



# FHWA HERS Model Project (Lane-Mile Costs for Long-Range Estimation)

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# FHWA HERS Model Project

- Federal Project Overview - Kathy
- State's Use of Project Results - Jeff



# FHWA HERS Model Project

## HERS

Highway Economic Requirements System



# Lane-Mile Cost Categories

URBAN Highway Category	Lane-Mile Cost (1,000s)					
	New	Improvement Type				
Reconstruction (3)		Widening (2)	Resurfacing(2)	Realign	Interchange(2)	
<b>Interstate, Freeway, Expressway</b>						
less than 50,000 pop.						
50,000 to 200,000 pop.						
200,000 to 1,000,000 pop.						
over 1,000,000 pop.						
<b>Other Principal Arterial</b>						
less than 50,000 pop.						
50,000 to 200,000 pop.						
200,000 to 1,000,000 pop.						
over 1,000,000 pop.						
<b>Minor Arterial</b>						
less than 50,000 pop.						
50,000 to 200,000 pop.						
200,000 to 1,000,000 pop.						
over 1,000,000 pop.						
<b>Major Collector</b>						
less than 50,000 pop.						
50,000 to 200,000 pop.						
200,000 to 1,000,000 pop.						
over 1,000,000 pop.						
<b>Minor Collector</b>						
less than 50,000 pop.						
50,000 to 200,000 pop.						
200,000 to 1,000,000 pop.						
over 1,000,000 pop.						
<b>Local</b>						
less than 50,000 pop.						
50,000 to 200,000 pop.						
200,000 to 1,000,000 pop.						
over 1,000,000 pop.						



# Lane-Mile Cost Categories

	Lane-Mile Cost (1,000s)					
RURAL	Improvement Type					
Highway Category	New	Reconstruction (3)	Widening (2)	Resurfacing(2)	Realign	Interchange(2)
<b>Interstate</b>						
flat						
rolling						
mountainous						
<b>Other Principal Arterial</b>						
flat						
rolling						
mountainous						
<b>Minor Arterial</b>						
flat						
rolling						
mountainous						
<b>Major Collector</b>						
flat						
rolling						
mountainous						
<b>Minor Collector</b>						
flat						
rolling						
mountainous						
<b>Local</b>						
flat						
rolling						
mountainous						



# HERS Model Project Overview

- Project Purpose: Updating the Highway Improvement Cost Model  
(lane-mile costs for long-range estimation)
- Project Team: Battelle and Info Tech
- 6 Participating States:

