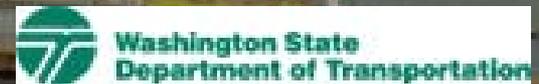
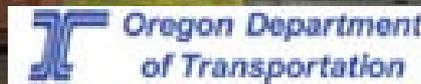




**OREGON IRON WORKS, INC.**  
serving industries worldwide

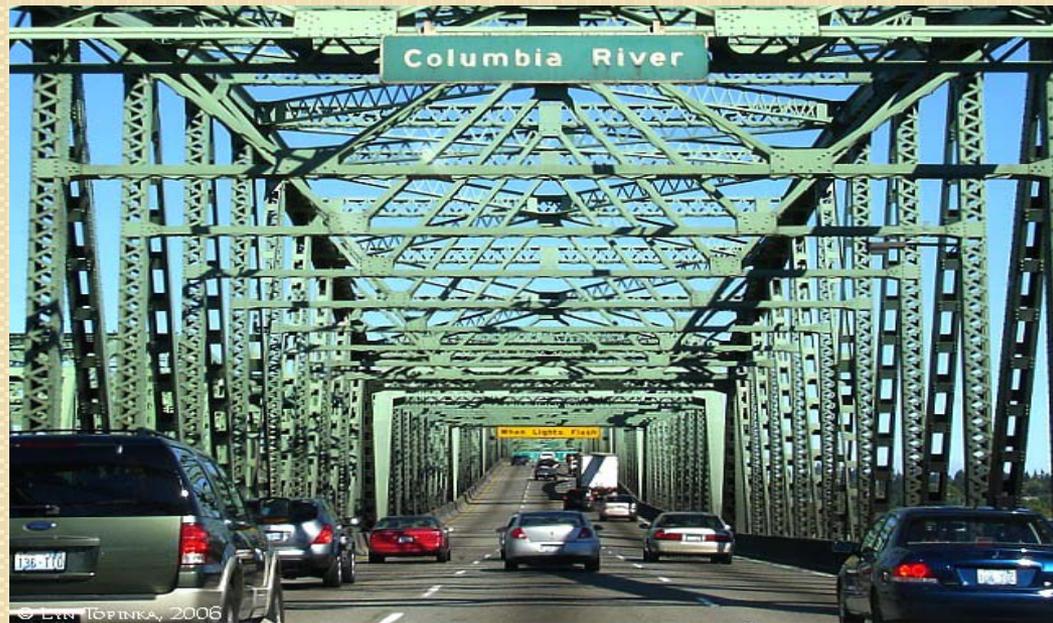


**COLUMBIA RIVER CROSSING**  
**LOCAL SOLUTIONS**  
**REGIONAL PARTNERS**  
**NATIONAL RECOGNITION**



# CURRENT ISSUES

- Concrete vs. Steel
- Alternative Methods of Design
- Local workforce and resources
- “Green” building and recycled content
- Conclusion and Questions





Could this  
be you?



Why it matters?

WSDOT and  
ODOT will  
partner to spend  
millions of dollars  
replacing a major  
commuter bridge.

How long should  
it last?

# WHY STEEL?

## LIFE CYCLE COST

With steel – what you see is what you get. As a material, steel is durable, impact resistant, easier and more accurate to inspect, and easily repaired compared to competing materials.

Using high performance weathering steel and/or current coating technology will provide reliable protection from corrosion and will allow bridges to last 100 years.

Historically, decks are the most vulnerable part of a bridge. While replacement of a concrete segmental bridge deck is problematic, steel bridge decks are commonly replaced one lane at a time, permitting uninterrupted but reduced traffic flow.

Life-cycle performance and the long-term durability of steel bridges have been clearly documented. The long-term durability of concrete in bridges remains uncertain.

## QUALITY

The AISC Certification Program for steel fabricators confirms to owners, the design community, building officials, and the construction industry that a certified steel fabricating facility has the personnel, organization, experience, procedures, knowledge, and equipment to produce fabricated steel of the quality required for normal structural steel building construction. All certified fabricators are audited annually, and a portion of them will be chosen at random to receive a supplemental, short-notice audit in addition to their regularly scheduled audit.

