disaster infrastructure restoration, and build stronger interdisciplinary networks. This spirit of mutual support and collaborative problem-solving is precisely what we hope to pass on to the next generation of transportation professionals and researchers across the region.

When disaster strikes, transportation serves as one of the most critical lifelines for evacuation, emergency services, and community reconstruction. Yet resilience to disasters is only one of many challenges facing Asian transportation today. Rapid urbanization, congestion, environmental pressures, technological changes, and evolving mobility needs require us to solve current problems while establishing a long-term vision for the future.

This is where EASTS plays a pivotal role. Our broad community brings together researchers, universities, international organizations, governments, practitioners, and private partners across Asia. By exchanging knowledge across national and disciplinary boundaries, we strive to nurture future professionals and transform our collective insight into improved policies and practices.

“Sustainable Transport & Urban Mobility” provided an exceptional platform for meaningful dialogue, rich knowledge exchange, and forward-looking collaboration across borders. I extend my deepest appreciation to Dr. Shrestha, Mr. Tiwari, and all members of SOTEN for their exemplary efforts in organizing this vital symposium. As we document these proceedings, let us carry forward the spirit of shared learning and partnership to build a safer, more sustainable, and better-connected future for transportation across Asia.

Prof. Dr. Akimasa Fujiwara
President
Eastern Asia Society for Transportation Studies (EASTS)

Message from Symposium Convenor
Society of Transport Engineers Nepal (SOTEN)



It is my pleasure to present the Proceedings of the International Symposium 2026 on **Sustainable Transport & Urban Mobility**, organized by the Society of Transport Engineers Nepal (SOTEN) in collaboration with the Eastern Asia Society for Transportation Studies (EASTS), with support from the Ministry of Infrastructure Development, Government of Nepal, on 9 September 2026 in Lalitpur, Nepal.

The symposium brought together policymakers, engineers, researchers, academics, and transport professionals from 19 countries to exchange knowledge, share international experiences, and explore pathways towards safer, more sustainable, inclusive, and resilient mobility.

Held amid devastating floods in Nepal, the symposium highlighted the vulnerability of transport infrastructure and the need for risk-informed planning, resilience, and effective disaster preparedness. These challenges reinforced the importance of building transport systems capable of withstanding future climate-related hazards.

The technical sessions addressed integrated land-use and transport planning, public transport, multimodal connectivity, walking and cycling, emerging technologies, and climate-resilient infrastructure. Discussions emphasized evidence-based decision-making, institutional coordination, and adapting international practices to Nepal's geographical, economic, and institutional context.

SOTEN recognizes that sustainable transport development requires collaboration among government institutions, academia, development partners, professional organizations, and the private sector. The symposium resolutions provide a foundation for translating research and discussions into practical policies and interventions that improve everyday mobility and strengthen transport networks.

I sincerely thank EASTS, the Ministry of Infrastructure Development, our keynote speaker, distinguished guests, international delegates, presenters, session chairs, panellists, and participants for their valuable contributions. I also extend my heartfelt appreciation to the Master of Ceremony Asmita Subedi along with volunteers Santosh Khadka, Samridhi, Manjil, Asmita, Sandesh, Himal, Sunil, Riti, Sushan, Swati, Prasanna and Dipesh. Their dedication, coordination, and tireless efforts, together with the contributions of the organizing committee, technical committee, advisory committee, and volunteers, played an important role in making this symposium successful.

I hope these proceedings will serve as a valuable resource for continued research, professional collaboration, and policy development. May the knowledge and commitments shared through this symposium strengthen our collective efforts towards safe, accessible, efficient, sustainable, and resilient transport systems.

Mr. Hemant Tiwari
Symposium Convenor
General Secretary
Society of Transport Engineers Nepal (SOTEN)

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Symposium Committees

Advisory Committee

Dr. Bindu Nath Lohani
Chancellor, University of Nepal

Mr. Arjun Jung Thapa
Member, National Planning Commission

Mr. Dhana Raj Acharya
Mayor, Pokhara Metropolitan City

Mr. Gopal Prasad Sigdel
Secretary, Ministry of Infrastructure Development

Prof.Dr. Padma Bahadur Shahi
Chairman, Nepal Engineering Council

Prof. Dr. Surya Raj Acharya
Registrar, University of Nepal

Prof. Dr.Akimasa FUJIWARA
President, EASTS

Prof. Dr.Yu-Chiun CHIOU
1st Vice-President, EASTS

Dr. Tulasi Sitaula
Past President, SOTEN

Mr. Lal Krishna KC
Past President, SOTEN

Mr. Rajendra Raj Sharma
Past President, SOTEN

Mr. Jagat Man Shrestha
Kathmandu Metropolitan City

Organizing Committee

Symposium Chair:
Mr. Hare Ram Shrestha, Ph.D
President, SOTEN

Symposium Convenor:
Mr. Hemant Tiwari
General Secretary, SOTEN

Members:

Prof. Dr. Shinya HANAOKA
Secretary General, EASTS

Dr. Hiromichi Yamaguchi
Associate Professor, Kanazawa University

Mr. Bhimarjun Adhikari
Joint Secretary, MoID

Mr. Sushil Babu Dhakal
Joint Secretary, MoID

Dr. Bijay Jaishi
Director General, DoR

Mr. Ashok Kumar Sah
Director General, DoLID

Mr. Dilip Bhandari
Director General, DUDBC

Mr. Mukesh Dangol
Director General, CAAN

Dr. Keshab Kumar Sharma
Former Secretary, GoN

Mr. Kamal Pande
Senior Transport Specialist

Mr. Nicholas Pandey
President, FCAN

Mr. Thakur Prasad Sharma
President, SCAEF

Mr. Anga Lal Rokaya
Vice-President, SOTEN

Mr. Shrawan Kumar Thapa
Secretary, SOTEN

Mr. Bindu Adhikari
Treasurer, SOTEN

Mr. Binod Bhattarai
Department of Roads

Mr. Pradeep K. Shrestha, Ph.D
IOE, Pulchowk Campus

Mr. Ram Kumar Shrestha
Department of Roads

Mr. Saujanya Nepal
Department of Roads

Mr. Shiva Ram KC
Nepal Electricity Authority

Mr. Top Bahadur Baniya
High Powered Committee for Integrated Development of the Bagmati Civilization

Technical Committee

Dr. Rojee Pradhananga
Assistant Professor, IOE Pulchowk Campus

Mr. Sunil Poudyal
Traffic & Transportation Expert

Mr. Shuva Raj Neupane
Deputy Director General, Department of Roads

Mr. Kuber Nepali
CEO, Federal Capital City Public Transport Authority

Ms. Rosaria Ilaria Marino
Senior Consultant, TRL

Mr. Shuva Sharma
Scott Wilson Nepal

Dr. Basant Raj Adhikari
Director, Center for Disaster Risk Engineering, IOE Pulchowk Campus

Mr. Santosh Khadka
Kathmandu Engineering College

Symposium Secretariat

Ms. Samridhi Singh

Mr. Manjil Khatiwada

Ms. Asmita Pokhrel

Ms. Asmita Subedi

Mr. Sandesh Acharya

Mr. Sunil Paudel

Mr. Himal Paudel

About the Symposium

The International Symposium 2026 on Sustainable Transport and Urban Mobility was a one-day professional gathering held on 9 September 2026 at Hotel Royal Tulip, Lalitpur, Nepal. It was organized by the Society of Transport Engineers Nepal (SOTEN) in collaboration with the Eastern Asia Society for Transportation Studies (EASTS) and with the support of the Ministry of Infrastructure Development, Government of Nepal.

The symposium brought together policymakers, regulators, practising engineers, academics and development partners to examine how urban mobility systems can be planned, financed, operated and protected in a country whose settlement pattern is urbanizing rapidly and whose terrain makes its transport network unusually exposed to natural hazards. International case material was drawn from Singapore, Myanmar, India, Japan, Indonesia, New Zealand and the United Kingdom, and was set deliberately alongside Nepalese experience so that the transferable elements could be identified and the context-specific ones set aside.

Symposium Theme

"Sustainable Transport & Urban Mobility"

The theme addresses the convergence of three pressures on Nepal's transport sector: the growth of urban travel demand beyond the capacity of existing networks; the need to decarbonize and to shift travel toward public and non-motorized modes; and the demonstrated vulnerability of the network to floods, landslides and other climate-driven events. The symposium treated these not as separate agendas but as a single planning problem.

Sessions

- **Inaugural / Opening Session**
- **Keynote Session: The Future of Urban Mobility**
- **Technical Session 1: International Perspective & Experiences in Urban Mobility**
- **Technical Session 2: Urban Mobility in Regional and National Context**
- **Technical Session 3: Resilient and Sustainable Transport Infrastructure**
- **Closing Session**

Symposium Agenda

International Symposium 2026
Sustainable Transport & Urban Mobility

Hotel Royal Tulip, Lalitpur, Nepal | 9 September 2026 Wednesday

PROGRAM SCHEDULE

08:00 - 09:00 **Registration and Welcome of Participants (Refreshments)**

Inaugural/Opening Session

09:00 - 09:05 **Invitation to Dignitaries to the Dias**

Chair: Dr. Hare Ram Shrestha, President, SOTEN
Chief Guest: Honorable Ashish Gajurel, Member of Parliament; Chairman, Infrastructure Development Committee
Special Guest: Mr. Dhana Raj Acharya, Mayor, PokharaMetropolitan City
Guest: Mr. Gopal Prasad Sigdel, Secretary, Ministry of Infrastructure Development
Keynote Speaker: Prof. Dr. Bambang Susantono, Dean, Cities & Local Governments Institute Asia Pacific; Professor, Diponegoro University, Indonesia; Former Chairman, Nusantara New Capital Authority (2022-2024)
Guest: Prof. Dr. Akimasa Fujiwara, President, Eastern Asia Society of Transportation Studies (EASTS)
Symposium Convenor: Mr. Hemant Tiwari, General Secretary, SOTEN

09:05 - 09:10 **National Anthem followed by a moment of silence in condolence for the lives lost in Rasuwa flood**

09:10 - 09:15 **Welcome Remarks: Mr. Hemant Tiwari**, Symposium Convenor; General Secretary, Society of Transport Engineers Nepal (SOTEN)

09:15 - 09:20 **Remarks by the Co-Organizer: Prof. Dr. Akimasa Fujiwara**, President, Eastern Asia Society of Transportation Studies (EASTS)

09:20 - 09:25 **Special Remarks: Mr. Gopal Prasad Sigdel**, Secretary, Ministryof Infrastructure Development

09:25 - 09:30 **Remarks by the Special Guest: Mr. Dhana Raj Acharya**, Mayor, Pokhara Metropolitan City

09:30 - 09:40 **Remarks by the Chief Guest: Honorable Ashish Gajurel**, Member of Parliament; Chairman, Infrastructure Development Committee

09:40 - 09:45 **Token of Appreciation to the Keynote Speaker and Distinguished Guests**

09:45 - 09:50 **Concluding Remarks: Dr. Hare Ram Shrestha**, President, SOTEN

09:50 - 10:00 **Video reflecting recent disaster affecting transport infrastructure**

10:00-10:30 Keynote Session

- **The Future of Urban Mobility**
  Prof. Dr. Bambang Susantono, Dean, Cities & Local Governments Institute Asia Pacific; Professor, Diponegoro University, Indonesia; Former Chairman, Nusantara New Capital Authority (2022-2024)

10:30-12:20 Technical Session 1: International Perspective & Experiences in Urban Mobility

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Session Chair: Prof. Dr. Shinya Hanaoka, Secretary General, EASTS

- **Special Lecture: Economic Concentration and Transportation in the Capital City**
  Prof. Dr. Shigeru Morichi, Founder & Former President, Eastern Asia Society of Transportation Studies (EASTS), and Professor Emeritus, GRIPS
- **International Case Presentation: Urban Mobility in Singapore: Towards an Intelligent Transportation System and Autonomous Vehicles**
  Associate Prof. Dr. Ong Ghim Ping Raymond, National Universityof Singapore
- **International Case Presentation: Towards a Bicycle-Friendly Yangon: From Travel Patterns to Network Planning**
  Prof. Dr. Daw Kyaing, Yangon Technological University, Myanmar

Discussion and Question & Answer Session

Token of Appreciation to the Speakers

Remarks by the Session Chair

Group Photograph

12:20 - 13:10 **Lunch and Networking**

13:20-15:00 Technical Session 2: Urban Mobility in Regional and National Context

Session Chair: Mr. Bhimarjun Adhikari, Joint Secretary, Ministry of Infrastructure Development

- **Urban Mobility Planning for Public Transit and Multimodal Integration: The Indian Context**
  Dr. Srinivasa Reddy Nallamilli, FIE, FTTP, India
- **Urban Transport System Master Plan for Kathmandu: Insights from a JICA-Supported Project**
  Ms. Aya Iwatsuji, Programme Officer, JICA
- **Remarks from the Panel**
  Prof. Dr. Surya Raj Acharya, Registrar, University of Nepal

  Mr. Sunil Poudyal, Traffic & Transportation Expert

Question & Answer Session

Remarks by the Session Chair

Group Photograph

15:00 - 15:20 **Tea Break and Networking**

15:20-17:30 Technical Session 3: Resilient and Sustainable Transport Infrastructure

Session Chair: Honorable Arjun Jung Thapa, Member, National Planning Commission

- **Prioritizing Transport Infrastructure Interventions for Climate Resilience:** A Data-Driven Approach
  Ms. Rosaria Ilaria Marino, Senior Consultant, TRL

- **New Zealand Land Transport Funding Hypothecation and Natural Disaster Research Opportunities**
  Dr.-Ing. Jean Paul Thull, FCILT, President, EASTS-New Zealand
- **Turning Pressure into Progress: Managing Disasters on Nepal's Highway**
  Mr. Shuva Raj Neupane, Deputy Director General, Department of Roads
- **Remarks from the Panel**
  Mr. Kamal Pande, Senior Transport Specialist

  Dr. Basant Raj Adhikari, Director, Center of Disaster Risk Engineering, Institute of Engineering, Pulchowk Campus

  Mr. Keshab Kumar Sharma, Former Secretary, Government of Nepal

Question & Answer Session

Remarks by the Session Chair

Group Photograph

Closing Session (17:30-18:30)

17:30 - 17:35	**Invitation to Dignitaries to the Dias** **Chair: Dr. Hare Ram Shrestha, President, SOTEN** **Chief Guest: Dr. Bindu Nath Lohani, Chancellor, University of Nepal** **Special Guest: Honorable Arjun Jung Thapa, Member, National Planning Commission** **Guest: Prof. Dr. Padma Bahadur Shahi, Chairman, Nepal Engineering Council** **Guest: Mr. Gopal Prasad Sigdel, Secretary, Ministry of Infrastructure Development** **Guest: Prof. Dr. Yu-Chiun Chiou, 1st Vice-President, Eastern Asia Society of Transportation Studies (EASTS)** **Guest: Dr. Rojee Pradhananga, IOE Pulchowk Campus** **Vice-Chair: Er. Anga Lal Rokaya, Vice-President, SOTEN**
17:35 - 17:40	**Symposium Resolution**: **Dr. Rojee Pradhananga**, IOE Pulchowk Campus
17:40 - 17:55	**Token of Appreciation to Collaborating Partner and Sponsors**
17:55 - 18:00	**Remarks by the Guest** : **Prof. Dr. Yu-Chiun Chiou**, 1st Vice-President, Eastern Asia Society of Transportation Studies (EASTS)
18:00 - 18:05	**Remarks by the Guest**: **Prof. Dr. Padma Bahadur Shahi**, Chairman, Nepal Engineering Council
18:05 - 18:10	**Remarks by the Guest**: **Mr. Gopal Prasad Sigdel**, Secretary, Ministry of Infrastructure Development
18:10 - 18:20	**Remarks by the Special Guest**: **Honorable Arjun Jung Thapa**, Member, National Planning Commission
18:20 - 18:30	**Remarks by the Chief Guest**: **Dr. Bindu Nath Lohani**, Chancellor, University of Nepal
18:30 - 18:35	**Token of Appreciation to Distinguished Guests**
18:35 - 18:40	**Vote of Thanks: Er. Anga Lal Rokaya**, Vice-President, SOTEN
18:40 - 18:45	**Closing Remarks: Dr. Hare Ram Shrestha**, President, SOTEN
18:45 onwards	**Dinner and Networking Reception**

Inaugural Session

Chair: Dr. Hare Ram Shrestha, President, Society of Transport Engineers Nepal (SOTEN)
Time: 09:00 - 10:00

Registration opened at 08:00 with refreshments, and the Inaugural Session of the International Symposium 2026 commenced at 09:00 under the chairmanship of Dr. Hare Ram Shrestha, President of the Society of Transport Engineers Nepal. Dr. Shrestha invited the dignitaries to the dais and formally opened the proceedings.

The session was graced by Honorable Ashish Gajurel, Member of Parliament and Chairman of the Infrastructure Development Committee, as Chief Guest, with Mr. Dhana Raj Acharya, Mayor of Pokhara Metropolitan City, as Special Guest. Mr. Gopal Prasad Sigdel, Secretary of the Ministry of Infrastructure Development, and Prof. Dr. Akimasa Fujiwara, President of the Eastern Asia Society for Transportation Studies, joined as Guests. Prof. Dr. Bambang Susantono, Dean of the Cities and Local Governments Institute Asia Pacific, Professor at Diponegoro University, Indonesia, and former Chairman of the Nusantara New Capital Authority (2022-2024), delivered the keynote address online from Jakarta after a volcanic eruption disrupted air travel from Indonesia in the days preceding the symposium. Mr. Hemant Tiwari, General Secretary of SOTEN, attended as Symposium Convenor.

The formal proceedings began with the national anthem, followed by a moment of silence observed in condolence for the lives lost in the Rasuwa flood.

Welcome Remarks: Mr. Hemant Tiwari



Mr. Hemant Tiwari, Symposium Convenor and General Secretary of SOTEN, welcomed participants on behalf of the Ministry of Infrastructure Development, SOTEN, and EASTS. He explained that the symposium was organized alongside the EASTS Board Meeting in Kathmandu, the first such meeting in twelve years, which brought representatives from 19 member countries to Nepal. He noted that the recent devastating floods had prompted discussions about postponing the event, but the organizers decided to proceed while incorporating the disaster into the programme and linking it with the broader themes of sustainable transport and urban mobility. He outlined the day's programme, including the keynote address, Prof. Morichi's special session on urban development in capital cities, technical sessions with international speakers, the JICA-supported Kathmandu master plan presentation, and the closing panel discussion. He also expressed appreciation to SOTEN's members and supporters, emphasizing that the society operates on a volunteer basis and relies on their support to organize events of this scale.

Remarks by the Co-Organizer: Prof. Dr. Akimasa Fujiwara



Prof. Dr. Akimasa Fujiwara, President of EASTS, opened by extending condolences to those who lost their lives in the recent glacial lake outburst flood and expressing sympathy and solidarity with the affected families and communities. He placed the disaster within a broader pattern of natural hazards across Asia, noting recent events in Japan, Nepal, and Indonesia, and emphasized that disaster resilience is a shared regional challenge. As an expression of solidarity, he announced that EASTS, together with the Korean Society of Transportation, the Hong Kong Society for Transportation Studies, and the Chinese Institute of Transportation in Taiwan, had contributed more than USD 7,000 in relief donations to those affected by the flood. He emphasized that transportation serves as a critical lifeline during disasters by supporting evacuation, emergency response, recovery, and reconstruction, while also facing challenges from rapid urbanization, congestion, environmental pressures, and technological change. He highlighted EASTS as a diverse platform connecting researchers, universities, governments, international organizations, practitioners, and private-sector partners, and expressed hope that the symposium would generate new ideas, connections, and collaborations beyond the event itself.

A video titled "Resilient Transportation for Safer, Sustainable and Prosperous Future: Lessons from the Recent Natural Disasters in Nepal" was then screened.

Remarks by Guest: Mr. Gopal Prasad Sigdel



Mr. Gopal Prasad Sigdel, Secretary of the Ministry of Infrastructure Development, welcomed the international delegates to Nepal and reflected on the tribute paid to those who lost their lives in the Rasuwa flood. He emphasized that climate resilience is an immediate national priority, linking it to human safety, economic continuity, and the reliability of transport lifelines. He argued that transport development should be measured not only by kilometres of road constructed, but also by the resilience of roads, bridges, and slopes to climate hazards in Nepal's geologically active terrain. Addressing rapid urbanization in Kathmandu Valley, Pokhara, and major trade corridors, he highlighted growing congestion, air pollution, road crashes, and weaknesses in public transport systems. He called for a shift from private vehicle-oriented planning toward people-centred mobility that prioritizes high-capacity public transport, accessibility, walking, and cycling. He outlined three strategic pillars of the Ministry's work: strengthening international collaboration, including through the JICA-supported Kathmandu urban transport master plan, to advance dedicated bus corridors, route rationalization, cashless ticketing, and scheduled services; accelerating transport electrification by leveraging Nepal's hydropower potential and developing regulatory, charging, and public-private partnership frameworks; and modernizing resilience and infrastructure procurement through proactive risk reduction, hazard mapping, bioengineered slope stabilization, and performance-based life-cycle maintenance. He concluded by describing the symposium as a policy forum capable of connecting research with implementation and reaffirmed the Ministry's commitment to translating its resolutions into engineering standards, procurement provisions, and concrete projects.