Indiana	Oklahoma
Nebraska	Oregon
Ohio	Vermont

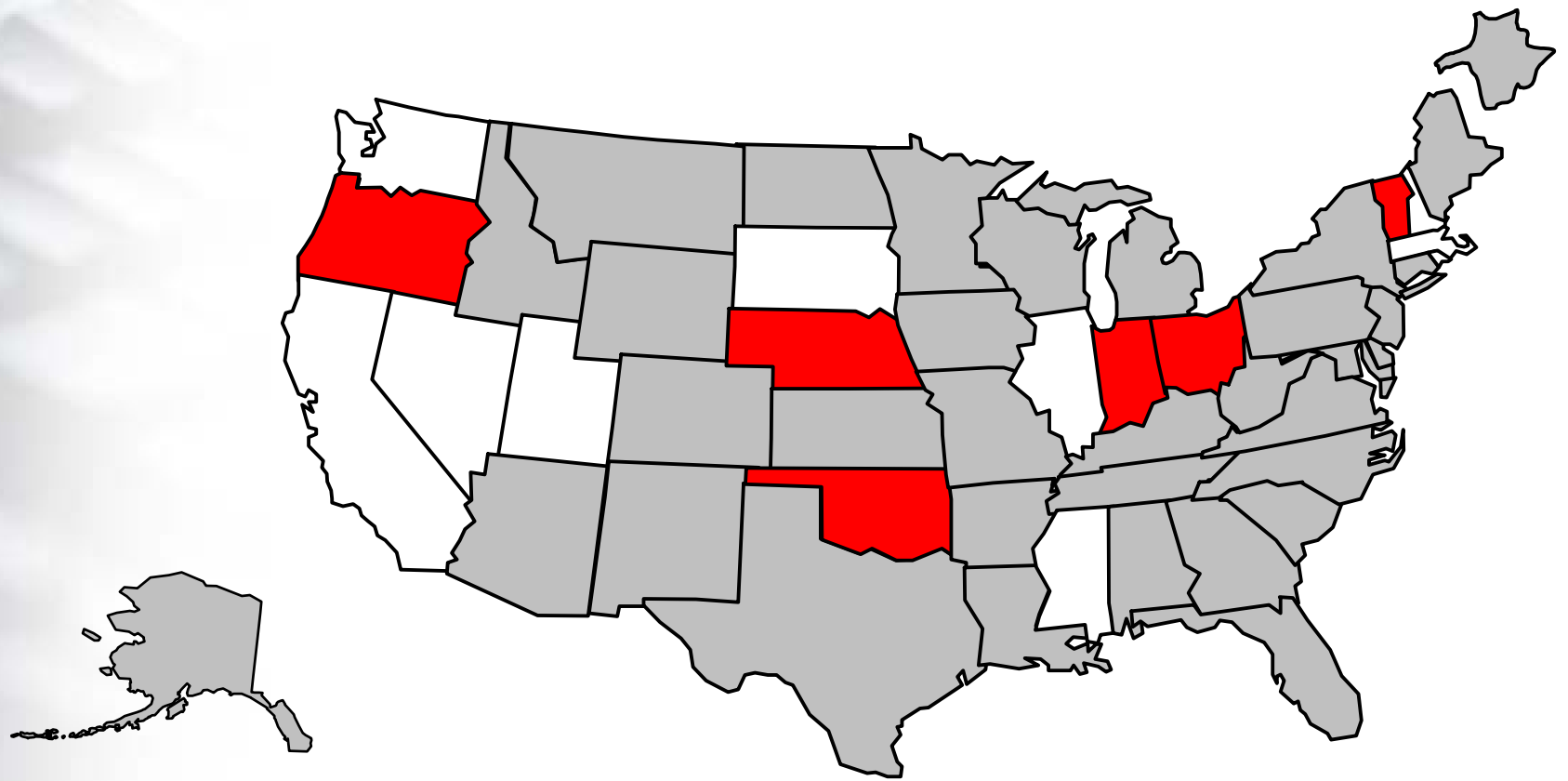


# State Selection Criteria

- Variety of location, terrain, and size
- BAMS/DSS database quality
- Previous experience with database
- Availability of peripheral data:
  - PE, CE Costs
  - Lane Miles
  - ROW Costs
  - FMIS Codes
  - Utilities Costs
  - Functional Codes
- State HERS model users



# HERS Model Data States





# Highway Improvement Cost Model

Federal URBAN Capital Improvement Costs (in 1,000s)												
Highway Category	New	Reconstruction			Widening		Resurfacing		Realign	Interchange		
		New Highway on New Alignment	Pavement only, with incidental work	with widening of existing lanes	while adding normal cost lanes	Minor Widening - widen existing lanes	Major Widening - at normal cost	with shoulder improvements		may include incidental work	Realignment	New
<b>Freeways/Expressways</b>												
less than 50,000 pop.	1,409	202	687	1,503	518	826	87	99	1,674	3,271	3,679	
50,000 to 200,000 pop.	1,815	214	699	1,599	554	887	115	101	1,777	3,807	3,706	
200,000 to 1,000,000 pop.	1,866	228	745	1,876	660	1,040	123	138	2,109	3,999	4,008	
over 1,000,000 pop.	2,164	243	931	1,901	613	1,523	197	265	2,185	4,218	4,410	
<b>Other Principal Arterial</b>												
less than 50,000 pop.	1,415	152	506	791	424	1,003	55	61	1,701	2,047	2,246	
50,000 to 200,000 pop.	1,622	166	614	898	426	1,193	70	61	1,802	2,030	2,189	
200,000 to 1,000,000 pop.	1,989	166	703	947	540	1,366	77	63	1,841	2,491	2,618	
over 1,000,000 pop.	2,078	184	903	1,868	689	1,534	94	91	1,958	3,466	3,722	



