

TECHNICAL COMMITTEE 1.5 – DISASTER MANAGEMENT

1.5.1. Information and communication in disaster management

Strategies / Objectives

- Follow up works carried out by *T.C.E.3 –Disaster Management* within Cycle 2016-2019 in gathering and diffusion information for disaster management, taking into account of new evolutions such as Big Data and Social Networks.
- Study how to process huge amount of information acquired from the Big Data and Social Networks rapidly and efficiently in order to extract necessary and reliable information for disaster management.
- Study how to evaluate the accuracy of information from the Big Data and Social Networks and ensure the quality of the information related to disaster management.
- Study how to disseminate disaster information efficiently among the road users and the relevant parties through social networks.
- Identify the best practice of disaster management techniques using recent evolutions in information, communication area such us Big Data and Social Network
- Encourage coordination with other TCs and TFs, such as *T.C.1.4 – .Climate change and resilience of road networks*, *T.C.3.1 – Road Safety*, *T.C.2.4 – Road Network Operation/ITS*, *T.F.3.1 – Road Infrastructure and Transport Security* and *T.C.3.3 – Asset Management*.

A proactive approach in disaster management will receive a positive reaction from road users.

In this sense, information management is the primary and fundamental basis of disaster management. Developing a reliable information collection and sharing system is the first step of proactive disaster management toward engaging with internal and external stakeholders and understanding their information needs and expectations.

T.C.E.3 - Disaster Management (SP 2016-2019) made preliminary study on current status of information management especially in collection and provision of disaster information. According to the result of this study, within the management activities using conventional disaster information sources and outlets, effective and successful disaster management could be made with the disaster management center under the specific communicational procedures rather than structure, with the periodical practice training to ensure the procedures work well in emergency situations, and with establishing alliances with media.

It is needless to say that the quality of the information provided to road users and road administrators governs the quality of the subsequent disaster management. With the unexpected development in IoT technologies and devices, and unprecedented increase in mobile telecommunications and social media which can instantaneously convey a huge amount of disaster information data to road administrators as well as road users, management of disaster information is about to change using the benefit of those internet related data.

Internet related data can be divided into two, Big Data and Social Networks. In this paper, Big data is defined as the data generated by IoT devices and Social Networks is defined as the data generated by various activities of “people” such as opinions, evaluations, and behavior.

The most successful application of Big Data in disaster management might be “Passable road map”. Japanese car manufactures and ITS japan integrated their car probe data at the occasion of major disasters and provides “Passable road map” on the disaster area on the web.

Social Networks is also a powerful tool for information dissemination but is also a potential tool for information gathering in an emergency. Social Networks is currently used somewhat passively to disseminate disaster information to the road users and receive their feedbacks. The most successful case study can be found in the emergency operation at the Forth Road Bridge Closure. Social Networks has

a potential tool for disaster management tool in terms of 1) emergency communications and issue warnings; 2) receiving victim requests for assistance; 3) monitoring user activities and postings to establish situational awareness; and 4) using uploaded images to create damage estimates, among others (Source: OECD report, <https://doi.org/10.1787/5k3v01fskp9s-en>).

Big Data and Social Networks are pretty huge data, and Social Networks is “People” generated information. Therefore, the road administrator has responsibility for selecting good and concise information, for managing fake news, and disseminating good and accurate news on Big Data and Social Networks. In this meaning, the following studies are essential to road administrators:

- Study how to process huge amount of information acquired from the Big Data and Social Networks rapidly and efficiently in order to extract necessary and reliable information for disaster management.
- Study how to evaluate the accuracy of information from the Big Data and Social Networks and ensure the quality of the information related to disaster management.
- Study how to disseminate disaster information efficiently among the road users and the relevant parties through Social Networks.

Finally, integrating Big Data and Social Networks to disaster information management is in its early stage, this report, based on case studies, will provide the best practice of disaster management techniques using recent evolutions in such information communication area. This contribution from PIARC will be relevant and useful to not only to disaster management but also all kind of emergency management.

Outputs	Expected Deadlines
<ul style="list-style-type: none"> • Collection of case studies 	<ul style="list-style-type: none"> • December 2021
<ul style="list-style-type: none"> • Full report 	<ul style="list-style-type: none"> • December 2022

1.5.2. Financial aspects of disaster management

Strategies / Objectives

- Conduct case studies where:
 - To study effective practices for accelerating disaster recovery from the view point of financial, contract and procurement systems
 - To study financial aspects of disaster management during preparedness, mitigation, response, and recovery phases
- Explore and document good practices.
- Explore collaboration with TRB and other external organizations for a joint workshop.
- Encourage coordination with other TCs and TFs, such as *T.C.1.3 – Finance and Procurement*, *T.C.1.4 – Climate change and resilience of road networks*, *T.C.2.4 – Road Network Operation/ITS*, *T.F.3.1 – Road Infrastructure and Transport Security*, *T.C.3.3 – Asset Management*, *T.C. 4.1 - Pavements*, *T.C. 4.2 - Bridges*, *T.C. 4.3 - Earthworks* and *T.C. 4.4 - Tunnels*.

Disaster can be defined as “a crisis situation that far exceeds the capabilities” - Quarantelli, 1985. Therefore, disaster management can be explained as a series of activities to improve the capability of the society.

Disaster management is generally divided into four phases and often discussed (preparation, mitigation, response, and recovery). The disaster prone countries have improved their technology to enhance capacity and management techniques in each phase based on their disaster experiences. Many of these capacity improvement technologies are shared in disaster prone countries. Disaster management in nature is inseparable from financial management in terms of technological improvement and its implementation. However, there are few studies that have organized disaster management from the financial point of view even for such disaster prone countries. The financial discussion in disaster management is often found at the prompt recovery phase in order to minimize the economic losses from the disaster.

