Hood Canal Bridge Closure Operations

Bringing Urban Technology to a Rural Location

National Rural ITS Conference
August 23 – 27, 2009
Seaside, OR
Project Overview

The Hood Canal Bridge is a vital transportation link between the northeast Olympic Peninsula and Kitsap, King, Pierce and Snohomish counties.
Project Overview

- January 2009 Project Budget - $499.8 M
- Closure Mitigation Budget - $12.5 million
- What do we get for all this investment?
  - Improved Safety - Wider shoulders create more room for both motorists and bicyclists, improving safety for both as they cross the bridge.
  - Reduced Congestion - Wider lanes and safe shoulders help keep the 15,000-20,000 vehicles that cross the bridge daily moving smoothly.
  - Reliable Systems - Upgraded mechanical, electrical and hydraulic systems translate into more reliable bridge openings.
- Planned six-week closure began May 1, 2009

Treat it “as if we’re bringing Interstate 5 to a rural environment”
Planning, Staffing, Building Partnerships

- Two primary components:
  - Project site/transit/ferry/marine related
    (Coordinated by HCB Project Team)
  - “Drive around” route/highway related
    (Coordinated by Region Maintenance & Operations partners)

- Common goals for success
  - Extensive communication required between the teams, other agencies, private partners, and the public
Reference Handout

135 + mile “Drive Around Route” – Point to Point

Drive Time: 2 hours 58 minutes
Planning, Staffing, Building Partnerships

**WSDOT Internal Planning – Laying the Foundation**

- **Hood Canal Bridge Operations Coordination Center**  
  Day-to-day operations at the bridge site, transit & ferry coordination, conference call lead

- **Olympic Region Traffic Management Center (TMC)**  
  Central communications “hub” for all highway-related incidents and information dissemination using ITS and traveler information tools, Maintenance responder dispatch, WSP coordination, etc.

- **Olympic Region EOC**  
  Resource planning and assistance as necessary, public information support

- **Headquarters EOC**  
  Managing executive expectations, resource planning and assistance as necessary

- **Call Center Operations (Washington State Ferries)**  
  Managing public feedback from 1-877 number

- **Northwest Region TMC (Seattle Area)**  
  Scaled ITS support approach coordinated with Olympic Region TMC for initial and final notification of closure on the I-5 corridor

Significant communications structure built – during the closure, all entities participate in multiple daily conference calls scheduled throughout the closure period
Planning, Staffing, Building Partnerships

A Comprehensive Closure Operations Plan:
Keeping normal operational relationships in place

- WSDOT
  - WSF Operations Call Center
  - Transit Services
  - WSDOT Project Team/Contractors
  - US Navy Coast Guard Homeland Security
  - Local Agencies
  - City/County/School Districts

- Traveling Public
  - WSDOT HCB Ops Coord. Center, Communications, & Media Relations

- Media: TV/Radio/Print/Blog

- ITS Device Control
  - Traveler Information: 511/Internet/Toll-Free 1-877 Number/On-Site Staff

- ITS Olympic Region Traffic Management Center

- WSDOT Maintenance/Incident Response
  - WSP/Local Law Enforcement

- Local Fire/EMS
  - Dept. of Ecology Spill Response
  - Towing Services

- WSDOT HQ EOC/Management
  - WSDOT Region EOC/Management
  - WSDOT Northwest Region TMC
Planning, Staffing, Building Partnerships

External Agency Outreach Efforts (relative to highway operations)

Washington State Patrol (WSP)

- Major Accident Investigation Team (MAIT)
- District 8 Bomb Squad
- WSP Towing Inspector
- Field Operations (Troopers)

JOPS
A Joint Operations Policy Statement

Prepared and agreed to by the Washington State Patrol and the Washington State Department of Transportation

July 2008
Planning, Staffing, Building Partnerships

Local Fire, Law Enforcement, & Emergency Services Agencies (Standardized TIM Training)

Washington State Dept. of Ecology
(Pre-staged spill supplies)

Area Towing Companies
(Pre-staged/relocated Class C/S Tow Trucks, private partnerships)

Freight Community
(Up front communication with industry, frequent haulers combined loads and drove during low volume times, restricted oversize loads on US 101 to non-peak hours, increased enforcement awareness)
Training Program Built – Fall 2008: “Traffic Incident Management for the Incident Command System” (TIM4ICS)

- 35 Maintenance responders trained using detailed scenarios
- ✔ Making the HCB project and potential personal impacts “Real”
- ✔ Identifying perceived gaps while building the team environment
- ✔ Building responder confidence to “step up” and become an important part of a unified command system
- ✔ Creating lasting benefits after the project for future WSDOT incident response needs
Planning, Staffing, Building Partnerships

Staffing Needs Addressed

• Three sets of teams set up for Maintenance Service Patrols covering three distinct highway segments. Staffed for 24/7 coverage, roving units during peak hours and special events, call out coverage all other times.

