

Remediation Cost Database and Web-Based Application for Geologic Hazards

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Geologic Hazard Types

- Landslides
- Rockfalls
- Underground Mine Subsidence



Common Tasks

- Creating a new sites, plans, and scenarios
- Viewing itemized costs
- Submitting plans for a site



Task: Creating a New Site

The screenshot shows a Mozilla Firefox browser window titled "Create New Remediation Site - Mozilla Firefox". The browser's address bar is empty, and the status bar at the bottom shows "Done".

The main content area of the browser displays the "ODOT Remediation Cost Database Application Demo". At the top of this page, there is a green navigation bar with the following links:

- User actions: [View Sites in My Area](#), [Search Sites](#), [Add New Site](#), [Send Feedback](#), [Help](#), [Logout](#)
- Admin actions: [View Committed Sites](#), [View/Edit Default Costs](#), [User Management](#), [View All Sites](#)

Below the navigation bar, there is a breadcrumb trail: [Home](#) > [Add Site](#).

The main heading of the page is "Create New Remediation Site". Below this heading is a form with the following elements:

- A label "Hazard Type?:" followed by a dropdown menu currently showing "Underground Mine".
- A "Continue" button.

At the bottom of the page, there is a green footer bar displaying the timestamp: "Tue Jul 17 20:56:13 GMT 2007".

Remediation Techniques: Landslides

- Slope modification
 - Flatten slope, bench & re-grade, excavate & replace, counter berm, slope offloading
- Drainage
 - Drainage pipes
 - Vertical drain trenches (parallel or perpendicular)
- Soil modification
 - Over-excavate, modify, & reconstruct
 - Deep soil mixing
 - Chemical injection
 - Dynamic compaction
- Retaining structures
 - Retaining wall (H-pile or sheet pile)
 - Drilled shafts
- Retaining walls for road relocation or widening
 - Cantilever retaining wall, Mechanically stabilized earth retaining wall
- User-defined

Primary Features of RCDA



Feature: Facilitates Cost Estimation

- RCDA facilitates cost estimations for remediation
 - Input: site characteristics
 - e.g., elevation, soil type, angle of incline
 - Input: specifications for remediation
 - Choice of technique (e.g., excavate & fill)
 - Remediation parameters (e.g., grout hole spacing)
 - Output:
 - Itemized cost list for completing work



Feature: Facilitates Cost Estimation

- RCDA also permits flexibility
 - User-defined remediation techniques
 - User-defined line items



Feature: Standardization

- RCDA standardizes the cost estimation process across the Districts
 - Library of standardized remediation calculation methods
 - Standardizes costs based on state-wide averages
 - Unit costs for materials
 - Unit costs for drilling, excavation, disposal, etc
 - Mobilization overhead



Feature: Robustness

- Site input data is checked for sensibility
 - e.g., Mine elevation must be below roadway
- Remediation design is checked for sensibility
 - e.g., Minimum void width for stowing
- As site data changes over time, remediation designs are re-checked for sensibility



Feature: Durability

- RCDA stores an audit trail
 - Archives kept of *all* submitted data used to calculate each cost estimate (e.g. unit costs)
- Once plans are submitted, data can no longer be edited
 - Copies can be made for editing
- When site data is revised, previous data is archived
 - Old remediation plans are archived as well

