Advocating a Renewed Culture of Surveying Education

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Editor

In recent years torrents of ink have been spent describing the pros and cons of removing the field of surveying education from the umbrella of engineering or, more precisely, civil engineering. For a time, the uproar was so loud and incessant that an orchestrated effort by professional associations—none affiliated with the American Society of Civil Engineers (ASCE)—successfully decreased the career academic standards for surveyors, which have continued to degenerate in the confusing impasse that we are confronting now.

This impromptu ill-advised movement brought about the beliefs that the original Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology—ABET (EAC)—was too scientifically advanced and rigorous in their curriculum requirements and that the creation of new accreditations, more technological and applied in scope, were necessary. Accordingly, we witnessed the birth of less stringent and more permissive educational certifications such as the ABET (ASAC), accredited by the Applied Science Accreditation Commission. Was this a wise move? In retrospect, and restricting ourselves to the surveying profession, the answer is probably no.

It is becoming perfectly clear that many of the revolutionary measuring technologies sprouting profusely these days are more in tune with the surveying engineering field than with the land surveying field. I am specifically referring to novel and broadly based scientific realms such as Global Navigation Satellite Systems (GNSS), inertial navigation systems (INS), terrestrial and airborne LiDAR (Light Detection and Ranging), laser tracking and sophisticated terrestrial scanning devices, building information modeling (BIM), and digital photogrammetry. Do these topics belong in the curriculum of a two-year technology program? The answer is an emphatic no! This limited amount of time gives opportunity to learn the subjects only superficially.—Knowing how to sequentially press instrument keys is not exactly what a professional surveying engineer should be primarily concerned with.

Could we draw a time line and start again, practically from scratch, with our expectations focused on the coming decades? In my humble opinion we are compelled to scientifically invigorate the surveying engineering profession for the benefit of future generations of certified professionals. It is imperative that all states require, besides pertinent experience, a minimum of a four-year college degree in surveying engineering before a license is granted. Why emphasize surveying engineering? Because with the exception of boundary location procedures, all surveying specializations have historically been closely intertwined with civil engineering, e.g., road and highway layouts, structural deformation and stability, large bridge construction and monitoring, tunnel perforation surveys, water canalization and sewer systems, dam construction and subsequent deformation monitoring, and accurate industrial measurements. It seems logical then that expert surveying engineers should aspire to complement their PLS licenses with P.E. licenses, as was often the case not too long ago. This dual licensure will ensure a full understanding of most types of engineering projects and will have the added advantage of allowing the surveyor to interact smoothly with other professions. Is not this the way the surveying profession should be revamped?

Civil engineering departments across America should reconsider teaching all of the above-mentioned innovative technologies under an affiliated surveying program. Civil engineers must be abreast of every newly developed surveying technique in order to apply digitized databases in accurate 3D georeferencing, the foundation for all well-done engineering infrastructures. Knowing how to investigate the output of these massive volumes of geospatial data mathematically through computerized statistical analysis (least-squares, Kalman filtering, robust estimation, hypothesis testing, etc.) is necessary to arrive at a scientific and judicious conclusion that can be extrapolated to the particular project at hand. Baccalaureate surveying engineering programs should strive to acquire ABET (EAC) certification and, if at all possible, to provide their students with the necessary access to courses that fulfill the prerequisites for simultaneously obtaining the P.E. license. I am convinced that this approach will dissipate doubts and will help to regain the surveying engineers' self-identity and prestige, which has been diminished lately by lowering compulsory educational criteria.

At the *Journal of Surveying Engineering* we are proud to literally chart the course. During the last three years, the *Journal* has published, for example, two articles about terrestrial and airborne LiDAR applied to detect ground displacement hazards to water systems and to improve the mapping of obstruction surveys in airport approaches; four articles about the use of terrestrial laser scanners to determine the location of a radio telescope antenna reference point and gravitational deformations in large parabolic antennas, and to study the dynamic environment of extended sea cliff sections; three articles about the use of GPS to monitor deformations; three articles about CORS networks and two about OPUS-RS; and one about GPS/INS integration. Some of these papers are very technical in content and, perhaps, difficult to understand by surveyors who specialized entirely in boundary demarcation. About 60% of the contributions were authored and coauthored by members of engineering departments, including civil, civil and construction, and civil and environmental. The others were submitted by federal researchers and faculty and students from various universities (mainly foreign) offering graduate surveying engineering programs.