## EFFICIENCY

High Performance Steels (HPS) were developed specifically for bridges by a collaborative consisting of the Federal Highway Administration, the Navy, and the steel industry. HPS and weathering steels both boast greater toughness and weldability at affordable prices. It is also generally easier to make spans continuous for both live and dead loads and to develop composite action with steel designs rather than with concrete ones.

## AESTHETICS

Almost all of the world's architectural significant and award-winning bridges are designed and built in steel.

For examples, visit us on the web to explore past NSBA Prize Bridge Award winners.

## SUSTAINABILITY

Steel is the most recycled material on the planet with bridge plate containing about 75% recycled content. In fact, new steel bridges annually use recycled steel from hundreds of thousands of old cars that would otherwise mar the landscape. In addition to its metallurgical benefits, steel can span longer, putting less strain on the environment, ultimately reducing the number of piers impacting natural habitats and waterways. Less piers also leads to upfront first cost savings as well as future maintenance costs.

## FIRST COST

One of the biggest advantages of steel is weight savings, which means lower erection costs since bridge assemblies can be handled with lighter equipment. In addition, for the same span and load, a steel girder requires less depth than a concrete girder which can be helpful when constrained by vertical clearance requirements. Ultimately, steel leads to faster erection, lighter foundations, and more efficient designs that take advantage of composite action.

# WHY STEEL?(Continued)

Efficiencies in steel material and design can lead to lighter foundations & longer spans, putting less strain on the natural habitat, reducing impact on other environmental factors, and ultimately reducing costs.

At 98%, steel has the highest overall recycling rate of any material on the planet.

Steel is the US's most recycled material. Each year more than 83 million tons of steel is recycled, more than double the amount of all other materials combined including paper, glass, plastic, lead, copper and aluminum.

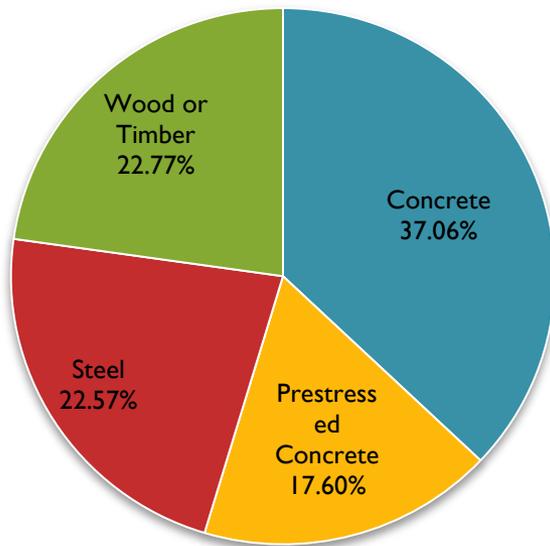
Steel is magnetic, a unique quality that makes it easy and economical to remove it from the solid waste stream to be recycled over and over again. In the past decade alone, more than 83 million tons of steel scrap, removed magnetically from the solid waste stream, have been recycled, thus keeping a valuable commodity out of the nation's landfills.

In steel mills, two kinds of furnaces are used to make new steel for bridges. The basic oxygen furnace uses about 33% steel scrap to make new steel. The electric arc furnace (EAF) typically melts about 94% steel scrap, producing products in long shapes, like steel plate and structural beams.

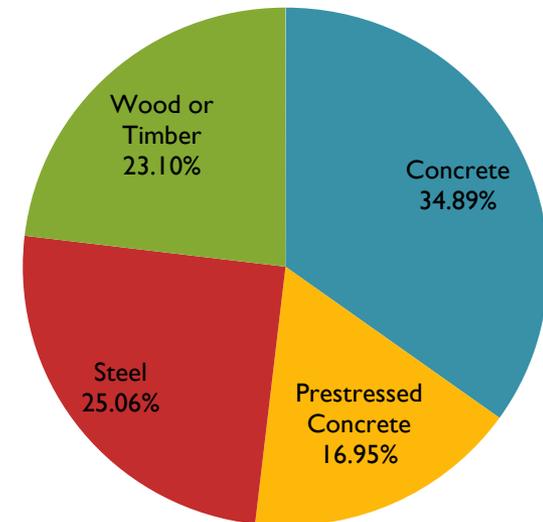
## SUPPORTING DATA

The following charts represent the deficiencies in bridges built by material- over 70% deficient bridges, in both states combined, are made using concrete or prestressed concrete.

