

## 2008 Innovations Awards Program APPLICATION

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ID # (assigned by CSG): 08-E-34PA

**Please provide the following information, adding space as necessary:**

State: \_\_\_\_\_ Pennsylvania \_\_\_\_\_

**Assign Program Category (applicant):** Infrastructure and Economic Development - Transportation

1. *Program Name* Risk Assessment for Department-owned Bridges and Structures
2. *Administering Agency* Department of Transportation
3. *Contact Person (Name and Title)* Thomas P. Macioce, P.E., Chief Bridge Engineer
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8. *Web site Address* [www.dot.state.pa.us](http://www.dot.state.pa.us)

9. **Please provide a two-sentence description of the program.** A risk based assessment program that prioritizes and ranks the Pennsylvania Department of Transportation bridges for improvement. This first-in-the-nation approach to prioritizing bridge needs will give the Department a tool for getting a better idea sooner of bridge needs, which can then be listed on the statewide project list, known as the Transportation Improvement Program update.

10. **How long has this program been operational (month and year)?** June 2007

11. **Why was the program created?** Pennsylvania has over 25,000 state-owned bridges and over 20% of them are structurally deficient. The Commonwealth needed a way to assess which of these bridges are most in need of reconstruction. With very limited funds and a huge bridge inventory, PennDOT needed a way to zero in quickly on which bridges needed priority attention. **What problem[s] or issue[s] was it designed to address?** Pennsylvania is currently in the process of updating its Transportation Improvement Program (TIP), which is the blueprint for projects that move to construction. Given all of the structurally deficient bridges and the lack of funding to address them, this risk assessment gives the Department a way to determine which of the state's structurally deficient bridges should be included on the TIP. This program allows the Department to prioritize bridge reconstruction projects using a rational risk-based assessment. The risk assessment was developed to establish risk levels for Department-owned bridges and other selected structures within the Department's inventory using criteria in addition to the Federal Sufficiency Ratings. The importance of a risk based assessment concept gained national attention as a result of the I-35W bridge collapse in Minnesota. As a side note, U.S. Representative Oberstar of Minnesota, chairman of the Transportation and Infrastructure Committee, has proposed national legislation requiring risk based prioritizing of reconstruction of deficient bridges. This program can be the national model for other Departments of Transportation if Congressmen Oberstar's legislation becomes law.

12. **Describe the specific activities and operations of the program in chronological order.** The scope of the project was initiated in September 2006. The development of ranking criteria, risk assessment equation, development of database and spreadsheet, validation of database and spreadsheet, training and final report occurred from the fall 2006 through the spring of 2007. The program was fully implemented by policy in June 2007.

13. **Why is the program a new and creative approach or method?** Prior to the development of the risk assessment, bridge projects were not prioritized using a rational methodology. Essentially, we relied heavily on the Federal Sufficiency Rating to select projects for construction. Pennsylvania has approximately 1,900 bridges that would qualify to be replaced under these criteria but are not currently funded. This allows the Department to systematically address the backlog of bridges to be funded. This new risk based program includes many critical bridge factors to calculate a scoring and ranking. Some of the risk factors that are used include:

- Type of bridge
- Size and physical condition of the bridge
- Importance to the highway system
- Effects on road user costs
- Implications to commerce

By using factors other than the sufficiency rating, the Department is able to evaluate the importance of a bridge to the community and the entire transportation network when considering when it should be replaced.

14. **What were the program's start-up costs?** \$40,000 for development of the database and spreadsheet needed to determine the risk score, ranking and cost estimating for bridge reconstruction. (Provide details about specific purchases for this program, staffing needs and other financial expenditures, as well as existing materials, technology and staff already in place.)

15. **What are the program's annual operational costs?** Less than \$10,000 per year to update the database and spreadsheet. This cost is offset by the time saved during the TIP update process.

16. **How is the program funded?** State maintenance funds.

17. **Did this program require the passage of legislation, executive order or regulations?** No

18. **What equipment, technology and software are used to operate and administer this program?** The Department used the data from its Bridge Management System. It then developed a database and spreadsheet to extract and process the data for the determining the risk score and ranking.

19. **To the best of your knowledge, did this program originate in your state?** If YES, please indicate the innovator's name, present address, telephone number and e-mail address.

Yes - Brian G. Thompson, P.E., Bureau of Design, P.O. Box 2966, Harrisburg, PA 17105-2966, (717) 787-3310, [briathomps@state.pa.us](mailto:briathomps@state.pa.us).

20. **Are you aware of similar programs in other states?** Other states may be in the process of considering a Risk Assessment strategy, but we are not aware of other states having a comprehensive risk assessment program.

21. **Has the program been fully implemented?** Yes, this is our standard business practice to prioritize and program bridge projects.

22. **Briefly evaluate (pro and con) the program's effectiveness in addressing the defined problem[s] or issue[s]. Provide tangible examples.** Pennsylvania's large number of bridges that are structurally deficient and its lack of adequate funding to address all of these bridges at this time require the state to find a way to effectively prioritize which bridges pose the greatest risk to the driving public. Risk mitigation of structurally deficient bridges is a key objective of this program through prioritization of projects. The assessment provides key decision makers with objective information at project level, network level and statewide level to determine appropriate funding allocation for risk abatement. In addition, the Department now has baseline information that can be used in the future to develop additional performance measures and trend and feedback analysis.

The Department has not found any negative impacts related to this program. In fact, the Department has determined that it has saved each district between 3 and 4 weeks of time during the TIP development process. Since the Department has 11 engineering districts, this is a huge cost savings to the state to implement this program. In addition, the Department believes that it is a prudent investment of taxpayer funds to rebuild bridges of a high economic significance in a community. Finally, the Department has found that although the program identifies which bridges need to be rebuilt, it further demonstrates the funding needs of the bridges of Pennsylvania.

23. **How has the program grown and/or changed since its inception?** The fundamental concept of determining and ranking of bridges has not changed since inception. It has been quickly implemented and accepted as standard business practice. The Department is using the analysis to allocate resources for the improvement of our bridge infrastructure. Since its implementation, the Department is continuing to refine the outputs such as trend analysis, metrics, and presentation of the data.

24. **What limitations or obstacles might other states expect to encounter if they attempt to adopt this program?** The vast majority of the data is in accordance with federally mandated bridge inspection, thus the calculation of risk score and ranking should be readily incorporated by other states. This program allows Pennsylvania to present data-driven rationale for prioritizing bridges. Other states may use other rationale, such as population growth, available funding or restricted funding to determine bridge priority. Changing the way bridge projects are selected and funded may be difficult in some states.