Remarks by the Special Guest: Mr. Dhana Raj Acharya



Mr. Dhana Raj Acharya, Mayor of Pokhara Metropolitan City, welcomed participants on behalf of the city and, departing from his prepared English remarks, spoke partly in Nepali. He emphasized the responsibility of policymakers for infrastructure failures and stressed that decisions made through policy must also be enforced consistently. He questioned the long-standing practice of developing roads along riverbanks for construction convenience, calling for greater consideration of their long-term economic and environmental consequences. He also urged that Environmental Impact Assessments and Initial Environmental Examinations be conducted as genuine risk assessments rather than prepared by replicating previous reports. Addressing urban road safety, he noted the frequent occurrence of crashes in Pokhara and argued that the underlying policy and planning issues require attention at the appropriate institutional level. Reflecting on Nepal's rapid urbanization following federal restructuring, he cautioned that designating local governments as municipalities does not automatically create functional cities and called for a common commitment, such as a Kathmandu Declaration, to guide sustainable urban development in Nepal and other developing countries. He concluded by highlighting Pokhara's progress in improving household water supply and urban mobility over the past decade, as well as its ongoing Asian Development Bank-supported electric mobility project and separate green transport initiative, and invited international delegates to visit the city.

Remarks by the Chief Guest: Honorable Ashish Gajurel



Delivering the address of the Chief Guest, **Honorable Ashish Gajurel**, Member of Parliament and Chairman of the Infrastructure Development Committee, emphasized the need to build people-centred cities that serve persons with disabilities, older people, children, cyclists, pedestrians, public transport users, and private vehicle users alike. Drawing on his professional background in infrastructure and transport, he reflected on his visit to the Krishna Bhir landslide site the previous day and noted that slope instability along the corridor has persisted for decades, highlighting the need to address long-standing infrastructure vulnerabilities. He outlined the committee's oversight responsibilities in transportation, energy, irrigation, and water resources, as well as its engagement with the Ministry of Infrastructure Development on current policy issues. He acknowledged the pressure on engineers to minimize project costs amid limited resources and high infrastructure demand, noting that this can result in greater emphasis on the quantity of infrastructure than on its quality, resilience, and integration with productive sectors such as agriculture, industry, and hydropower. He also called for greater private-sector investment, both domestic and international, alongside multilateral and bilateral development support, and invited investors to raise bureaucratic challenges directly with the committee. He concluded by urging the symposium to develop concrete recommendations on infrastructure resilience and private investment that could inform future government policies, legislation, and regulations.

Concluding Remarks: Dr. Hare Ram Shrestha



Dr. Hare Ram Shrestha, President of SOTEN, delivered the concluding remarks of the inaugural session. He recalled that the symposium had been envisioned earlier by SOTEN committee and became possible following EASTS's approval of Nepal's bid to host the EASTS Board Meeting at its conference in Surakarta, Indonesia. He expressed appreciation to the EASTS Secretariat, President, and General Secretary for their guidance and support. Referring to the United Nations Decade of Sustainable Transport (2021–2035), he noted that recent landslides and floods had damaged 43 bridges, 40 kilometres of highway, and 14 hydropower projects, underscoring the urgency of the symposium's theme. He also highlighted how transport disruptions had directly affected the event, as the volcanic eruption in Indonesia disrupted air travel and prevented the keynote speaker from attending in person. He thanked the Chief Guest, Secretary of Infrastructure Development, and Mayor of Pokhara for attending despite the significant national responsibilities and ongoing transport disruptions at the time, and welcomed the EASTS leadership and delegates from its 19 member countries. He then formally concluded the inaugural session and handed over to the keynote presentation by Prof. Dr. Bambang Susantono, delivered online from Jakarta.

Keynote Session

Time: 10:00 – 10:30

The Future of Urban Mobility



Prof. Dr. Bambang Susantono, Dean, Cities & Local Governments Institute Asia Pacific; Professor, Diponegoro University, Indonesia; Former Chairman, Nusantara New Capital Authority (2022–2024)

Prof. Susantono structured his keynote in five parts: the state of urban transportation today, the five mega-trends reshaping it, the new transport methods and technologies emerging in response, and finally a call to navigate the changing world, closing with a direct charge to EASTS as an institution.

Prof. Dr. Bambang Susantono opened his keynote by drawing attention to the two-way relationship between urban growth and transportation. As populations grow and land use changes, demand for transportation increases, while transportation infrastructure in turn influences the direction and pace of urban development. He placed this relationship within the scale of global urbanization, noting the rapid increase in the number of megacities and the continuing growth of the world's urban population. He also highlighted the close relationship between the quality of urban transportation and GDP per capita, while noting that access to local services and amenities can itself reduce the need for people to travel long distances by car.

Against this backdrop, Prof. Susantono outlined seven challenges that are becoming increasingly visible in rapidly urbanizing cities. These included traffic congestion, road safety, inadequate infrastructure for walking and cycling, unequal access to transportation, first- and last-mile connectivity, job-housing mismatch, and environmental impacts. Using examples from Indonesia and other countries, he showed how these issues are closely interconnected. He described congestion as a self-reinforcing cycle in which additional road capacity can induce more travel and urban expansion, ultimately generating further congestion. He noted that congestion in Indonesian urban areas has significant economic costs and that private cars continue to account for a large share of trips globally. On road safety, he highlighted the scale of transport-related fatalities worldwide and the continuing challenges faced by countries such as Indonesia. He also pointed to disconnected footpaths, pedestrian spaces occupied by parked vehicles, and inadequate facilities for persons with disabilities and cyclists as evidence of the persistent weaknesses in non-motorized transport infrastructure. Unequal access to employment, poor first- and last-mile connections, and the separation of affordable housing from employment centres further increase people's dependence on motorized travel. These challenges, he argued, ultimately contribute to the environmental burden associated with urban transportation.

Prof. Susantono then identified five major trends that are reshaping the context in which transport planners must work: rapid urbanization, climate change, economic changes including inflation, demographic change, and technological disruption. These trends, he argued, mean that planning approaches developed for the cities of yesterday cannot simply be carried forward into the cities of tomorrow. He pointed to changing consumer preferences as evidence of this transition, with growing interest in public transport, micromobility, shared mobility, electric vehicles, and multimodal travel.

Although private cars are expected to remain an important mode, he noted that their overall share of urban travel could decline as people gain access to a wider range of mobility options.

A substantial part of the keynote focused on the technologies and planning approaches that could shape future urban mobility. Discussing transit-oriented development, he stressed that TOD should not be reduced to development around railway or bus stations. Properly understood, it is an approach to urban development that integrates land use with public transport and makes transit a central part of everyday mobility. He connected this idea with the fifteen-minute city, where most daily needs, including employment, food, healthcare, education, culture, and recreation, can be reached within a short walking or cycling trip. He also explored the growing role of autonomous vehicles, robotics, artificial intelligence, and intelligent transport systems, highlighting applications such as automated highway inspection, AI-supported traffic management, digital ticketing, and emerging robotic and drone technologies. Drawing on examples from Jakarta and elsewhere, he showed that many of these technologies are already moving beyond the experimental stage.

His discussion of technology was accompanied by an important reminder about inclusion. Smart and green transport, he argued, cannot be considered successful simply because it is technologically advanced. It must also be accessible to persons with disabilities and other groups that are often overlooked in transport planning. He illustrated this through examples of accessible public transport and emphasized the need to consider spatial, social, and economic inclusion together. He also discussed urban logistics, noting that freight movement should be planned alongside passenger transportation rather than treated as a separate or secondary concern. Digital twins and AI-supported logistics management, he suggested, could increasingly help cities coordinate the movement of goods in real time.

Prof. Susantono also devoted considerable attention to the changing role of air transportation and urban air mobility, drawing on his professional work and his co-authored book on the subject. He presented urban air mobility as a potential additional layer of the urban transport system rather than a replacement for existing modes. Connected and automated vehicles, mass transit, and aerial mobility could operate as complementary components of a future mobility system. At the same time, he cautioned that issues such as noise must be taken seriously as these technologies develop. Looking further ahead, he described the future airport as a seamless, intelligent, and sustainable mobility hub, supported by biometric identification, artificial intelligence, autonomous ground vehicles, solar energy, digital twins, and integration with urban air mobility. He identified digital twins, RFID-based baggage systems, and AI-based predictive maintenance as technologies likely to have particularly important practical applications in future airport and transport infrastructure management.

In the final part of his keynote, Prof. Susantono returned to what he described as the fundamental principles that should guide these technological and planning choices. Drawing on his involvement with the United Nations and FIA High Level Panels for Road Safety, he emphasized that mobility is a human right and should remain the starting point for transport planning. He revisited the mobility pyramid, with walking and cycling at its base, followed by public transport and shared mobility, while private vehicles and aviation occupy the upper levels. He illustrated the efficiency of this hierarchy through the familiar comparison of road space required by buses, pedestrians, cyclists, and private cars. The underlying

message was clear: cities should use scarce road space in ways that move the greatest number of people efficiently and equitably.

He also connected transportation with the physical form of cities. Using Jakarta as an example, he showed how urban expansion and transport networks have developed together and argued that cities need to move away from disorganized, monocentric growth toward more organized and polycentric urban forms centred on strong transport corridors. He urged planners, technology providers, logistics operators, and policymakers to move beyond institutional silos, share data, and align their incentives around common urban mobility objectives. In a particularly human framing of the issue, he suggested that the success of a future city should not be judged by how many roads it builds, but by whether people can reach their destinations efficiently, goods can be delivered on time, and children can breathe clean air.

Prof. Susantono concluded by outlining the broader principles of sustainable transportation: environmental sustainability, economic efficiency, social equity, sound investment, and effective regulation. He emphasized that infrastructure, regulation, and enforcement must work together. Even well-designed infrastructure cannot deliver its intended benefits without appropriate policies and effective enforcement. He closed with a call for EASTS to take a leading role as a regional knowledge platform during a period of rapid technological, environmental, and urban change. His message also resonated with the partnership at the heart of the symposium: that organizations such as SOTEN and EASTS have an important role in connecting research, policy, technology, and practice to shape more sustainable and inclusive transport systems across Asia.

Technical Session 1
International Perspective & Experiences in Urban Mobility

Session Chair: Prof. Dr. Shinya Hanaoka, Secretary General, Eastern Asia Society for Transportation Studies (EASTS)

Time: 10:30 – 12:20

Chaired by Prof. Dr. Shinya Hanaoka, Secretary General of the Eastern Asia Society for Transportation Studies, this session assembled international case material on urban mobility from three very different settings: a high-income city-state with a mature intelligent transport system, a large metropolitan capital confronting the consequences of economic concentration, and a rapidly growing South-East Asian city at an earlier stage of network planning. Taken together, the presentations offered a range of reference points against which Nepal's own position could be judged.

Special Lecture: Economic Concentration and Transportation in the Capital City

Prof. Dr. Shigeru Morichi, Senior Adviser for Research, Japan Transport and Tourism Research Institute; Professor Emeritus, Tokyo Institute of Technology, University of Tokyo and GRIPS; Founder and Former President, Eastern Asia Society for Transportation Studies (EASTS)



Prof. Morichi opened his presentation by placing Asia's urbanization within a much broader historical context. He noted that the total urban population increased from around 0.75 billion in 1950 to 2.9 billion in 2000 and was projected to reach 4.7 billion by 2025, with the most rapid growth occurring in Asia. To illustrate the different patterns of urban concentration across the region, he compared the share of national populations living in capital metropolitan areas among EASTS member countries. Kathmandu's metropolitan area accounts for about 9.8 per cent of Nepal's population, a proportion comparable to Yangon and Colombo but considerably lower than Seoul, where the figure is about 51 per cent, and Bangkok, at around 21 per cent. However, he stressed that the pressures associated with capital-city growth are not determined by this ratio alone.

He then described what he called a vicious circle of regional disparity. Differences in income and employment opportunities encourage migration toward capital cities, while public and private investment also tends to concentrate there because tax revenues, government expenditure, and foreign aid are channelled through the central government. Higher economic growth in the capital then reinforces its attractiveness, creating further migration and investment concentration. For developing-country capitals, this process often results in inadequate infrastructure and limited financial resources, growing income disparities, shortages of affordable housing, the expansion of informal settlements and squatter areas, and the arrival of migrants without sufficient employment or housing opportunities.

Against this experience, Prof. Morichi presented Japan as an example of a country that was able to achieve high economic growth while reducing regional disparity. He explained that this was not the result of a single policy, but of several measures implemented together. These included infrastructure investment combined with incentives for private investment, beneficiary-burden financing linked to land development, efficiency improvements in rural primary industries, restrictions that encouraged factories to locate outside major cities, public and corporate housing programmes, and a lifetime-employment

model that provided migrants to major cities with stable employment, housing, and education. He also went into considerable detail about the financial resources that supported Japan's infrastructure development. These included profits generated through land reclamation, land readjustment and new-town development, beneficiary-pays mechanisms such as fuel taxes, port and airport usage fees and toll roads, loan-financed public corporations, and cross-subsidy and inflation-linked fare policies. In his view, these institutional and financial arrangements were fundamental to Japan's development experience rather than incidental supporting measures.

Turning to urban railways, Prof. Morichi argued that congestion in Asian mega-cities has become a constraint not only on transportation, but also on economic growth, the environment, and overall quality of life. As household incomes increase, car ownership tends to rise unless public transport is deliberately developed as a competitive alternative. He presented four broad urban structures for comparison: centralized development, multi-core development, low-density dispersed development, and car-oriented development. He argued in favour of transit-oriented and preferably multi-core urban development rather than the car-oriented model associated with cities such as Los Angeles, contrasting this with Tokyo's rail-oriented urban structure.

The timing of investment, he stressed, is equally important. When mass transit is introduced only after car ownership has become deeply established, as occurred in many US cities, it becomes much more difficult to attract passengers back to public transport. By contrast, he cited Taipei as an example where earlier investment in mass transit helped regain public transport ridership. He suggested that Phnom Penh is currently at a stage where the timing of decisions on mass transit could have a particularly significant influence on the city's future urban structure.

Prof. Morichi was also critical of what he described as a common misconception that light rail transit and bus rapid transit can serve as substitutes for heavy rail in mega-cities. On the busiest corridors, he argued, these systems may not have sufficient capacity to accommodate future demand and are more appropriately suited to routes with comparatively lower passenger volumes. He referred to Manila's LRT, where peak-period waiting times can reach thirty minutes and queues can extend outside stations, and to Bangkok's Blue Line, where platforms were designed for six-car trains but operations had not yet shifted from three-car to four-car trains. He also challenged the assumption that international financial institutions recommend LRT or BRT for mega-cities simply because heavier rail is unaffordable.

Instead, he outlined four principal ways of increasing the capacity of urban rail systems: increasing train frequency, operating longer and larger trains, constructing new lines, and improving stations. He noted, however, that station improvements themselves face physical constraints related to platform capacity, escalators, ticket gates, and concourse space. He further emphasized that a mega-city requires a hierarchical railway network rather than a collection of independent lines. Long-distance services with wider station spacing are needed for major commuting movements, while more closely spaced services are necessary to provide local accessibility.

Station-plaza design, he argued, is another critical element in making such a network function as an integrated system. Effective stations must facilitate rail-to-rail transfers, connections between rail and feeder services, and common fare systems. He contrasted Tokyo's detailed design manuals and cost-

sharing arrangements with Manila's LRT1 experience. Although converting a surface railway to an elevated system preserved valuable road space, the absence of appropriate station plazas for feeder jeepneys and tricycles contributed to congestion around stations. The example demonstrated that railway infrastructure cannot be considered in isolation from the surrounding street and feeder network.

Prof. Morichi then examined the experience of public-private partnerships in urban rail, tracing their international development from Turkey's BOT proposal in 1980 through the UK's Private Finance Initiative and its subsequent replacement by PF2. He presented several examples from Asia where PPP arrangements had encountered serious difficulties. Seoul's Metro Line 9 faced problems after the government rejected a proposed fare increase, exposing the project to country-risk pressures. Delhi's Airport Express eventually moved from private to public operation following bankruptcy. Manila's MRT3 suffered from inadequate capacity, low fares, and maintenance problems, with around one-third of its fleet becoming inoperable before Japanese ODA support helped restore safe operations. Bangkok Metro required support through cross-subsidy from road projects, while Kuala Lumpur's Kelana Jaya Line was taken over by a government-owned special-purpose company after its holding company collapsed during the Asian Financial Crisis.

From these cases, Prof. Morichi identified three recurring causes of PPP failure. The first was the political setting of fares too low to provide a sustainable revenue base, particularly when compared with bus fares. The second was the expectation that profits from surrounding urban development could compensate for railway deficits during the early stages of operation. He argued that this assumption overlooks the fact that railway losses are generally greatest in the early years, while the benefits from land development emerge only over a much longer period. The third was the loss of revenue caused by reduced vehicle availability when maintenance is inadequate. Based on these experiences, he argued that governments should directly assume infrastructure and demand risks, particularly by funding initial railway lines and using the profits generated by mature lines as an internal source of subsidy for network expansion. He cautioned that PPP arrangements selected primarily on the basis of the lowest price can repeatedly produce unsustainable outcomes.

His discussion then moved to transit-oriented development. Prof. Morichi distinguished the relatively narrow American definition of TOD, associated with Peter Calthorpe's 1993 concept of a mixed-use community located within approximately 2,000 feet of a transit stop, from the broader Japanese approach. He traced the Japanese model back to Ichizo Kobayashi's development of the Hankyu Railway in 1910. The approach linked suburban housing development with railway ridership, while urban-area attractions helped generate off-peak demand and suburban destinations helped create counter-flow demand during peak periods. Over time, this model developed into a broader business strategy in which related activities such as retail, real estate, education, and hospitals became major sources of revenue for railway companies rather than relying on railway fares alone.

He explained that TOD can be understood at two different scales. The first involves development that shapes the overall urban structure, particularly around city-centre stations and major suburban hubs. The second focuses on development immediately surrounding individual stations. As an example of the integrated approach, he discussed Tokyu Corporation's coordinated development of transportation and land use at Aobadai, approximately twenty kilometres from central Shibuya. The example demonstrated

how railway investment, land development, and the creation of supporting urban activities can reinforce one another when planned as a single system.

Prof. Morichi concluded his presentation with a detailed discussion of the financial resources available for urban railway development, including fares, cross-subsidy, value capture, government subsidy, and PPP. He argued that fares should ultimately be determined on the basis of costs and revised accordingly rather than being fixed purely for political reasons. Cross-subsidy between older and newer railway lines can also be justified, he noted, provided that the mechanism is transparent and appropriately regulated. Government subsidy, in his view, is generally unavoidable during the initial stage of railway development. Without such support, many Asian urban rail systems have experienced financial difficulties and eventually required even larger public interventions. Similarly, value capture can work only when urban planning and development regulations allow the potential development value created by transport investment to be realized.

He closed by drawing together five principal conclusions. First, Asian mega-cities cannot rely on BRT and LRT alone and will require heavy rail to accommodate future demand on major corridors. Second, railway networks need a clear hierarchy, just as road networks do, with different services responding to different levels of travel demand. Third, the financial sustainability of operators is essential for maintaining services and continuing technological improvements. Fourth, bus and para-transit fares need to remain compatible with rail fares rather than systematically undercutting them. Finally, the timing of investment is critical. For this reason, he stressed the importance of preparing an urban railway master plan well before major investment decisions are required, citing Tokyo's urban railway master plan from the early 1960s as an example. His overall message was that transport investment, urban development, financial mechanisms, and institutional policy must be considered together if Asian mega-cities are to develop efficient and sustainable mobility systems.

International Case Presentation: Urban Mobility in Singapore — Towards an Intelligent Transportation System and Autonomous Vehicles

Associate Prof. Dr. Ong Ghim Ping Raymond, Dean's Chair, College of Design and Engineering; Director, Centre for Transportation Research, Department of Civil and Environmental Engineering, National University of Singapore



Associate Prof. Dr. Ong opened his presentation by arguing that mobility in Singapore is not simply a matter of transportation, but a fundamental condition of national viability. As a city-state whose economy depends heavily on trade, talent, and tourism, Singapore relies on strong connectivity at the urban, international, and logistical levels. He explained that these different forms of connectivity are closely linked to the country's economic competitiveness and resilience, and are therefore treated as central considerations in national planning.

He described Singapore's planning philosophy as one of integrated and long-term infrastructure development. Land use and transportation are planned together over horizons of twenty to fifty years, with infrastructure often provided ahead of anticipated demand rather than introduced only after problems emerge. Scenario-based analysis is used to account for different possible futures, while

coordination across government agencies helps align land development, transport investment, and wider national objectives. Within this framework, land transport is organized around a rail-centric network supported by integrated bus services, expanding active mobility infrastructure, and deliberate attention to first- and last-mile connectivity.

He also discussed the policy instruments that support this transport system, including the Certificate of Entitlement, Electronic Road Pricing, broader travel-demand management measures, and transit-oriented development. These measures are designed not simply to restrict private vehicle ownership or use, but to create conditions in which public transport becomes the preferred mode for everyday travel while remaining affordable and accessible to the wider population. The approach therefore combines infrastructure provision with demand management rather than relying on either strategy in isolation.

Moving from physical infrastructure to the digital dimension of mobility, Associate Prof. Dr. Ong described Singapore's transition toward intelligent mobility ecosystems. These increasingly incorporate intelligent transport systems, artificial intelligence-based traffic management, sensor networks, integrated mobility platforms, and real-time operations management. He highlighted the growing role of digital twins in this transition, particularly for transport planning, predictive maintenance, infrastructure health monitoring, and scenario simulation. Such tools can also support resilience planning and climate adaptation by allowing authorities to test potential disruptions and interventions before they occur, while improving the day-to-day optimization of transport operations.

The sustainability transition formed another major part of his presentation. He discussed the growing adoption of electric vehicles, the electrification of public bus fleets, green shipping, and circular economy approaches to infrastructure development. Rather than considering sustainability only in terms of operational emissions, he stressed the importance of lifecycle thinking, including the materials used, energy consumption, durability, maintenance requirements, and overall carbon footprint of infrastructure and vehicles.