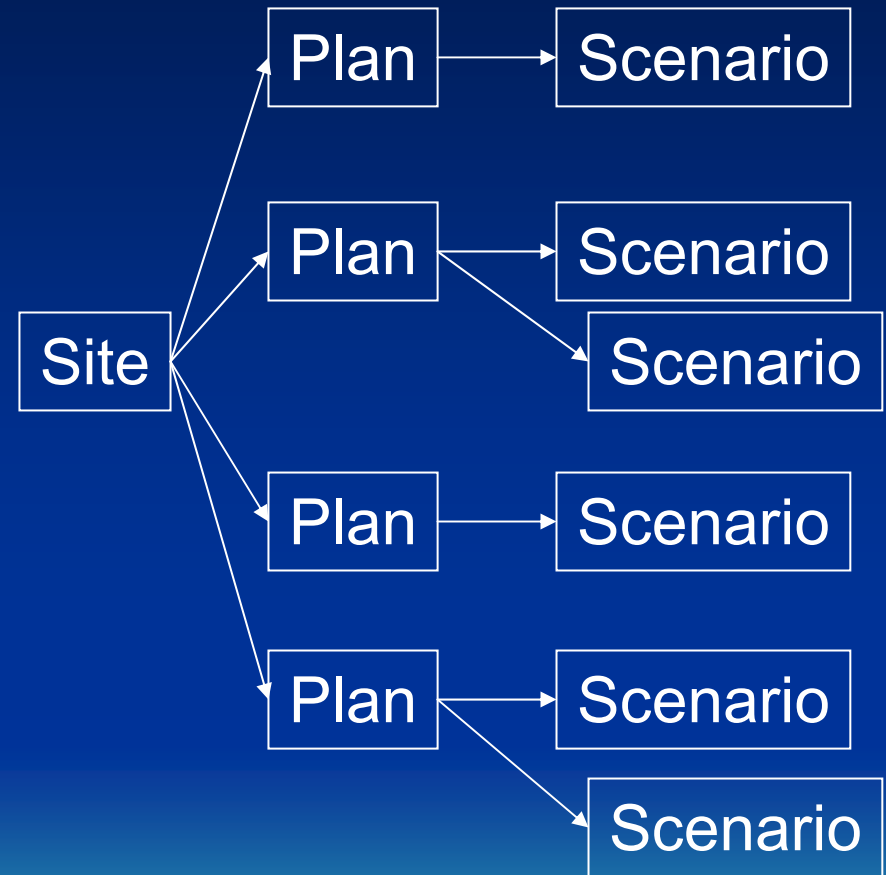
Feature: Accessibility

- RCDA is web-based and “browser neutral”
 - Accessible anywhere
 - Standard login / password authentication
- User interface adopts some accessibility “best practices” for visually impaired users



Types of Data Stored in RCDA

- Sites
 - Roadway locations requiring remediation
- Plans
 - Each site may have several plans
- Scenarios
 - Each plan consists of one or more scenarios



List of Sites in Area

Sites - Mozilla Firefox

File Edit View History Bookmarks Tools Help

ODOT Remediation Cost Database Application Demo

User actions: [View Sites in My Area](#) [Search Sites](#) [Add New Site](#) [Send Feedback](#) [Help](#) [Logout](#)

Admin actions: [View Committed Sites](#) [View/Edit Default Costs](#) [User Management](#) [View All Sites](#)

[Home](#) ▶ [Sites](#)

Available Sites

Sites within the State of Ohio

Inventory# (details)	Status	Modified	Jurisdiction	District	County	Route	Start section	End section	Report	Plans	Update Data	View Archives	Delete
L000000	New	4/10/07	C	6	FAY	0000R	000.00	000.00	report	plans	update	archives	delete
L000002	New	4/17/07	S	5	GUE	0022R	006.83	006.90	report	plans	update	archives	delete
L000099	New	4/11/07	S	11	BEL	0070R	10.00	10.50	report	plans	update	archives	delete
L888888	New	6/18/07	H	1	ALL	0000R	000.00	000.00	report	plans	update	archives	delete
M000000	New	2/21/07	S	11	BEL	0007R	6.00	006.40	report	plans	update	archives	delete

Done

Searching Sites

Sites - Mozilla Firefox

File Edit View History Bookmarks Tools Help

ODOT Remediation Cost Database Application Demo

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Admin actions: [View Committed Sites](#) [View/Edit Default Costs](#) [User Management](#) [View All Sites](#)

[Home](#) Search

Search Sites

Filter Sites By:

Inventory #:

Site Type:

Status:

Jurisdiction:

District:

County:

Additional Criteria:

Route:

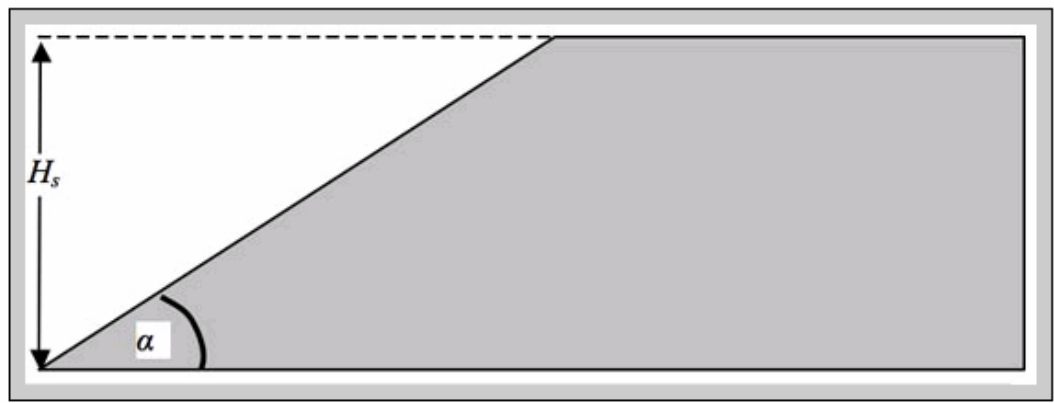
Start Section:

End Section:

Memo:

Done

Landslide Site Details



[List of sites](#)
[Update](#)
[List site plans](#)
[Site report](#)

Property	Value
Inventory#	L000002
Jurisdiction	S
District	5
County	GUE
Route	0022R
Starting section	006.83
Ending section	006.90
Length of slope along highway L	670.0ft
Average height of slope H_s	60.0ft
Slope angle α	60.0deg

Site Details

List of Site Plans

ODOT Remediation Cost Database Application Demo

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[Home](#) ▶ [Site Details](#) ▶ [Site Plans](#)

Site Plans

[View associated site](#) [Add a remediation plan](#) [Rank Plans](#) [Commit ranked plans](#)

Methods ▾	Date Modified ▾	Number of Scenarios ▾	Ranking ▾	Cost ▾	Delete
slope drape	4/17/07	4 - view/edit	none	\$2,887,264.13	delete
scale slope	4/18/07	1 - view/edit	none	\$65,257.32	delete

Tue Jul 17 15:49:40 GMT 2007

Done

Plan Scenarios - Mozilla Firefox

File Edit View History Bookmarks Tools Help

ODOT Remediation Cost Database Application Demo

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Admin actions: [View Committed Sites](#) [View/Edit Default Costs](#) [User Management](#) [View All Sites](#)

[Home](#) ▶ [Site Details](#) ▶ [Site Plans](#) ▶ [Plan Scenarios](#)

Plan Scenarios

Warning: the combined length of scenarios in this plan exceed the length of the site.

[List plans](#) [View associated site](#) [Add a remediation scenario](#)

Name ▾	View Details	Date Created ▾	Remediation Method ▾	Cost ▾	Copy	Delete
slope drape	details	4/17/07	User Defined	\$245,700.00	copy	delete
Slope drape - anchors	details	4/17/07	User Defined	\$240,450.00	copy	delete
Upper Cut	details	4/17/07	Flatten Slope	\$437,494.01	copy	delete
flatten entire slope	details	4/17/07	Flatten Slope	\$1,863,620.12	copy	delete

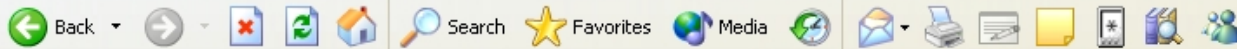
Tue Jul 17 16:09:27 GMT 2007

Done

Variables for Remediation Plan

Flatten Slope - Microsoft Internet Explorer provided by ODOT

File Edit View Favorites Tools Help



Address <http://pc-674a.cse.ohio-state.edu:8080/mines/viewScenario.action?planId=24ebf408109451a40111e1131fe6034f&scenarioId=24ebf408109451a40111e1143f2c03a3> Go Links >>

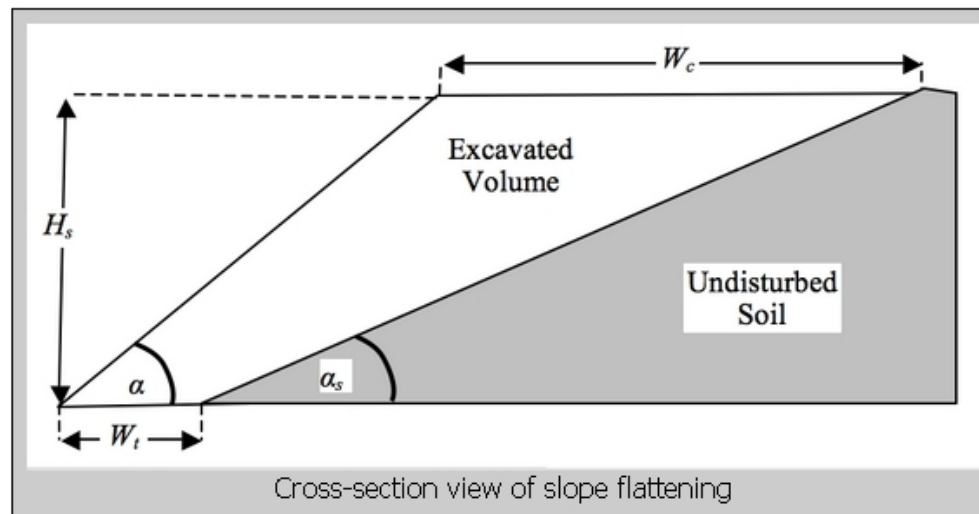
ODOT Remediation Cost Database Application Demo

