Press release

Disaster management in road infrastructures: a brief introduction

(Athens, August 2019) Several studies, evaluating the effects of disasters on road infrastructures, have focused primarily on the economic impacts, rerouting strategies, and retrofit priorities. Almost 90% of research addressed mitigation, preparedness and response phases of disaster risk management, while less than 10% of the research contributed to managing disaster recovery projects[1]. Practically, we have pre-disaster and post-disaster planning.

Pre-disaster (i.e. preventing) planning involves the identification of network elements prone to disasters, their impact on operations and protection requirements, and the establishment of resilient infrastructures. However, prevention tasks may be inadequate; both the characteristics (magnitude, space and time extent) of a catastrophic event and the performance of infrastructures are uncertain. In addition, limitations in resources make an extensive deployment of plans for enhancing resilience infeasible.

In the post-disaster phase, the transportation network may suffer severe damages to its elements, ranging from degradation to full collapse. These may in turn reduce the network's performance, limit its connectivity or lead to partial loss of functionality. There are several studies[2] regarding the behavior changes of commuters during such cases. These studies include maintenance-related closures (e.g. Fix I-5 project in Sacramento, Centre Street Bridge in Calgary), and disasters (e.g. I-35W Bridge Collapse in Minneapolis, 1995 Kobe, Japan earthquake).

Post-disaster planning may involve different operational tasks including evacuation, emergency traffic management, emergency logistics deployment, recovery-oriented resource allocation and restoration project programming. Such tasks may be prepared as parts of proactive plans or reactive and therefore decided, planned and implemented following a disaster. In both cases, planning requires an estimation of the post-disaster network performance (PDNP), which could then be used for decision making[3].

PANOPTIS targets to cover the whole spectrum of the disaster management cycle, which is usually decomposed into four phases: mitigation, preparedness, relief, and recovery. More specific the PANOPTIS project offers the opportunity to improve assessment of long-term risk and optimize the mix of prevention, mitigation, preparedness, warning and response measures. Consequently, it will be formed a strong ecosystem through which it will be possible to manage extreme events, facilitating the information flow and sharing a global view of the overall progress.

Additional information can be found in PANOPTIS site link: http://www.panoptis.eu/

[1] Altay, N., Green, W.G., 2006. OR/MS research in disaster operations management. Eur. J. Oper. Res. 175, 475–493.

[2] Faturechi, R.; Miller-Hooks, E. Measuring the performance of transportation infrastructure systems in disasters: A comprehensive review. J. Infrastruct. Syst. 2014, 21, 04014025.

[3] Konstantinidou, Maria, Konstantinos Kepaptsoglou, and Matthew Karlaftis. "Transportation network post-disaster planning and management: a review part I: post-disaster transportation network performance." International journal of transportation 2.3 (2014): 1-16.

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