He then presented two strands of his own research. The first addressed the planning of electric vehicle charging infrastructure in a dense urban environment. His proposed four-step method considers the deployment of both normal and fast charging facilities to meet the charging requirements of private electric vehicles as well as electric taxis operating under one-shift and two-shift arrangements. The second focused on estimating energy consumption at the transport-network level while accounting for battery degradation. He explained that battery performance changes over the life of a vehicle, meaning that energy consumption per unit of travel can increase as battery capacity and efficiency decline. Incorporating this effect can therefore provide a more realistic assessment of the long-term energy requirements of an electric transport system.

Throughout the presentation, he maintained a strong human-centred perspective alongside the technological discussion. He addressed accessibility, universal design, Silver Zones, walkability, and the development of inclusive mobility systems. He also referred to research on building-level accessibility within a twenty-minute neighbourhood framework, where land-use and transport information can be integrated across walking, cycling, and public transport networks. This approach places accessibility to

opportunities and services at the centre of planning rather than measuring mobility only by speed or travel distance.

On governance, Associate Prof. Dr. Ong identified strong institutional coordination, long-term policy continuity, a pilot-and-scale approach, and integration across the public sector as important conditions behind Singapore's transport outcomes. At the same time, he was careful not to present Singapore as a model that could simply be replicated elsewhere. He acknowledged that the country's institutional arrangements, geographical characteristics, and governance structure are distinctive, and that other cities and countries need to determine which elements can realistically be adapted to their own circumstances.

He concluded by identifying several tensions that are likely to become increasingly important as mobility systems evolve: connectivity versus sustainability, automation versus employment, efficiency versus privacy, resilience versus affordability, and economic growth versus liveability. Rather than presenting technology as an end in itself, he argued that future mobility should be judged by how effectively it contributes to resilient, sustainable, accessible, and human-centred urban systems. His concluding message was that the future of mobility is not simply about moving people faster, but about creating urban systems that remain functional, inclusive, and liveable as cities face changing environmental, technological, and social conditions.

International Case Presentation: Towards a Bicycle-Friendly Yangon — From Travel Patterns to Network Planning



Prof. Dr. Kyaing, Visiting and Former Professor, Department of Civil Engineering, Yangon Technological University, Myanmar

Prof. Dr. Kyaing presented a bicycle network planning approach for Yangon that was grounded in observed travel behaviour rather than assumed demand. She began by explaining why cycling deserves greater attention in the city's transport planning. According to the YUTRA transport mode share survey, bicycles account for about 23 per cent of trips in Yangon, making cycling the second most-used mode after large buses. Bicycle use increased further during the COVID-19 period as public transport use declined. With motorcycles still banned within the city, bicycles have also become particularly important for food delivery and other short-distance commercial trips. At the same time, cycling safety remains a serious and growing concern. Bicycle-related accidents increased from 9 per cent of all traffic accidents in 2017 to a peak of 16 per cent in 2020, while fatal bicycle accidents accounted for 5 per cent of traffic fatalities in 2022. These risks exist alongside limited dedicated bicycle lanes and parking facilities, leaving cyclists to share road space with motorized traffic. Against this background, Prof. Kyaing argued that creating a bicycle-friendly city requires more than simply constructing bicycle lanes. It first requires an understanding of how people actually travel, where they travel, and under what conditions they choose to cycle.

The study covered Yangon's 971 km² area and its population of approximately 7.47 million in 2019. The methodology progressed from identifying the main cycling problems and collecting questionnaire data to descriptive and regression analysis of bicycle trip frequency. This was followed by spatial route analysis using Kernel Density Estimation and an overlay of the resulting demand patterns with existing

transport infrastructure. The final stage translated these findings into proposed bicycle network outputs. Field data were collected through roadside interviews in September 2023 across 33 townships. The survey covered a wide range of trip purposes, including food and cargo delivery, education, recreation, business, work, and social activities. Although the calculated minimum sample size was 384, the study collected 620 responses and retained 608 valid responses, representing 98 per cent of the collected sample. The variables were organized into three broad groups covering socio-economic characteristics, travel behaviour, and the built environment.

The descriptive results provided a detailed picture of the city's cycling population. Company employees represented the largest group of respondents at 43 per cent, followed by students at 13 per cent, with most cyclists falling within the 21 to 30 age group. The sample was predominantly male, with men accounting for 73 per cent of respondents. A large majority, 88 per cent, did not own a motor vehicle, while 68 per cent owned only one bicycle. Work was the most common trip purpose, accounting for 16.5 per cent of trips, followed by food delivery at 15.1 per cent and recreation at 13.2 per cent. When asked why they chose bicycles, respondents most frequently identified travel cost, at 35.1 per cent, followed by health benefits at 24.8 per cent. Most bicycle trips lasted between 15 and 30 minutes, reinforcing the importance of cycling for relatively short urban journeys.

The findings on cycling infrastructure were particularly revealing. Only 24 per cent of respondents reported having a bicycle lane available along their route. However, among those who had access to a bicycle lane, 96 per cent reported using it. This suggests a strong relationship between the provision of dedicated infrastructure and actual cycling behaviour. Among respondents without a bicycle lane, 66 per cent reported riding in the inner traffic lane rather than using the platform or outer lane. Destination facilities were also important: 57 per cent reported that bicycle stands were available at their destination. At the same time, 68 per cent encountered traffic congestion along their routes, while only 46 per cent said they felt safe while cycling. These findings highlighted that infrastructure availability, traffic conditions, and perceived safety remain closely connected to the everyday cycling experience in Yangon.

To examine the factors associated with bicycle use more systematically, Prof. Kyaing presented a multiple linear regression model of bicycle trip frequency using the socio-economic, travel, and built-environment variables. The model achieved an R^2 of 0.765 and an adjusted R^2 of 0.762 using an 80/20 train-test split, indicating a relatively strong explanatory performance. Delivery purpose emerged as by far the strongest positive predictor of bicycle trip frequency, with a coefficient of $\beta = 14.674$ and significance at $p<0.01$. This was followed by middle-income status, with $\beta = 2.355$ and $p<0.01$. Bicycle stand availability also showed a positive association, with $\beta = 0.895$ and $p<0.10$, while basic education had $\beta = 0.830$ and $p<0.10$. In contrast, e-bike ownership was a significant negative predictor, with $\beta = -1.438$ and $p<0.05$.

Prof. Kyaing interpreted these results as evidence that cycling in Yangon is not limited to people who have no alternative means of transportation. The positive association between middle-income status and bicycle trip frequency suggests that cycling also serves users who could potentially choose other modes. The influence of bicycle stand availability was equally important from a planning perspective, indicating that secure parking can affect how frequently people choose to cycle. The particularly strong relationship

between delivery activity and bicycle use also reflects the growing role of cycling in Yangon's urban commercial and service economy.

The study then moved from individual travel behaviour to network planning. The 608 origin-destination records were digitized in ArcGIS and analysed using Kernel Density Estimation to identify corridors with concentrated cycling demand. These demand patterns were then overlaid with existing bicycle lanes, bus stops, and train stations. To strengthen the analysis and avoid relying solely on reported travel behaviour, Prof. Kyaing also incorporated GPS-tracked routes from food-delivery cyclists. These routes were collected separately in September 2023 and provided an additional source of evidence on the corridors being used in practice. The combination of questionnaire-based routes and GPS-tracked delivery movements helped identify where actual cycling demand was concentrated.

The resulting demand heatmap was then compared with public transport access points to identify opportunities for connecting cycling with the wider urban transport system. Rather than proposing a network for immediate citywide implementation, the study organized the proposed routes into three priority levels. Rank 1 corridors represented the highest-priority routes, supported by the strongest evidence of cycling demand. Rank 2 corridors were identified as secondary routes connecting important urban areas, while Rank 3 corridors provided supporting links that could help extend the overall network and improve coverage. This phased approach provides a practical way of matching investment with demonstrated demand while allowing the network to expand progressively.

Prof. Kyaing brought the statistical and spatial findings together in her concluding observations. Bicycle-trip frequency was highest among delivery cyclists, middle-income users, and those with basic education, while bicycle parking availability also encouraged more frequent use. The majority of cyclists were working-age employees in their twenties, and most bicycle journeys lasted between 15 and 30 minutes. She also found that most trips remained within a single township, while inter-township movements were more concentrated around the central business district. These patterns provide useful evidence for identifying where dedicated infrastructure would have the greatest immediate value.

She placed these findings within the wider sustainability benefits of cycling. Greater use of bicycles can help reduce air pollution and dependence on fossil fuels, while shifting short-distance and delivery trips away from motorized vehicles can contribute to congestion reduction. Cycling also provides direct public health benefits through increased physical activity. However, Prof. Kyaing stressed that these benefits will be difficult to realize without a safer and more supportive infrastructure environment. She therefore concluded that a phased bicycle network combining dedicated lanes, secure parking, and connections with public transport is essential for making cycling in Yangon both safer and more attractive. More broadly, she presented the study as an example of how observed travel behaviour, statistical analysis, spatial data, and practical network planning can be brought together to provide an evidence-based foundation for future transport policy that gives cycling a more central role.

Question and Answer Session I

Associate Prof. Dr. Ong Ghim Ping Raymond addressed the growing concern over electric vehicle battery disposal, noting that landfilling can cause heavy-metal leaching and significant environmental pollution. He emphasized that two fundamental questions should be considered before disposal. First,

degraded batteries often retain meaningful residual capacity and can be reconfigured for energy storage applications, such as supplementary charging systems or grid-scale storage that charges during off-peak periods and discharges during peak demand. Second, heavy metals contained in the batteries can potentially be extracted and recycled into new materials, although this technology remains largely at the research and development stage in Singapore and elsewhere. With the first generation of EV batteries deployed around 2010 now approaching end of life, the need for effective solutions is becoming increasingly urgent. However, battery reuse for energy storage is already a practical near-term application.

Prof. Dr. Shigeru Morichi explained that licensing for infrastructure development along mass transit projects is regulated by railway-related agencies and is governed by several factors, including financial capacity, safety standards, and the availability of adequate engineering personnel. Senior engineering appointments generally require approval from the central government. He also noted that data and information from EASTS member organizations, including private-sector board members, contribute to this regulatory and oversight process.

Regarding the application of public-private partnerships (PPP) to a potential Kathmandu metro rail connection, Prof. Dr. Shigeru Morichi described the issue as particularly challenging. He argued that infrastructure development should generally remain the responsibility of the public sector because railway systems do not fit comfortably within a narrowly commercial framework. PPP arrangements may be more appropriate for railway operations, which could, in some cases, be contracted to experienced operators from outside Nepal. He emphasized that effective risk sharing is the key consideration, particularly in determining which risks should be borne by the private sector and which should remain with the public sector. Excessive risk allocation to private partners can increase the likelihood of bankruptcy and ultimately require greater public expenditure to rescue the project. Therefore, careful structuring with the support of experienced consultants is essential.

Remarks by the Session Chair: Prof. Dr. Shinya Hanaoka



Prof. Dr. Shinya Hanaoka, Secretary General of EASTS, closed the session by drawing out what he considered the key lessons from the three presentations. From Prof. Morichi's special lecture, he took away that mass rail transit delivers benefits over a much longer time horizon than LRT or BRT, and that Singapore's roughly fifty-year planning horizon was a model of the long-term vision Nepal's own transport planning should aspire to rather than a narrower, more short-sighted approach. From Prof. Kyaing's presentation on Yangon, he highlighted the effectiveness of the city's motorcycle ban in accelerating a shift toward bicycle use, and posed the question directly to the room: what would happen if Kathmandu were to introduce a similar ban? He suggested that decisive government intervention of this kind could improve Nepal's transport situation both immediately and over the longer term, and closed the session by thanking all three speakers.

Tokens of appreciation were presented to the speakers by Mr. Lal Krishna KC & Mr. Ashok Kumar Sah, and a group photograph was taken. The session was followed by lunch and networking.



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Technical Session 2
Urban Mobility in Regional and National Context

Session Chair: Mr. Bhimarjun Adhikari, Joint Secretary, Ministry of Infrastructure Development
Time: 13:20 – 15:00

Chaired by Mr. Bhimarjun Adhikari, Joint Secretary at the Ministry of Infrastructure Development, this session moved the discussion from international precedent to the regional and national setting. It paired an Indian account of public transit and multimodal integration with a detailed presentation on the master planning process under way for Kathmandu, and closed with a panel drawing on Nepalese academic and professional expertise.

Urban Mobility Planning for Public Transit and Multimodal Integration: The Indian Context

Dr. N. Srinivasa Reddy, FIE, FITP, Urban Transport Infrastructure Expert and Multi-Modal Integration Specialist



Dr. Reddy framed his presentation around a central diagnosis: Indian cities have urbanized rapidly alongside rising private vehicle ownership, organic and often unplanned growth, and expanding urban sprawl, while public transport systems have continued to underperform against ridership expectations despite substantial recent investment. In his view, multimodal integration is one of the most important and yet most neglected factors in reversing the shift toward private vehicles.

He began by examining the scale and characteristics of travel demand, drawing on evidence from seven metropolitan and six non-metropolitan cities. He emphasized that peak demand is concentrated both in time and direction, with work trips forming the largest single trip purpose and education trips occurring within a similar peak period. As a result, it is peak demand rather than average daily travel that ultimately determines the capacity required in the transport system and, consequently, the cost of infrastructure. Satellite imagery and remote sensing data from Mumbai, Chennai, Kolkata, Hyderabad, and Bengaluru showed a consistent pattern across all five cities. While the urban core continues to consolidate, development is spreading outward along arterial roads and national highway corridors, with municipal boundaries increasingly lagging behind the actual extent of built-up areas.

He then turned to changes in travel behaviour associated with this spatial expansion. Over the past decade, the average per-capita trip rate has increased by 18 per cent, while the average trip length has increased by 29 per cent. He linked the longer trip lengths directly to urban sprawl, as housing and employment opportunities become increasingly separated. Personal vehicles now account for approximately 35 to 45 per cent of motorized trips across Indian cities, while formal public transport accounts for around 25 per cent and intermediate public transport for approximately 10 per cent. Walking and cycling continue to represent the largest individual share of trips in the megacities, although these modes are losing their share most rapidly in smaller and medium-sized cities. He also described a self-reinforcing cycle affecting public transport: declining ridership reduces farebox revenue, which can lead operators to reduce services, further affecting reliability and making public transport less attractive. As an illustration, he noted that bus fleets across 19 major State Transport Undertakings increased by 4.6 per cent between 2014 and 2019, while ridership declined by 5.8 per cent during the same period.

The discussion then moved to India's rapid expansion of metro rail. Dr. Reddy highlighted what he described as the central paradox of the country's metro programme. The operational metro network increased from 248 km in 2014 to 1,159 km by early 2026, with another 1,000 km under construction. Despite this major expansion, Indian metro systems achieve, on average, only around 25 to 35 per cent of their projected ridership. He attributed this gap partly to the structure of the networks themselves. More than 15 of the country's over 16 operational metro systems are essentially single corridors rather than interconnected networks, limiting their ability to provide comprehensive urban accessibility. He also pointed to the relatively weak contribution of non-farebox revenue compared with international examples.

Multimodal integration formed the core of his presentation. Dr. Reddy defined it as the planned and seamless coordination of different transport modes at and around stations, allowing passengers to transfer with minimum time, distance, and effort. He explained that achieving this requires attention to four elements simultaneously: physical integration, operational integration, fare integration, and information integration. Simply constructing interchange infrastructure, he argued, does not automatically produce a seamless journey. He illustrated this principle through the interchange design of the Surat Metro Rail Phase-1 corridor, showing how station design and connections with surrounding modes can influence the overall passenger experience.

He linked multimodal integration with a broader package of travel demand management measures. These included appropriate parking pricing and parking formalization, bus priority measures and service benchmarks, the formal integration of autorickshaws and other shared modes as first- and last-mile feeders, intelligent transit management systems, improved non-motorized transport infrastructure, and gender-responsive transport planning. His argument was that these measures need to function as part of a coordinated system rather than as separate interventions. A metro line, for example, cannot achieve its full potential if passengers face poor pedestrian access, unreliable feeder services, fragmented fares, or inadequate information at the beginning and end of their journey.

Reviewing India's policy development, Dr. Reddy traced the progression from the National Urban Transport Policy of 2006 to the Metro Rail Policy and National Transit-Oriented Development Policy of 2017, followed by the National Common Mobility Card in 2019 and the PM-eBus Sewa programme in 2023. He also discussed the challenges surrounding congestion pricing. Proposals in Delhi, Bengaluru, and Mumbai have faced difficulties, partly because of concerns that existing public transport networks may not have sufficient capacity to accommodate the shift in travel behaviour that a congestion charge could generate. From this, he drew a broader lesson: demand management and supply-side investment need to be sequenced and developed together rather than treated as alternatives. If people are encouraged or required to reduce private vehicle use without providing a sufficiently attractive public transport alternative, the policy may face significant practical limitations.

Institutional arrangements were another important concern. Dr. Reddy noted that more than two decades after the idea of unified metropolitan transport authorities was proposed for million-plus cities, many Indian cities still either lack such an institution or have authorities that do not possess sufficient statutory powers or independent revenue sources. In his view, effective multimodal integration requires an

institutional structure capable of coordinating different agencies, modes, and investment decisions rather than leaving each component of the transport system to operate independently.

Looking ahead, he proposed seven directions that should be pursued together rather than in isolation. These included integrated network planning across metro, bus rapid transit, and feeder services; large-scale transit-oriented development; mobility-as-a-service and fare integration; sequencing demand management with improvements in transport supply; diversified revenue models including land value capture; institutional reform through empowered statutory authorities with dedicated funding; and the transition toward cleaner fuels. Taken together, these measures would allow transport investment, land use, operations, financing, and environmental objectives to reinforce one another.

Dr. Reddy concluded by bringing the discussion closer to the Nepalese context. He argued that Kathmandu shares several characteristics with Indian and other South Asian urban areas, including rising private vehicle ownership, outward expansion of the urban area, increasing travel distances, and a public transport system that is struggling to keep pace with changing demand. He referred to his application of the same distance-graded approach to multimodal integration in the feasibility study for the proposed Kathmandu ropeway along the Teku-Balaju corridor beside the Bishnumati River. Through this example, he demonstrated how the principles discussed in the presentation could be applied to Kathmandu by considering not only the main transport infrastructure, but also the connections between different modes and the accessibility of the system as a whole.

Urban Transport System Master Plan for Kathmandu: Insights from a JICA-Supported Project

Ms. Aya Iwatsuji, Programme Officer, Japan International Cooperation Agency (JICA)



Ms. Iwatsuji presented insights from the Project on Kathmandu Valley Urban Transport System Master Plan, beginning with an overview of JICA's broader approach to urban transport development. She explained that JICA treats the promotion of urban public transport as a cluster strategy, with particular emphasis on developing sustainable and inclusive public transport systems in metropolitan areas with populations exceeding three million. This approach brings together land use, transport, infrastructure, and institutional development rather than addressing them separately. It promotes transit-oriented development and relies on evidence-based planning through data analysis, travel demand forecasting, and long-term urban visioning. JICA's support also extends across the project cycle, from master plan preparation and institutional capacity development to investment planning and implementation.

She explained that the Kathmandu Valley project has two principal objectives. The first is to develop the capacity and procedures required by counterpart agencies to prepare, update, and maintain the urban transport master plan. The second is to establish a coordination mechanism that can support its consistent and sustained implementation. The project has three main outputs: a comprehensive and updated urban transport system master plan for Kathmandu Valley with a particular focus on mass transit; the identification of a high-priority mass transit route and appropriate mode through a pre-feasibility study; and a provisional coordination mechanism for comprehensive urban planning and management.

Turning to the future urban structure of the Valley, Ms. Iwatsuji reported that Kathmandu Valley's population is projected to reach approximately 4.2 million by 2050 based on the latest census data. Although annual population growth is expected to decline in most municipalities after 2031, the eastern municipalities are projected to maintain relatively high growth rates throughout the period. To understand how this growth could shape the future city, current land use was compiled using 2021 satellite imagery. Development potential was then assessed using seven different factors, which were used to develop three alternative future urban structures against a base case representing continued uncontrolled development.

Her assessment of existing transport conditions identified severe congestion at major locations such as Koteshwor, Gaushala, and Siddhitol, where traffic flows are heavily concentrated. Congestion is also widespread on minor roads, particularly in the northern parts of the Valley, where narrow road widths restrict movement. Several structural deficiencies contribute to these conditions, including inconsistent road widths, sudden bottlenecks, inadequate bridges and approach roads, missing footpaths and pedestrian crossings, and limited off-street parking. These physical limitations are compounded by inefficient intersection geometry and signal control, a high number of road crashes, and weak enforcement. Travel demand is particularly concentrated within Kathmandu Metropolitan City and its central business district, with strong movement among the three main urban areas of the Valley. At the same time, motorcycles have become the dominant mode of travel, further increasing pressure on the existing road network.

The presentation then examined the Valley's public transport system, which she described as highly fragmented, with numerous small-scale operators providing services with poor punctuality and limited comfort, safety, and overall attractiveness compared with motorcycles. Operational inefficiencies also contribute to congestion. On some road sections, service frequency exceeds 240 trips per hour, creating congestion around bus stops as numerous vehicles compete for limited road space. The heavy reliance on microbuses also results in inefficient use of available road capacity. Capacity analysis showed particularly high demand along major corridors, especially in the east-west direction. Some sections already have passenger densities that exceed the practical capacity of conventional road-based public transport. The analysis indicated that large buses become necessary when passenger demand exceeds 50,000 passengers per kilometre, while road-based transport solutions become insufficient when demand exceeds 100,000 passengers per kilometre.

The travel demand forecast presented a further concern. Vehicle ownership is projected to increase from 10 per cent in 2024 to 19 per cent by 2050, with motorcycles expected to remain the dominant private vehicle mode. Given this trajectory, the master plan concludes that a substantial shift from motorcycles to public transport will be necessary to manage future mobility conditions in the Valley. Mass transit performance was assessed for three major corridors: east-west, north-south, and the Ring Road. The east-west corridor showed the highest estimated loading, at approximately 21,000 passengers per hour per direction. The master plan scenario therefore combines improvements to the road network, traffic management, and conventional public transport with mass transit development and Ring Road bus rapid transit. It also identifies the need for a primary connecting road node on the north-eastern side of the Valley by 2050 to support the future transport structure.