In recent years, disaster management activities are evolving from the stage of sophistication of disaster response to the sophistication of disaster mitigation and preparedness. Therefore, the financial aspects in disaster management need to be discussed in not only in recovery phase but also preparedness, mitigation, and response phase.

At the phase of preparedness, disaster insurance and disaster recovery cost pooling, which have been experimentally implemented in some disasters prone countries, will be financially important research issues. In some countries, it is reported that the introduction of disaster insurance enabled effective and efficient disaster response. (Source: World Bank report, *Sovereign Disaster Risk Finance in Middle-Income Countries*, 2018)

At the phase of mitigation, it will be necessary to consider the improvement of road network redundancy and disaster prevention quality of infrastructure in order to minimize the disaster effect from the financial point of view. In Japan, after the 2011 East Japan earthquake, a new scheme for evaluating road project by considering their effect after disasters was established. They introduced a disaster mitigation benefit to the cost-benefit analysis for adopting a new road project. (Source: *Routes/Roads* pp72-pp79, #356, 2012)

At the phase of recovery, the development of procurement methods and contract systems for prompt recovery was an important financial issue. In recent years, it has been reported that, in view of securing a road network, the impact on the regional economy is also considered in the selection of the restoration method. (Source: PIARC report, *Disaster Information Management for Road Administrators*, 2019)

At the stage of response, securing safety and securing emergency activities are given the highest priority, so there are few cases where financial considerations becomes important, but further investigation is necessary.

In this meaning, the following studies are essential to road administrators:

- To study effective practices for accelerating disaster recovery from the view point of financial, contract and procurement systems

- To study financial aspects of disaster management during preparedness, mitigation, response, and recovery phases

Financial considerations in disaster management activities often include sensitive matter. Careful consideration and discussion will be needed in obtaining information and processing and analyzing the information.

Finally, financial considerations in disaster management are quite new concept to study. Therefore, it is important to collect various case studies from the world and introduce good and informative cases studies to the world. This contribution from PIARC will be relevant and useful to not only to disaster management but also all kind of incident or emergency management.

These case studies will be summarized in a briefing note.

Outputs	Expected Deadlines
<ul style="list-style-type: none"> • Collection of case studies 	<ul style="list-style-type: none"> • December 2021
<ul style="list-style-type: none"> • Briefing note 	<ul style="list-style-type: none"> • December 2022

1.5.3. Update the Disaster Management Manual

Strategies / Objectives

- Update of the Disaster and Risk Management Manual.
- Take into account works carried out by *T.C.E.3 – Disaster Management* within Cycle 2016-2019.
- Encourage coordination with other TCs and TFs, such as *T.C.2.4 – Road Network Operation/ITS*, *T.C.3.1 – Road Safety*, *T.C.4.3 – Earthworks*, *T.C. 4.4 – Tunnels*, *T.C.1.4 – Climate change and resilience of road networks*, and *T.F.3.1 – Road Infrastructure and Transport Security*.

The core role of PIARC is knowledge exchange. PIARC organized technical committees that make a key role of dissemination and exchange of technical information during 4-year cycle period. For this purpose, T.C.s produces technical reports and holds at least two international seminars during the cycle period in Low-Middle Income countries, and some international workshop or roundtables in High Income countries. Those seminars, workshops, and roundtables are the good opportunities to exchange their technologies. The technical reports and slide files presented at seminars, workshops, and roundtables are uploaded to the PIARC website for disseminating the information of these activities.

Internet is a powerful, convenient, and economical tool to disseminating technical information to the world, but internet relies on the search engine to find out the information. PIARC is now exploring a good information type for disseminating technical information to be easily searched and to be easily referenced. One of the ideas is to produce “Manuals”.

T.C.E.3 – Disaster Management (2016-2019) made a technical report that contained a lot of information of management principles, precious case studies, and a bunch of element techniques that support disaster and risk management activities. *T.C. E.3* compiled some of previous materials and launched an English version of on-line disaster and risk management manual at PIARC web site.

With the rapid changes in road administration environment and the development of management techniques, there is a need to constantly update this manual for sustainable use.

Disaster management is not a theoretical based activity but an experience based activities. Useful disaster management manual will be a well-organized bunch of lessons, experiences, and examples of successful practices. In this meaning, there is still significant work to be done to update articles that would not were implemented by the end of 2019.

Risk management is already well documented in the academic field. Our main concern is how the risk management concept can apply to the road engineering. Previous study revealed that the risk management technique is well implemented in the project planning phase, and is gradually implemented in the maintenance field. Enriching the contents of application of risk management is welcomed by the practical engineers.

The work of the cycle 2016-2019 covered some of the principles, technical tools, and case studies documented in the previous report. This cycle continues to effort on updating and enriching the contents of the manual in order to make it more attractive and more in line with what is expected from an online resource, and to make it rich with new case studies and other media.

- Update and enrich the articles using the PIARC latest work (Cycle of 2016-2019) related to disaster and risk management.
- Cooperate with related TCs for finding good case studies
- Update the manual for easy to use by using various forms: images and videos
- Update the manual in PIARC official languages
- Explore the possibility for a webinar for the side menu of the manual

This contribution from PIARC will be relevant and useful to practical engineers who are engaging with disaster management activities.

In this Cycle, a full report is expected to be completed.

Outputs	Expected Deadlines
<ul style="list-style-type: none">• Update of the Disaster and Risk Management Manual	<ul style="list-style-type: none">• December 2022
<ul style="list-style-type: none">• Full report	<ul style="list-style-type: none">• December 2022