• Additional TMC staff planned to focus on the closure.

• Most leave requests put on hold during the closure period.

Other Notable Preparations

• Diesel pumping capability added to roving Maintenance Service Patrol trucks.

• Two 1500 stall Park & Rides created for passenger ferry & transit shuttle operations.

• Backup satellite phones purchased through the project to counter cellular dead zones.

• “Crew Manager” application populated and organized – all necessary contacts in one spot.

• “WebEOC” modified with special page for the closure operations effort.
# Planning, Staffing, Building Partnerships

## WSDOT HCB ROAD CONDITIONS AND CLOSURES BOARD

- **Total Number of Roads Closed:** 0
- **Total Number of Roads Restricted:** 0
- **Total Number of Roads Open:** 13

### WSDOT HCB Region

<table>
<thead>
<tr>
<th>WSDOT Region</th>
<th>County</th>
<th>State Route</th>
<th>Direction</th>
<th>Start MP</th>
<th>End MP</th>
<th>Road Status</th>
<th>Closure Conditions</th>
<th>Description</th>
<th>Effective Date/Time</th>
<th>Update Date/Time</th>
<th>Edit</th>
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<tbody>
<tr>
<td>Olympic</td>
<td>Kitsap Co.</td>
<td>003</td>
<td>Both</td>
<td>0.00</td>
<td>60</td>
<td>Open</td>
<td>Hood Canal Bridge Closure Related</td>
<td>No Incidents To Report</td>
<td>04/29/2009 13:02:03</td>
<td>05/29/2009 14:55:00</td>
<td>Edit</td>
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<tr>
<td>Olympic</td>
<td>Mason Co.</td>
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<td>Both</td>
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<td>05/16/2009 18:25:51</td>
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<tr>
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<td>Both</td>
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<td>24</td>
<td>Open</td>
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<td>06/03/2009 16:30:00</td>
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<tr>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td>05/15/2009 00:00:00</td>
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<td>N/A</td>
<td>N/A</td>
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<td>05/09/2009 00:00:00</td>
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<td></td>
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<tr>
<td>Olympic</td>
<td>PCMS US 101 NB at SR 8</td>
<td>Northbound</td>
<td>N/A</td>
<td>N/A</td>
<td>Active</td>
<td>Hood Canal Bridge Closure Related</td>
<td>Remote Operation - Active with message HOOD CANAL OPEN</td>
<td>04/30/2009 07:54:19</td>
<td>06/03/2009 22:40:20</td>
<td>Edit</td>
<td></td>
</tr>
<tr>
<td>Olympic</td>
<td>PCMS SR 16 NB at SR 3</td>
<td>Northbound</td>
<td>N/A</td>
<td>N/A</td>
<td>Active</td>
<td>Hood Canal Bridge Closure Related</td>
<td>Remote Operation - Active with message HOOD CANAL BR OPEN</td>
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<td>06/03/2009 10:30:00</td>
<td>Edit</td>
<td></td>
</tr>
<tr>
<td>Olympic</td>
<td>PCMS SR 20 NB at SR 3</td>
<td>Northbound</td>
<td>N/A</td>
<td>N/A</td>
<td>Active</td>
<td>Hood Canal Bridge Closure Related</td>
<td>Remote Operation - Active with message, HOOD</td>
<td>04/30/2009 07:55:55</td>
<td>06/03/2009 10:30:00</td>
<td>Edit</td>
<td></td>
</tr>
</tbody>
</table>
ITS Infrastructure

Traveler Information Tools

- **Condition Acquisition Reporting System (CARS)** - Modified to automatically group all four “drive around” routes based on incident priority setting

- [www.HoodCanalBridge.com](http://www.HoodCanalBridge.com) - WSDOT web pages adjusted to receive new temporary traffic cameras

- **511 System** – added upfront “Banner” message to quickly direct users to HCB closure information
ITS Infrastructure

ITS Field Equipment Deployed

**Scaled approach** – coordination with Northwest Region TMC/I-5 from Seattle to Olympia ITS used

**12 Temporary Traffic Cameras** – Nine rented webcams, two borrowed, one PTZ permanently added

**Five Permanent Highway Advisory Radio (HAR) Transmitters** - 12 corresponding 800 MHz radio controlled flashing beacon

**Data Collection** - Eight tube counters deployed to measure volumes and track changes before & during

**10 Portable Changeable Message Signs (PCMS)**

- Five fixed signs at key locations with cellular remote control technology (TMC controlled)
- Five additional signs pre-staged for quick deployment, built new relationship with local vendor
Challenges/Lessons Learned

Remote Controlled PCMS Deployment

- New service request caused confusion
- Delays in getting the right people in the loop
- Vendor cooperation issues with proprietary software
- Connection issues with VPN tunnel security
  - Met primary goal in time