# Highway Improvement Cost Model

- Highway Construction Projects
- 4 Years Data: 1997 - 2000  
(last refresh in 1988)
- Separate Tables for Urban and Rural
- Separate Tables for Construction and Non-Construction Costs per Lane-Mile



# Data Classifications

- **CONTRACTS**
  - Highway Improvement Type
  - Highway Type
  - Urban-Population / Rural-Terrain
- **ITEMS**
  - Major Items

# Highway Improvement Types

- NEW - new highway on new alignment
- RECONSTRUCTION
  - pavement only, with incidental work
  - with widening of existing lanes
  - with addition of normal cost lanes
- WIDENING
  - minor - widen existing lanes
  - major - add normal cost lanes

# Highway Improvement Types

- RESURFACING
  - with shoulder improvements
  - may include incidental work
- REALIGNMENT
- INTERCHANGE
  - new
  - improvement
- INTERSECTION

# Urban / Rural Classifications

## URBAN

less than 50,000

50,000-200,000

200,000-1,000,000

over 1,000,000

## RURAL

flat

rolling

mountainous



# Highway Type Classifications

- Freeway, Interstate, etc.
- Other Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Local



# Contract Classifications

RURAL Highway Category	Improvement Type					
	New	Reconstruction	Widening	Resurfacing	Realign	Interchange
	New Highway on New Alignment	Pavement only, with incidental work with widening of existing lanes while adding normal cost lanes	Minor Widening - widen existing lanes Major Widening - at normal cost	with shoulder improvements may include incidental work	Realignment	New Improvement
<b>Interstate</b>						
Flat						
Rolling						
Mountainous						
<b>Other Principal Arterial</b>						
Flat						
Rolling						
Mountainous						
<b>Minor Arterial</b>						
Flat						
Rolling						
Mountainous						
<b>Major Collector</b>						
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Flat						
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<b>Local</b>						
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50,000 to 200,000 pop.						
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# Additional Contract Data

- Lane Miles
- Contract Awarded \$
- Final Construction \$ (if complete)
- % Complete
- Contract \$ for Non-Roadway Work (bridge, intersection, interchange, ...)
- Non-Construction \$ (PE, CE, ROW,...)



# Major Item Classifications

(CES Cost Groups)

Asphalt

Base

Concrete

Drainage

Earthwork

Erosion Control

Gates/Fences

Traffic Cntl (perm)

Landscaping

Guardrail

Incidentals

Structure

Pavement Marking

Non-Roadway

Mobilization

DesignBuild

Traffic Cntl (const)

Misc.



# Additional Item Data

- Common Unit and Conversion
- Item Awarded Quantity and \$
- Item Final Quantity and \$ (if complete)



# Data Collection Summary

- 2537 Highway Improvement Contracts
  - 1,668 rural
  - 879 urban
- Common Missing Data Issues:
  - final construction costs
  - contract lane miles
  - improvement types (FMIS codes)
  - highway type (functional) classifications
  - ROW and utilities costs



# Current Project's Benefits

- Refreshed national lane-mile cost table
- Lane-mile cost tables for participating states
- Instructions for future data collection
- Ad hoc program to generate lane-mile cost table in BAMS/DSS
- Finally...SuperBAMS approach



# Future Goals

- More states will collect required data.
- Lane-mile cost tables will become another long-range estimating option.
- CES will be enhanced to support lane-mile cost tables.
- Trns•port database will be enhanced to support required data elements.



# Individual State's Perspective...

How will ODOT make use of their Highway Improvement Lane-Mile Cost tables?