EDITORIAL

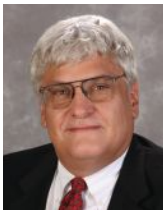

Photo: PCI.

Our Conversation Continues: *Philotimo* and the Future of Bridge Engineering

William N. Nickas, *Editor-in-Chief*

In the last issue of *ASPIRE*® (Winter 2020), we started a difficult conversation about how our industry can best move forward after a tragic event. In that issue's editorial, Gregg Freeby of the American Segmental Bridge Institute and I shared our thoughts following the release of the final National Transportation Safety Board (NTSB) report[1] on the 2018 Florida International University (FIU) pedestrian bridge collapse. In that same issue, Leon H. Grant, vice president of operations at Coreslab Structures (Conn.) Inc., also offered a perspective on how a bridge collapse more than a century ago inspired an oath of professionalism that every engineering student in Canada takes—and the profound influence that oath has had on his own career. Many of you have joined the conversation, and your comments have given me a lot to think about.

One person who wrote to me about the last issue of *ASPIRE* was a retired 87-year-old structural engineer who wants to know why the bridge construction community seems to have shifted away from traditional checks and balances. This commenter worries that we may no longer confidently assume that (a) materials engineers collect and validate the data used by the construction inspectors; (b) project engineers verify the inspection findings; (c) oversight bridge engineers validate field requests from the owner's project managers and contractors; (d) project and field staff are empowered to engage the responsible bridge engineers when they have concerns; or (e) leadership will escalate issues as needed. More broadly stated: Do we still cross-check each other's data and calculations? And are we prepared to take a pause to do what is right?

That final question reminds me of a concept I learned when being taught right from wrong in my youth. My Greek family often spoke of *philotimo*. A rough English translation might be "love of honor" or "friend of honor," but neither phrase fully captures the meaning of the Greek word. In fact, I have been told *philotimo* doesn't have an exact English counterpart. Trying to describe this "Greek word without a meaning," behavioral expert John R. "Jack" Schafer, PhD, a professor in the Law Enforcement and Justice Administration Department of Western Illinois University wrote, "*Philotimo* encompasses the concepts of pride in self, pride in family, pride in community, and doing the right thing. *Philotimo* is an all-encompassing concept that gives meaning to life that stretches well beyond ourselves. Elder Paisiou aptly defined *philotimo* as 'that deep-seated awareness in the heart that motivates the good that a person does. A *philotimos* person is one who conceives and enacts eagerly those things good.'"[2] To my mind, what the retired engineer expressed was a concern that professionals in our industry today might lack *philotimo*.

To move forward as a community and industry that exemplify the values of *philotimo*, we are going to need to grapple with the implications of mistakes we have made, share our points of view, and really engage with the perspectives of others. During the 2020 Transportation Research Board (TRB) Construction of Bridges and Structures Committee meeting on January 13, 2020, Alan Fisher, chief engineer for Cianbro Construction Company, asked the room full of engineers how many had read the thoughtful statement by the NTSB vice chairman (dated October 28, 2019) about what went wrong—and why—in the FIU bridge collapse. Only four people of the 30-plus in attendance had read the letter, which could be a sign that we as a community may not be reckoning with the implications of that event and others like it for our profession. The statement is republished in full in this issue (page 51). I encourage you to read it, reflect on it, and discuss it with your colleagues.

Also on January 13, Steve DeWitt (formerly the North Carolina Department of Transportation construction engineer) moderated the TRB panel discussion on alternative delivery and contract risk sponsored by the TRB Standing Committee on Project Delivery Methods. This discussion suggested to me that the balance in public-private partnerships may

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Erection of the final segment in the Interstate 59/Interstate 20 elevated bridge replacement project in Birmingham, Ala.
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have shifted too far toward the private sector. This is yet another challenge that we as an industry will need to fold into our ongoing conversations about our future.

Based on the comments we received about the editorial and Leon's perspective in the Winter 2020 issue, we have decided to dedicate space in each issue of *ASPIRE* to broader engineering topics. In this issue, for example, Gregg and I offer a perspective on the human dynamics of closing a bridge or the roadway under a bridge (page 50).