**Structurally  
Deficient Bridges by  
Material  
Superstructure  
Rating - NBIS 2009 -  
Oregon**



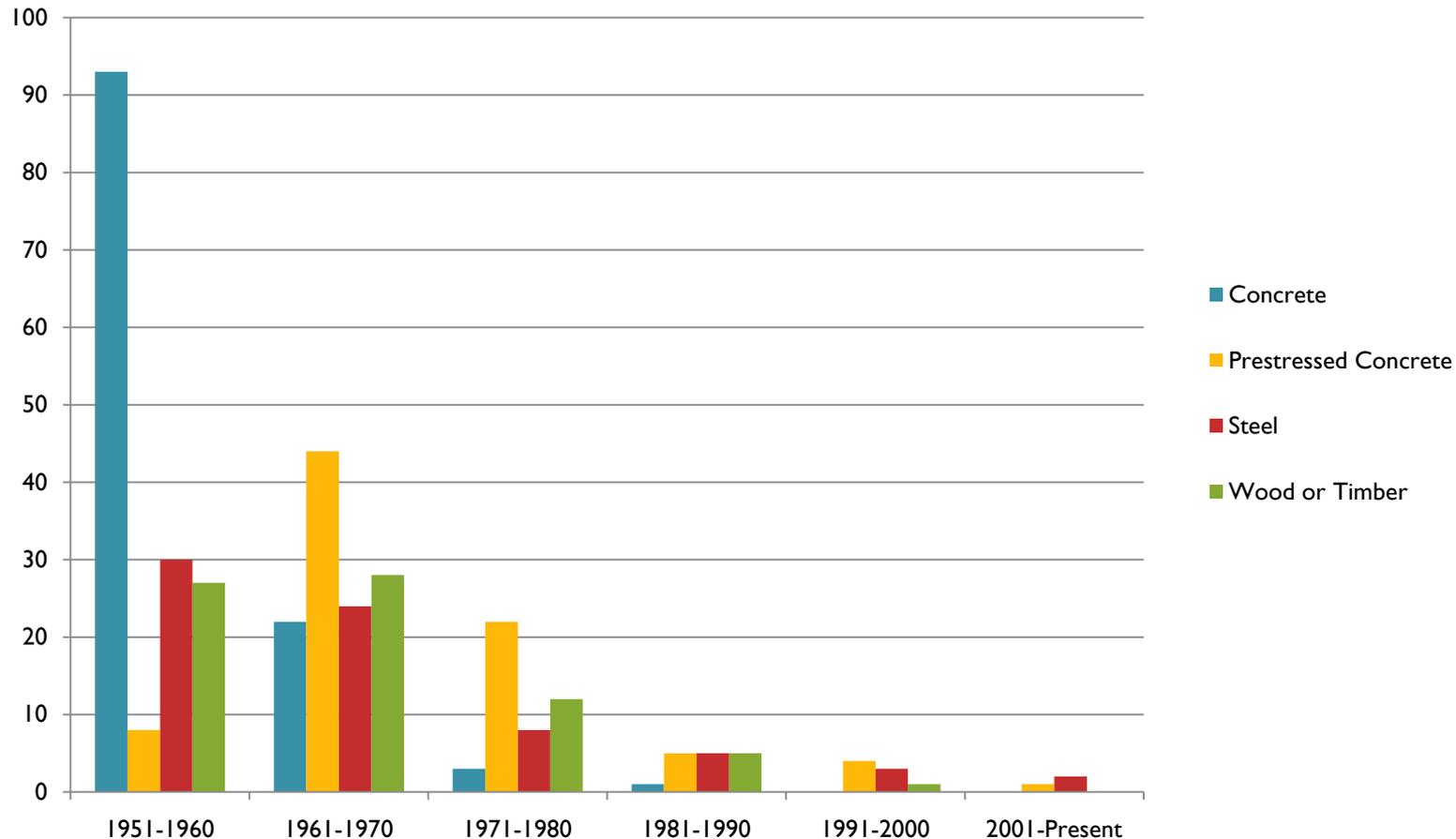
**Structurally  
Deficient Bridges by  
Material  
Superstructure  
Rating - NBIS 2009 -  
Washington**



While concrete offers a low cost initially, how much will it cost the government to repair, fix and replace over its lifetime?

