

ASCE Journal Features Soliman/Frangopol Paper as Research Highlight

The January 2015 issue of the *Journal of Bridge Engineering* showcases a paper authored by Mohamed Soliman, a newly-minted Ph.D. from the department of civil and environmental engineering at Lehigh, and [Dan M. Frangopol](#), a professor of structural engineering and Soliman's doctoral adviser.

The featured paper, "[Life-Cycle Cost Evaluation of Conventional and Corrosion-Resistant Steel for Bridges.](#)" appears as the research highlight in the monthly ASCE journal. The research was made possible through the support of the Pennsylvania Infrastructure Technology Alliance ([PITA](#)) and an in-kind contribution from [ArcelorMittal Global R&D](#).

Steel bridges that are under severe chloride exposure due to deicing salts or marine environmental effects require frequent maintenance and repair to extend their service life and perform well. The Soliman study quantifies the life-cycle cost of steel bridges constructed with different steel types by integrating the indirect environmental, social, and economic impacts involved in life-cycle maintenance.

Similarly, life-cycle performance and cost analysis contributed significantly to the development of ASTM A1010, a new steel product developed by ArcelorMittal and studied by Soliman and Frangopol. Manufactured exclusively in Pennsylvania, A1010 costs bridge fabricators approximately 2.8 times more to use than conventional bridge steel, but delivers significant maintenance savings over the functional life of the bridge. The results of the PITA project demonstrate that, for bridge life-cycle considerations, A1010 is the least-costly steel available for bridges that would otherwise need repainting due to aggressive environmental conditions.

Given the importance of identifying the most sustainable alternative for steel bridge construction in highly corrosive environments, the paper's findings are meaningful to both researchers and practitioners working in the field of bridge engineering.

Soliman was awarded a doctorate in January 2015 for his dissertation, "Life-Cycle Management of Civil and Marine Structures under Fatigue and Corrosion Effects." He is currently a post-doctoral research associate in the ATLSS (Advanced Technologies for Large Structural Systems) Research Center at Lehigh University.

—Shelley Drozd

¹Soliman, M. and Frangopol, D.M. (2015). "Life-Cycle Cost Evaluation of Conventional and Corrosion-Resistant Steel for Bridges." *Journal of Bridge Engineering*, 20(1), 06014005, doi: 10.1061/(ASCE)BE.1943-5592.0000647

Civil and Environmental Engineering



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