Ms. Iwatsuji presented the strategic direction as a step-by-step approach built around three closely connected priorities. The first is to promote a modal shift from motorcycles toward public transport. The second is to improve bus operating efficiency and raise the overall level and reliability of service. The third is to strengthen road capacity and connectivity by improving accessibility outside the Ring Road while managing travel demand within it. Mass transit corridors were presented as the key enabler linking these three priorities, as they can support a shift away from private vehicles, provide a stronger framework for organizing bus and feeder services, and reduce pressure on the existing road network.

She concluded by identifying the main challenges that could affect implementation of the priority projects. These include limited land availability, the need to protect cultural heritage assets, difficulties in coordinating among institutions, a complex stakeholder environment, and financial constraints. Beyond individual projects, she stressed the importance of genuinely integrating land-use and transport planning. The long-term success of the master plan will therefore depend not only on constructing new infrastructure, but also on coordinating institutions, managing travel demand, improving public transport operations, protecting the Valley's cultural and urban environment, and ensuring that future land development supports the transport system rather than creating additional pressure on it.

Panel Intervention: Prof. Dr. Surya Raj Acharya



Prof. Dr. Surya Raj Acharya, Registrar of the University of Nepal, responded to the two preceding presentations by narrowing the discussion to a single, deliberately provocative question: not whether Kathmandu needs mass transit, but whether Nepal is asking that question in the right way. He began by appreciating both presentations for clearly setting out the transport challenges facing the Valley. He then focused his remarks on two issues that he felt are often overlooked in Kathmandu's mass transit debate: what role mass transit should actually play in a developing-country city, and where the financing required for such a system would come from. He argued that public discussion in Nepal often starts and ends with the common-sense assertion that mass transit is necessary because it is necessary, without sufficiently examining what a particular city's travel behaviour, density, and demand actually require. He connected this point with an observation made earlier in the day by Prof. Dr. Shigeru Morichi during his special lecture. Recalling Morichi's work with an earlier joint research team on Asian megacities, he noted that the team had been cautioned against importing solutions directly from Western literature. Instead, each city was expected to study its own conditions and identify solutions suited to its circumstances. He pointed to Japan, Korea, and Singapore as examples of countries that developed their transport systems by understanding their own conditions rather than simply adopting prescriptions from external consultants.

He was particularly critical of the tendency to substitute bus rapid transit for metro simply because BRT is cheaper. In his view, the appropriate question should not be which option costs less, but what level and type of transport capacity the city actually requires. He linked this argument to Prof. Morichi's earlier discussion of LRT and BRT systems that have struggled or failed on heavily travelled corridors in different parts of the world. To illustrate the importance of long-term institutional foresight, he referred to Tokyo's decision in the 1950s, when Japan was still a relatively poor country, to phase out its surface tram network and invest in underground rail. The decision was based on the recognition that continuing with a cheaper surface system could eventually create a serious bottleneck as the city grew.

He contrasted this with the tendency in Kathmandu to treat major transport decisions as matters of everyday common sense rather than as technical questions requiring specialist analysis. He recalled an exchange with a journalist who had argued that Kathmandu's transport problem was not particularly complicated because he himself travelled by bus every day. Prof. Acharya used the example to make a broader point: using public transport does not make someone a public transport scientist. Urban transport is a specialised discipline with its own evidence base, including travel behaviour, demand characteristics, network capacity, and mode technology, and therefore cannot be addressed adequately through everyday intuition alone.

Turning to Kathmandu's own characteristics, he noted that the Valley's census population of approximately three million increases to around 4.5 to 5 million when the floating population is considered. He also pointed to the Valley's relatively low road coverage in relation to its built-up area. With such a large population concentrated within roughly 300 square kilometres, he argued that Kathmandu is exceptionally dense by this measure. In his reading of the JICA findings presented earlier, these conditions provide a strong basis for the mass transit corridors identified in the master plan. The east-west and Ring Road corridors, he suggested, should therefore be understood as close to the minimum infrastructure required to respond to the Valley's scale and travel demand rather than as an excessive expansion of the transport system.

He then turned to the question of financing, which he described as one of the central issues that must accompany any serious discussion of mass transit. He argued that the estimated cost of a Tokyo-scale metro system, at approximately six to seven billion US dollars, can appear enormous when considered as a single figure. However, when spread over the implementation period, he estimated the annual requirement at roughly 250 to 300 million dollars. In comparison with Nepal's annual budget of approximately 15 billion dollars, he argued that this represents a relatively modest share. From this perspective, he suggested that the fundamental constraint is not necessarily the absolute availability of money, but the political willingness and technical clarity required to make a long-term commitment to such an investment. He reinforced this argument by referring to the experiences of Seoul and Singapore. Seoul began developing its metro system in 1974 while the country was still developing economically. In Singapore, the decision followed nearly a decade of debate, commonly referred to as the Great MRT Debate, before Lee Kuan Yew personally intervened to approve the first line. Construction followed in 1986–87, despite earlier arguments from planners that buses would be sufficient. For Prof. Acharya, these examples demonstrate that the decision to build a metro is ultimately connected to the kind of city a country intends to create for its population by 2050. He argued that Nepal's political leadership has yet to confront this question with sufficient seriousness.

Prof. Acharya further argued that for many developing-country cities, the question is not simply whether to build a metro, but how extensive the system needs to be in relation to the city's scale. Some cities may require only two lines, Kathmandu might require three or four, while a city such as Bangkok would require considerably more. He described metro as the reliable and punctual backbone of a metropolitan transport system around which other modes, including feeder buses, can be organised. In his view, once passengers reach a metro station, rail is effectively the only mode capable of providing a predictable, congestion-free journey at the scale required by a dense metropolitan area. He contrasted this with even grade-separated expressways, which can still be affected by congestion. He was therefore firm in arguing

that BRT should not be treated as a substitute for rail-based mass transit. Referring to an international research collaboration conducted in 2007, he noted that its findings pointed to the limitations of BRT as an alternative to rail on corridors with very high demand. He also referred to a 2022 World Bank report documenting the cancellation or difficulties of BRT systems in Delhi, Bangalore, Mumbai, and other Indian cities, as well as challenges encountered in Ho Chi Minh City. For him, these experiences demonstrate why BRT should not automatically be treated as a lower-cost equivalent to metro without first examining whether it can provide the required capacity.

He identified peak-hour capacity as one of the decisive technical considerations in selecting a mass transit mode. According to his comparison, metro systems can accommodate peak demand reaching approximately 250 to 300 per cent of nominal capacity, while buses can accommodate around 150 per cent. He argued that questions of this kind should be addressed through research and specialist analysis rather than through public debate based on general assumptions about what appears affordable or convenient. He made a direct appeal to the younger academics and researchers participating in the symposium to take up this research agenda and strengthen the evidence available to policymakers. In his view, researchers have an important role in resolving the conflicting or sometimes contradictory advice that policymakers receive on major transport investments.

He concluded by returning to the relationship between technical choice, political commitment, and financing. Once the appropriate technical solution has been established and there is sufficient political commitment to pursue it, he argued that financing mechanisms can be developed. He pointed to value capture as one such mechanism, drawing on examples from Singapore and Japanese cities where increases in land value associated with transport investment have been used to support infrastructure development. Such approaches, he suggested, could also be adapted to Nepal's institutional and economic context. His central message was therefore that the debate on Kathmandu's mass transit should move beyond the general statement that mass transit is needed. It should instead begin with a rigorous assessment of the city's scale, travel behaviour, demand, technology requirements, long-term urban structure, financing options, and the kind of metropolitan system Nepal wants to have by 2050.

Panel Intervention: Mr. Sunil Poudyal



Mr. Sunil Poudyal, Traffic and Transportation Expert, used his panel remarks to connect the different presentations delivered throughout the day rather than introduce a separate topic. He worked back through the morning sessions, drawing together the key messages from the keynote, special lecture, technical presentations, and the Kathmandu Valley Urban Transport System Master Plan before reflecting on the two presentations that had just been delivered.

Returning first to the keynote by Prof. Dr. Bambang Susantono, Mr. Poudyal recalled the presentation's discussion of the likely direction of urban mobility in India and other rapidly developing cities. He highlighted the shift away from dependence on private cars toward more loosely connected, shared, electric, and automated transport networks built around the concept of fifteen-minute cities. These systems, he noted, are increasingly being considered alongside air transport and urban logistics rather than as isolated modes. He observed that Nepal is moving in a similar direction, particularly through the

rapid adoption of electric vehicles with support from government and development partners. However, he stressed that EV adoption alone does not solve the broader mobility challenge. Nepal still has considerable work to do in improving the efficiency of the overall transport system and in developing safe and sustainable approaches for managing and disposing of the secondary waste that will emerge as the electric vehicle fleet continues to grow.

Reflecting on Prof. Dr. Shigeru Morichi's special lecture, Mr. Poudyal emphasized the mechanism through which capital cities become dominant or "prime" cities. Businesses tend to concentrate in capital cities because they benefit from a large pool of skilled workers, access to a substantial consumer market, and direct proximity to government decision-making. Transport networks then develop around the same concentration, reinforcing the gravitational pull toward a single urban hub and accelerating the relative decline of peripheral regions. He observed that this pattern is already visible in Nepal and in neighbouring countries such as India, Bangladesh, and Pakistan. In many remote areas, secondary and tertiary roads are deteriorating rapidly, making economic activity increasingly expensive and inefficient. If this trend continues, he warned, the vicious circle described by Prof. Morichi could further widen regional disparities over the long term. Reversing that process, in his view, requires transport investment to be redirected toward a properly hierarchical, multi-directional, and non-polluting regional transit network. He stressed the urgency of this task, remarking that Nepal should have started planning such a network "yesterday."

He also returned to the financing issues raised in Prof. Morichi's lecture. Attracting private capital to urban transit requires the investment to be sufficiently attractive to private investors. Yet, given the number of urban mass transit public-private partnerships that have encountered difficulties or failed across the region, he noted that the practical question is how much incentive needs to be provided to make private participation viable. Referring to this as the question of how large a "carrot" must be offered to the private sector, he acknowledged that the issue requires further study, particularly in the context of Nepal's own institutional and financial conditions.

Turning to Associate Prof. Dr. Ong Ghim Ping Raymond's presentation, Mr. Poudyal highlighted Singapore's use of centralized artificial intelligence, data analytics, and the rapid deployment of autonomous vehicles as responses to the country's constraints on land and labour. He pointed to the Land Transport Authority's long-standing efforts to optimize traffic signals and its broader policy of discouraging excessive private car ownership while continuing to protect the mobility needs of citizens and businesses. In his view, the combination of real-time data, centralized systems, and predictive AI has contributed to significant improvements in network efficiency. He noted that the wider region could learn from Singapore's experience with autonomous shuttles operating in residential hubs. Such systems, he emphasized, were not introduced overnight. They were developed route by route, allowing public trust to build gradually while balancing efficiency and inclusivity and addressing labour shortages without simply displacing existing transport workers.

Discussing Prof. Dr. Kyaing's presentation on bicycle networks in Yangon, Mr. Poudyal drew a broader comparison across Nepal, India, Pakistan, Bangladesh, and Myanmar. These countries share a history in which bicycle use was once much more significant but declined as motorized two-wheelers became increasingly affordable and accessible. He highlighted Yangon's experience following its motorcycle

ban as an example of how that trend can be reversed. Bicycle mode share increased by approximately ten percentage points within four years from 2013, with health and economic considerations playing important roles in encouraging people to cycle. He connected this experience with the pandemic-era increase in bicycle use in Stockholm and with the longer history of citizen advocacy that contributed to the development of integrated cycling infrastructure in the Netherlands. He agreed with Prof. Kyaing that sustaining bicycle use requires more than constructing individual bicycle lanes. A systematic network must be developed and properly integrated with public transport. He questioned how cyclists could realistically be expected to change their travel behaviour when bicycle lanes, regardless of how wide or well designed they are, remain disconnected from one another. Motor vehicle networks, he noted, are not normally designed as isolated stretches of road with no connection to the wider network, and bicycle infrastructure should be approached with the same principle of continuity and connectivity.

Reflecting on Dr. N. Srinivasa Reddy's presentation, Mr. Poudyal agreed that urban mobility planning across the region has historically placed greater emphasis on moving private vehicles than on moving people. He noted that this approach has imposed significant costs on urban centres through congestion and inefficient use of road space. He restated Dr. Reddy's diagnosis of India's transport situation, including the shortage of reliable and sufficiently extensive mass transit, an unfavourable modal mix, the promotion of inefficient transit options, shifting political priorities, gaps in data that weaken rational planning, urban sprawl that intensifies peak-hour congestion, and the inability of many systems to generate ridership proportionate to the size of the urban population. In response, he argued that multimodal integration needs to become central to urban mobility planning. Such integration must address institutional, physical, operational, informational, and fare dimensions rather than focusing only on physical interchange between modes. He also stressed that uncontrolled urban expansion needs to be addressed alongside mass transit planning. Land-use growth and transport development cannot continue to be treated as two separate processes when the location and form of urban development directly influence travel demand and the viability of public transport.

He connected this point with Prof. Morichi's argument that transit-oriented development should be placed at the centre of mass transit planning. He then linked the discussion directly to Ms. Aya Iwatsuji's presentation of the JICA-supported Urban Transport System Master Plan for Kathmandu Valley. He noted that the master plan extends beyond the core urban areas and includes the peripheral municipalities of the Valley. It is also supported by data collected over an extended period, providing a stronger basis for long-term planning. From a practical perspective, he argued that Nepal's federal and provincial governments, together with all eighteen municipalities in the Valley, now need to come together, pool resources, work through their institutional differences, establish clear responsibilities, and begin implementing the master plan rather than allowing it to remain only as a study. He stressed that preparation of the operational framework for new infrastructure must also begin much earlier in the planning process. Transport managers, traffic police, and road administrators should understand their respective responsibilities before a new system is opened, rather than being required to improvise operational arrangements after the infrastructure has already been constructed.

Mr. Poudyal concluded by raising an issue that he felt had received comparatively limited attention during the symposium: urban drainage. He observed that flooded roads have become an increasingly common problem across cities in the region, with the situation aggravated by inadequate climate change

adaptation and unmanaged urban expansion. Roads and other transport infrastructure that are planned without sufficient provision for rainfall drainage, he argued, represent a significant design failure. As extreme rainfall and urban flooding become increasingly important challenges for cities, he stressed that drainage needs to be treated as an integral part of transport infrastructure planning rather than as an afterthought. His closing remarks therefore broadened the discussion of sustainable transport beyond vehicles, networks, and mobility systems to include the basic resilience of the urban infrastructure on which those systems depend.

Question and Answer Session II

Ms. Aya Iwatsuji explained that disaster risks, including those associated with extreme rainfall and river encroachment, are considered in the master plan. She noted that the plan also accounts for the possibility of routes becoming unusable due to disasters by providing alternative routes that can be used when necessary.

Regarding the Integrated Master Plan of Kathmandu Valley 1969 as a guiding document, Ms. Aya Iwatsuji explained that the Kathmandu Valley Development Authority is currently preparing master plans as well. She noted that JICA had prepared several master plans in the past, but their implementation phase was not adequately pursued. This time, JICA intends to seek Cabinet approval to help secure the implementation of the master plan.

Dr. N. Srinivasa Reddy explained that traffic studies in India were traditionally conducted manually, but modern studies increasingly use CCTV cameras to record traffic and software to process the footage and obtain traffic counts. However, for origin-destination surveys, surveyors still need to be physically present in the field to collect the required information. He noted that this requirement remains broadly similar in both India and Nepal.

Remarks by the Session Chair: Mr. Bhimarjun Adhikari



Mr. Bhimarjun Adhikari, Joint Secretary at the Ministry of Infrastructure Development, closed the session by reflecting on both presentations against Nepal's own context. On Dr. Reddy's presentation, he set out a structural contrast between India and Nepal that he felt was essential to keep in view when drawing lessons across the two countries: India is a predominantly plains country, with roughly seventy per cent of its land in plain terrain, against Nepal, where some twenty-six per cent of the land is high mountain, and transport provision in mountainous terrain is inherently more expensive per passenger than in plains. He noted that Nepal's roughly one million registered vehicles are a fraction of India's fleet, and that where India's competing metropolitan pair is Mumbai and Delhi, Nepal's equivalent is Kathmandu, with a population of roughly four million, and Pokhara. His conclusion was that Dr. Reddy's principles remain valuable but need to be deliberately contextualized to Nepal's smaller scale and more difficult topography rather than applied directly.

On the JICA presentation, he confirmed that the Ministry is working closely with the JICA expert team on the Kathmandu Valley master plan, which will help prioritize the Ministry's own activities, and noted that the same team is separately preparing a feasibility report for a bus rapid transit corridor in the Valley,

which he hoped would mark the beginning of a genuine public transport system there. He set out figures illustrating the scale of the underlying challenge: Nepal's vehicle fleet is growing at roughly fourteen per cent annually, Kathmandu alone accounts for about half of the national fleet of some 6.6 million vehicles, and motorcycles make up fifteen to seventeen per cent of that fleet mode share he considers a distinctly important issue for Nepal. He highlighted the rapid recent growth in electric vehicle adoption, noting that as of 2024 roughly seventy-four per cent of vehicles imported into the country were electric, driven by tax relaxation and other incentives, and that this shift has measurably reduced national diesel and petrol consumption even as consumption trends rise in many other countries by his own calculation, electric vehicle uptake has saved approximately six million tonnes of carbon dioxide emissions over the past four years. He noted that the Government of Nepal has recently revised its national transport policy partly to address urban mobility and improve transport sustainability, and said the Ministry looks forward to receiving the symposium's conclusions to help shape the policy's guiding principles going forward. He closed by thanking SOTEN and EASTS for their work organizing the symposium.

Tokens of appreciation were presented to the speakers by Mr. Rajendra Raj Sharma, and a group photograph was taken. A tea and networking break was held.



Technical Session 3
Resilient and Sustainable Transport Infrastructure

Session Chair: Honorable Arjun Jung Thapa, Member, National Planning Commission

Time: 15:20 – 17:30

The final technical session, chaired by Honorable Arjun Jung Thapa, Member of the National Planning Commission, turned to the resilience of transport infrastructure. Its three presentations addressed, in turn, how interventions should be prioritized when resilience investment competes for limited funds, how a national land transport funding system can be structured to support disaster response and research, and how Nepal's own highway agency manages disruption on the network in practice.

Prioritizing Transport Infrastructure Interventions for Climate Resilience: A Data-Driven Approach

Ms. Rosaria Ilaria Marino, Senior Consultant, Transport Research Laboratory (TRL)



Ms. Marino presented lessons and emerging insights from the RIDE Climate Resilience Toolbox project in Nepal. She framed the project around a practical decision-making question: when climate hazards are increasing, road networks are extensive, budgets are limited, and agencies face competing priorities, how can they determine where to invest first if it is not possible to invest everywhere? Rather than treating climate resilience as a question of addressing every hazard across every road, the project seeks to provide a systematic basis for identifying which locations and assets require attention most urgently.

She explained that conventional approaches to road resilience often depend on reactive maintenance, local knowledge, limited hazard information, and assessment of individual assets. While these approaches can be useful at a local level, they become increasingly difficult to apply across large road networks with limited resources and incomplete datasets. The RIDE project is therefore exploring whether openly available satellite and geospatial data can be used to assess climate resilience at the level of individual road segments. The broader objective is to develop a scalable methodology that can identify hazard exposure, assess vulnerable road assets, and support the prioritization of appropriate interventions.

Gandaki Province was selected as the case study area because of its highly diverse terrain, extending from plains to hills and mountains. The province is exposed to a range of hazards, including floods, landslides, extreme weather events, and earthquakes. At the same time, its road network includes infrastructure that is both vulnerable to these hazards and critical for maintaining connectivity. The availability of open geospatial data also made the province suitable for testing the proposed approach. Three pilot areas were selected to represent contrasting geographical and risk conditions: Pokhara Metropolitan City for urban and peri-urban flood risk, Annapurna Rural Municipality for mountainous terrain and landslide exposure, and Madi Rural Municipality for rural connectivity and flood-related risk.

She described the analytical pathway as a sequence that begins with open data, develops climate risk indicators, applies machine learning and geospatial analytics, assesses risk at the road-segment level, and ultimately identifies priority interventions. One component of the analysis focused on flood hazards. Flood hazard indicators were developed from elevation data in QGIS by combining Height Above Nearest Drainage, flow accumulation, distance to the drainage network, and slope. Each variable was normalized to a common scale and assigned a weight before being combined to classify flood hazard conditions. This approach was intended to transform different characteristics of the terrain and drainage system into a consistent indicator that could be applied across individual road segments.

Land surface temperature was introduced as another climate-related indicator. Using MODIS and VIIRS products, the analysis considered temperature-related stress on road infrastructure through measures including peak temperature, heat load, the number of days above a specified threshold, and thermal stress. These indicators were intended to contribute to an assessment of potential deterioration mechanisms such as asphalt softening and material ageing. The longer-term objective is to combine temperature-related indicators with slope, flood, and landslide information to develop an overall road climate resilience score that can be used to compare road segments across the network.