Solar Powered PCMS & HAR Device Issues

- Weather can affect charge times
- Strategies built into device usage plan to counter down time
  - Three-day maximum assumed
  - Additional batteries and staff on call
  - Effective plan – no down time encountered

Video Recording/Bridge Cameras

- Coordination with project and contractor – documentation requirement
- Communications cut while removing the East Truss
- Video on microwave path to state network, too many users watching the video caused an overload
  - Additional T1 line and modified user expectations solved the problem
Challenges/Lessons Learned

Weather Issues

- Wind on May 5 caused closure of the passenger ferry
- Used pre-planned coordination meetings to quickly resolve issues, determine strategies, plan public messaging and outreach
- Updated HAR & Permanent Variable Message Signs on the fly
- Deployed personnel to adjust PCMS messaging around the region
- Updated CARS to indicate changed conditions on the WSDOT web and 511 system

✓ Effective notification in a timely manner

GPS/Internet Mapping Vendor Participation

- Outreach to major companies met with resistance
- Public outcry to same companies caused a quick reaction

✓ Desired goal achieved
Challenges/Lessons Learned

Recreational Events and Festivals

- **Shrimp Season** – getting the word out through Washington State Department of Fish and Wildlife
- **Normally scheduled festivals**
  - Shrimpfest, Brinnon, WA
  - Juan de Fuca Festival
  - Rhododendron Festival
  - Irrigation Festival
- **Additional planned WSP monitoring & flagging at key locations + built in roving patrols expedited traffic flow**

“*The closure was very successful. Some businesses reported sales increases, and the Irrigation Festival was a huge success. People said it gave them an opportunity to see more of the area. Some people did have extensive commute times, but everybody showed patience and understanding.*”

*Source: Vicki Maples, executive director, Sequim-Dungeness Valley Chamber of Commerce*
Challenges/Lessons Learned

Significant Collisions/Blockages

- Applying the strategies of the National Unified Goal (NUG)
- Working Traffic Incident Management (TIM) best practices “for Real”
- Operating under the Incident Command System (ICS)

✓ Unified Command Structure generally functioned very well

<table>
<thead>
<tr>
<th>Route</th>
<th>MP</th>
<th>Date</th>
<th>Time</th>
<th>Problem</th>
<th>Reopened</th>
<th>Total Time</th>
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</thead>
<tbody>
<tr>
<td>101</td>
<td>318.00</td>
<td>5/5/2009</td>
<td>12:25 AM</td>
<td>TREES BRANCHES ON POWER LINES CAUSING A FIRE</td>
<td>2:11 AM</td>
<td>1 hr 46 min</td>
</tr>
<tr>
<td>101</td>
<td>339.00</td>
<td>05/06/2009</td>
<td>3:19 AM</td>
<td>TREES TREE/Branches Down - Power Lines in Roadway</td>
<td>9:03 AM</td>
<td>5 hr 44 min</td>
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<tr>
<td>101</td>
<td>287.00</td>
<td>5/14/2009</td>
<td>11:17 AM</td>
<td>COLLISION FATALITY PASSENGER CAR -VS- BICYCLIST</td>
<td>2:03 AM</td>
<td>2 hr 46 min</td>
</tr>
</tbody>
</table>
Challenges/Lessons Learned

Memorial Day Weekend Backups

- Traffic in Quilcene on US 101 increased from 4,000-5,000 vehicles per day (before) to 8,000-10,000 per day (during) with a peak of 25,000 vehicles on the Friday before Memorial Day
- Many additional recreational users to the Olympic Peninsula
- “Like rice through a straw”…only so much available capacity

✔ Roving Service Patrols helped keep TMC, managers, and the public informed

WSDOT Alert - Update
DATE/TIME: May 25, 2009, 2:32 p.m.
DESCRIPTION: Motorists traveling southbound on US 101 are encountering a nine-mile backup due to heavy traffic volume. The backup currently extends from Hoodsport (milepost 332) to three miles north of Lilliwaup (milepost 323) in Mason County.
LOCATION: Southbound US 101, milepost 332, Hoodsport, Mason County
START: May 25, 2009, 11:45 a.m.
Est. END: Unknown
OTHER: Drivers should expect delays and plan accordingly.
CONTACT: Kelly Stowe, WSDOT Communications, 253-548-2438

DISCLAIMER: The Washington State Department of Transportation provides this information as a public service. It is based on currently available information. Motorists are reminded that weather and road conditions can change rapidly and should plan accordingly. For current traveler information, please visit www.wsdot.wa.gov/traffic or call 5-1-1
### Public Interaction via Media, Web, and Call Center

