Bridge Software News

The Official Newsletter of the Alternate Route Project

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Alternate Route Projects Turns 4

Happy Birthday ARP

On October 1, 1999, the Washington State Department of Transportation made a bold leap into the world of Open Source Software. Four years later the Alternate Route Project is alive and well – and is paying dividends.

The past four years have been very exciting. We've published six major software titles, had one independently developed program contributed to the project, and have seen two software companies offer value added distributions.

This software is being used by engineers all over the world both in the office and the classroom. At a sustained rate of 15 downloads per day there has been in excess of 22,000 copies of the software distributed worldwide.

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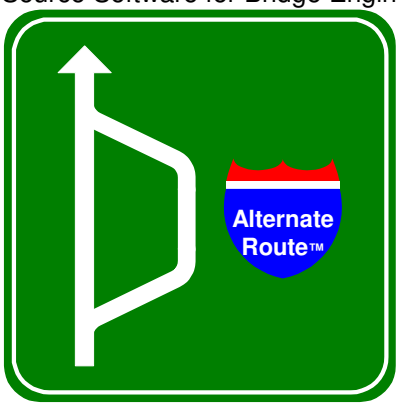
Alternate Route Project

Open Source Software for Bridge Engineering



www.wsdot.wa.gov/eesc/bridge/alternateroute

WBFL 2.0 Released

Featuring longitudinal bridge analysis components

Version 2.0 of the Washington Bridge Foundation Libraries (WBFL) has been released. This latest version adds several new component libraries that you can use to model and analyze bridge structures.

The WBFL is a collection of programmable software components for bridge engineering. These component libraries make up the technical foundation upon which you can build bridge engineering software.

This release includes new components for computing the nominal moment capacity of reinforced concrete sections and for performing a complete plane-frame structural analysis of a bridge.

The reinforced concrete capacity library, called RcCapacity, implements a variety of methods for computing the nominal moment capacity of virtually any reinforced concrete section. Analysis methods include capacity equations from the AASHTO Standard Specifications and the LRFD Bridge Design Specifications. The PCI Bridge Design Manual method, whereby an average β_1 value is computed for T-sections having dissimilar concrete in the slab and beam, is supported as well as a full non-linear analysis method.

Computing moment capacities is as easy as describing the beam (the problem), creating a "solver" object for the desired computational method, and requesting the solution. In pseudo-code:

```
solution = solver.Solve(problem)
```

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More recently, we have captured the attention of the real open source community, Linux advocates. There is a strong push for more open source development in government. As we've said all along, not only is the open source philosophy a good fit for government, it is the right thing to do. It's apparent that we are not alone in thinking that.

Recently, the Alternate Route Project was highlighted on LinuxJournal.com in its special series titled "Linux Access in State and Local Government" and has been reported to be the motivation for the open source government portal GovernmentForge.net.

We remain committed to developing open source software for the bridge engineering community. We are eager to forge relationships with engineers and software developers with the goal of cooperatively advancing the state of the art in bridge engineering software. ❖

Need more information?

If you need more information about the Alternate Route Project or any of the software titles published by WSDOT contact Rick Brice at (360) 705-7174 or e-mail bricer@wsdot.wa.gov

Links

Alternate Route Project
www.wsdot.wa.gov/eesc/bridge/alternateroute

Distributions
WSDOT (free download)
www.wsdot.wa.gov/eesc/bridge

BridgeSight Software
www.bridgesight.com

PCTrans
http://www.kutc.ku.edu/pctrans/

Support

Peer-to-peer technical support is only an e-mail away
ARP-L@lists.wsdot.wa.gov

WBFL 2.0 Released - continued from page 1

The crown jewel of this release is the Longitudinal Bridge Analysis Modeling components (LBAM). Developed as the computational engine for QConBridge and PGSplice, the LBAM components provide engineers with the means to rapidly incorporate a detailed structural analysis of a plane frame bridge structure into their programs. The LBAM has a wide range of analysis capabilities including multi-stage models, modeling of non-prismatic members, and temporary supports and hinges.

Loading conditions include concentrated, distributed, strain, temperature, and support settlement loads. The generalized live loading can be configured for the HS and HL93 live load models as well as user defined vehicles. The fully customizable load combination engine can be configured for AASHTO Standard Specification, LRFD Bridge Design Specification, or user-defined limit states.

The LBAM is designed to compute on demand. That is, all you have to do is build a model, give it to the engine, and ask for analysis results. And, analysis results you will get: the LBAM can compute forces, deflections, reactions, stress, support deflections, and influence lines.

All of the WBFL components, including the LBAM, have been designed so that they can be used from a variety of programming languages including C/C++, Visual Basic (and its variants), Java, JavaScript, FORTRAN, and .NET technologies. This means that you can use the WBFL components as objects in spreadsheets, components in web pages, and add-ins to MathCAD. This gives you the remarkable freedom of integrating this technology into the programming environment of your choice.

The best thing about the WBFL components is that they are designed for YOU, the practicing bridge engineer. Along with the source code, we have provided a plenitude of documentation and sample programs to help you make the WBFL the "foundation" for your next generation of bridge engineering software. ❖