Notice of the Final Oral Examination
for the Degree of Master of Applied Science
of
ANDREW DEELSTRA

BSc (Dordt College, 2014)

“Disaster Recovery Modeling for Multi-damage State Scenarios Across Infrastructure Sectors”

Department of Civil Engineering

Wednesday, September 4, 2019
1:00 P.M.
Engineering / Computer Science Building
Room 227

Supervisory Committee:
Dr. David Bristow, Department of Civil Engineering, University of Victoria (Supervisor)
Dr. Chris Kennedy, Department of Civil Engineering, UVic (Member)

External Examiner:
Dr. Curran Crawford, Department of Mechanical Engineering, UVic

Chair of Oral Examination:
Dr. Lisa Mitchell, Department of Anthropology, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies
Abstract

Residents in urban areas depend on infrastructure systems to return to functionality quickly after disruptions from natural and man-made disasters to support their livelihood and well-being. This work seeks to improve the accuracy of infrastructure recovery time estimates by introducing mutually exclusive damage state modeling into the Graph Model for Operational Resilience (GMOR) and utilizing this capability for road recovery assessment in two case studies in the District of North Vancouver, British Columbia. The first case study also explores the recovery of water, wastewater, and power networks in the District, and demonstrates that power and road systems recover more slowly and are more variable in their recovery time than water distribution and wastewater collection systems. The second study specifically addresses important sections of road within the District and shows that intelligent prioritization of resource allocation for road repairs can improve recovery times by up to 37% compared to random ordering.