Tennessee’s Geohazard Management System
Moving from Disaster Recovery Towards Asset Management

Vanessa C. Bateman*, PG PE
US Army Corps of Engineers
vanessa.c.bateman@usace.army.mil

Len Oliver, PE
Geotechnical Section, TDOT
len.oliver@tn.gov

Richard Polk
GIS Group, TDOT
richard.polk@tn.gov
Acknowledgements

Frederick Barrell, PG, EIT - TDOT Geotechnical
Van Colebank - TDOT GIS
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Olekan Oiende - TDOT GIS, Mobile Form Designer
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Harry Moore*, PG - Golder Associates
William Trolinger, PE - TDOT Materials and Tests Division
Paul Degges, PE - TDOT, Chief Engineer

* formerly of Tennessee Department of Transportation, Geotechnical Engineering Section
Most people notice this.
Or this...
Sometimes they miss these...
But they definitely notice this.
Slides like this are fine...
Until they gets worse.
Standstill Traffic for 10+ miles
This is getting old.
There's got to be a better way.
Is a hole an asset?
Our asset is the roadway
But how do we get there?
A central system component of a policy based asset management program is the inventory (FHWA, 2007).
Rockfall is the model

“15 mph curve”
Not all the work was “worst first”
Rockfall is the model

Database
Inventory
Costs/Benefits
Budget
Select Projects

“15 mph curve”
Priority Repair List for Rockfall Sites in Tennessee
State Routes, US Highways and Interstates

Priority repair sites are those which have a preliminary assessment of A (High Hazard) and which have a total hazard score above 350. Projects marked as priority are then selected based upon impact of a fall (Road Closure Impact) at a particular location, hazard rating, costs and site conditions.

Contracts Let for Mitigation Projects

<table>
<thead>
<tr>
<th>Program Year</th>
<th>Fed Fiscal Year</th>
<th>No. Sites</th>
<th>Contracts</th>
<th>Contract Letting Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>07/08</td>
<td>3</td>
<td>2</td>
<td>$1,994,697.10</td>
</tr>
<tr>
<td>2</td>
<td>08/09</td>
<td>24</td>
<td>4</td>
<td>$5,950,713.30</td>
</tr>
<tr>
<td>3</td>
<td>09/10</td>
<td>2</td>
<td>3</td>
<td>$2,706,024.40</td>
</tr>
<tr>
<td>Sum</td>
<td></td>
<td></td>
<td></td>
<td>$13,641,834.80</td>
</tr>
</tbody>
</table>

Program Statistics

<table>
<thead>
<tr>
<th>Region</th>
<th>Priority Sites</th>
<th>A Sites</th>
<th>Mitigated Sites*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>119</td>
<td>576</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>104</td>
<td>283</td>
<td>21</td>
</tr>
<tr>
<td>3</td>
<td>69</td>
<td>88</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Statewide</td>
<td>232</td>
<td>949</td>
<td>33</td>
</tr>
</tbody>
</table>

* As of 10/04/10

Legend

- Mitigated Sites
- A site with Hazard Score >350
- A site with Hazard Score >500

Interstates

Count Boundary

As of 10/04/10
Like many of the previous hazard rating systems in the United States, the RCI is designed to rank sites in order of hazard. It also keeps the exponential scoring system used with the RHRS and proposed by Wyllie (1987). The RCI is made up of five factors, ADT, Detour Length, Impedance, Duration of Impedance and Facility Degradation. For each site, a score is generated from each of these five factors and is summed up for a final score. The details of the scoring system can be seen in Table 3.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Score = 3</th>
<th>Score = 9</th>
<th>Score = 27</th>
<th>Score = 81</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADT (Average Daily Traffic)</td>
<td>Little Traffic ADT&gt;300</td>
<td>Some Traffic ADT 300-1000</td>
<td>Moderate Traffic ADT 1000-3000</td>
<td>Major Traffic ADT &gt;3000</td>
</tr>
<tr>
<td>Impedance</td>
<td>Shoulder</td>
<td>1 lane</td>
<td>2 lanes</td>
<td>&gt;=3 lanes or Total</td>
</tr>
<tr>
<td>Impedance Duration</td>
<td>Hours</td>
<td>1 Day</td>
<td>Days</td>
<td>Weeks</td>
</tr>
<tr>
<td>Detour Length</td>
<td>Very Short &lt;1 mile or lane still open</td>
<td>Short 1-2 miles</td>
<td>Medium 3-4 miles</td>
<td>Long or None &gt;4 miles</td>
</tr>
<tr>
<td>Facility Degradation RF-DF= DOF</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

DOF=Degree of Facility (RF=Degree of Road Facility; DF= Degree of Detour Facility)

0 = Local Roads / 1 Lane Road
1 = 2 Lane, no shoulder
2 = 2 lane, adequate shoulder
3 = 3 lane
4 = 4 lane
5 = 4 lane, divided highway, 5 lane highway
6 = Interstate
Field Data Gathering Forms for GPS or Tablet
TDOT GeoHazards Web Application Legend

The online legend listed below outlines the symbols used within the web application. Where available, descriptions for some layers can be viewed by clicking the '-show description-' text.

GeoHazards

The GeoHazard group of layers controls display of the different types of GeoHazard data.

- **Super Hazards by Type**

  - Rockfall
    - A
    - B
    - C
  - Landslide
    - A
    - B
    - C
  - Sinkhole
    - A
    - B
    - C
  - Settlement
    - A
    - B
    - C
  - Spring
    - Seep
  - Incomplete
    - Required
    - data is missing

Symbols with a diamond in the upper right corner have the following mitigation:

- **Completed Full**
Badges identify sites that have received some work.

B site, partial mitigation
B site, complete mitigation
C site, complete mitigation
You don’t want to lose track of old repairs
Background layers and feature mapping
Potentially Acid Producing Rock Layer
Historical Records are Important
Debris Flow

You don’t want to miss something...

Monday, July 25, 2011
We’re not there, yet

But it’s getting closer...