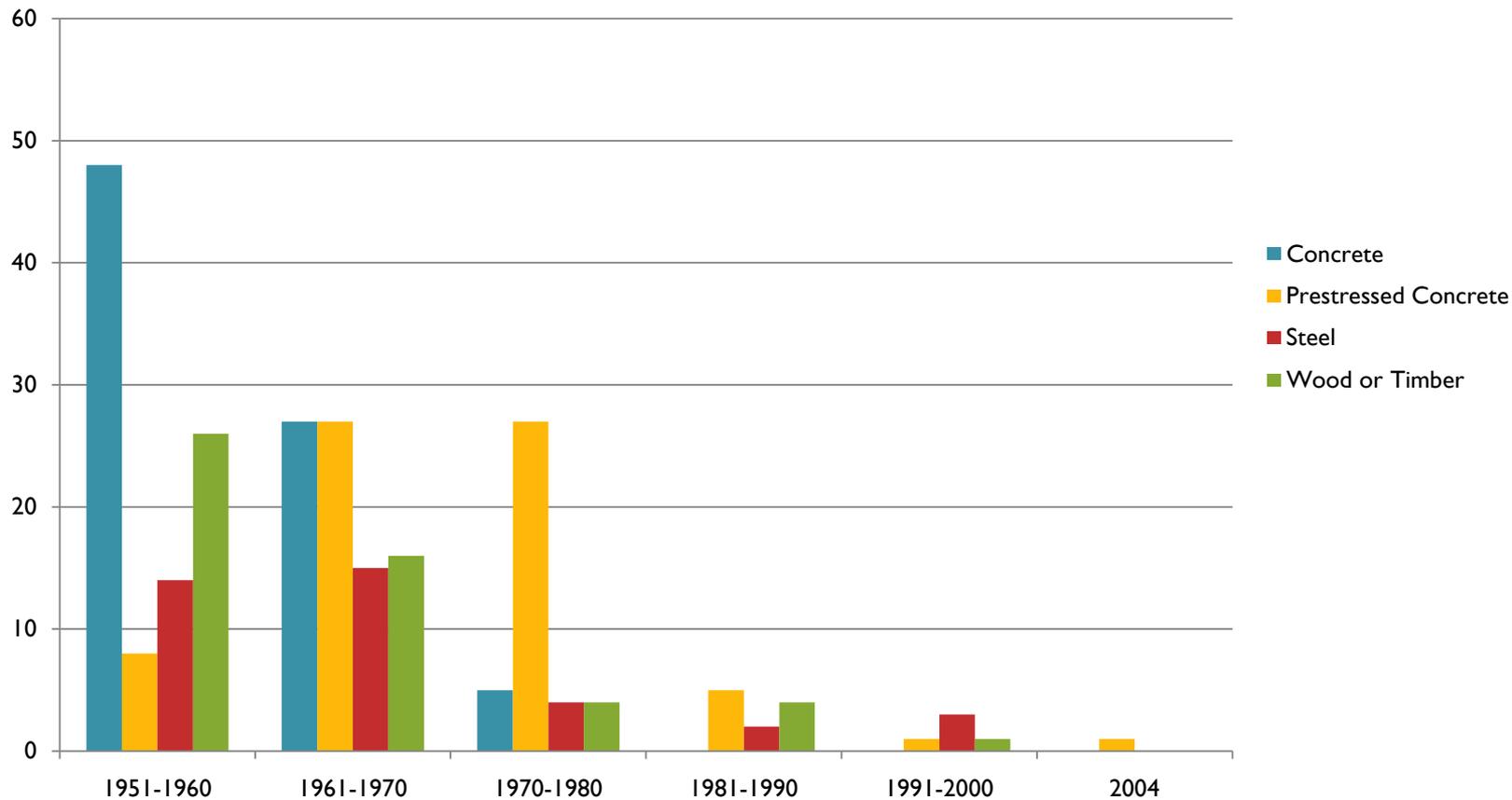
# SUPPORTING DATA (BY YEAR)- OREGON

## Count of Structurally Deficient Bridges by Year Built Superstructure Rating - NBIS 2009 - Oregon



# SUPPORTING DATA (BY