The bridge community needs to revisit what the NTSB vice chairman calls the "safety management system" that should prevent catastrophes. We must work to never allow human habits and the time pressures of project delivery to disrupt our bridge engineer's *philotimo*.

References

1. National Transportation Safety Board (NTSB). 2019. *Pedestrian Bridge Collapse Over SW 8th Street, Miami, Florida, March 15, 2018*. Highway Accident Report NTSB/HAR-19/02 PB2019-101363. https://www.ntsb.gov/investigations/AccidentReports/Reports/HAR1902.pdf.
2. Schafer, J.R. 2015 (August 15). "*Philotimo*: A Greek Word Without Meaning but Very Meaningful" *Psychology Today* [blog post]. https://www.psychologytoday.com/us/blog/let-their-words-do-the-talking/201508/philotimo-greek-word-without-meaning-very-meaningful.

DISCUSSION

The Effects of Strand Debonding

This is a discussion of "The Effects of Strand Debonding" by Dr. Oguzhan Bayrak published in the Winter 2020 issue of *ASPIRE* magazine (pp. 52–53). The explanations given by Dr. Bayrak are clear and welcomed. We would like to bring attention to two items:

1. In the paragraph following Eq. (5.7.3.5-2), Dr. Bayrak explains that stirrups in excess of those required to correspond to $V_s = (V_u/\phi_v)$ should not be used to artificially reduce the amount of longitudinal tie steel required. This is in accordance with the AASHTO LRFD specifications provision and should be followed. However, the equation given below the paragraph and described as the minimum value for the longitudinal tie force can be misleading and its use should be clarified. We recommend clarifying that the minimum requirement for longitudinal tie reinforcement should be the larger of Eq. (5.7.3.5-2) and the following equation given in the article:

$$A_{ps} f_{ps} + A_s f_y \geq \left(0.5 \frac{V_u}{\phi_v} - V_p \right) \cot\theta$$

2. The discussion in the article, and also in the AASHTO LRFD specifications, indicates that debonded strands may not be used as part of the longitudinal tie reinforcement. We only partially agree with this statement. It is only valid when the debonded strands are not anchored after detensioning. Debonded strands can be anchored by embedding them into a cast-in-place diaphragm, which is a common detail in much of the United States for beams made continuous for live load. They can also be anchored by other means, such as using strand chucks and secondary end blocks. If debonded strands are anchored, it would be reasonable to assume that they contribute to the longitudinal tie resistance at the strength limit state.

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Author's response

The author wishes to thank the discussers for their thoughtful comments. The points raised by the discussers are addressed in the same order.

1. The unnumbered equation in the subject article was provided for the purposes of clarifying the lower bound for Equation (5.7.3.5-2). The V_s value used in this equation cannot be greater than (V_u/ϕ_v). Therefore, the interpretation of the discussers is correct: Adding stirrups can only reduce the demand on the longitudinal tie up to a point. Put simply, the definition provided for V_s after Equation (5.7.3.5-1) in the AASHTO LRFD specifications reads "*shear resistance provided by transverse reinforcement at the section under investigation as given by Eq. 5.7.3.3-4, except V_s shall not be taken as greater than V_u/ϕ_v (kip)*." This limit placed on V_s should be taken into account when using Equation (5.7.3.5-2).
2. If positive anchorage is provided to debonded strands by extending them into diaphragms and bending them up or by using strand chucks, at the point where this positive anchorage is provided strand can be adequately developed or assumed to be "fixed." Under additional loads, it is true that the "fixed" or "positively anchored" debonded strand will pick up some additional strain, and associated stress. This creates an interesting distribution of stress along the length of a debonded strand. Additional stresses experienced by the debonded portion of a strand anchored at its end due to additional gravity loads acting on the beam will add to a "zero stress state" and not the effective prestress at the service limit state. So, with this important subtlety acknowledged, the author agrees with the discussers' point on this item. Finally, simply supported beams made continuous for live load creates a boundary condition that starts deviating from a simply supported beam end such as that depicted in Figure C5.7.3.5-1, where there is no moment reaction at the support.

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