

# **REFLECTING BACK: Some Recollections on the Inaugural ABET Industry Advisory Council**

**By Frank G. Splitt**

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## PREFACE

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### **Background**

It was in 1948 that I graduated from St. Philip High School and began pre-engineering studies at Chicago's Wright Junior College. It was also the year that the life of Aldo Leopold, America's foremost conservationist and environmental scholar, came to a tragic end at the early age of 61. Over the years, Leopold's life story and work came to provide me with renewed inspiration and motivation to keep asking and seeking to answer Leopold's root question, "*How do we live on the land without spoiling it?*" This question was to have a profound impact on my ABET related work

My concern about environmental issues began sometime in 1986 and emanated from work that my wife and I did with the Foundation for Global Community – formerly known as the Beyond War Foundation. It was through the Foundation that I first became aware of the concept of sustainable development and was introduced to the work of Donella Meadows, Jonas Salk, and a new way of thinking – that we are one, and, that individually and collectively, we share the responsibility for the future course of events on the planet. I also came to better understand the challenge before us – to affect an appropriate level of positive change to protect the environment – is of daunting proportions.

### **Engineering Education**

My interest in Engineering Education was kindled sometime in the mid-1980s by Professor Ed Ernst, then an Associate Dean at the University of Illinois and a highly regarded academic leader at ABET – the Accreditation Board for Engineering and Technology. Professor Ernst, a fellow director of the International Engineering Consortium (IEC), played an important role as a mentor and a facilitator within the academic and engineering accreditation communities. With additional encouragement and strong support from IEC Executive Director Bob Janowiak and Deans Bill Schowalter at Illinois and Jerry Cohen at Northwestern, I began to speak and write on the subject of Engineering Education from an industry perspective.

The first venture was in 1986 at the National Communications Forum where my focus was on overspecialization as a problem for engineering education. Environmental issues began to be emphasized in the late 1980s with a call to our engineering students to take a leadership role in policy issues. Over time, I became a strong advocate for restructuring engineering education and worked to catalyze the changes that began to be called for since the early 1980s – not only in the way we educate our engineers, but also, as a member of the ABET Industry Advisory Board, in the criteria we use to accredit our engineering programs.

The IEC published the *Creating Our Common Future* monograph in 1991. The monograph addressed environmental, education, energy and economic issues of the day and saw worldwide dissemination. Among other things, it was used to help provide the context for a high-level path forward for the business and academic sectors of the Information Industry. At the time it was also clear that opportunities to revitalize education and facilitate environmental clean-up and sustainable development would be important drivers. Environmental and educational initiatives were seen to be synergistic and mutually supporting. Engineering Education and ABET now came to the fore. Here's how.

### **The ABET Industry Advisory Council**

During his term as the ABET president, Ed Ernst established the ABET Industry Advisory Council (IAC). It was Ed's view that ABET was in a highly leveraged position to affect change in engineering education. Why?...because he believed that a major restructuring of the accreditation criteria and process would have significant long-range effects. Ed invited me to serve on the board.

We had our first meeting in May of 1991. This was the time when President James Duderstadt of the University of Michigan, President Charles Vest of the Massachusetts Institute of Technology, and others, were calling for a fundamental change in the post-World War II model for Engineering Education that was proving to be inadequate – not capable of supporting the new emphasis on quality, customer focus, and

continuous improvement. They also saw ABET's rigid, "bean-counting" implementation of accreditation criteria as a barrier to needed innovations in Engineering Education. This was also the time when the National Science Foundation was demonstrating increased interest in curricular innovation and would soon initiate a series of workshops on restructuring Engineering Education.

### **Outcomes Approach to the Accreditation Process**

The ABET connection proved to be most rewarding. It provided a platform to implement the ideas described in *Creating Our Common Future*, as well as the concept of systems thinking advocated by MIT's Peter Senge in *The Fifth Discipline*. Most importantly, it provided a venue for a wide-scale introduction of environmental protection and sustainable development imperatives into Engineering Education. The restructuring process was helped considerably by ABET President John Prados, University of Tennessee, who was providing leadership to affect requisite change, and by Deans Jerry Cohen and Bill Schowalter who were providing valuable insights on accreditation practices as viewed by major research universities. As noted in the appended letter, these insights kindled the ABET IAC's thinking on an outcomes approach to the accreditation process.