YEAR)- WASHINGTON

**Count of Structurally Deficient Bridges by Year Built  
Superstructure Rating - NBIS 2009 - Washington**



# Benefits of Using Steel



Sustainability

Flexibility

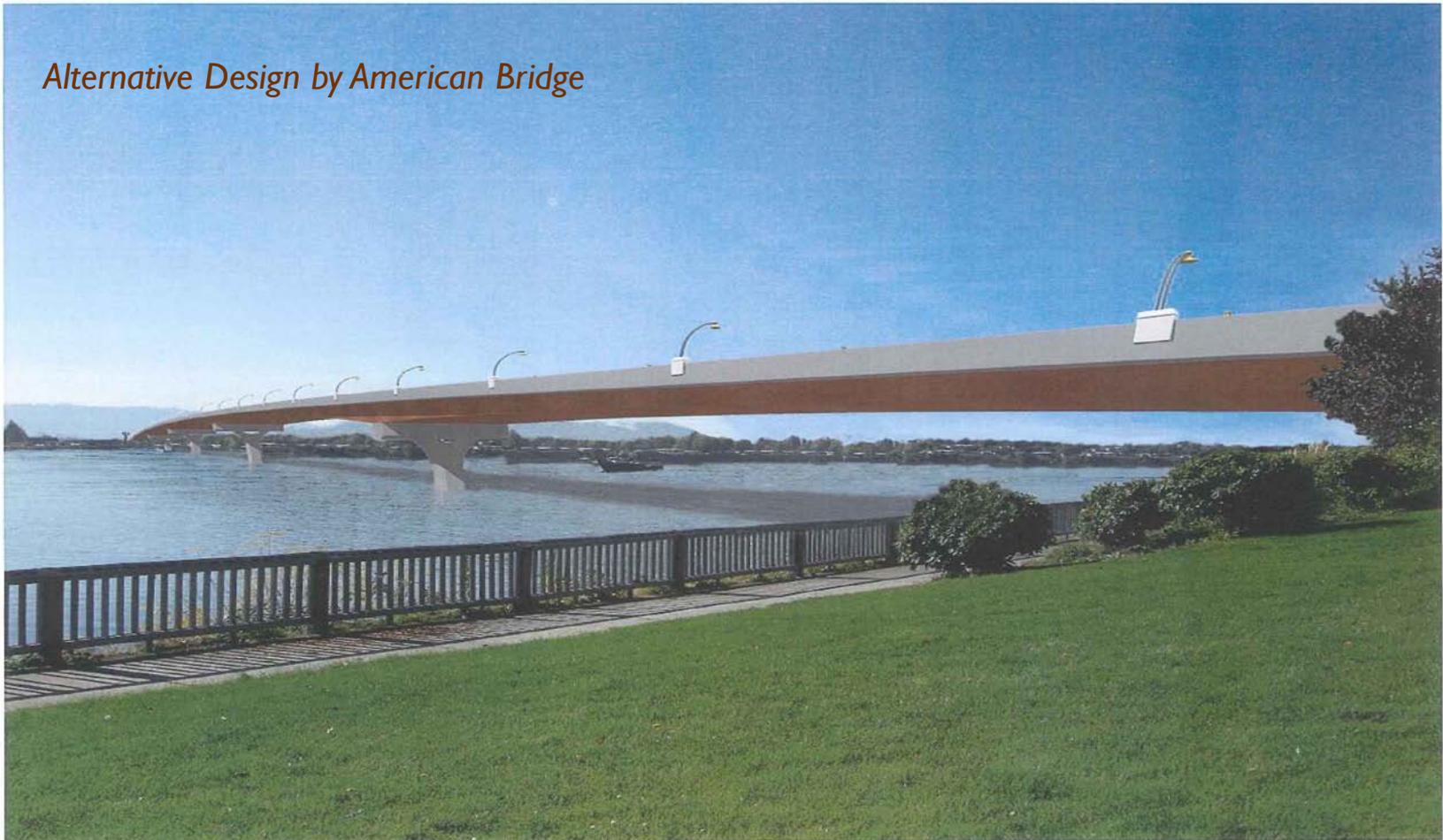