Her discussion of machine learning was notably candid about both the potential and the limitations of the approach. A gradient-boosted model using XGBoost was developed across 11,938 road segments in the three pilot areas. Road segments were labelled as affected or unaffected using information from Nepal's BIPAD disaster portal and the 2015 Gorkha earthquake inventory. Separate models were also developed to examine rainfall-triggered and earthquake-triggered landslides. The rainfall-triggered model was successfully trained, but its performance on unseen road segments was poor. The available examples were not sufficient for the model to learn a dependable pattern that could be generalized beyond the training data. At the same time, the limited availability of earthquake impact data within the pilot areas prevented the development of a reliable earthquake model. She therefore identified the availability of historical failure records as one of the project's most important constraints. Supervised machine learning depends on sufficient historical examples of failures, and where those records are sparse or inconsistent, the reliability of the resulting models becomes limited. This has led the project team to explore unsupervised approaches that do not require the same level of historical failure data.

The presentation also set out the underlying data challenges. The BIPAD datasets covering hazards, incidents, and infrastructure losses do not share a common identifier that would allow them to be integrated directly. The infrastructure loss dataset contains only 113 transport-related records from 2021 onward, providing a relatively small historical base for analysis. Event data also has limited temporal coverage, while asset records are often sparse or inconsistent. These limitations make it difficult to validate relationships between climate hazards and actual infrastructure failures with sufficient confidence. The challenge, therefore, is not simply developing more sophisticated analytical models, but ensuring that the underlying data are sufficiently complete, consistent, and representative to support those models.

Ms. Marino concluded by presenting three possible forms that the RIDE Climate Resilience Toolbox could ultimately take. The first is a screening tool that provides traffic-light ratings and network-wide priorities. This would be relatively simple to use and could support broad prioritization, although it

would provide less detail. The second is a decision-support tool offering risk maps and scenario testing. This would provide a more strategic basis for decision-making but would also require greater data availability and analytical capacity. The third is a full asset-management tool capable of supporting lifecycle planning and budget optimization. Such a system could have stronger potential for institutional adoption and integration into routine road management, but it would also be considerably more complex to implement and maintain.

She closed by posing several questions for further discussion rather than presenting the toolbox as a finished solution. She asked what level of complexity is actually useful to road agencies working with limited technical and financial resources, whether explainability should be valued more highly than predictive accuracy when decisions involve public infrastructure, how different hazards should be prioritized across geographical and socio-economic contexts, and how transferable the proposed approach might be to other low- and middle-income countries. These questions underscored a central message of the presentation: building a climate-resilient road network is not only a matter of improving analytical tools, but also of developing methods that are practical, explainable, scalable, and compatible with the data and institutional realities of the agencies expected to use them.

New Zealand Land Transport Funding Hypothecation and Natural Disaster Research Opportunities

Dr.-Ing. Jean-Paul Thull, FCILT, EASTS U35 Chair of Young Researchers; EASTS – New Zealand



Dr. Thull opened his presentation by expressing his condolences for the loss of life and damage caused by the recent disaster in Nepal. He then divided his presentation into two parts. The first focused on the operation and financial structure of New Zealand's National Land Transport Fund, while the second introduced a proposed EASTS research initiative focused on natural disasters and the development of a new generation of disaster management researchers.

Beginning with New Zealand's transport funding system, he explained that the country hypothecates land transport revenue under the Land Transport Management Act 2003, with investment priorities established through a Government Policy Statement. He first outlined the scale of the vehicle fleet that supports this system. New Zealand has approximately 5.9 million registered motor vehicles for a population of 5.36 million, with around 90 per cent of the fleet consisting of light motor vehicles. The average age of the vehicle fleet is approximately 14.8 years. Road user charges currently apply to roughly 23 per cent of the vehicle fleet. This group includes diesel vehicles, electric vehicles, and plug-in hybrid vehicles, amounting to approximately 1.38 million vehicles. More than 75 per cent of light motor vehicles, however, continue to contribute to the transport system through fuel excise rather than distance-based road user charges.

He then explained the practical implications of New Zealand's transition from fuel excise toward distance-based charging. Using two contrasting vehicles, he illustrated how the change can redistribute the financial burden between different types of vehicles. Under a distance-based charging system, an efficient small vehicle can face a higher relative cost because its previous contribution through fuel

excise was comparatively low. At the same time, a large and fuel-intensive vehicle can face a lower relative cost because the distance-based charge is less closely tied to the amount of fuel it consumes. The example demonstrated that changing the basis of transport taxation does not simply change how revenue is collected; it can also alter the relative incentives and costs faced by different vehicle users.

Dr. Thull was direct about the financial difficulties currently facing the system. He noted that the National Land Transport Fund is projected to face a deficit of approximately NZD 50 million in 2025–26. This pressure has been driven by commitments to projects already underway as well as projects that have been brought forward. He also highlighted the increasing contribution from the Crown, meaning general taxpayer funding rather than revenue generated directly from road users. The Crown contribution increased from approximately 3 per cent during the 2018–2021 period to 24 per cent during 2021–2024 and is projected to reach 39 per cent during 2024–2027. He used these figures to illustrate an important limitation of hypothecation. A dedicated transport fund can provide a clear connection between transport revenue and transport expenditure, but hypothecation alone does not guarantee that revenue will remain sufficient to meet expenditure commitments. If project commitments grow faster than dedicated revenue, the system can increasingly depend on general taxation to close the gap.

The second part of his presentation introduced a proposed EASTS U35 Natural Disaster Research Initiative. He explained that the proposal emerged partly from discussions at the society's thirtieth anniversary symposium, where participants considered how countries can balance the demands of disaster recovery with limited budgets. The initiative also responds to the need to connect academic research more closely with actual recovery requirements and real-world decision-making, while creating opportunities for a new generation of researchers to develop expertise in disaster management.

The proposed model centres on applied research undertaken by a small team of approximately five or six researchers under the age of 35 within a single EASTS member country. Each team would focus on a recent major disaster in its own country and examine what happened, why it happened, and what could be improved. Rather than concentrating only on post-disaster reconstruction, the research would examine the complete disaster management cycle, including prevention, preparedness, response, recovery, and reconstruction. This would allow researchers to move beyond documenting the consequences of a disaster and instead investigate the institutional, infrastructure, social, economic, and governance factors that influence both vulnerability and recovery.

Dr. Thull emphasized that the initiative would deliberately take an integrated approach. Infrastructure would be considered alongside social and economic conditions, institutional arrangements, and governance rather than being treated as an isolated technical issue. Meaningful stakeholder participation would also be central to the research process. Research teams would be expected to engage with government agencies, policymakers, industry, affected communities, and academic institutions so that the research responds to practical needs and can contribute directly to disaster management decisions. In this way, the initiative would seek to create a closer connection between research findings and the institutions responsible for preparing for and responding to disasters.

He also proposed establishing a U35 Natural Disaster Management Award for future EASTS conferences. The award would recognize research based on several dimensions, including research

quality, practical relevance, stakeholder engagement, innovation, and impact on resilience. He proposed supporting the initiative through a sustainable funding pool so that the research and recognition programme could continue beyond a single conference or project cycle. Dr. Thull clarified that the proposal was scheduled to be presented to the EASTS Board on the following day and therefore had not yet been formally approved. He presented it as an initiative under consideration, with the potential to strengthen applied disaster research across EASTS member countries while giving younger researchers an opportunity to work directly on the disaster challenges facing their own communities.

Turning Pressure into Progress: Managing Disasters on Nepal's Highway

Mr. Shuva Raj Neupane, Deputy Director General, Department of Roads



Mr. Neupane began by setting out the scale of Nepal's disaster challenge. The country experiences more than 7,500 disaster-related events every year, while landslides and floods continue to damage retaining walls, culverts, road surfaces, and other transport infrastructure along major highways such as the Prithvi, BP, Kanti, Mechi, Araniko, and Mid-Hill highways. With climate change increasing the intensity of rainfall and the frequency of landslides, Nepal's highways, bridges, and public buildings are facing growing long-term structural risks. As a result, large-scale reconstruction is no longer an occasional requirement but an increasingly recurring demand on public finances and infrastructure agencies.

He examined two major disaster events in detail. The first was the extreme rainfall event of 26-28 September 2024. On 28 September alone, twenty-five weather stations across fourteen districts recorded their highest-ever 24-hour rainfall totals. Daman recorded 517.0 mm of accumulated precipitation over the three-day period. The rainfall triggered hundreds of landslides and widespread flooding across several river basins. Sections of the BP, Kanti, Prithvi, Araniko, and Tribhuvan highways were washed away, severely disrupting the road network serving Kathmandu. Initial infrastructure losses from the event were estimated at NPR 12.85 billion, equivalent to approximately one per cent of Nepal's national GDP.

The Bhotekoshi flash flood of August 2026, however, was described as a disaster of an entirely different scale. According to Mr. Neupane, the event was triggered by the collapse of a glacier-rock mass in Langtang Lirung, which generated an ice-rock avalanche and debris flow in the Lehende River. The resulting surge travelled downstream through Rasuwagadhi, Syabrubesi, Betrawati, Trishuli, and Devighat along the Trishuli and Narayani river systems. He described the event as Nepal's deadliest recorded disaster, with more than 1,300 lives lost, nearly 5,000 people reported missing, and total damages estimated at approximately USD 4 billion, or around ten per cent of national GDP. The Galchi–Trishuli–Rasuwagadhi highway was particularly severely affected. Around 40 of its 82 kilometres were washed away, while most of the remaining sections were covered by debris. Approximately five kilometres of the Prithvi Highway were also buried.

Turning to the institutional response, Mr. Neupane described the organizational structure through which the Department of Roads manages maintenance, emergency response, and mechanical support. The system operates through four flood and river training offices, eight highway engineering divisions,

thirty-three road divisions, and eight mechanical offices. He also outlined the Department's equipment deployment programme, under which the total number of heavy equipment units increased from 218 in 2023 to 277 in 2026. Financing for disaster response and reconstruction comes from several sources, including Road Board Nepal, the Ministry of Finance, and multilateral and bilateral development partners. Road Board Nepal allocates NPR 200 million for emergency maintenance, while the Ministry of Finance committed NPR 18.6 billion for highway and alternative corridor reconstruction following the 2024 floods. Highway upgrading projects supported by the Asian Development Bank and World Bank also include disaster mitigation components. In addition, JICA sanctioned a grant of three billion yen for reconstruction of a section of the BP Highway.

The most detailed and instructive part of the presentation was his day-by-day account of the restoration of the BP Highway following the September 2024 disaster. The washout of 27–28 September caused major damage at fifteen critical sections of the highway. On 29 September, road divisions began planning the mobilization of heavy equipment from four different sources while engineering teams simultaneously collected damage information from the affected areas. On 30 September, equipment began to be mobilized, with fuel supplied through helicopter lifts where necessary. By 1 October, equipment had reached Chaukidada, where approximately 400 metres of highway had been completely washed away. At the same time, work was progressing from the Nepalthok section. Temporary diversions at the washed-out sections were subsequently completed between 1 and 10 October, allowing the highway to be restored before Bijaya Dashami.

Mr. Neupane attributed this rapid restoration to a deliberately decentralized and proactive response model. Rather than relying primarily on conventional bureaucratic hierarchy, the response emphasized team resilience, field-level agility, and rapid decision-making. The Secretary and Director General themselves moved to the field to support the response. A special command system brought together police, government authorities, and civil society stakeholders to facilitate real-time decision-making and information sharing. A 24-hour communication protocol ensured that the media and public received regular updates, while direct hotline communication with the Minister, Secretary, and Director General allowed high-level decisions to be taken immediately when required. At the same time, site engineering teams were given decision-making authority appropriate to the conditions they encountered in the field. The heavy equipment operators and field staff who contributed to the restoration were subsequently recognized and felicitated by the Minister.

He then placed these experiences within the broader disaster management cycle. Preparedness measures included machinery and fuel management, advance allocation of manpower and budgets, and procurement of modular bridges that could be deployed rapidly after a disaster. Response measures focused on immediately opening tracks, establishing stream crossings, identifying alternative corridors, and installing Bailey bridges where necessary. Recovery involved temporary structures and gravel surfacing to restore basic connectivity, while longer-term mitigation measures included upgrading highways, developing alternative resilient corridors, stabilizing slopes, protecting river toes along vulnerable corridors, and constructing high-raised bridges. These measures, he explained, should follow a "build-back-better" principle, using reconstruction as an opportunity to reduce future vulnerability rather than simply restoring infrastructure to its pre-disaster condition.

Mr. Neupane concluded with a broad set of policy recommendations aimed at moving Nepal from reactive reconstruction toward long-term resilience. He called for land-use and transport planning to be undertaken in coordination with river basin management so that transport infrastructure decisions reflect broader hydrological and environmental conditions. Existing design standards, he argued, need to be revised to account for increasingly extreme climate events. He also recommended developing alternative corridors connecting district headquarters, with route selection considering different river catchments so that a single disaster does not isolate an entire region. For connections to the national capital, he highlighted the potential importance of resilient alternative corridors such as Thankot-Chitlang, Kulekhani-Bhimfedi, and the Sindhuli-Khurkot tunnels.

He further called for alternative planning approaches for snow-fed river corridors, greater use of tunnels and high-raised long-span bridges in areas exposed to severe hazards, and a more strategic approach to bridge development in the Terai, where fewer but properly trained and managed river corridors could improve resilience. He also recommended developing more link corridors between the East-West Highway and Mid-Hill Highway and completing the resilient north-south trade corridors to strengthen national and regional connectivity.

His proposed way forward also included dedicated reconstruction budgets, stronger integration of Department of Hydrology and Meteorology data into early warning systems, development of reliable baseline infrastructure data and information systems, institutional capacity enhancement, and modernization of equipment procurement. He emphasized the potential role of drones throughout the disaster management cycle, from preparedness and rapid damage assessment to response, recovery, and monitoring. Continuous monitoring and evaluation, he concluded, would be essential to ensure that lessons from each disaster are translated into improvements in infrastructure standards, institutional practice, emergency preparedness, and long-term resilience.

Panel Intervention: Dr. Keshab Kumar Sharma



Dr. Keshab Kumar Sharma, Former Secretary to the Government of Nepal, responded to three questions from the panel, addressing the protection of Nepal's road system against disasters, the institutional arrangements required for rapid infrastructure recovery, and the technologies that could improve road slope management. His responses moved from the broader challenge of making transport infrastructure more resilient to the institutional and technological measures needed to achieve that resilience in practice.

On safeguarding the road system. Dr. Sharma began by emphasizing the central role of road transport in national mobility and economic activity. In low- and middle-income countries, roads carry approximately 80 per cent of passenger movement and 70 per cent of freight. In Nepal, these shares rise to around 90 per cent for both passenger and freight movement. This dependence is even more pronounced in the Hindu Kush Himalaya, where difficult topography means that many settlements have few or no viable alternatives to road connectivity. This creates a fundamental paradox: mountain roads are among the most important infrastructure for economic integration in a landlocked and mountainous country, yet they are also among the infrastructure assets most exposed to natural hazards. He noted that

more than twice as many landslides occur within 100 metres of roads compared with areas farther from roads.

He placed Nepal's road vulnerability within the country's broader disaster risk profile. Nepal ranks fourth globally in vulnerability to climate change, eleventh for earthquake risk, and seventh for landslide risk. When landslide risk is measured by the proportion of the population affected, Nepal ranks first. He also referred to findings from ICIMOD indicating that extreme weather events that previously occurred at intervals of five to ten years are now recurring approximately every one to two years. These trends, he argued, demonstrate why conventional approaches to transport infrastructure design and maintenance can no longer be considered sufficient.

Dr. Sharma therefore called for a fundamental shift in the way road resilience is planned and designed. Historical design standards are increasingly inadequate under changing climate conditions, while recent disasters have exposed deficiencies in hydraulic capacity, river setbacks, and the management of sediment and debris. Future infrastructure design, he argued, needs to account for a non-stationary climate, compound hazards, and increasingly intense extreme rainfall. Drawing on international practice, he identified four broad areas for action: incorporating climate risk screening and adaptation planning into policy and governance; adopting climate-informed design through updated hydraulic and geometric standards; using nature-based and hybrid solutions, including bioengineering and watershed management; and applying corridor-level risk management through vulnerability mapping and risk-based investment prioritization.

He proposed several specific strategic measures. Corridor-level vulnerability mapping should become mandatory and integrate flood hazards, landslides, geomorphological conditions, and climate projections. Hydraulic and geometric design standards should be upgraded, including the use of higher design return periods where justified by changing hazard conditions. Climate science should be incorporated directly into the standards, planning procedures, and maintenance practices of the Department of Roads. Asset monitoring should also become more proactive through real-time sensors, corridor databases, and community-based early warning systems. He further called for multi-agency corridor resilience platforms that can bring together the institutions responsible for roads, hydrology, disaster management, local government, and communities. His central message was that resilient transport cannot be achieved through engineering alone. It requires the integration of engineering, climate science, governance, and community-based risk management.

On a dedicated institution for rapid infrastructure services. The second question considered whether the scale of the Bhotekoshi disaster justified establishing a dedicated agency for rapid infrastructure reconstruction and resilience. Rather than arguing for one institutional model without qualification, Dr. Sharma examined the advantages and limitations of both a separate authority and reliance on existing institutions.

He explained that a separate reconstruction and resilience authority with overriding statutory powers could provide a clear institutional focus and allow decisions to be taken more quickly by bypassing routine administrative procedures. It could also serve as a single point of contact for international donors, potentially simplifying funding and procurement processes. A dedicated authority would further have

the ability to recruit multidisciplinary technical specialists directly, including engineers, geologists, hydrologists, and other experts required for complex disaster recovery. However, such an institution could also create friction with existing line agencies and generate coordination delays. If established only temporarily, it could result in the loss of institutional knowledge when the authority is eventually dissolved. There would also be a risk that creating a new institution could draw human and financial resources away from existing local governments and line agencies.

He then considered the alternative of relying primarily on existing line agencies and local governments. This approach would strengthen permanent state institutions and make use of the established knowledge that local agencies have about terrain, communities, infrastructure, and local operating conditions. It would also avoid the administrative overhead of creating a new hierarchy. At the same time, existing agencies can be constrained by bureaucratic procedures, slow procurement processes, fragmented coordination between departments, and limited technical and financial capacity. These constraints can become particularly problematic when infrastructure needs to be restored within days or weeks following a major disaster.

His recommendation was therefore a hybrid institutional framework, which he termed the matrix approach. Under this model, a specialized, time-bound, high-level coordination authority would be established with multidisciplinary expertise. The authority would not replace the existing line agencies. Instead, it would function as a central coordinator, monitor, fund manager, and quality assurer. It would also have overriding powers to fast-track procurement and bypass administrative bottlenecks when immediate restoration of critical infrastructure requires rapid action. Physical reconstruction and longer-term resilience upgrading would continue to be implemented through empowered line agencies and local governments. This would allow those institutions to build their capacity through practical experience while retaining ownership of the infrastructure after reconstruction.

The dedicated authority would also mandate and finance build-back-better standards, including advanced early warning systems, flood-resistant bridges, and other resilience measures. Line agencies would then be required to implement these standards during reconstruction and upgrading. Dr. Sharma acknowledged that the precise balance between the central coordination function and the existing institutions would depend on the availability of funds and the nature of the work involved. Immediate emergency repairs may require stronger centralized coordination, while longer-term risk mitigation and asset management can rely more heavily on existing institutions.

On technology for road slope management. In addressing the third question, Dr. Sharma argued that Nepal already has a general policy orientation toward resilient slope management, but significant gaps remain in construction-phase regulation and operational maintenance. In his view, effective slope management depends less on formal institutional arrangements alone and more on how well risk considerations are integrated into day-to-day planning, construction, monitoring, and maintenance. He described this as a lifecycle governance gap. Across different regions, recurring slope failures are associated with inadequate drainage, excessive slope steepening during road excavation, and a tendency to undertake stabilization only after a failure has already occurred. This creates what he described as an awareness-enforcement paradox, in which institutions recognize the importance of prevention but reactive expenditure continues to crowd out investment in preventive measures.

He recommended mainstreaming hazard risk directly into transport planning and design. Corridor-level risk mapping should be institutionalized as a mandatory input to detailed project reports for all major transport corridors. This would help shift the planning culture from responding to damage after it occurs toward anticipating risks before infrastructure is constructed. Landslide susceptibility mapping and infrastructure vulnerability assessment should also become standard components of feasibility studies and environmental impact assessments.

At the policy and institutional level, he called for performance-based stability verification of cut slopes and climate-adjusted hydraulic design thresholds based on updated intensity-duration-frequency curves. He also recommended explicit sediment budgeting for road projects along river corridors, recognizing that sediment and debris can substantially alter hydraulic conditions during extreme events. He proposed establishing a dedicated national geo-hazard risk management unit within the Department of Roads, with responsibility for maintaining a national database of slope failures. Corridor-level multi-stakeholder coordination platforms would provide another mechanism for bringing together relevant agencies and technical stakeholders. He also emphasized the value of partnerships between universities and government institutions to co-develop open-access risk datasets, landslide inventories, and slope hazard atlases.

Turning to emerging technologies, Dr. Sharma grouped the tools according to the purpose they could serve. For improving efficiency, he highlighted satellite-based InSAR monitoring, which can detect accelerating ground and slope movement months before catastrophic failure in suitable conditions. He also pointed to autonomous sensor networks capable of measuring pore-water pressure, soil moisture, and ground tilt and transmitting the information to a centralized early warning dashboard. Another potential tool is the use of AI-powered digital twins of critical road corridors. By combining real-time sensor information with meteorological data, such systems could simulate different weather scenarios and identify slopes that are approaching critical conditions.

For sustainability, he highlighted engineered eco-bioengineering approaches that combine deep-rooting native vegetation with biodegradable geocells. He also identified hydrophobic and self-healing concrete as potential materials for rigid stabilization applications, alongside high-tensile and flexible carbon-fibre or basalt-fibre composite meshes that could provide alternatives to heavy steel rockfall netting. These technologies, he suggested, could reduce the material intensity of conventional stabilization while improving long-term performance in appropriate applications.

