

April 15, 2008



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TO WHOM IT MAY CONCERN:

As our nations failing infrastructure becomes more and more of a focal point, I would like to suggest a possible arena within our infrastructure that Bentley has yet to represent with applicable software products, our nation's rivers, levees and associated flooding problems. For a few representative articles please see the following:

[Top 10 Infrastructure Problems](#)¹

[There Will Be Floods, NY Times](#)²

[Levee May Fail, USA TODAY](#)³

[California Levees](#)⁴

[FEMA Map Modernization](#)⁵

[Facing the flood facts – a location intelligent view](#)⁶

Bentley has most infrastructure represented such as bridges, roadways, buildings, and utilities which all have specific software for better more efficient analysis, design, and construction. My suggestion is to create new applications, purchase existing software, and/or work with existing applications for better interoperability specifically created for this area of engineering.

The analysis, rehabilitation, and design of levees, the hydraulic analysis of possible flooding and it's effects, the design of bridges over a river, properly restoring our nations polluted and neglected waterways, and more work related to rivers requires a multiple disciplinary effort to address and complete the work. Currently this requires the use of multiple software platforms and a lot of wasted time spent transferring data between them.

I have personally been involved in engineering work in the riverine environment for the last 10 years. Much of that work related to flood protection and river restoration. MicroStation and InRoads have been very useful tools throughout my career, and InRoads works surprisingly well in the river environment due to some similarities with roads, i.e., alignments, cross sections, profiles, etc. There continue to be more instances where a more discipline specific software package would be very helpful. Below are some suggested ideas to help tailor Bentley software to better tackle the current and future problems facing our nation's waterways.

Hydraulic Modeling

A major component of understanding waterways and flooding is appropriate hydraulic modeling. I am aware of the tools InRoads has to assist in creating a HEC-RAS model, but more advanced tools and post processing functionality are needed. Both one dimensional and two dimensional models are used frequently for analysis and design.

BOSS International has a software program called [RiverCAD](#)⁷ that is close to what is needed. The capability to run HEC-RAS from within MicroStation would be a huge benefit, and to take it a step further than RiverCAD, to be able to incorporate and use the results within MicroStation would create the potential for much greater use.

For two-dimensional modeling the [Surface Modeling Software \(SMS\)](#)⁸ by Environmental Modeling Systems, Inc. is the standard for creating, running, and post processing the results. Any steps in better interoperability with this or similar types of software would be beneficial.

Geotechnical Modeling

Having an understanding of the geotechnical aspects of a waterway and the interaction with surface water and ground water are just as important. Seepage, slope stability, piping, etc. all play an important role in properly analyzing and designing projects within a river system. The ability to have these calculations and analysis performed from within MicroStation would be highly beneficial. Software applications such as [GMS](#)⁹ and [GEO-SLOPE](#)¹⁰ are some examples. In the riverine environment the hydraulic and geotechnical components are interrelated and both are needed for proper evaluation, analysis, and design.

River-Levee-Waterway Specific Tools

As InRoads is to roadway design a software application tailored to the river, levee, and flooding arena would be just as useful. Using applications that are designed for a specific discipline and applying them to other disciplines can only take you so far. There is a great need for a discipline specific piece of software within the CAD environment to address these specific infrastructure needs.

Direction

These are merely suggestions for what I feel is an under equipped area within engineering. Bentley may not be interested in pursuing any of the above mentioned items, it is presented merely to engage in dialog about any possibilities. If you have questions or would like to discuss more details, I would welcome any contact.

Sincerely,

Ayres Associates Inc



Dusty Robinson, PE
Civil Engineer

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- ¹ <http://www.popularmechanics.com/technology/transportation/4257814.html?page=9>
- ² http://www.nytimes.com/2008/02/27/opinion/27prudhomme.html?_r=3&ref=opinion&oref=slogin&oref=slogin&oref=slogin
- ³ http://www.usatoday.com/news/nation/2007-01-28-levees_x.htm
- ⁴ http://www.pbs.org/newshour/bb/science/july-dec05/levees_12-22.html
- ⁵ http://www.fema.gov/plan/prevent/fhm/mm_main.shtm
- ⁶ http://www.geoconnexion.com/uploads/facingflood_ukv6i2.pdf
- ⁷ http://www.bossintl.com/html/rivercad_overview.html
- ⁸ http://www.ems-i.com/SMS/SMS_Overview/sms_overview.html
- ⁹ http://www.ems-i.com/GMS/GMS_Overview/gms_overview.html
- ¹⁰ <http://www.geo-slope.com/>