### **The Impact of Sustainable Development**

It was in the late 1980s that sustainable development came to be recognized as a major issue of our times. Clearly, this issue was going to have a significant impact on Engineering Education. Jim Poirot, the first chairman of the Advisory Board, introduced me to the World Engineering Partnership for Sustainable Development. Together, we worked to promote the idea that sustainable development was going to be the dominant economic, environmental, and social issue of the 21<sup>st</sup> century; and that in addition, a fundamental change in Engineering Education was required to help the next generation of engineers learn to design for sustainable development and long-range competitiveness. This view was reflected in a letter sent to the ABET President Al Kersich in late September of 1993, by ABET IAC Chairman Mike Emery. In the letter we called upon ABET to bring about a major paradigm shift in engineering education. Among other things, the ABET IAC asked that emphasis be placed on teamwork and an interdisciplinary understanding of the societal, ecological, financial, national, and global impacts of engineering. The letter also recommended a set of *Accreditation Process Principles and Concepts & Supporting Strategies* that later helped form the working basis for ABET Engineering Criteria 2000 (ABET EC 2000): Criterion 3 Programs Outcomes and Assessment.

## **CLOSER LOOK: Inaugural ABET Industry Advisory Council**

Presidents Edward W. Ernst (1989-90) and Leslie F. Benmark (1990-91) provided principal leadership for the formation of the Industry Advisory Council (IAC). The membership of the original IAC, which held its first meeting in 1991, included the following individuals, listed with their affiliations at the time:

Bruce C. Coles, Stone & Webster	Donald H. Daigle, Exxon Research & Engineering
Mike Emery, E. I. du Pont	Lavele Frantz, Phillips Petroleum Company
Eugene D. Jones, Greiner, Inc.	John Lawson, Deere and Company
William F. Leonard, Rockwell International	Paul Low, IBM,
Larry Morata, McDonald Douglas Space Systems	Jarold Meyers, Chevron Research and Technology Co.
James W. Poirot, Chair, CH2M Hill	Kenneth Roe. Burns and Roe Enterprises
Joel S. Spira, Lutron Electronics Company	Frank G. Splitt, Northern Telecom

### **The Accreditation Process Principles**

The *Accreditation Process Principles* called for the “*understanding of and work toward sustainable development ... safety and environmental impact.*” In the process of balancing specific guidance against flexibility of choice by engineering programs, the wording of the *Accreditation Process Principles* relative to environmental considerations was subsequently generalized. Thus, Criterion 3 did not reflect the emphasis that the ABET IAC *Accreditation Process Principles* placed on these considerations. The ABET IAC also asked that engineering programs seek to provide their graduates with a combination of skills, attributes, and characteristics among which were: “*A holistic approach to achieve solutions to engineering challenges by integrating the elements of general education including human needs, culture, history and tradition, sociology, politics and government, economics and the environment.*” Emphasis on the environment and sustainable development was considered one of the ABET IAC’s more important recommendations. This emphasis was also promulgated in my presentations at ABET and ASEE conferences. Subsequently, a multitude of examples came to illustrate just how important emphasis on sustainable development is to business leaders today.

### **Concluding Remarks**

Looking back, I understand why ABET’s Criterion on Program Outcomes and Assessment was generalized to the extent that it was. The burden of developing case studies and other mechanisms that enable student learning in the cited areas is exactly where it should be – on the engineering schools. Unfortunately, in my opinion, a significant opportunity for an appropriate level of emphasis and guidance may have been lost in the process of getting to this end objective. However, this emphasis and guidance should, and can, manifest itself in other ways, sometimes, in quite unexpected ways.

Fortunately, as a consequence of a 2000-03 campaign for Systemic Engineering Education Reform (SEER), ABET EC2000 Criterion 3.(c) and (h) were revised as follows. (These changes, denoted by underscore, went into effect in the 2005-06 accreditation cycle.)

(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

As a result, EC2000 now reflects what I believe to be the original intentions of the inaugural ABET Industrial Advisory Council.

### **APPENDIX: Letter from Frank Splitt to David Reyes-Guerra**

October 21, 1992

Dr. David R. Reyes-Guerra  
Executive Director, Accreditation Board  
For Engineering & Technology  
345 East 47<sup>th</sup> Street  
New York, New York 10017-2397

Subject: Accreditation Practices and Major Research Universities

Dear Dave:

As you suggested at our August ABET/IAC meeting, I discussed the subject with University of Illinois at Urbana-Champaign, Dean Bill Schowalter, and Northwestern University Dean, Jerry Cohen. Both were kind enough to spend time with me and arranged for me to meet with some of their key people as well. A summary of our discussions follows:

Bill and Jerry are well aware of the growing tension between accreditation practices and the positions of major research universities. They also know that the dissension has engaged the attention of several university presidents who happen to be engineers and members of the National Academy of Engineering. Both Bill and Jerry are of the opinion that drastic action on the part of the major research universities would be counter productive in the long run. Furthermore, they believe several substantial changes in ABET practices are required if a serious rupture is to be avoided. These include:

1. The bean-counting perception of ABET evaluations must be dispelled.
2. Individual visitors should be empowered to make subjective judgments. Presumably, the visitors are chosen because of their high stature and credibility. Their high standing should be exploited in the evaluation process.
3. The ultimate measure of success of a program is the success of the alumni. That factor should receive more explicit recognition. What fraction of the students is placed at the time of graduation? What is the record of the alumni five and ten years after graduation? What do alumni surveys say about satisfaction with their education?
4. Experimentation and latitude should be encouraged *within the context* of the institution, its student body, and objectives. It is entirely correct that procedures at MIT should differ from those, at say, Notre Dame, which would again differ from those at Texas A&M, each program being, perhaps, perfectly acceptable for its special environment.

Additionally, Jerry believes that the examiners are often not the leaders in the field they are examining...many times they are from second-level schools. He feels that the latter is probably the fault of the research universities who are not promoting the examiner role. Jerry also believes that we need engineers who graduate ready to be "worker bees," but we especially need engineering leaders. To help the latter, he believes the engineering curriculum needs to be opened up to a broader range of subjects... a move discouraged by present bean-counting practice. Going to a five-year curriculum to do the job will, in Jerry's opinion, kill engineering enrollments. In summarizing his views, Jerry pointed out the fact that, in spite of the recent criticism of our research universities, the educational function especially at the graduate level) is the envy of the world. "Why else would there be so many applications from overseas? Can many of our industries say that? Where will the ideas for the next generation of industries come from if we continue to damage this vital part of our country?"

In closing, let me share some of my thinking with you. First, the accreditation process should be more output (crop) based, rather than input (seed/bean) based. Thoughtful consideration needs to be given to university programs within the overall context of their mission, goals, objectives and tactics (where the beans can be counted with relative ease). This requires judgment by empowered examiners.

Secondly, all teaching and learning need not be done via formal course work. There are other vehicles that can be used to multiplex new content with an in-place program. It is my view that relevant topics such as communication skills, ethics, leadership, TQM, and holistic thinking can be provided by *integration* into the current curriculum and/or *overlaid* with a professional growth seminar program. For elaboration on the integration approach, I commend the October 1992 ASEE/PRISM cover story to your attention.

We can discuss this further in San Antonio if you wish. Please copy others as you deem appropriate.

Warmest personal regards,

Frank G. Splitt  
Vice President, Educational and Environmental Initiatives  
Northern Telecom, Inc.  
Member, ABET/IAC

FGS: gjs



### **Frank Splitt**

Vice President Emeritus of Educational  
and Environmental Initiatives,  
Northern Telecom

Member of ABET's Industry Advisory  
Council, 1991-94

Frank G. Splitt holds a Ph.D. in Electrical and Computer Engineering from Northwestern University. He is the former McCormick Faculty Fellow of Telecommunications, McCormick School of Engineering and Applied Science, Northwestern University and Vice President Emeritus of Educational and Environmental Initiatives, Nortel Networks.

As a Director of the International Engineering Consortium, he chaired the Consortium's Committee on the Future and its Fellow Awards Committee. He was also a member of the Accreditation Board for Engineering and Technology (inaugural) Industry Advisory Council, the Institute of Electrical and Electronic Engineers (IEEE) Educational Activities Board, and the IEEE Corporate Recognition's Committee.

His professional career covered research & development, marketing, administration, teaching, and public service. He has authored numerous technical papers, as well as articles on public affairs. He is a Fellow of the International Engineering Consortium, a Life Fellow of the Institute of Electrical and Electronic Engineers, an Eminent Engineer of Tau Beta Pi, the recipient of *The Drake Group's 2006 Robert Maynard Hutchins Award*, and has been recognized by the State of Wisconsin for Outstanding Lake Stewardship.

His interests involve research and planning for the future of Engineering Education, environmental protection and conservation, and college sports reform. He and his wife Judy reside in Mt. Prospect, Illinois and in Star Lake, Wisconsin.

A complete listing of links to his essays and commentaries on college sports reform can be found at <http://thedrakegroup.org/splittessays.html>.

**The Drake Group**  
**<http://thedrakegroup.org>**