For safety, he pointed toward robotic and autonomous maintenance technologies as an emerging area of opportunity. Such systems could potentially reduce the need to expose workers directly to unstable slopes and hazardous locations during inspection, monitoring, and maintenance activities. His broader message was that Nepal's approach to slope management needs to move from predominantly reactive stabilization toward continuous monitoring, early warning, preventive maintenance, and risk-informed design. The combination of better data, modern monitoring technologies, stronger standards, and institutional coordination would allow road agencies to identify problems earlier and intervene before relatively manageable slope instability develops into major infrastructure failure.

Panel Intervention: Mr. Kamal Pande



Mr. Kamal Pande, Senior Transport Specialist, framed his remarks as a direct response to the presentation by Mr. Shuva Raj Neupane. While agreeing with much of Mr. Neupane's assessment, he drew attention to two areas that he felt had received less attention: the engineering history behind some of the roads that failed, and the management of transport assets after they have been rebuilt.

He began with the Galchi-Trishuli-Rasuwagadhi corridor, particularly the section between Dhunche and Syafrubesi that suffered extensive damage, including the loss of a significant length of road and forty-six bridges. He pointed out that this corridor was never originally designed or aligned as a highway. The alignment began as an access road constructed and extended by a hydropower project, which was later taken over and upgraded by the Department of Roads. This raised an important question about how much systematic highway engineering had actually been incorporated into the original alignment and subsequent upgrades.

He connected this issue to the broader history of Nepal's hill road network. From the 1950s through the 2000s, road alignment practices gradually shifted from following hill contours toward following river corridors. River-corridor alignments eventually became common across the country, but he argued that the resilience implications of this shift were not adequately considered. Roads placed close to rivers may provide easier gradients and lower initial construction costs, but they can also expose critical infrastructure to flooding, erosion, debris flows and changes in river behaviour.

Mr. Pande also questioned a common assumption he had observed following the loss of the Rasuwa bridge during the previous year's disaster. He noted that disasters are sometimes viewed through the lens of a fifty- or hundred-year return period, creating an impression that once such an event has occurred, the associated risk has effectively been removed for the next generation. He argued that this is an inadequate way of thinking about resilience. The more important question is whether the underlying conditions that produced the disaster can occur again. If those conditions remain unchanged, simply assuming that the event has a long return period does not make the corridor safer. In his view, this fundamental question has often not been asked.

He then raised a specific comparison in bridge provision between Nepal's major road corridors. The East-West Highway has roughly 29 metres of bridge length per kilometre of alignment, reflecting substantial investment in crossing structures. By comparison, the North-South corridors have only around five to seven metres of bridge length per kilometre. He suggested that such a large difference should not be treated as incidental. It deserves closer examination in relation to terrain, river systems, alignment choices, drainage requirements and the overall resilience of the road network.

His central concern, however, was road asset management, which he felt had been understated in the earlier presentation. Nepal, he observed, has demonstrated a strong capacity to create infrastructure. He referred to the substantial resources spent addressing the Krishna Bhir landslide site as an example of the country's willingness to invest heavily when a critical problem emerges. The greater weakness, in his view, comes after construction or rehabilitation. There is limited routine monitoring to determine

whether conditions along a rebuilt corridor have changed over time, whether previous interventions remain effective, or whether new risks are developing. Without this continuous follow-up, damage can recur and become more difficult and expensive to manage when the next disaster occurs.

For Mr. Pande, this points to a fundamental change in Nepal's transport paradigm. The focus needs to move from road construction to road services and asset management. Building an asset is only one stage of its life. If the asset is not properly monitored, maintained and managed afterward, the conditions that contributed to its failure can gradually re-emerge and create the basis for another disruption.

Building on this argument, he identified six areas that require greater attention. First, maintenance should be prioritized over further expansion. He noted that Nepal has designated around eighty roads as highways, often on political rather than functional grounds. This has the effect of spreading already limited maintenance resources across a large number of corridors, including roads that may not all warrant highway status from a functional or strategic perspective. A more disciplined approach would prioritize resources according to the actual role and importance of each corridor.

Second, climate and disaster resilience standards need to be developed and implemented. It is not enough to refer to resilience in policy documents if there are no practical standards for engineers and agencies to apply. Mr. Pande referred to the relevant commitment in Nepal's recent National Transport Policy, which calls for climate-resilient, disaster-resilient and life-cycle-based infrastructure standards. He pointed out, however, that the sector still does not have such standards in place in a form that can be systematically applied to transport infrastructure. The policy commitment therefore needs to be translated into engineering requirements, design practices and maintenance procedures.

Third, road safety and performance should be assessed in terms of network efficiency rather than simply accepting existing geometry as given. He illustrated this with the Narayangarh road, where journey time has remained at roughly forty-five minutes over the past decade despite substantial investment. The corridor now carries more vehicles, but this increase in traffic has not produced a corresponding improvement in travel efficiency. This suggests that simply adding infrastructure or accommodating more vehicles does not necessarily improve the performance of a transport corridor. The wider network and the service it provides need to be considered.

Fourth, coordination among federal, provincial and local governments needs to be strengthened. He noted that the damage and loss figures reported after major disasters generally focus on the national road network. Provincial and local roads affected by the same event are often not fully captured in these assessments. As a result, reported losses can significantly understate the actual impact on the country's transport system. A more integrated assessment across all three levels of government is therefore necessary to understand the true scale of disaster impacts and allocate recovery resources appropriately.

Fifth, road asset management needs to be formally established as a discipline. Asset management should not be treated simply as routine maintenance or as an activity undertaken when a road begins to deteriorate. It should form part of a structured, life-cycle approach covering planning, design, construction, monitoring, maintenance, rehabilitation and eventual renewal. This would allow agencies to make better use of limited resources while reducing the likelihood of repeated failures.

Sixth, Nepal needs to develop resilient strategic corridors. Mr. Pande described these as a defined category of routes that would be deliberately prioritized for multimodal trade as well as passenger and goods movement. Such corridors would need to be planned, protected and managed according to their strategic importance. Rather than treating every road in the same way, Nepal could identify the corridors that are critical to national connectivity, economic activity, emergency response and trade, and then provide them with a higher level of resilience and asset management.

He concluded by arguing that Nepal's transport development in the coming phase should not be judged simply by the number of kilometres of highway constructed. He noted that figures such as the commonly cited 12,000 kilometres of national highway are often presented as indicators of progress on their own. In his view, the more meaningful measure is how reliably, safely and efficiently the existing network delivers transport services to the people and economic activities that depend on it. The emphasis, therefore, should shift from the quantity of roads built to the quality, resilience and performance of the transport services those roads provide.

Panel Intervention: Dr. Basant Raj Adhikari



Dr. Basant Raj Adhikari, Director of the Centre of Disaster Risk Engineering at the Institute of Engineering, Pulchowk Campus, responded to the preceding presentations by calling for a more integrated and people-centred approach to resilient transport planning in the Himalayas.

He began by drawing on his own experience as a technical advisor to the Government of Indonesia in establishing a slope management system, informed by comparable studies from Hong Kong and Malaysia. This experience led him to raise a broader question with the panel and the audience: is it time to rethink how transport networks themselves are conceived? Rather than viewing transport simply as a collection of nodes connected by links, he argued that networks need to be designed as systems that can withstand the climatic extremes now affecting the Himalayan region.

In this context, he called for a shift from conventional design approaches toward more pragmatic and AI-driven approaches for developing sustainable transport networks. He questioned whether Nepal's existing infrastructure can realistically be expected to withstand extreme events such as the 624 mm of rainfall recorded within twenty-four hours during recent flooding. Referring to Mr. Neupane's earlier account of the rapid restoration of the BP Highway, he acknowledged the effectiveness of the response but asked a more fundamental question: if such extreme events are becoming part of the operating environment, should the design criteria themselves not change? In his view, climate resilience cannot depend only on responding quickly after infrastructure fails. The infrastructure must first be designed with the changing hazard environment in mind.

The discussion then turned to institutional capacity. Dr. Adhikari argued that resilience requires strong institutions with a high degree of institutional memory. Nepal has experienced major floods, landslides and other disasters repeatedly, yet the country continues to be caught unprepared when similar events occur. He questioned why lessons from previous disasters are not being systematically retained and incorporated into subsequent planning and design.

He connected this concern with his own research following the 2015 Gorkha earthquake, which found a markedly higher incidence of landslides in areas close to road corridors than farther away. The finding reinforced his argument that disaster risk cannot be treated as a separate issue from transport planning. Route selection, road alignment, slope cutting and infrastructure design all influence the level of disaster risk, and these decisions therefore need to be considered together.

At the centre of his remarks was a strong argument for placing people, rather than freight alone, at the heart of disaster risk reduction and sustainable transport planning. He noted that transport corridor risk assessments are often dominated by physical vulnerability, while social, economic and environmental vulnerabilities receive less attention. This is particularly important in Nepal because settlements, businesses and essential services are frequently concentrated along road corridors. When a road is disrupted, therefore, the consequences extend well beyond the physical damage to the pavement, bridge or slope. Communities can lose access to markets, health facilities, schools, employment and emergency services.

He also questioned the continued practice of aligning roads along river corridors because they offer easier construction conditions and convenient access to construction materials. While such alignments may appear attractive from an engineering or cost perspective, he asked whether they remain appropriate under changing climatic and geomorphic conditions. He emphasized the need to consider risk-sensitive land-use zoning alongside transport planning so that infrastructure and settlements are not repeatedly placed in locations exposed to predictable hazards.

Dr. Adhikari was particularly critical of the narrow spatial boundaries within which slope risks are often assessed. A road cutting through a hillslope, for example, may be evaluated within a fifty-metre buffer around the road. However, the debris flow, landslide or mass-movement process threatening that road may originate much farther upslope and extend across an entire geomorphic catchment. In such cases, assessing only the immediate road corridor can provide an incomplete picture of the actual hazard.

He referred to the Rosi Khola watershed disaster two years earlier as an example where this narrower understanding of risk proved inadequate. He also returned to his post-Gorkha earthquake studies on sediment mobility, using them to emphasize that the Himalayas remain highly active both tectonically and sedimentologically. These processes continue to reshape slopes, river systems and catchments, and current transport design practices do not always account for their wider implications.

Extending his people-centred approach, Dr. Adhikari called for a shift from a purely financial audit of infrastructure projects toward a social audit. Infrastructure should not be judged only by how much money was spent, whether the project was completed on time, or whether the physical works meet engineering specifications. Communities should also have a meaningful role in what he described as the three core stages of project management: design, development and delivery.

He framed this within a whole-of-society and whole-of-government approach. Resilient infrastructure cannot be delivered by transport agencies or engineers working in isolation. Communities, local governments, disaster management institutions, planners, social scientists and other technical agencies all have roles to play. He therefore questioned whether affected communities are given clear and usable

information about alternative routes during emergencies, and whether evacuation drills are conducted before disasters occur rather than relying entirely on emergency response once an event has already taken place.

In this context, he pointed to Nepal's Disaster Risk Reduction and Management Act and the role of Ward Disaster Management Committees as an existing institutional mechanism that could be better integrated into infrastructure and urban mobility planning. These structures should not operate separately from transport planning. Instead, their local knowledge, preparedness responsibilities and community connections could contribute directly to the planning and management of resilient transport infrastructure.

Dr. Adhikari concluded by returning to the importance of sustained awareness, knowledge creation and institutional memory of extreme events in the Himalayas. The challenge, he argued, is not simply to develop better engineering solutions but also to change the way the sector thinks about risk. Both design concepts and institutional mindsets need to evolve as the hazard environment changes.

Ultimately, he emphasized that genuinely sustainable and resilient transport and urban mobility cannot emerge from a single discipline working alone. Engineering, disaster risk management, social science and governance need to work together, with collaboration and coexistence across these areas becoming a fundamental part of how transport systems are planned, designed and managed in the Himalayas.

Question and Answer Session III

Mr. Shuva Raj Neupane explained that, from the planning and monitoring branch's perspective, the Road Board's existing emergency disaster management budget needs to be increased. Resilient alternative corridors can be planned through the Medium-Term Framework, which is currently being finalized with input from the National Planning Commission, allowing multi-year procurement of such projects. Major structures, including high-rise bridges and tunnels, may require additional support from multilateral and bilateral donors. He also noted that Nepal has recently passed an alternative financing fund bill under which the government, along with institutions such as the Citizen Investment Trust and Provident Fund, can invest up to one kharab, approximately USD 750 million. PPP or Hybrid Annuity Model arrangements could use this fund for major projects alongside donor loans or grants, while ordinary alternative corridors could continue to be financed through the Ministry's regular Medium-Term Framework.

Addressing the persistent gap between technical knowledge and implementation, Mr. Shuva Raj Neupane identified resource constraints and limited involvement of universities and research institutions in government decision-making as major challenges. He emphasized that identifying the root cause of disasters is essential. For example, the underlying causes of the Roshi Khola flood have not yet been fully established, with unplanned quarrying and upstream industrial activities adding complexity. Even when the root cause is identified, addressing it often requires coordinated action among several government agencies and ministries rather than the transport sector alone. Dr. Keshab Kumar Sharma, whose research focuses on road slope stabilization, added that the main challenge is the gap between awareness and execution. Stakeholders generally understand appropriate practices, such as avoiding uncontrolled slope cutting and quarrying, but implementation standards often deteriorate at the ground

level. He also emphasized the importance of life-cycle costing rather than focusing only on initial construction costs, noting that a higher-standard bridge may require greater initial investment but could be more economical over its entire service life than a lower-standard structure requiring reconstruction after 10 or 20 years.

Regarding the recent failure at Krishna Bhir, Mr. Shuva Raj Neupane explained that the site initially remained intact during the first flood but began eroding during a second event, gradually washing away the pavement. Alternative options were assessed on both sides of the valley. Constructing approximately 1.8 kilometres of new track on the opposite bank was considered impractical, while the existing corridor had gradients too steep for long-haul trucks, leaving hillside excavation through Krishna Bhir as the only practical short-term option. Cracks have subsequently appeared on the excavated slope, and measures are being taken to prevent water seepage and further erosion, with longer-term stabilization planned through soil nailing, sheet piles and micropiling. He emphasized that restoring the route is critical to preventing a major supply disruption in Kathmandu Valley, requiring engineers to balance immediate connectivity needs with long-term stability. A permanent solution, either through the opposite riverbank or a tunnel through Krishna Hill, has been referred to the Nepal Geological and Geotechnical Society for further study, after which the government will act on its recommendations.

On coordinating transportation planning across Nepal's three levels of government, Mr. Shuva Raj Neupane explained that the federal government should focus on national highways, expressways and strategically important corridors, while provincial and local governments should manage the remaining networks according to their respective responsibilities. He emphasized the need for a central policy framework developed jointly by the National Planning Commission and the unified Ministry of Infrastructure Development. Under this framework, the Department of Roads and federal government would manage strategic and national highways, provincial governments would manage roads connecting to rural municipality headquarters, and local governments would be responsible for local road maintenance. Metropolitan cities could independently plan mass-transit-oriented networks within their jurisdictions. He concluded that investment decisions at all levels should ultimately be guided by economic analysis and population distribution.

Remarks by the Session Chair: Honorable Arjun Jung Thapa



Honorable Arjun Jung Thapa, Member of the National Planning Commission, opened his closing remarks by placing the day's discussions within the wider context of Nepal's growing exposure to climate-related hazards. Referring to a World Bank study, he noted that Nepal is among the ten countries most affected by climate-related extreme events. The study projects temperature increases of 1.8 to 6 degrees Celsius and precipitation increases of roughly 7.9 to 12.1 millimetres over the period 1986 to 2065. These changes are expected to increase the frequency and intensity of floods, landslides, forest fires and droughts. He noted that extreme events are now recurring at intervals of roughly two years, consistent with the research presented earlier by Dr. Adhikari.

To illustrate this changing pattern, he walked through a chronology of major disasters experienced by Nepal in recent years. He referred to the country's first recorded tornado, which occurred in the Tarai on

31 March 2019 and affected Bara, Parsa and Dhanusha. He then recalled the 2021 Melamchi flood in Sindhupalchowk, which claimed five lives, left twenty people missing and injured six others. The event also destroyed hydropower plants, bridges and roads and deposited debris across approximately fifty-four kilometres downstream.

He further referred to the extreme rainfall events of 2021 that affected Ilam, Panchthar, Dhankuta, Humla, Bajhang and Darchula, with estimated losses of around NPR 6 billion. The same year, an avalanche in Mustang injured more than a dozen schoolchildren and caused extensive livestock losses. In 2022, a post-monsoon disaster affected Mugu, Kalikot, Humla and Jumla in Karnali Province. He also recalled the 2021 rainfall event that damaged approximately forty kilometres of the Manang road and required nearly a month for restoration, followed by a similar event in 2023 that claimed around sixty-three lives. Heavy rainfall affected Kanchanpur in 2024, while the 2025 disruption of the BP Highway by the Roshi River flood, discussed earlier in the session, demonstrated again how quickly a major transport corridor can be cut off.

Most recently, he referred to the Bhotekoshi disaster, for which damages have been estimated at around USD 4 billion. He highlighted the geological significance of this event by noting that Pokhara Valley itself was formed by an event resembling the Bhotekoshi disaster approximately 800 years ago. For him, this provided an important reminder that extreme geological events may occur over long intervals, but those intervals should not be mistaken for permanent protection from recurrence. At the time of the symposium, the National Planning Commission and the National Disaster Risk Reduction and Management Authority (NDRRMA) were also finalizing post-disaster and rapid disaster needs assessments.

Against this background, Mr. Thapa observed that Nepal has already undertaken several studies aimed at improving resilience, but implementation has often fallen short. He referred to a GIS-based decision support system proposed under the World Bank-supported KEAR (Climate Adaptation and Resilience for South Asia) project for Madhesh and Bagmati provinces, which was never fully operationalized. He also noted that hazard mapping prepared under the Road Sector Development Project for the Chinchu-Jajarkot road, the Surkhet-Jumla road and other routes in the far-western region has not been adequately reviewed or acted upon since its preparation.

His message was therefore not simply that Nepal needs more studies. Rather, the country needs to implement the studies and hazard maps it has already commissioned. These efforts should be accompanied by revised design codes, guidelines and manuals, as well as stronger early warning and decision support systems. He credited both Dr. Keshab Kumar Sharma and Ms. Rosaria Ilaria Marino for emphasizing these issues in their respective presentations.

Reviewing the day's presentations, Mr. Thapa first highlighted Ms. Marino's presentation on the TRL data-driven approach to prioritizing climate resilience interventions. He noted its direct relevance to Nepal's recurring problems of landslides, erosion and flood-related transport disruption. He summarized her Pokhara Valley case study and her approach to defining climate risk through the interaction of hazard, exposure and vulnerability. The framework brings together information on assets, hazards,

exposure, criticality, potential failure consequences and intervention priorities to support decisions on where limited resilience resources should be directed.

He also welcomed Dr.-Ing. Jean-Paul Thull's proposal for EASTS New Zealand research funding targeted at young researchers under thirty-five. He described the initiative as an encouraging opportunity to strengthen research capacity while encouraging younger researchers to engage directly with disaster resilience and recovery challenges.

Turning to Mr. Neupane's presentation, Mr. Thapa highlighted the practical account of mobilizing equipment and human resources to reopen roads following major disruptions. He also endorsed the recommendations concerning the integration of land-use planning with river basin management, revision of design standards, and development of alternative corridors connecting important commercial and administrative centres. He noted that there was broad agreement among the presentations that reducing the number of bridges alone is not necessarily the objective; rather, bridge locations and designs need to be carefully considered. He added that the concept of having fewer but more strategically sited bridges is already among the cost-reduction approaches frequently discussed by transport academics.

Regarding Dr. Adhikari's presentation, Mr. Thapa highlighted the call for a more holistic approach to resilient and sustainable infrastructure. He noted that the presentation reinforced the need to move beyond isolated engineering interventions and consider disaster risk, communities, land use, institutions and infrastructure as interconnected elements of the same system.

He then addressed the three issues raised by Mr. Sharma: the role of road transport, the appropriate approach to rehabilitation, and how Nepal should respond to extreme events. Mr. Thapa agreed with the first point, recognizing the continuing importance of road transport to Nepal's mobility and economic activity. On the question of whether rehabilitation should be managed through a dedicated agency or existing line agencies, however, he offered a more qualified view.

As an example, he recalled the 2017 decision to assign the Kathmandu-Tarai Fast Track project to the Nepal Army. At the time, the expectation was that the Army's organizational discipline would allow the project to be completed within four years, by 2021. However, nine to ten years later, he noted that the project had reached only around 49 per cent progress, with one package still unawarded. For him, this illustrates that institutional capacity and project delivery depend on more than organizational form alone. Establishing a separate or dedicated institution does not automatically guarantee faster implementation.

Mr. Thapa also offered a measured response to an implicit criticism raised earlier that engineering considerations were entirely absent from road design in the Koshi area. He noted that some engineering judgment had in fact been applied, even if the design may not have been sufficient for the event that eventually occurred. He pointed out that hydropower structures in the area are designed for a 500-year return-period flood, while the recent disaster exceeded that design basis. In his view, it would therefore be unfair to place the entire responsibility for the resulting damage on the engineers or implementing agencies after the event. The experience instead demonstrates the need to reconsider whether existing design assumptions remain appropriate under changing hazard conditions.

He agreed, however, with several of the broader recommendations raised during the session. Design standards need to be revised to reflect emerging risks. Nepal's highway classification has often been driven more by political considerations than by functional criteria, and this has implications for how limited maintenance resources are distributed. Maintenance therefore needs greater priority, while road asset management and resilient strategic corridor development should become important directions for the transport sector.

In closing, Mr. Thapa referred to Nepal's Climate Change Action Plan (2021–25), which had set a target of maintaining 45 per cent forest cover. He noted that Nepal has already exceeded that target, with forest cover at roughly 46 per cent. He used this as an example of the importance of translating policy targets into measurable outcomes.