Innovation and  
Complex Problem  
Solving

# Alternative Methods of Design

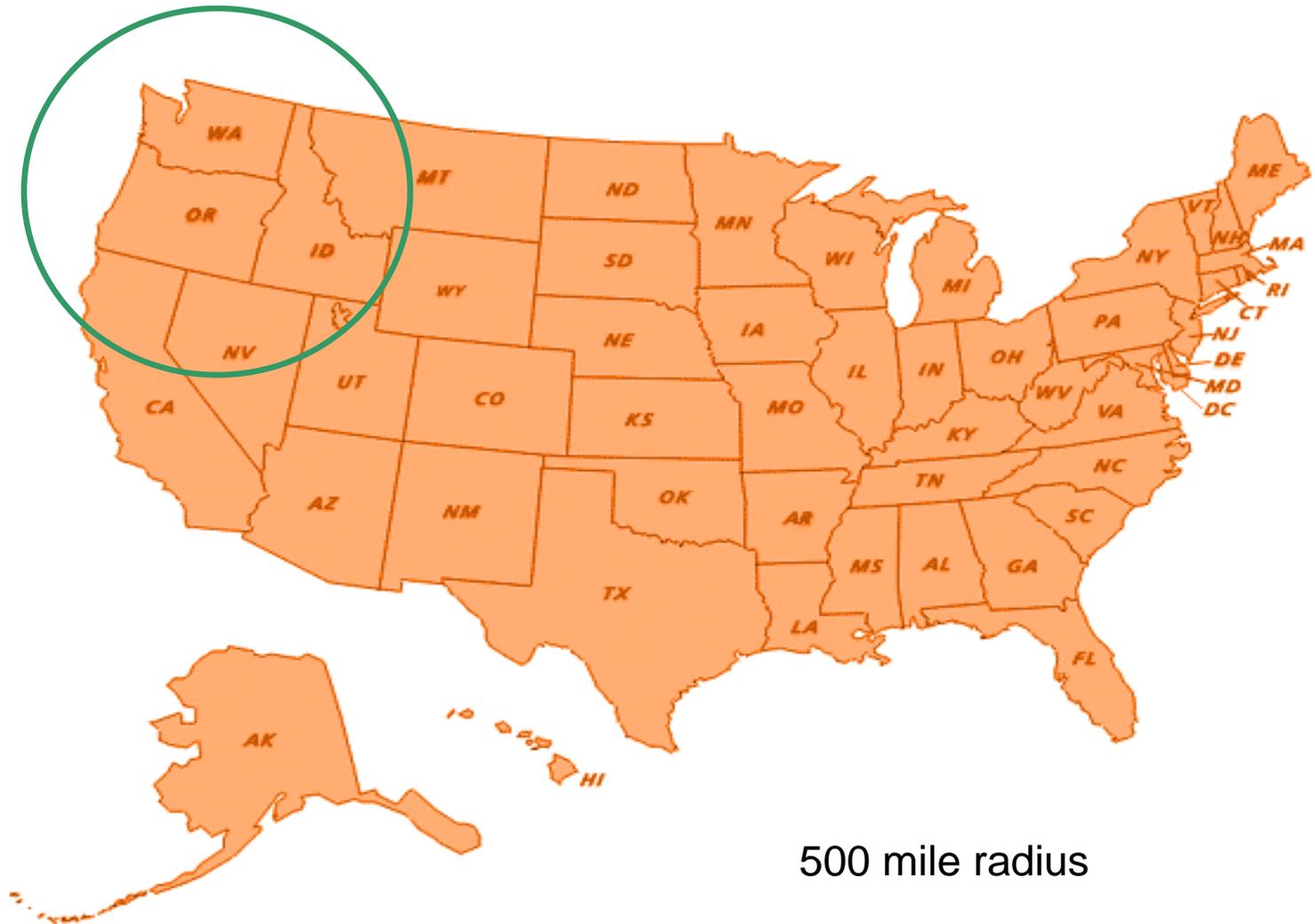
- ✓ Cable Stay
- ✓ Arch Bridge
- ✓ Box Girder
- ✓ Orthotropic Deck

