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Natural hazard resilient cities: the case of a SSMS model

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Modern society is characterised by complexity; i.e. technical systems are highly complex and highly interdependent. The nature of the interdependence amongst these systems has become an issue on increasing importance in recent years. Moreover, these systems face a number threats ranging from technical, human and natural. For example, natural hazards (earthquakes, floods, heavy snow, etc) can cause significant problems and disruption to normal life. On the other hand, modern society depends on highly interdependent infrastructures such as transport (rail, road, air, etc), telecommunications, power and water supply, etc. Furthermore, in many cases there is no single owner, operator, and regulator of such systems. Any disruption in any of the interconnected systems may cause a domino-effect. The domino-effect may occur at local, regional or at national level; or, in some cases; it may be extended across international borders. Given the above, it may be argued that society is less resilient to such events and therefore there is a need to have a system in place able to maintain risk within an acceptable range, whatever that might be.

This paper presents the modelling process of the interdependences amongst "critical infrastructures" (i.e. transport, telecommunications, power & water supply, etc) for a typical city. The approach has been the application of the developed Systemic Safety Management System (SSMS) model. The main conclusion is that the SSMS model has the potentiality to be used to model interdependencies amongst the so called "critical infrastructures". It is hoped that the approach presented in this paper may help to gain a better understanding of the interdependence amongst these systems and may contribute to a resilient society when disrupted by natural hazards.