He concluded that Nepal's vulnerable terrain and river corridors require continued revision of design standards, guidelines and construction manuals. The country must also ensure that knowledge generated through studies, hazard mapping and disaster experience is converted into practical decisions, stronger institutions and more resilient infrastructure. He thanked all six presenters and the participants for their contributions, bringing the session and the symposium discussions to a close.

Tokens of appreciation were presented to the speakers by Dr. Tulasi Sitaula, and a group photograph was taken.



Closing Session

Chair: Dr. Hare Ram Shrestha, President, SOTEN

Vice-Chair: Er. Anga Lal Rokaya, Vice-President, SOTEN

Time: 17:30 - 18:45

The Closing Session of the International Symposium 2026 commenced at 17:30 with Dr. Hare Ram Shrestha, President of SOTEN, in the chair. He invited the dignitaries to the dais: Chief Guest Dr. Bindu Nath Lohani, Chancellor of the University of Nepal; Special Guest Honorable Arjun Jung Thapa, Member of the National Planning Commission; Prof. Dr. Padma Bahadur Shahi, Chairman of the Nepal Engineering Council; Prof. Dr. Yu-Chiun Chiou, 1st Vice-President of the Eastern Asia Society for Transportation Studies; and Dr. Rojee Pradhananga of the Institute of Engineering, Pulchowk Campus. Er. Anga Lal Rokaya, Vice-President of SOTEN, served as Vice-Chair of the session.

Dr. Rojee Pradhananga of the Institute of Engineering, Pulchowk Campus, presented the Symposium Resolution on behalf of the Resolution Committee, setting out a ten-point resolution that had emerged from the day's deliberations. Tokens of appreciation were then presented to the collaborating partners and sponsors in recognition of their support.

Symposium Resolutions



Presented by **Dr. Rojee Pradhananga**, Institute of Engineering, Pulchowk Campus, on behalf of the Resolution Committee, during the Closing Session of the International Symposium 2026 on Sustainable Transport and Urban Mobility, 9 September 2026.

1. The symposium calls for a long-term vision and timely action in the planning, development, and implementation of Mass Rapid Transit (MRT) systems as a strategic priority for improving mobility, supporting sustainable urbanization, and strengthening the overall economic development of the country.
2. The symposium emphasizes the need for integrated land use and transport planning and coordinated development of different modes within a defined hierarchy of transport infrastructure, with improved first- and last-mile connectivity to enhance accessibility, strengthen regional connectivity, and reduce regional disparities.
3. The symposium emphasizes the need for coordinated development of transport infrastructure with an intelligent ecosystem to enable data-driven decision-making, rapid response, and more efficient transport planning and management.
4. The symposium calls for human-centered and inclusive transport planning and development, ensuring that transport systems are safe, accessible, affordable, and responsive to the needs of all users.
5. The symposium emphasizes the establishment of an Urban Mobility Study Centre to function as a think tank, bringing together representatives from academia, experienced government professionals, and industry to support evidence-based research, global best practices, analysis, policy development, and planning for sustainable and efficient urban mobility in Nepal. Such a center will benefit by including international experts and advisers, such as from EASTS.

6. The symposium emphasizes the need for data-driven monitoring and assessment of transport assets and effective asset management supported by early warning systems to enable timely interventions, optimize resources, and improve the long-term performance and resilience of transport infrastructure.
7. The symposium emphasizes the need to identify and map climate-vulnerable zones and transport infrastructure, and to prioritize climate-resilient and adaptive planning, design, construction, and maintenance measures based on the identified vulnerabilities.
8. The symposium emphasizes the need to develop and implement standards for climate-resilient transport infrastructure and disaster risk management, in line with the provisions and direction of the Nepal Transport Policy, 2026.
9. The symposium emphasizes the need to identify and prioritize resilient strategic corridors along international and regional trade routes and high-traffic corridors to ensure an efficient, effective and reliable transport network for service delivery.
10. The symposium recognizes the potential for Nepal to undertake and promote research on Mountain and Hill roads, drawing upon the country's extensive experience, local knowledge, and diverse geographical conditions, with the aim of developing and sharing context-specific, innovative, and resilient solutions. Nepal could also look into establishing a Center on Mountain and Hill Roads as a research think tank which could help in providing evidence-based suggestions on all aspects of Mountain and Hill Roads.

These resolutions are submitted to guide the Government of Nepal, and in particular the Ministry of Infrastructure Development and the concerned departments and local governments, in shaping transport policy, infrastructure investment and institutional reform in alignment with national development goals and international sustainability commitments.

SOTEN and its partners record their commitment to pursuing these resolutions in cooperation with the Government of Nepal and to reporting on progress at future gatherings of the transport community.

Remarks by the Co-Organizer: Prof. Dr. Yu-Chiun Chiou



Prof. Dr. Yu-Chiun Chiou, 1st Vice-President of EASTS, thanked Dr. Hare Ram Shrestha and Mr. Hemant Tiwari for their efforts in organizing the symposium and acknowledged the strong support of Prof. Akimasa Fujiwara, Prof. Hanaoka, Prof. Morichi and other EASTS representatives present. He described the day as unusually fruitful, with a wide range of topics and perspectives across the sessions, and noted that he had never before attended a symposium where so many participants photographed presentation slides with their mobile phones, which he saw as a clear sign of genuine engagement with the content. He also expressed his sympathy and solidarity with those affected by the recent floods and landslides, acknowledging that his own capacity as an academic to provide financial assistance was limited, but emphasizing that the expertise of the EASTS community could meaningfully support disaster relief planning and response. He concluded by reaffirming EASTS's commitment to working together toward a safer and more successful future.

Remarks by the Guest: Prof. Dr. Padma Bahadur Shahi



Prof. Dr. Padma Bahadur Shahi, Chairman of the Nepal Engineering Council, described the symposium as an excellent opportunity to discuss sustainable and resilient transport infrastructure and expressed hope that the following day's EASTS Board Meeting would further strengthen the spirit of collaboration demonstrated during the event. He recalled his earlier involvement as an EASTS board member and SOTEN president, and the discussions held at board meetings in Phnom Penh, Tokyo, Shah Alam and Surakarta that eventually led to Nepal hosting both the symposium and the board meeting, calling the outcome a proud and memorable moment for SOTEN. He thanked the presenters, speakers, moderators, organizers and participants for the knowledge shared and the professional networks strengthened throughout the day. Speaking as Chairman of the Nepal Engineering Council, he emphasized that better engineering education leads to a stronger engineering profession, which in turn contributes to better national development. He also stressed that continuing professional development, as demonstrated by the symposium, should be viewed as an ongoing process rather than a one-time activity. He concluded by encouraging Nepal's professional societies to grow into strong knowledge platforms for national development, congratulating SOTEN on the successful symposium, and inviting the international guests to enjoy their time in Kathmandu.

Remarks by the Special Guest: Honorable Arjun Jung Thapa



Honorable Arjun Jung Thapa, Member of the National Planning Commission, congratulated the Ministry of Infrastructure Development, SOTEN and EASTS on the symposium and noted that the day's discussions had created a valuable network among researchers and practitioners. Referring again to the Bhotekoshi disaster, for which rescue operations were still ongoing, he outlined Nepal's institutional mechanism for responding to such events. The National Disaster Risk Reduction and Management Authority (NDRRMA), established in 2019 to coordinate disaster response and headed by a Chief Executive Officer, directs rescue operations carried out through the Nepal Army, Armed Police Force and Nepal Police. Rehabilitation of damaged infrastructure is then handled by the relevant line agencies, including the Department of Urban Development and Building Construction for buildings, the Department of Roads and Department of Local Infrastructure for roads and bridges, and the Department of Irrigation for irrigation infrastructure. He identified four key components of resilience: knowledge enhancement, such as that promoted through the symposium; preparedness, including logistics, modular bridges, machinery and specially trained manpower supported by formal preparedness plans; resilient infrastructure design through revised standards, manuals and guidelines; and updated codes of practice. He noted that Nepal currently relies on Indian, Chinese and British codes and that, where necessary, the country needs to develop codes suited to its own conditions. Referring to the BP Highway, which had been constructed with deliberate efforts to minimize environmental disturbance, he noted that it was nevertheless severely damaged the following year. For him, this demonstrated that even careful engineering cannot completely eliminate disaster risk and highlighted the need for continued research and regular review of past practices. He concluded by thanking all the speakers, moderators and the two organizing societies for their contributions to the symposium.

Remarks by the Chief Guest: Dr. Bindu Nath Lohani



Dr. Bindu Nath Lohani, Chancellor of the University of Nepal and former Vice-President of the Asian Development Bank, began by congratulating SOTEN, EASTS and the Government of Nepal for organizing what he described as an excellent symposium. He noted that he had attended every session of the day, from the morning keynote onward. Rather than summarizing the many presentations, which he felt had already been well synthesized, he chose to offer five broader observations on what the day's discussions meant for urban mobility in Kathmandu Valley.

His first observation was that Kathmandu Valley does not face only a transport problem. It also faces an urban development problem and, increasingly, a climate resilience problem. Transport is closely connected to where people live, where jobs and businesses are located, how land is used, and how the city responds to disasters. Referring to the IPCC's characterization of cities as interconnected and interdependent systems, he argued that the key question should move beyond what transport projects Kathmandu Valley should build. Instead, the country should ask what kind of mobility system, and ultimately what kind of Kathmandu, it wants to create. This broader framing would allow investment, urban development and resilience decisions to be considered together.

His second observation was that the purpose of urban mobility is to move people and goods, not vehicles. Success should therefore be measured by how many people can move efficiently, safely and comfortably, rather than simply by how many vehicles a road can carry. He acknowledged the strong advocacy for mass transit throughout the day, including Prof. Surya Raj Acharya's forceful position on the need for mass transit, but cautioned that the appropriate technology for each corridor should be determined by demand, economics, geography and the character of the corridor. Metro, light rail, BRT, electric buses, elevated systems or a combination of these may each have a role depending on the context. Whatever technology is selected, however, it should operate as part of one integrated system that connects rail, buses, walking, cycling, elevated pedestrian facilities, interchanges, integrated ticketing and digital traffic management, rather than as a collection of disconnected projects.

His third observation was that transport should not be built only after a city has already developed around its absence. Retrofitting transport infrastructure into an established city is expensive and can sometimes be nearly impossible. Land use and mobility therefore need to be planned together from the beginning, including decisions on where people should live, where jobs should be located, where higher densities should occur, and which corridors should become major mobility spines. He connected this directly with the logic of transit-oriented development discussed by Prof. Morichi. He also supported the long planning horizons discussed earlier in the day, including the twenty-to-fifty-year framework presented in the Singapore session, and suggested that such a long-term perspective should become a minimum standard for transport planning in Nepal.

His fourth observation focused on climate resilience. He stressed that resilience cannot be treated as an additional feature added after a transport design has already been completed. It must be incorporated from the beginning because a transport system is only as resilient as its weakest critical link. A flooded

road can isolate a neighbourhood, a damaged bridge can sever an entire corridor, and a landslide can bring movement to a complete halt.

He specifically cautioned against relying too heavily on historical rainfall and flood return-period data when assessing future risk under a changing climate. He recalled an exchange with a politician who, after hearing that a road had been designed for a fifty-year flood event and had subsequently experienced such an event, concluded that the road would now be safe for another fifty years. Dr. Lohani described this as a dangerous misunderstanding because a similar event could occur much sooner. In his view, true resilience requires redundancy, alternative routes, reliable drainage and power, accurate and current data, and, above all, the ability to recover quickly after a failure. A resilient system is not necessarily one that never fails, but one that can absorb disruption and restore essential mobility rapidly. Given the consequences of major disruptions for workers, businesses, supply chains and the wider economy, he argued that resilience should be treated as an intrinsic part of infrastructure value rather than an additional cost.

He welcomed the strong emphasis on electrification throughout the symposium but added an important qualification: an electric car is still a car. Electrification can reduce emissions, but it does not by itself solve congestion. He therefore argued that electrification and higher-capacity public transport should be pursued as complementary strategies rather than substitutes. He also noted that the symposium had not yet fully addressed the challenge of electrifying two-wheelers, which remain an important part of Kathmandu's transport system.

His fifth and final observation was that Nepal needs to move faster through what he described as adopt, adapt and leapfrog. Proven practices from cities such as Tokyo or Bangkok can be adopted where they transfer directly, adapted where local conditions require modification, and outdated approaches should be abandoned rather than continued simply because they are familiar. He used Kathmandu's traffic enforcement as an example, contrasting it with AI-based enforcement systems now being used in Bangkok and suggesting that some areas require leapfrogging rather than gradual improvement.

He also argued that technology choices should be evaluated according to full life-cycle cost and performance rather than the lowest initial price. An option that appears more expensive at the beginning can ultimately be cheaper when its energy use, maintenance, reliability, safety and operating life are considered. From this perspective, he posed several underlying policy questions to the room. Does Nepal's existing transport policy require a comprehensive review rather than a limited update? Should the country establish a clear and credible timeline for transitioning public transport toward zero emissions? He cited Shenzhen's fully electrified bus and taxi fleet as an example of what strong government policy can achieve. Should public procurement move beyond lowest-cost selection and consider life-cycle cost, energy efficiency, safety, resilience and maintenance? And should specific urban corridors be identified now to pilot future mobility standards that bring together high-capacity transit, electric mobility, pedestrian access, integrated digital systems and environmental resilience?

He closed with two concrete proposals. First, he suggested that Nepal establish an urban mobility study centre, functioning as a standing, evidence-based think tank that brings together government, private sector, universities and technical experts to continuously study Kathmandu Valley as a living system.

Rather than relying on one-off studies, such a centre could provide ongoing evidence to support government decisions, drawing where appropriate on the expertise of EASTS and experts such as Prof. Morichi. He noted that many universities operate similar city laboratories as a means of maintaining continuous knowledge about urban systems.

Second, building directly on the presentations by Mr. Sharma and Mr. Neupane on mountain roads, he proposed that Nepal consider establishing a comparable centre dedicated to hill and mountain road engineering. Such a centre could institutionalize the country's accumulated knowledge and experience in one of Nepal's most technically demanding areas. He suggested that it could be supported by government, the private sector or a combination of both, and offered the proposal directly to SOTEN for further consideration and feasibility assessment. Drawing on nearly fifty years of his own professional experience, he emphasized the value of creating institutions that preserve knowledge and continuously apply it to the country's evolving transport challenges.

Tokens of appreciation were presented to the distinguished guests.

Vote of Thanks: Er. Anga Lal Rokaya



Er. Anga Lal Rokaya, Vice-President of SOTEN, delivered the vote of thanks on behalf of the organizing committee. He thanked the Chief Guest, Special Guest and other guests of both the opening and closing ceremonies for gracing the symposium, and the keynote speakers, panellists, session chairs and moderators for their expertise and actionable ideas. He extended gratitude to the co-organizing Ministry of Infrastructure Development and EASTS, and to the Department of Roads, Department of Local Infrastructure, Department of Urban Development and Building Construction, Civil Aviation Authority of Nepal, Kathmandu Metropolitan City, Bharatpur Metropolitan City, Pokhara Metropolitan City, the Federation of Contractors' Associations of Nepal, and the Federal Capital City Public Transport Authority, alongside a number of academic and engineering-service partner institutions. He formally recognized the symposium's sponsors by tier, gold sponsor Amber Motors and Kalika Construction; silver sponsors ARX Smart Minds and Anhui Kaiyuan Highway and Bridge; bronze sponsors Scott Wilson Nepal, ITECO Nepal, Sohatsu System Laboratory and Water Asia International; a further group of supporting sponsors and consultancy firms; and insurance partner SALICO, and thanked the organizing, advisory, technical and resolution committees, the symposium's volunteers, the master of ceremony, and the sound and hotel management teams, closing by noting that the event's success rested on the contribution of every participant.

Closing Remarks: Dr. Hare Ram Shrestha



Dr. Hare Ram Shrestha, President of SOTEN, delivered the closing remarks, choosing not to repeat what had already been comprehensively covered in Dr. Pradhananga's ten-point resolution and in the Chief Guest's detailed observations, both of which he described as valuable guidance for the society going forward. He thanked Dr. Lohani for his continued support to SOTEN over the years, in his former capacity at the Asian Development Bank and now as Chancellor of the University of Nepal and an honorary SOTEN member. On behalf of the Nepali transport community, he formally acknowledged EASTS contribution, together with the Korean Society of Transportation and the Hong Kong Society for Transportation Studies, of a combined USD 7,000 in relief support for victims of the recent flash floods, thanking EASTS President Fujiwara and his team directly for the gesture. He summarized the day's central takeaway as encapsulated in the symposium's own theme, sustainable transport and urban mobility, adding that the recent disaster had underscored resilient transport infrastructure as an inseparable part of that same agenda rather than a separate concern, and closed the symposium with thanks to all participants. The programme concluded with a dinner and networking reception from 18:45 onwards, followed by a group photograph.



Symposium Agenda

International Symposium 2026
Sustainable Transport & Urban Mobility

Hotel Royal Tulip, Lalitpur, Nepal | 9 September 2026 Wednesday

PROGRAM SCHEDULE

08:00 - 09:00 **Registration and Welcome of Participants (Refreshments)**

Inaugural/Opening Session

09:00 - 09:05 **Invitation to Dignitaries to the Dias**

Chair: Dr. Hare Ram Shrestha, President, SOTEN
Chief Guest: Honorable Ashish Gajurel, Member of Parliament; Chairman, Infrastructure Development Committee
Special Guest: Mr. Dhana Raj Acharya, Mayor, PokharaMetropolitan City
Guest: Mr. Gopal Prasad Sigdel, Secretary, Ministry of Infrastructure Development
Keynote Speaker: Prof. Dr. Bambang Susantono, Dean, Cities & Local Governments Institute Asia Pacific; Professor, Diponegoro University, Indonesia; Former Chairman, Nusantara New Capital Authority (2022-2024)
Guest: Prof. Dr. Akimasa Fujiwara, President, Eastern Asia Society of Transportation Studies (EASTS)
Symposium Convenor: Mr. Hemant Tiwari, General Secretary, SOTEN

09:05 - 09:10 **National Anthem followed by a moment of silence in condolence for the lives lost in Rasuwa flood**

09:10 - 09:15 **Welcome Remarks: Mr. Hemant Tiwari**, Symposium Convenor; General Secretary, Society of Transport Engineers Nepal (SOTEN)

09:15 - 09:20 **Remarks by the Co-Organizer: Prof. Dr. Akimasa Fujiwara**, President, Eastern Asia Society of Transportation Studies (EASTS)

09:20 - 09:25 **Special Remarks: Mr. Gopal Prasad Sigdel**, Secretary, Ministryof Infrastructure Development

09:25 - 09:30 **Remarks by the Special Guest: Mr. Dhana Raj Acharya**, Mayor, Pokhara Metropolitan City

09:30 - 09:40 **Remarks by the Chief Guest: Honorable Ashish Gajurel**, Member of Parliament; Chairman, Infrastructure Development Committee

09:40 - 09:45 **Token of Appreciation to the Keynote Speaker and Distinguished Guests**

09:45 - 09:50 **Concluding Remarks: Dr. Hare Ram Shrestha**, President, SOTEN

09:50 - 10:00 **Video reflecting recent disaster affecting transport infrastructure**

10:00-10:30 Keynote Session

- **The Future of Urban Mobility**
  Prof. Dr. Bambang Susantono, Dean, Cities & Local Governments Institute Asia Pacific; Professor, Diponegoro University, Indonesia; Former Chairman, Nusantara New Capital Authority (2022-2024)

10:30-12:20 Technical Session 1: International Perspective & Experiences in Urban Mobility

Session Chair: Prof. Dr. Shinya Hanaoka, Secretary General, EASTS

- **Special Lecture: Economic Concentration and Transportation in the Capital City**
  Prof. Dr. Shigeru Morichi, Founder & Former President, Eastern Asia Society of Transportation Studies (EASTS), and Professor Emeritus, GRIPS
- **International Case Presentation: Urban Mobility in Singapore: Towards an Intelligent Transportation System and Autonomous Vehicles**
  Associate Prof. Dr. Ong Ghim Ping Raymond, National Universityof Singapore
- **International Case Presentation: Towards a Bicycle-Friendly Yangon: From Travel Patterns to Network Planning**
  Prof. Dr. Daw Kyaing, Yangon Technological University, Myanmar

Discussion and Question & Answer Session

Token of Appreciation to the Speakers

Remarks by the Session Chair

Group Photograph

12:20 - 13:10 **Lunch and Networking**

13:20-15:00 Technical Session 2: Urban Mobility in Regional and National Context

Session Chair: Mr. Bhimarjun Adhikari, Joint Secretary, Ministry of Infrastructure Development

- **Urban Mobility Planning for Public Transit and Multimodal Integration: The Indian Context**
  Dr. Srinivasa Reddy Nallamilli, FIE, FTTP, India
- **Urban Transport System Master Plan for Kathmandu: Insights from a JICA-Supported Project**
  Ms. Aya Iwatsuji, Programme Officer, JICA
- **Remarks from the Panel**
  Prof. Dr. Surya Raj Acharya, Registrar, University of Nepal

  Mr. Sunil Poudyal, Traffic & Transportation Expert

Question & Answer Session

Remarks by the Session Chair

Group Photograph

15:00 - 15:20 **Tea Break and Networking**

15:20-17:30 Technical Session 3: Resilient and Sustainable Transport Infrastructure

Session Chair: Honorable Arjun Jung Thapa, Member, National Planning Commission

- **Prioritizing Transport Infrastructure Interventions for Climate Resilience:** A Data-Driven Approach
  Ms. Rosaria Ilaria Marino, Senior Consultant, TRL

- **New Zealand Land Transport Funding Hypothecation and Natural Disaster Research Opportunities**
  Dr.-Ing. Jean Paul Thull, FCILT, President, EASTS-New Zealand
- **Turning Pressure into Progress: Managing Disasters on Nepal's Highway**
  Mr. Shuva Raj Neupane, Deputy Director General, Department of Roads
- **Remarks from the Panel**
  Mr. Kamal Pande, Senior Transport Specialist