*Alternative Design by American Bridge*



# Local and Regional Sources

- ✓ **Ironworkers Union- Qualified Workforce and Training Available**
- ✓ **Steel Mills and Fabricators with capacity in the area**



# LOCAL WORKFORCE

The Pacific Northwest offers a large pool of qualified workers, as well as training. OIW is but one qualified company to assist in this work. Below is just a partial list of available companies who have the know-how and capacity to complete this project.

Albina Pipe Bending Co.  
Aloha Welding  
A-one Ornamental  
Aluminum & Bronze  
Building Specialty Systems  
Cannon Western Constructors, Inc.  
Columbia Wire & Iron Works, Inc.  
Fought & Company, Inc.  
GTE Metal Fabricators, Inc.  
International Inspection, Inc.  
Magna Design  
Mercer Industries, Inc.  
Ochoco Manufacturing, Inc.

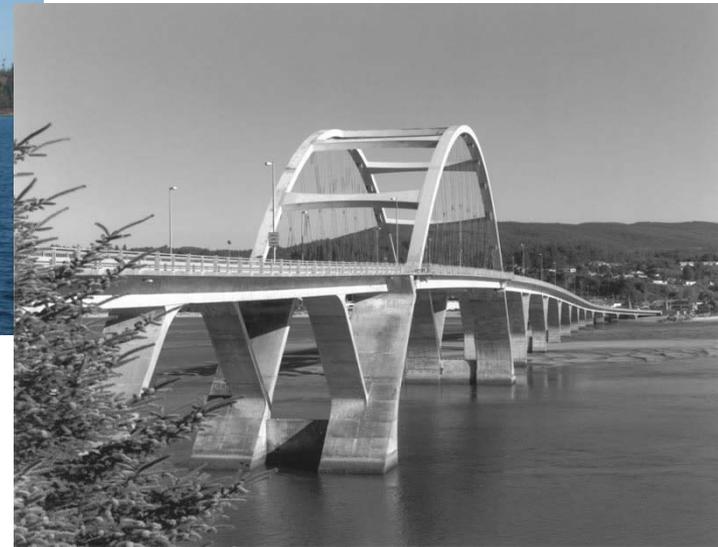
Oregon Iron Works  
Oregon Iron Works Vancouver  
Pella Vinyl Portland  
Quality Fence Builders  
Seidelhuber Iron & Bronze  
Tri-way Industries  
Twin Erectors & Fabricators  
United Iron Works  
Walters & Wolf  
The Western Group-Oregon

**Local and Regional training available at: Clackamas Community College, Clark College, Portland Community College, Work Systems**

Washington and Oregon Resources can build your bridge.  
(Just like the ones below.)



