Special Issue on Complex Engineered Networks: Reliability, Risk, and Uncertainty
ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems:

Part A. Civil Engineering (Special Issue number SI019A)
Part B. Mechanical Engineering (Special Issue number SI019B)

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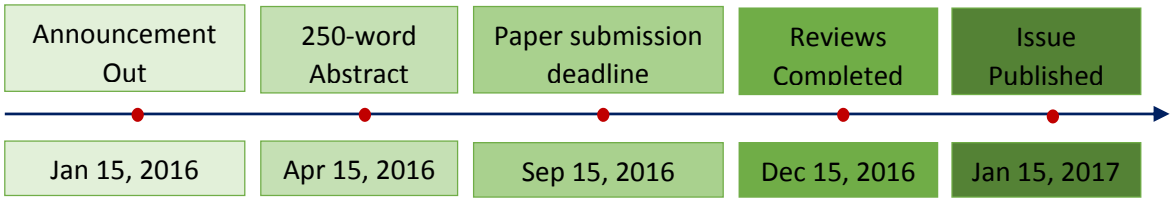
Complex engineered networks are a pervasive feature of modern society. Examples include transportation systems (road, rail, and airlines), electric power grids, cellular grids, and the internet. These distributed network systems with many interconnected components provide critical services for everyday life, such as water, food, energy, transport, communication, banking, and finance. Moreover, most of these critical infrastructures are interconnected and interact with and depend on social networks. As a result of technological progress and worldwide urbanization and globalization processes, the dependence of our society on these complex systems spanning cities, countries, and even continents, constantly grows. Given the critical role that engineered networks play in the functioning of our societies, there is an increasing demand for these systems to be highly reliable. A deep understanding of their actual capabilities to withstand natural hazard, such as earthquakes, tsunamis and hurricanes, and man-made threats, e.g. accidents and terrorism, is crucial. The related issues of resilient network design and operation are also closely related to sustainability problems which are of increasing importance today. In particular, the degree to which a technological network subjected to internal or external stresses (e.g. cascading failures or seismic hazards) is capable of keeping (or recovering) the service demanded needs to be quantitatively estimated. A failure of a critical infrastructure to provide the required service could lead to a range of serious consequences for business, government and the community. In this respect, cascading failures, where external perturbations trigger some initial local failures that lead to eventual global network failure, are especially hazardous. Quantitative assessment of network reliability and associated risks and uncertainties is therefore a key aspect of system design, optimization, and operation.

This special issue is aimed at providing a venue for leading experts, researchers, academics and practicing engineers working in the interdisciplinary area of complex engineered networks to present the latest developments in the field and set the state of the art. Contributions addressing the following topics are especially welcome:

- Reliability, risk, and uncertainty in complex engineered networks and systems.
- Vulnerability and resilience analyses of critical infrastructures.
- Modelling of technological networks and uncertainty quantification
- Statistical properties of lifelines and processes on the networks.
- Avalanches, cascading failures and extreme events.
- Resilient network design and maintenance strategies
- Robustness of networks of networks and multiplexes

Proposed Timeline

The proposed timeline for this special issues is shown below.



Manuscript submission Links

For Part A: http://www.editorialmanager.com/jrnrueng/default.aspx

For Part B:
http://journaltool.asme.org/Content/JournalDescriptions.cfm?journalId=27&Journal=RISK

Potential Contributors

Potential contributions include:

- Unsolicited manuscripts
- From participants of Session "Reliability of Complex Systems and Networks," the 11th International Conference on Structural Safety & Reliability ICOSSAR-2013, New York, USA, June 16-20, 2013. Session organizers: K.M. Zuev, J.L. Beck, and S.K. Au
- From participants of Mini-Symposium "Critical Infrastructures and Network Systems: Statistical Properties and Modelling for Reliability, Risk, Vulnerability and Resilience Analyses," the 2nd International Conference on Vulnerability and Risk Analysis and Management & 6th International Symposium on Uncertainty Modelling and Analysis ASCE-ICVRAM-ISUMA-2014, Liverpool, UK, July 13-16, 2014. MS organizers: K.M. Zuev J.L. Beck and E. Zio.
- From participants of Mini-Symposium "Reliability of Large Systems and Structures," the 6th Asian-Pacific Symposium on Structural Reliability and its Applications APSSRA-2016, Shanghai, China, May 28-30, 2016. MS organizers: K.M. Zuev, M. Beer, A.A. Pantelous, and M. Broggi.
- From participants of Mini-Symposium "Risk Assessment of Complex Infrastructure Networks," the 6th Asian-Pacific Symposium on Structural Reliability and its Applications APSSRA-2016, Shanghai, China, May 28-30, 2016. MS organizers: K.M. Zuev, J.L. Beck, E. Zio, and A.A. Pantelous.

Quality Assurance Standards

The guest editors ensure that the special issue will include only the top quality contributions from the leading experts in the field. The abstract requirement prior to submission of a full manuscript will ensure that all important topics listed above will be covered in equal depth to obtain a well-balanced special issue. The high quality of the reviewing process will guarantee the high standards of the accepted manuscripts. This will lead to high citations and high impact of the special issue.