  Dr. Basant Raj Adhikari, Director, Center of Disaster Risk Engineering, Institute of Engineering, Pulchowk Campus

  Dr. Keshab Kumar Sharma, Former Secretary, Government of Nepal

Question & Answer Session

Remarks by the Session Chair

Group Photograph

Closing Session (17:30-18:30)

17:30 - 17:35	**Invitation to Dignitaries to the Dias** **Chair: Dr. Hare Ram Shrestha, President, SOTEN** **Chief Guest: Dr. Bindu Nath Lohani, Chancellor, University of Nepal** **Special Guest: Honorable Arjun Jung Thapa, Member, National Planning Commission** **Guest: Prof. Dr. Padma Bahadur Shahi, Chairman, Nepal Engineering Council** **Guest: Mr. Gopal Prasad Sigdel, Secretary, Ministry of Infrastructure Development** **Guest: Prof. Dr. Yu-Chiun Chiou, 1st Vice-President, Eastern Asia Society of Transportation Studies (EASTS)** **Guest: Dr. Rojee Pradhananga, IOE Pulchowk Campus** **Vice-Chair: Er. Anga Lal Rokaya, Vice-President, SOTEN**
17:35 - 17:40	**Symposium Resolution**: **Dr. Rojee Pradhananga**, IOE Pulchowk Campus
17:40 - 17:55	**Token of Appreciation to Collaborating Partner and Sponsors**
17:55 - 18:00	**Remarks by the Guest** : **Prof. Dr. Yu-Chiun Chiou**, 1st Vice-President, Eastern Asia Society of Transportation Studies (EASTS)
18:00 - 18:05	**Remarks by the Guest**: **Prof. Dr. Padma Bahadur Shahi**, Chairman, Nepal Engineering Council
18:05 - 18:10	**Remarks by the Guest**: **Mr. Gopal Prasad Sigdel**, Secretary, Ministry of Infrastructure Development
18:10 - 18:20	**Remarks by the Special Guest**: **Honorable Arjun Jung Thapa**, Member, National Planning Commission
18:20 - 18:30	**Remarks by the Chief Guest**: **Dr. Bindu Nath Lohani**, Chancellor, University of Nepal
18:30 - 18:35	**Token of Appreciation to Distinguished Guests**
18:35 - 18:40	**Vote of Thanks: Er. Anga Lal Rokaya**, Vice-President, SOTEN
18:40 - 18:45	**Closing Remarks: Dr. Hare Ram Shrestha**, President, SOTEN
18:45 onwards	**Dinner and Networking Reception**

List of Participants

Distinguished Guests/Panelists/Presenters	Organization
Honorable Ashish Gajurel	Chairman, Infrastructure Development Committee
Dr. Bindu Nath Lohani	Chancellor, University of Nepal
Dhana Raj Acharya	Mayor, Pokhara Metropolitan City
Honorable Arjun Jung Thapa	Member, National Planning Commission
Gopal Prasad Sigdel	Secretary, Ministry of Infrastructure Development
Prof. Dr.Akimasa FUJIWARA	President, EASTS
Prof.Dr. Padma Bahadur Shahi	Chairman, Nepal Engineering Council
Prof. Dr.Yu-Chiun CHIOU	1st Vice-President, EASTS
Dr. Tulasi Sitaula	Past President
Lal Krishna KC	Past President
Rajendra Raj Sharma	Past President
Prof. Dr. Shinya HANAOKA	Secretary General, EASTS/Session Chair
Prof. Dr. Shigeru MORICHI	National Graduate Institute for Policy Studies/Presenter
Assoc Prof. Dr.Ghim Ping (Raymond) Ong	National University of Singapore/Presenter
Prof. Dr. Daw KYAING	Yangon Technological University/Presenter
Bhimarjun Adhikari	Joint Secretary, Ministry of Infrastructure Development/Session Chair
Dr. Srinivasa Reddy Nallamilli	FIE, FTTP/Presenter
Aya Iwatsuji	JICA/Presenter
Prof. Dr. Surya Raj Acharya	Registrar, University of Nepal/Panelist
Sunil Poudyal	Traffic & Transportation Expert/Panelist
Rosaria Ilaria Marino	TRL/Presenter
Dr.-Ing. Jean-Paul THULL	Thull & Associates Consulting/Presenter
Shuva Raj Neupane	Deputy Director General, Department of Roads/Presenter
Kamal Pande	Senior Transport Expert/Panelist
Dr. Keshab Kumar Sharma	Former Secretary, Government of Nepal/Panelist
Dr. Basant Raj Adhikari	Director, Center for Disaster Risk Engineering, IOE Pulchowk Campus/Panelist

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Shrawan Kumar Thapa	Secretary
Bindu Adhikari	Treasurer
Binod Bhattarai	Executive Committee Member
Pradeep K. Shrestha, Ph.D	Executive Committee Member
Ram Kumar Shrestha	Executive Committee Member

Shiva Ram KC	Executive Committee Member
Top Bahadur Baniya	Executive Committee Member

Participants	Organization
Aachal Acharya	Engineer, Kathmandu Metropolitan City
Aakriti Lakhe	Engineer, North-South Trade Route Expansion Project Directorate
Aanchal Tiwari	Cosmos College of Management and Technology
Aavishkar Timilsina	Engineer, Department of Roads
Abhash Acharya	Universal Engineering and Science College
Abhilekh Gautam	Engineer, Nepal Engineering Council
Ajaya Bhattarai	High Powered Committee for Integrated Development of Bagmati Civilization (HPCIDBC)
Akhil Pokharel	Engineer, Lalitpur Metropolitan City
Aman Chitrakar	Former Joint Secretary, GoN
Amindra Khadka	Sr. Divisional Engineer, Quality Research and Development Center
Anand Gopal Shrestha	Sub-Engineer, Quality Research and Development Center
Angishor Shrestha	GRID Consult
Anil Kaushal	Amber Motors
Anil Marsini	Assistant Professor, IOE Pulchowk Campus
Anish Shrestha	Engineer
Anju Pariyar	Suyabinayak Dhulikhel Road Project
Anup Dhimal	Engineer, IDO, Sindhuli
Apurba Sharma	Scott Wilson Nepal
Arati Bhatta	Department of Local Infrastructure Development
Archana Paudel	Suyabinayak Dhulikhel Road Project
Arjun Kumar Bam	Secretary, MoPID, Karnali Province
Aruna Tandukar	GRID Consult
Ashaya Ojha	Sitara Consult
Ashika Pokhrel	Sr. Divisional Engineer, Kathmandu Valley Road Expansion Project
Ashim Adhikari	High Powered Committee for Integrated Development of Bagmati Civilization (HPCIDBC)
Ashim Gautam	ACME Engineering College
Ashok Dhakal	Homeland Engineering Consultancy P. Ltd.
Ashok Kumar Shah	Director General, Department of Local Infrastructure Development
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Asmita Khanal	Urban Planner, Bharatpur Metropolitan City
Asmita Pokhrel	Civil Engineer, SOTEN
Asmita Subedi	Department of Roads
Asralt BUYANTSOGT	Mongolian University of Science and Technology

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Asst. Prof. Gopal Gautam	Nepal Engineering College
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Atsushi FUKUDA	Nihon University
Ayush Joshi	SDE, Koshi Province, MOPID
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Bhupendra Chandra Bhatta	Asian Development Bank
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Bikram Paudel	Engineer, Quality Research and Development Center
Binayak Bhattarai	Civil Aviation Authority of Nepal
Binod Sah	Freelancer
Bir Bahadur Thokar	Engineer, Lalitpur Metropolitan City
Bishal Bhandari	Engineer, Quality Research and Development Center
Bishnu Bhattarai	Transportation Expert
Bishnu Prasad Devkota	Nepal Electricity Authority
Bishnu Prasad Khanal	Suyabinayak Dhulikhel Road Project
Bishnu Prasad Poudel	Civil Aviation Authority of Nepal
Buddha Ratna Tuladhar	Project Director, Pushpalal (Mid-Hill) Highway Project Directorate
BUI Tien Thanh	University of Transport and Communications
Chen Juntao	Deputy Manager, M/S Anhui Kaiyuan Highway and Bridge Co. Ltd
Chuda Raj Dhakal	Project Director
Danda Padi Basyal	Hazana Ando Corporation
Deepak Kunwar	Lalitpur Engineering College
Deepak Negi	MoPID, Sudurpaschim Province
Derong WANG	The Institute of ZJX Logistics of Beijing
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Dharmendra Kumar Jha	Project Director, Department of Roads
Dhruba Kumar Shrestha	Deputy Project Director, ADB
Dinesh Raj Pandeya	Amber Motors
Dipak Sharma	MoPID, Gandaki Province
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Dipesh Munankarmi	Road Division Khalte
Dipesh Rajak	Sr. Divisional Engineer, Department of Roads

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Gajendra Kumar Jha	Universal Engineering and Science College
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Govinda Dev. Adhikari	Homeland Engineering Consultancy P. Ltd.
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Hemraj Bhatta	MoPID, Sudurpaschim Province
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Kabindra Kaji Bajracharya	Civil Aviation Authority of Nepal
Kabita Gautam	Engineer, Nepal Engineering Council
Kali Prasad Bist	Pokhara University
Kalpana Adhikari	Department of Roads/Nepal Geotechnical Society
Kamal Bista	Federal Road Supervision and Monitoring Office, Kathmandu
Kamal Kumar Adhikari	Deputy Director General, Department of Local Infrastructure Development
Kasmira Sah	Pulchowk Campus
Keshab Paudel	ARX SMART MINDS
Keshav Raj Acharya	ITECO Soil Test ERMC JV
Khimananda Panthi	Fasttrack Project

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Kiran Kumar Mahat	Independent Consultant
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Krishna Bhattarai	IOE, Thapathali Campus
Krishna Prasad Sapkota	Sitara Consult
Kshitiz Dhakal	Transportation Engineer
Kuber Nepali	Superintending Engineer/Joint Secretary, MOPID
Kundan Mishra	IOE, Pulchowk Campus
Kyung Soo Chon	Yooshin Engineering Corporation
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Li Pei	Environment and Safety Engineer, M/S Anhui Kaiyuan Highway and Bridge Co. Ltd
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Madhav Kafle	Senior Engineer, Kathmandu Metropolitan City
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May Thu Zar Khin	Yangon Technological University
Milan Acharya	Secretary, Koshi Province, MOPID
Mint Aung	Delegate
Mohamed Rehan KARIM	University of Malaya
Monyrath KOV	Asian Development Bank
Mrigendra Raj Kafle	Hazana Ando Corporation
Nabraj Rawal	MoPID, Sudurpaschim Province
Naohisa OKAMOTO	University of Tsukuba
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Neeraj Chauhan	Thapathali Campus
Nemi Bhattarai	GGGI
Niraj Bohara	United Techincal College
Nischeet Maharjan	Water Asia International

Nisha Rijal	Deputy Director General, Department of Local Infrastructure Development
Nitesh Thakur	Geoinfra Research Institute
Nitu Yadav	Engineer, Nepal Engineering Council
Nurbhu Sherpa	Amber Motors
Paras Mani Hamal	Road Division Khalte
Paras Pandey	Senior Divisional Engineer, Department of Local Infrastructure Development
Parikshit Bahadur Magar	Senior Engineer, Lalitpur Metropolitan City
Parwati Thagunna	Everest Engineering College
Pashupati Gyawali	Project Manager, Narayanghat-Butwal Road Project (Western Section)
Pawan Gautam	Environmental Focal Person/Engineer, M/S Anhui Kaiyuan Highway and Bridge Co. Ltd
Pintu Kumar Sah	Infrastructure Development Directorate, Itahari
Prabin Jung Thapa	MCA Nepal
Prabina Thapa Magar	Asian Development Bank
Pragya Thapa	Sagarmatha Lumbini Insurance
Prakash Chandra Kharel	Kalika Construction Pvt. Ltd.
Pramod Khatiwada	Engineer, Road Division, Kathmandu
Pramod Pudasaini	Asian Development Bank
Pramod Raj Pandit	Engineer, Lalitpur Metropolitan City
Pranita Rana	Safe and Sustainable Travel Nepal
Prasanna Singh	Engineer, SOTEN
Prof. Thusitha Chandani Shahi,PhD	Nepal Engineering College
Puja Karki	Senior Engineer, Lalitpur Metropolitan City
Pujan Giri	Sr. Divisional Engineer, Gunstar Research and Development Center
Purna Bahadur Gautam	Amber Motors
Purushartha Khatiwada	Cosmos College of Management and Technology
Pushpa Raj Bhatta	Senior Transportation Engineer
Pushpa Raj Neupane	Civil Aviation Authority of Nepal
Puspa Deshar	NS Engineering and Geotechnical Services Pvt. Ltd.
Rabin Dhital	Civil Engineer, Bharatpur Metropolitan City
Rabin Rachalica	Bhaktapur Tours Research Centre
Rahul K. Bajracharya	Transportation Engineer
Rahul Thakur	Transportation Engineer
Rajay Bajracharya	Urban Planning (Pulchowk Engineering College)
Rakesh Maharjan	Sr. Divisional Engineer, Department of Roads
Ram Babu Prasad	High Powered Committee for Integrated Development of Bagmati Civilization (HPCIDBC)
Ram Bahadur Tamang	Newa Agency Nepal

Ram Bihai Chaudhary	Kathmandu Ringroad Improvement Project
Ramchandra Fuyal	Engineer, Road Division, Kathmandu
Ramchandra Khatri	MoPID, Sudurpaschim Province
Ramesh Bala	Khwopa College of Engineering
Ratnalaxmi Bajracharya	Sr. Divisional Engineer, Bridge Sector, Kathmandu
Ravi Bhusan Jha	Geocom International
Reeta Khadka	Kantipur Engineering College
Riti Shrestha	Civil Engineer
Robin Kumar Rauniyar	High Powered Committee for Integrated Development of Bagmati Civilization (HPCIDBC)
Robina Manandhar	Kathmandu University
Rojee Pradhananga	Assistant Professor, IOE Pulchowk Campus
Romharsh Oli	Everest Engineering College
Roshan Pathak	Engineer, IDO, Lalitpur
S.K. Jason CHANG	National Taiwan University
Sagar Onta	EAST Consult
Sajan Neupane	Engineer, RCIP, PIU
Saksith CHALERMPONG	ISC Chairperson
Samir Bajagai	Khwopa College of Engineering
Samridhi Singh	SOTEN Secretariat
Sandesh Acharya	Civil Engineer
Sandip K.C.	MECC
Santosh Acharya	Senior Divisional Engineer (S.D.E.), Bharatpur Metropolitan City
Santosh Khadka	Kathmandu Engineering College
Santosh Khatri	Sohatsu systems laboratory Inc.
Sarad Aryal	Transportation Engineering Civil
Sarala Neupane	Senior Divisional Engineer, Pushpalal (Mid-Hill) Highway Project Directorate
Sarju Bindukar	Senior Engineer, Lalitpur Metropolitan City
Saroj Adhikari	Himalaya College of Engineering
Sashin Chawal	Amber Motors
Satish Phaiju	Sagarmatha Engineering College
Sejeena Pradhan	Pulchowk Engineering Campus
Shambhu Acharya	Sr. Divisional Engineer, Road Improvement and Development Project
Shankar Raj Koirala	High Powered Committee for Integrated Development of Bagmati Civilization (HPCIDBC)
Shardul Sapkota	Transportation Engineer
Sharmila Sharma	Suyabinayak Dhulikhel Road Project
Shashishekhar Thapa	Kathford International College of Engineering and Management
Shila Nyaupane	Engineer, Naagdhunga Surung Road Construction Project
Shiva Hari Sapkota	Senior Infrastructure Expert
Shivsharan Timilsina	Federal Road Supervision and Monitoring Office, Kathmandu

Shiwahari Dahal	Section Officer, FCCPTA
Shree Ram Dhakal	University of Nepal
Shristi Maharjan	Civil Aviation Authority of Nepal
Shuva Sharma	Scott Wilson Nepal
Shyam Mani Kafle	Senior Divisional Engineer, Department of Local Infrastructure Development
Simanta Dhungel	Himalaya College of Engineering
Sirjana Bhattarai	Sub-Engineer, Department of Roads
Smita Sharma	Senior Divisional Engineer, Department of Local Infrastructure Development
Smriti Khatiwada	Freelancer
Sneha Subedi	Engineer, Nepal Engineering Council
Sorawit NARUPITI	Chulalongkorn University
Srijan Rana Magar	Department of Local Infrastructure Development
Srijan Subedi Chowi	Kantipur Engineering College
Subash Dhakal	Sagarmatha Engineering College
Sudeep Thapa	Safe and Sustainable Travel Nepal
Sudip Pokhrel	Federal Road Supervision and Monitoring Office, Kathmandu
Sujan Pudasaini	Kathford International College of Engineering and Management
Sukriti Joshi	Khwopa College of Engineering
Sulav Sigdel	Department of Local Infrastructure Development
Suman Gautam	Transportation Expert
Suman Yogesh	Road Division, Bhaktapur
Sumona Bajracharya	Kathmandu Engineering College
Sunil Paudel	Civil Engineer
Sunita Dahal	Road Division, Bhaktapur
Suraj Bhandari	Infrastructure Development Directorate, Itahari
Surakshya Kafle	Safe and Sustainable Travel Nepal
Surendra Ojha	Civil Aviation Authority of Nepal
Suresh Neupane	Department of Roads
Surya Prasad Kandariya	High Powered Committee for Integrated Development of Bagmati Civilization (HPCIDBC)
Sushan Shrestha	Kathmandu Engineering College
Susmita Dahal	Senior Engineer, Lalitpur Metropolitan City
Suwas Kumar Khadka Kshetri	Engineer, Quality Research and Development Center
Swarnima Shrestha	Engineer, Lalitpur Metropolitan City
Swati Neupane	Civil Engineer
Sylvia HE	The Chinese University of Hong Kong
Takeshi KURIHARA	Toyo University
Tanuk Lal Yadav	Free lancer
Tek Bahadur Hitan	MoPID, Karnali Province
Tetsuo YAI	The Japan Transport and Tourism Research Institute
Thakur Prasad Sharma	President, SCAEF

Tissa LIYANAGE	Master Hellie's Engineering Consultants
Tuk Lal Adhikari	ITECO Nepal Pvt Ltd
Tulakant Chaudhary	Road Division Khalte
Uday Raj Neupane	Clay Engineering
Ujjwal Shrestha	Project Manager, Kanchanpur-Kamala Road Project (Western Section)
Uma Shankar Sah	Retired Government Staff
Umesh Prasad Chaudhary	Unique Engineering Consultancy Pvt. Ltd.
Umesh Shrestha	SIDEF
Ushesh Shrestha	Engineer, TID Bagmati Province
Utsav Subedi	ITECO Nepal Pvt Ltd
Vibek Gupta	Safe and Sustainable Travel Nepal
Vijay Bhushan Jha	Road Design Engineer, Chilime Engineering and Services Co. Ltd.
Vijay Kumar Mahato	Suyabinayak Dhulikhel Road Project
Vishnu Bhandari	Province Secretary, Sudurpaschim Province
Yoko Sego	Sohatsu Systems Laboratory Inc.

**Note: The list of participants begins with the distinguished guests, followed by presenters and panelists of the various technical sessions, members of the 5th Executive Committee of SOTEN, and the Past President of SOTEN. It concludes with the remaining participants, including international delegates, listed in alphabetical order.*

Annex A: Photographs

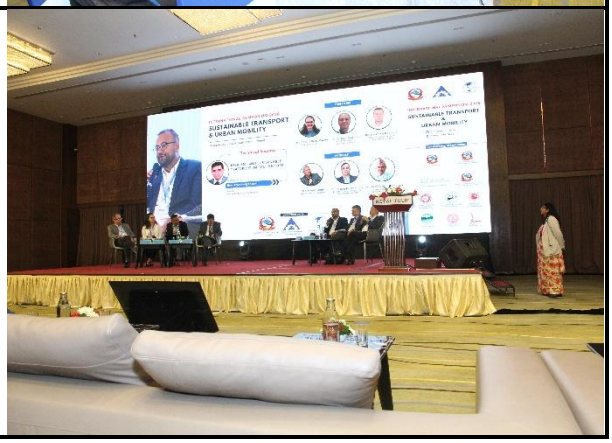












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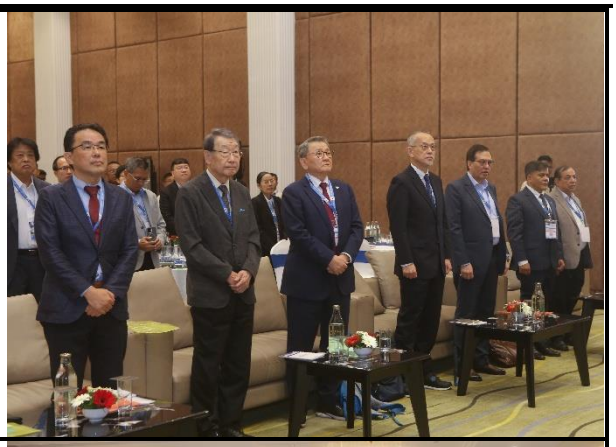







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Collaborating Organizations

- Department of Roads
- Department of Local Infrastructure Development
- Department of Urban Development and Building Construction
- Civil Aviation Authority of Nepal
- Society of Consulting Architectural & Engineering Firms
- Federal Capital City Public Transport Authority
- Pokhara Metropolitan City
- Kathmandu Metropolitan City
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- Geoinfra Research Institute
- Clay Engineering Consultancy
- Homeland Engineering Consultancy
- Geocom International
- Arghakhanchi Engineers and Builders Co.

Insurance Partner

- Sagarmatha Lumbini Insurance

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