User actions: [View Sites in My Area](#) [Search Sites](#) [Add New Site](#) [Send Feedback](#) [Help](#) [Logout](#)

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[Home](#) [Site Details](#) [Site Plans](#) [Plan Scenarios](#) Flatten Slope Scenario Report

Flatten Slope Scenario Report



testkirk1

[Edit](#) [Back](#)

[Edit](#) [Back](#)

[Add line item](#) [Plan Scenarios](#) [Plan Costs](#)

Calculated Line Items				
Name	Unit	Qty	Cost/Unit	Total
Soil excavation	CY	21,770.69	\$1.00	\$21,770.69
Soil disposal	CY	10,885.35	\$4.14	\$45,065.33
Seeding and mulching	SY	5,563.35	\$2.00	\$11,126.70
Silt fence	LF	200.00	\$2.50	\$500.00
Calculated Line Items Total				\$78,462.73

User-Added Line Items					
Name	Description	Actions	Quantity	Unit Cost	Total Cost
User-Added Line Items Total					\$0.00

Total Costs	
Name	Cost
Calculated Line Items Total	\$78,462.73
User-Added Line Items Total	\$0.00
Total Cost	\$78,462.73

Rank	Name	Memo	Subtotal			
1	test1					
		Scenarios				
	Name	Memo				
	s1	Flatten Slope test				
		Calculated Items				
	Name	Unit	Qty	Cost/Unit	Total	
	Soil excavation	CY	20,289.21	\$1.00	\$20,289.21	
	Soil disposal	CY	10,144.61	\$4.14	\$41,998.67	
	Seeding and mulching	SY	5,341.13	\$2.00	\$10,682.26	
	Silt fence	LF	200.00	\$2.50	\$500.00	
Calculated Items Total					\$73,470.14	\$73,470.14
		User-Added Items				
	Name	Unit	Qty	Cost/Unit	Total	
	fudge factor	correction	1	\$300.00	\$300.00	
User-Added Items Total					\$300.00	\$300.00
		Scenario Total			\$73,770.14	

Task: Viewing Itemized Costs

Task: Submitting Plans

Plan Rankings - Mozilla Firefox

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ODOT Remediation Cost Database Application Demo

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[Home](#) ▶ [Site Details](#) ▶ [Site Plans](#) ▶ Rank Plans

Rank Remediation Plans

Rank	Methods	Date Modified	Number of Scenarios	Cost
<input type="text" value="none - will not commit"/>	slope drape	4/17/07	4	\$2,887,264.13
<input type="text" value="none - will not commit"/>	scale slope	4/18/07	1	\$65,257.32

Tue Jul 17 20:35:27 GMT 2007

Done

User Privilege Levels



Types of User Accounts

- Two
- A
- L
- g

Add User

[Back](#)

Name	<input type="text" value="Jill"/>
Password	<input type="password" value="••••••"/>
Repeat Password	<input type="password" value="••••••"/>
User level	<input type="text" value="Power"/> ▾
Area of authority	<input type="text" value="County"/> ▾
District Association	<input type="text" value="6"/> ▾
County Association	<input type="text" value="ADAMS (ADA)"/> ▾
<input type="button" value="Submit"/>	

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Conclusions

The RCDA provides a consistent method and uniform cost database to calculate costs for remediation of:

- Landslides
- Subsidence of Underground Mines
- Rockfalls

Web-application allows ODOT Districts to submit remediation requests to ODOT Central Office.

Better financial planning can be made on which hazards to remediate first.