EDITORIAL

Be Careful What You Ask

by William Nickas, Precast/Prestressed Concrete Institute, and Gregg Freeby, American Segmental Bridge Institute

Most recent readers of the editorials in this magazine clearly grasp the notion that the Florida International University (FIU) pedestrian bridge collapse struck us deeply. Like you, we believe our business and this profession of ours demand our best.

When we first read the comments of National Transportation Board (NTSB) vice chairman Bruce Landsberg, they stung (the full text of his letter was reprinted in the Spring 2020 issue of *ASPIRE*®). How is it that Landsberg's words touched such an emotional chord? He is not an engineer; his entire professional career centers on private and commercial aviation—how can he possibly understand? We had several long and thoughtful discussions about this. Seeking insight into Landsberg's perspective, we made a call to my former Citadel roommate, a recently retired military officer who spent most of his 34 years of service in the cockpit of military aircraft. In addition to being an aviator, he is also a civil engineer. Surely, he would be able to help us gain greater insight into the vice chairman's statement.

Be careful what you ask. On this call, the two of us were educated on mission analysis, course of action development, associated risk, aircrew selection, premission briefings, rehearsals, route adjustments, risk assessment, final briefing, and launch authority. The military's process for each mission is thorough and vetted, double-checked with a keen eye on risk and safety. Every step and sequence is studied. After the mission is flown, a complete after-action report and review occurs. These sessions are inclusive, detailed reviews in which all crew members' candid assessments and perspectives are sought. The result is a holistic and honest critique, outlining things to maintain and sustain as well as aspects that must be addressed and fixed. It's during these reviews that lessons learned are identified and shared among the community as a way to learn, grow, and develop.

As my former roommate put it, "We're carrying our most precious resource, our sons and daughters. Our job is to get them to and from their destinations safely, without taking unnecessary risk. I was tough on discipline. Undisciplined crews and units take unnecessary risk. Our business is inherently dangerous and risky; there's no reason to take unnecessary risk by being undisciplined. We're trying to mitigate risk, not increase it. Fly the aircraft to standard, and adhere to the checklist and procedures." His comments on discipline led us to pause and think.

Further in the conversation, my old friend expressed his view that the vice chairman's commentary was direct, accurate, and clearly stated. "It resonates because it's an accurate assessment. The reason leaders are in the positions they're in is to lead and make the hard call when required. You only get one chance to land the aircraft safely."

"Wow. Thanks for sharing." At this point, there was an almost uncomfortable silence on the call.

Bridge engineers and aviation experts are not so different after all. Isn't our job as engineers to provide safe infrastructure that gets our most precious resource, our sons and daughters, to and from their destinations safely, without taking unnecessary risk?

That's why when our community suffers a catastrophic event, its effects ripple through our profession. As professionals, we seek to understand the cause(s) or reasons for such tragedy. Our aim is not to criticize but to understand the issues and circumstances. Then, we adjust our processes to remove this threat from future builds. It's why we continue to revise codes, enhance designs, and prove concepts through calculation, modeling, and simulation. Our pledge continues to be about lives, safety, and the health and welfare of the general public, and all our efforts must be based on sound, disciplined engineering judgment.

In this issue, an article by Dr. William Lawson gives his views on engineering judgment as it relates to the FIU tragedy. Also, Dr. Donald Meinheit shares an implementation plan for the design requirements, testing, installation, and inspection of concrete anchors, which are all now coordinated to "get it right" as a result of the "Big Dig" anchor failures.

Also in this issue, you will find an article by Dr. Oguzhan Bayrak about structural behavior and redundancy, further issues identified in the NTSB report. In the article, he notes the cracking levels observed in various lab specimens are more than experimental results. They should be alerting us to what cracks observed in the field can tell us about in-service behavior.

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Unlike the engineering profession, the aviation community actively shares lessons learned. They don't do this as a "gotcha," but as a way to move their profession forward and avoid repeating mistakes. They're about making the system better and developing a TTP (tactic, technique, or procedure) that enhances mission success and survivability.

Is it time to develop a national repository of engineering lessons learned? This could be a place where structural engineers can seek historical perspectives when a situation develops that might require a tough call.

Thank you, Mr. Shutt

For nearly three decades, Craig Shutt has been presenting clear and accurate information through PCI's various publications. Leading up to the institute's 50th anniversary, in 2004, Craig authored "PCI 50 Years: Visions Taking Shape." When PCI launched *ASPIRE* magazine, in 2007, Craig was on board as its first managing editor.

In recent years, Craig has written many of the project articles that have appeared in *ASPIRE* and *ASCENT*. Armed with a wealth of construction industry history and an impressive number of relationships within the precast concrete industry, Craig brought an understanding and craftsmanship to his writing that has been very much appreciated.

We thank Craig for all his contributions to the advancement of the industry and we wish him well as he embarks upon retirement.

ERRATA

Discussion of Sweep in Precast, Prestressed Concrete Bridge Girders–Part II

In "Sweep in Precast, Prestressed Concrete Bridge Girders—Part II" by Dr. Bruce W. Russell published in the Fall 2019 issue of *ASPIRE*® magazine (pp. 38–43), an error was found in the calculations for the girder braced using a king post. The author has revised the text on page 43 beginning with the second line as follows (deletions are ~~struck through~~; additions are shown in red):

> "... post. The king-post arrangement with four ~~fully-tensioned~~ strands tensioned to 30 ksi deflects the center of the girder ~~0.44~~ 0.89 in., which is a sizable amount of the original sweep used in this example. Moreover, largely because of the straightening effects, the factor of safety against cracking FS_θ is increased from 1.60 (without the king post) to ~~2.62~~ 2.35 with ~~8 fully-tensioned~~ eight 0.6-in.-diameter strands tensioned to 30 ksi. These computations ..."

The remainder of the paragraph is unchanged.

Values in **Table 5** are revised to reflect the recalculated stiffness of the braced-girder system and the revised tension in the strands of the king post. The corrected version of Table 5 is shown below.

The revised values do not alter the author's conclusion.

The article posted on the *ASPIRE* website will be revised to reflect these changes.

Table 5. Increasing Lateral Stiffness and Straightening the Girder with a One-Sided, External King Post at a 36 in. Standoff

No. of External Strands	A_{sx}, in.^{2}	Lateral Stiffness Factor	z_0, in.	FS	F_{px}, kip	Δ_x, in.	θ_i, rad	FS_0
0	0	1.00	15.43	2.18	0.00	0.00	0.0323	1.60
1	0.217	1.01	15.26	2.21	0.60	0.22	0.0281	1.69
2	0.434	1.02	15.09	2.23	1.20	0.44	0.0239	1.79
4	0.868	1.05	14.76	2.28	2.39	0.89	0.0155	1.99
6	1.302	1.07	14.45	2.33	3.59	1.33	0.0070	2.19
8	1.736	1.10	14.16	2.38	4.79	1.77	-0.0014	2.35