<table>
<thead>
<tr>
<th></th>
<th>Stories in Paper/Web</th>
<th>Mentions on TV</th>
<th>Media Contacts</th>
<th>Constituent Correspondence</th>
<th>Website Views</th>
<th>Traffic Cameras</th>
<th>Blog Views</th>
<th>1-877# Calls</th>
<th>Press Releases</th>
<th>Gov Delivery Members Added</th>
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</thead>
<tbody>
<tr>
<td><strong>Before</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>April 1–April 30</td>
<td>75</td>
<td>108</td>
<td>42</td>
<td>49</td>
<td>170,243</td>
<td>73,399</td>
<td>2,989</td>
<td>1,534</td>
<td>9</td>
<td>75</td>
</tr>
<tr>
<td><strong>During</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>May 1–June 3</td>
<td>120</td>
<td>578</td>
<td>140</td>
<td>253</td>
<td>432,694</td>
<td>385,786</td>
<td>103,269</td>
<td>9,403</td>
<td>23</td>
<td>44</td>
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<tr>
<td><strong>After</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 4 - June 10</td>
<td>27</td>
<td>100</td>
<td>5</td>
<td>0</td>
<td>42,439</td>
<td>34,094</td>
<td>8,481</td>
<td>122</td>
<td>1</td>
<td>0</td>
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<tr>
<td><strong>Totals</strong></td>
<td>222</td>
<td>786</td>
<td>187</td>
<td>302</td>
<td>645,376</td>
<td>493,279</td>
<td>114,739</td>
<td>11,059</td>
<td>33</td>
<td>119</td>
</tr>
</tbody>
</table>

**Legend:**
- Before-April 1–April 30
- During-May 1–June 3
- After-June 4 - June 10
- Totals-April 1 – June 10
## Facts & Statistics

### TMC EventsHandled During Closure - May 1 to June 3, 2009

<table>
<thead>
<tr>
<th>Event Type</th>
<th>US 101</th>
<th>SR 106</th>
<th>SR 3</th>
<th>SR 104</th>
<th>Totals</th>
</tr>
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<tbody>
<tr>
<td>Collision Fatality</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
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<tr>
<td>Collision</td>
<td>8</td>
<td>5</td>
<td>11</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>Disabled vehicle</td>
<td>8</td>
<td></td>
<td>1</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Dead Animal</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Debris</td>
<td>1</td>
<td>5</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Fire</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Maintenance</td>
<td>1</td>
<td>11</td>
<td>2</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>ITS &amp; IT</td>
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<td>1</td>
<td></td>
<td></td>
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<td>Signs</td>
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</tr>
<tr>
<td>Trees</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td>6</td>
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<tr>
<td>Water over Roadway</td>
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<td>2</td>
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<tr>
<td>Bridge</td>
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<td>6</td>
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<td>Closure</td>
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**Total Events (From TMC Radio Log)**: 124
Facts & Statistics

<table>
<thead>
<tr>
<th>Incidents - Year to Year Comparison</th>
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<tbody>
<tr>
<td>Route</td>
</tr>
<tr>
<td>US 101</td>
</tr>
<tr>
<td>SR 106</td>
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<tr>
<td>SR 3</td>
</tr>
<tr>
<td>SR 104</td>
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<tr>
<td>Totals</td>
</tr>
</tbody>
</table>

Other Efforts

- **Fly**: Kenmore Air flights doubled
- **Port Townsend/Edmonds**: 3,000 cars, 220 trucks, 500 walkers
- **WSF System**: Overall ridership down 6.5% with foot passenger numbers up and car numbers down; PT/Keystone ↑ 31%; Edmonds/Kingston ↓ 30% (as expected)
- **Cross Hood Canal**: This system moved 70,000+ riders

The water shuttle crosses Hood Canal.

Jefferson County Transit provided service to and from the water shuttle.
Facts & Statistics

• Closure Goals Accomplished

 ✓ Well thought-out closure mitigation plan was in place
 ✓ Advance notification provided, travelers planned ahead
 ✓ Helped travelers find alternate travel options
 ✓ Monitored alternate routes and services and ensured effective operations during the closure
 ✓ Communicated project changes to drivers
 ✓ Re-opened the bridge on time
Planned Next Steps for the Hood Canal Bridge Area

Planned Project Completion - December 2009
  - Retrofit West Half

New ITS features planned
  - Approximately $ 1 M slated for permanent area ITS improvements
  - Additional traffic cameras, signing, queue detection, HAR upgrades, etc.

E-mail and text message service now available
  - Alerts motorists to SR 104 Hood Canal Bridge marine openings and incidents on the bridge
  - Automatically “scrapes” CARS information and sends it out to subscribers = no dual entry at the TMC!
Thanks

Any Questions?

Tony Leingang
Freeway Operations Manager
WSDOT Olympic Region
(253) 548-2430
leingaa@wsdot.wa.gov