Washington State DOT Precast Points of Interest
(taken from presentation to PCI Bridge Committee, 9/24/10, by Dr. Bijan Khaleghi of WSDOT and AASHTO T10)

• Research--Precast Bent System
• Research--“Highways for Life”
• Precast columns—upcoming project
Precast Bent System (Emulative) – UW Test

WARD 648.2 Rapidly Constructible Large-Bar Precast Bridge-Bent Seismic Connection
PI: Professors John Stanton and Marc Eberhard
Seismic Performance

Pull out Test
Large Bar – Grouted Duct
PRECAST SUBSTRUCTURE
Test Specimen
FHWA - Highways for LIFE (HFL)
Fully Precast Bridge in Seismic Regions
PI: Dr. Lee Marsh, Professors John Stanton and Marc Eberhard

**TOP Connection**

**Bottom Connection**

![Diagram](image)

*Figure 1. Typical Implementation of Product Concept*

*Figure 3. Test Specimens*
Column Splice - Grouting

Grouting Ducts and the interface.
HFL Test Results

Specimen A

Specimen B

No cracks in footings.
Planned Tests 1: Thinner Footing

- Footing thickness < column diameter.
- Investigate strength and failure mode if footing fails.
- Expected failure mode:
  - Punching shear + moment transfer
Planned Tests 2: Drilled Shaft.

- P.C column embedded in drilled shaft.
- Investigate potential for failure in transition region.
- Specimen A: per WSDOT BDM and AASHTO Seismic Guide Spec.
- Specimen B: Less conservative design of transition region.
Professor Saiidi, director of Center for Advanced Technology for Bridges and other Infrastructure, University of Nevada, Reno

1. (a) Columns with shape memory alloy (SMA) reinforcement and engineered cementitious composite (ECC), and

2. (b) Columns with embedded elastomeric pads.

Columns with SMA-reinforced ECC: Two innovative materials are combined in these columns each with a distinct purpose. The role of SMA bars is to dissipate energy but essentially eliminate permanent drift and the role of ECC is to eliminate or, at least, minimize concrete damage.