Infrastructure Risk Assessment and Adaptation

Using XDI

A Canadian Case Study

Presented by: Daria Smeh
North America Lead
What is XDI?
Who is XDI?
What does XDI do?
“Government-owned corporation that provides potable drinking water, wastewater and some stormwater services to Greater Metropolitan Sydney and surrounding areas”
Karl Mallon, PhD.
Concerned Science and Engineering Geek

Rohan Hamden
Concerned
In May 2016, storms disrupted roads, power and telecommunication causing cross dependent impacts throughout the City of Sydney’s entire infrastructure base.
Cross Dependency Analysis

Assets that are in the Flood Zone such as schools, train lines, train stations, roads and substations are at risk of failure in an extreme event.

The assets in the Flood Zone transfer risk to other assets.

The substations supply power to the residential suburb and the industrial site.

Some road access is restricted for the hospital and to the train station.

LEGEND
- Dependent Risk Transfer
- Flood Zone
XDI Canada
NANAIMO REGIONAL GENERAL HOSPITAL, NANAIMO, VANCOUVER ISLAND, BRITISH COLUMBIA, CANADA
Aim: To test the ability of XDI to be an automated structured cross dependency analysis for vulnerability and risk assessment in Canada.

Asset level analysis for climate change now until 2100

Cross Dependencies
- Power
- Water
- Wastewater
- Key buildings
- Gas
- Telecommunications
- Roads and rail
- Bridges

Hazards
- Coastal
- Inundation
- Riverine
- Flooding
- Wildfire
- Soil Movement
- Wind
- Extreme Heat
- Freeze-Thaw
# Your Assets Operational in XDI

<table>
<thead>
<tr>
<th>Sector</th>
<th>Archetype</th>
<th>Asset Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Buildings</td>
<td>Hospital</td>
<td>6</td>
</tr>
<tr>
<td>Government Buildings</td>
<td>Court Building</td>
<td>3</td>
</tr>
<tr>
<td>Power &amp; Tele</td>
<td>Substation</td>
<td>66</td>
</tr>
<tr>
<td>Power &amp; Tele</td>
<td>Tower Pedestal</td>
<td>1410</td>
</tr>
<tr>
<td>Power &amp; Tele</td>
<td>Fibre Node</td>
<td>769</td>
</tr>
<tr>
<td>Power &amp; Tele</td>
<td>Gas Distribution</td>
<td>25</td>
</tr>
<tr>
<td>Power &amp; Tele</td>
<td>Transformer</td>
<td>1835</td>
</tr>
<tr>
<td>Transport</td>
<td>Roads</td>
<td>23489</td>
</tr>
<tr>
<td>Water &amp; Sewage</td>
<td>Reservoir</td>
<td>9</td>
</tr>
<tr>
<td>Water &amp; Sewage</td>
<td>Sanitary Pumping Stations</td>
<td>33</td>
</tr>
<tr>
<td>Water &amp; Sewage</td>
<td>Sanitary Treatment Plant</td>
<td>1</td>
</tr>
<tr>
<td>Water &amp; Sewage</td>
<td>Water Pumping Station</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>25824</strong></td>
</tr>
</tbody>
</table>
Hospital Overall Risk

Asset Risk Cost
Impact over time

- bushfire
- extreme wind
- freeze thaw
- soil movement

Cost ($) vs Year
- 2030 to 2090
- Cost decreases over time
- Cost increases over time
Scale of Asset Coverage
Cross Dependency
Risk Cost for all Cross Dependent Assets

Asset Risk Cost
Impact over time

- bushfire
- coastal inundation
- extreme wind
- freeze thaw
- riverine flooding
- soil movement

Year
Cost ($)

2030 2045 2060 2075 2090
$0
Asset Failure Risk

Impact over time

Failure Probability

Year

2030 2045 2060 2075 2090

- bushfire
- coastal inundation
- extreme wind
- heatwave
- riverine flooding
- soil movement
Freeze Thaw Adaptation
Heat Adaptation

Asset Failure Risk
Impact over time

- bushfire
- extreme wind
- freeze thaw
- heatwave
- soil movement

Year

2030 2045 2060 2075 2090

Highcharts.com
Thank you!

Contact Details

Rohan Hamden  
Director Projects  
rohan@xdi.systems  
+61 422 394 679

Daria Smeh  
North America Lead  
daria@xdi.systems  
+61 412 257 521