Hood Canal



Alsea Bay

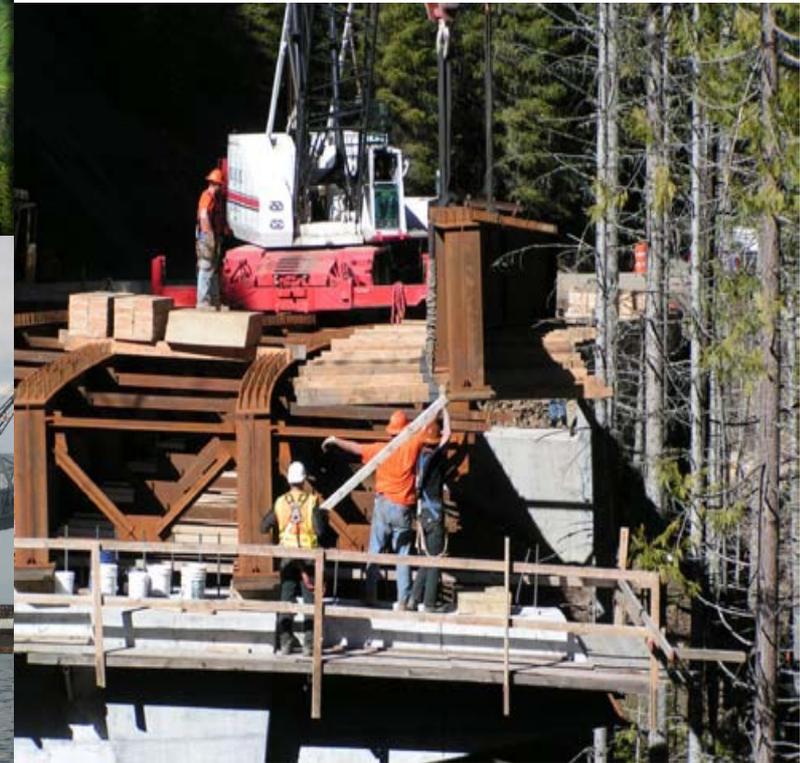
Duwamish River/ 1<sup>st</sup> Avenue

# ENVIRONMENTAL IMPACT

Nucor Corporation, the nation's largest recycler, used over 13 million tons of scrap steel in 2009 to create new products. Average recycled content was 91.7% using Electric Arc Furnace (EAF) technology at all of its steel recycling facilities. This technology uses post-consumer scrap material, which helps building projects under the LEED ("Green Building") program.



*Tight clearances can be achieved to minimize environmental disturbance.*



# STEEL RECYCLING IN 2010

## **97.5% of the steel used in the construction industry is recycled**

Steel is a highly recycled, well-traveled compound. A piece of steel may begin its life as an automobile or appliance, enjoy a brief stint as a can of soup or a hanger, and eventually be reincarnated as a beam in a skyscraper, a sign structure, part of a famous steel bridge or maybe even a water tank for NASA.

- More than 80 million tons of steel are recycled each year in North America.
- In the construction industry, 97% of all the steel we ship is recycled content, and at the end of its useful life it will be recycled again.
- Recycling one ton of steel saves 642 kwh of energy, 1.8 barrels (76 gallons) of oil, 10.9 million Btu's of energy and 4 cubic yards of landfill space.
- 69% of all steel is recycled- more than paper, aluminum, plastic and glass combined.

## **OIW Recycling Statistics in 2010**

Metal	Purchased (tons)	Finished Product (tons) (shipped)	Percentage	Recycled Material (tons)
Carbon	9,928	8,488	14.5%	1,439

**\*After its useful life, 97.5% of this finished product will be recycled.**

**\*\*100% of residual (scrap) is recycled.**

Recycled iron and steel scrap is a vital raw material for the production of new steel and cast iron products. In the United States alone, an estimated 65 million tons of steel was recycled in steel mills and foundries in 2008. Recycling of scrap plays an important role in the conservation of energy because the remelting of scrap requires much less energy than the production of iron or steel products from iron ore. Also, consumption of iron and steel scrap by remelting reduces the burden on landfill disposal facilities and avoids the accumulation of abandoned steel products in the environment.

### **RECYCLE RATES**

- ✓ Appliances: 90%
- ✓ Steel Cans: 63%
- ✓ Automobile: 110%

(result of steel industry recycling more steel from automobiles than used in domestic production)

- ✓ Construction Materials: 97.5%

# Conclusion

- Steel is the better choice in the rebuilding of the CRC. Over its lifetime, it will be more economical, sustainable, and safer.
- The Pacific NW has a large pool of qualified workers and resources to complete this project, which will stimulate the local and regional economy.
- OIW is committed in helping the DOT and its partners complete this project in the most efficient and economical way possible.

# Questions?

Information provided in this presentation can be sourced from the following:

- National Steel Bridge Alliance
- American Institute of Steel Construction
- Northwest Ironworkers Employers Association:  
<http://www.ironemployers.com>
- DOT logos/Columbia River Crossing Graphics:  
<http://www.columbiarivercrossing.org>

On behalf of the local Ironworkers and Fabricators located in the Pacific NW, OIW thanks you for the opportunity to present to you today.