



Academic Breakthroughs

The [Academic Breakthroughs](http://rebar.ecn.purdue.edu) portal is dedicated database for documenting research achievements in construction engineering and management.

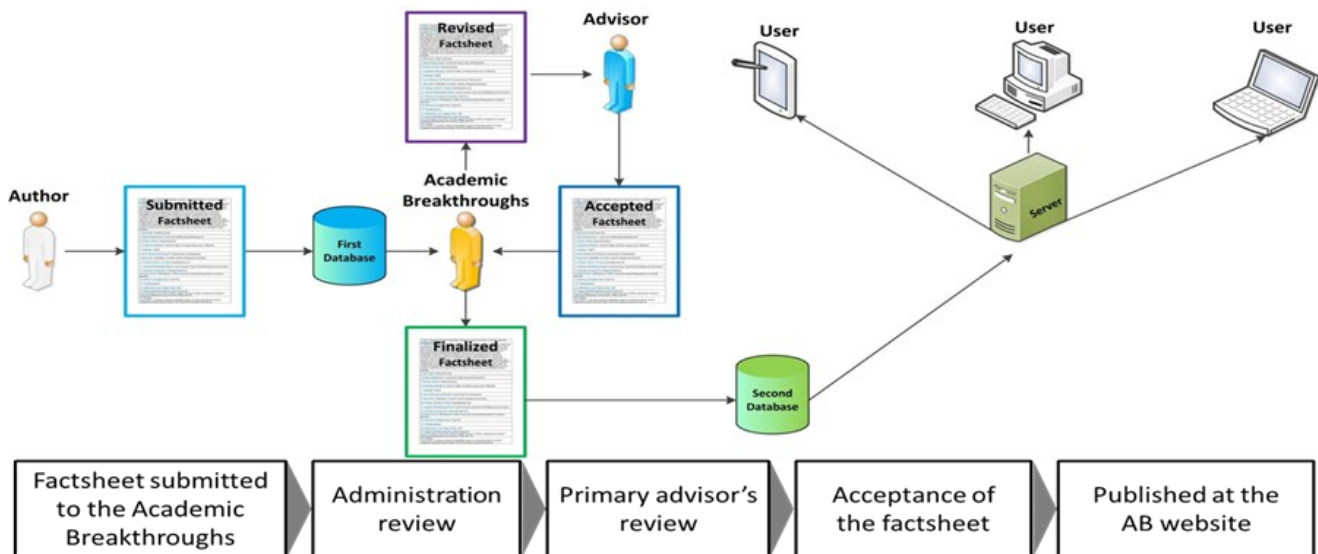
(Link: <http://rebar.ecn.purdue.edu/phd2/>)

The Academic Breakthrough synthesizes relevant information from PhD dissertations and display them in the form of factsheets. A dissertation factsheet will display information about a research breakthrough including information such as area of research, theme, analysis modeling methods, data sources, advisor contact, etc., which will be easily searchable. The Academic Breakthroughs is currently promoted by the construction engineering organizations, such as Global Leadership Forum for Construction Engineering and Management Programs (GLF-CEM) and the ASCE Construction Research Council (CRC).

IMPACT ANALYSIS OF NATURAL DISASTERS ON CRITICAL INFRASTRUCTURE, ASSOCIATED INDUSTRIES, AND COMMUNITIES	
Author: Chen Ho (David) Qi	Keywords: Critical Infrastructure, Vulnerability, Flood, Disaster Mitigation
Email: chen10@ecn.purdue.edu	Primary Advisor's Contact: hsu@ecn.purdue.edu
Abstract: The general objective of this research is to develop a decision support system (DSS) for providing disaster-related information based on the inter-relationships between infrastructure and associated industries and communities in the affected areas so that decision-makers can develop appropriate disaster strategies and plans. The interrelationships are defined in terms of the dependency of activities of local industries and communities on associated critical infrastructure. Data for disaster impact analysis is derived from the social, economic, and technical aspects were collected for facilitating and improving preparedness for the impact of natural disasters. The research presented criticality, vulnerability, and recovery can be used as inputs for the development of the DSS to determine the critical infrastructure, industries, and communities are most affected by the impact of natural disasters and how the natural impact can be measured. Assessment factors, such as the potential damage or failure of the critical infrastructure and the probability of occurrence were identified to create an associated the network system of the DSS, which uses Bayesian Network Theory and the System Dynamics Simulation method. The DSS will allow development of assessment strategies and plans for preparedness, response, and recovery using the criticality and vulnerability analysis for each affected area. Eventually, DSS will help to not only improving the resilience of the main infrastructure and activities of industries and communities to floods but also preparing quick response methods to mitigate the impacts during floods.	
Keywords: Korea Institute of Construction Technology	Analysis/Modeling Methods: Bayesian Network, System Dynamics Simulation
School/Department: Construction Engineering and Management / Civil Engineering	Category of Research or Major Software: Critical Infrastructure Mitigation Support System
Primary Advisor: Richard Hsu	Software Packages Used: Delphi, AutoCAD, ArcGIS, and ArcView
Committee Members: Nancy M. Anderson, Phillip S. Novakos, Eric Smith	Software Packages Used: ArcGIS, AutoCAD, Delphi, ArcView
Language: English	Funding Agency: NSF for Data Collection
Research Area (Theme): Disaster Management and Sequence	Publisher and Page Date: April 2015
	Pages: 1-24, L. Dedering, A., and Rostak, S. (2015). Vulnerability Assessment of Critical Infrastructure for Emergency Disaster Response. "Proc. Paper No. 15-12, ASCE, 12-17.
	Citation: Qi, C. (2015). Impact analysis of natural disasters on critical infrastructure associated industries, and communities. Ph.D. Dissertation, Purdue University, West Lafayette, IN, USA.
	URL: http://rebar.ecn.purdue.edu/construction/10100001

Unique Data Points for In-Depth Queries

Process of Factsheet Registration



Supporting Organizations:



Academic Breakthrough continued...

Benefits of the Academic Breakthroughs

For New PhDs

- Promote their research outcomes to both the industry and academia
- Provide the information useful for citation

For Academic Community

- Highlighting the most recent research advancements in CEM
- Helping new graduate students in CEM to get familiar with current research trends
- A database that is exclusively dedicated to help researchers in CEM
- A single location to search and find research trends and associated faculty members/researchers
- Quick and in-depth search in the content of PhD dissertations
- Showing the latest trends of research within CEM programs
- Readers can easily find what methodologies CEM research use and what outcomes they can expect from dissertation

For Industry

- Serving as a hub to assist CEM professionals and recent PhDs to mutually identify employment opportunities
- Industry professionals can identify cutting edge technologies that might help them improve their current practices
- If industries need any academic advice, they can readily find professionals in the academic area who did the relevant research