

Session Report

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**TECHNICAL SESSION: DISASTER MANAGEMENT BASED ON DIGITAL TRANSFORMATION
MONDAY FEBRUARY 7, 04.00 PM TO 05:30 PM**

1. KEYWORDS

Disaster management, Resilience, Risk Assessment, Redundant, Traffic Management, Data Mining

2. PRESENTATION OF THE SESSION (XX COPY THE SAME TEXT AS ON THE WEBSITE XX)

It is said that we are currently in an era of digital transformation, in which the penetration of increasingly sophisticated information and communication technologies is changing people's lives for the better in all aspects. It is said that this change will permeate society in stages, having a significant impact on society and changing it drastically.

The field of road disaster management is no exception. The digitization of all kinds of data is expected to lead to the evolution of technologies for rapid transmission of disaster information, the reliable and accurate understanding of disaster situations, impacts on road operations, influence on disaster response and recovery activities, and impacts on economic and social activities, as well as technologies for understanding these impacts and supporting more appropriate decision-making based on these technologies.

In addition to the aforementioned technology of digitization, recent years have seen the emergence of the use of big data and social network information for disaster management, which will accelerate digital transformation processes.

This session will provide an opportunity to share the world's efforts to sustain information supply chains in disaster management against natural events, through digitization, digitalization, and digital transformation, and discuss about sustainable road operations under these circumstances.

3. PROGRAMME OF THE SESSION

Session Chair: Jan GRUBER (WG1 leader, TC1.5 PIARC, CZE)

Session Organiser: Yukio ADACHI (Chair, TC1.5 PIARC, JPN)

Session Secretary: Marcelo MEDINA (Spanish Speaking Secretary, TC1.5 PIARC, CHL)

Session Q&A master: Tomohiro FUJITA (Web master, TC1.5 PIARC, JPN)

Person	Organisation, Position...	Title of the presentation
Hiroki TAKAMATSU	Hanshin Expressway Co., Ltd., Japan	Upgrade to the redundant traffic management system having high resilience of the traffic management functions against large-scale disaster (Paper IPO125)
Denis DAVI	Cerema, France	The SISMET Method: A Tool for Seismic Risk Assessment of Urban and Peri-Urban Roads in

		a Context of Crisis Management (Paper IP0098)
Masahiro HATTORI	Hanshin Expressway Research Institute for Advanced Technology, Japan	Study on resilience improvement of Hanshin Expressway infrastructure by cyber management (Paper IP0129)
Andri IRFAN RIFAI	Directorate General of Highway, Indonesia	Data mining implementation for disaster and risk management (Learn from Palu disaster area) (Paper IP0239)

4. TECHNICAL FINDINGS AND DEBATE

- **Traffic management system** that builds multiple management centres to back up each other was discussed as vital.
- Development of seismic **risk assessment** was suggested in order to concentrate resources on targeted routes or bridges.
- It was reaffirmed that more **precise simulation** using inspection and sensing data is essential for appropriate measures.
- The use of **Big data and data mining technique** were proposed to optimize each disaster management cycles.

5. RECOMMENDATIONS FOR DECISION MAKERS, FOR PIARC OR FOR INTERNATIONAL ORGANISATIONS

The key conclusions for decision makers within the industry included the following:

- Disaster and risk management can be done well by running a disaster management cycle. Prediction based on data mining can be used to support disaster management. Each stage of the cycle can be optimized by utilizing big data and data mining for good preparedness, better warning, reducing vulnerability, or preventing disaster in the next cycle at all points in the cycle.
- Innovative new technologies reducing disaster social economic impacts and infrastructure effects (Digital transformation, information technologies, new materials, new techniques, etc.) and many tools and systems that use big data and information from social networks in disaster management and related case studies are important factor in improving disaster management technologies, obtaining information and data for use in creating model simulations.
- The modifications have brought us one step closer to achieving the safest traffic in the world in the event of a large-scale disaster. For early response to various obstacles and for maintaining smooth traffic flow at all times is essential reliability of traffic management.
- Information and big data from various sources are increasingly being used to ensure safety and security in land transport (traffic situation, infrastructure situation, disaster information, people mobility, vehicles mobility, weather conditions and other). Technologies are on the rise to use not only big data, but also social networks for disaster management. Big Data and social networks are potential resources for monitoring and measuring catastrophic situations. Social networks are also a potential tool for public relations in disaster management.
- A very important aspect accompanying the use of big data and social networks is the need to ensure regular updates, upgrades and cyber security of the systems, including implementation of measures against possible cyber attack including of hybrid threats and fake news. The use of information from social networks is very often very fast, but it is necessary to verify the reliability and truthfulness of this information. Setting up of a functional system to ensure cyber security against possible attacks not only from the outside but also from the inside.

- The developing of the new systems and the use of modern IT technologies and information and communication systems in disaster management also bring higher requirements for the education of their users and their training in the use of these tools for disaster management.

The overarching conclusions for PIARC and other international organisations included:

- Developed and developing countries continue to suffer severe disaster impacts on their respective transport systems. In practice, we are improving how we design build maintain operate and even transform our roads with using big data and information of traffic systems. States and regions should encourage international technical cooperation, because it is efficient - for all countries, high income and lower income, including of education of disaster management
- It is desirable to share information between countries not only for the needs of dealing with disasters with a cross-border impact, but also for quality preparation for crisis management within the application and implementation of known data and information and practical experience in the conditions of another state. The problem can be the diversity of big data sources and social networks, the question arises of creating a unified environment for the community dealing with disasters
- Closer cooperation between international, national and regional road organizations and national governments should be encouraged. It is also necessary to develop active cooperation between the private sector, public administration and research and scientific institutions in the development of new and, in particular, functional and highly effective tools and systems for crisis management, including of education of disaster management.

6. PREPARATION OF THE SESSION

This session was planned, designed, and organised by PIARC TC1.5 “Disaster management”.