

**Excerpts from remarks by
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“Engineering a Sustainable Future”

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It’s a great honor to join you today as you celebrate the 65th anniversary of the Northern Virginia Post of SAME. I add my congratulations to the 50-Year Members, Life Members, Fellows, and Past Post Presidents who have been recognized today.

Returning to Fort Belvoir brings back many fond memories from visiting here as a cadet when the Engineer School did its best to convince all of my class to go Engineers when they graduated – an effort all of the branch schools made in selling their branch. I recall when at Fort Sill a highlight was to be the live firing of an Honest John rocket that did not ignite – Artillery probably lost a few files that day. Of course we all couldn’t go engineers, but this lucky guy made it! The basic course was followed a number of years later when I was as the Director of Combat Developments for the School. Also over the years Fort Belvoir hosted the annual Engineer Dinner and Ball – then two separate events.

The last time I had the pleasure of addressing this Post was in 1991 – 22 years ago.

I chose to title my remarks “Engineering a Sustainable Future” because I firmly believe that if we, those who follow us professionally and our children are to realize such a future, it will be primarily because it was created by engineers – engineers of all disciplines working in concert with others including human and social scientists and economists.

A member of the Dawson & Associates since 2012, Lt. Gen. (Ret) Henry Hatch was Commanding General and Chief Engineer of the U.S. Army Corps of Engineers from 1988 to 1992.

When I looked at SAME's web site and searched the topic of sustainability I found 39 entries referring to a long list of presentations, webinars, forums, and committee and Board of Direction meeting notes. Additionally, SAME's vision includes:

- PUBLIC SERVICE -- Recognize the critical contribution that public servants play in supporting the economic and environmental needs of the nation.
- ENVIRONMENTAL STEWARDSHIP – Preserve, protect, conserve and restore our national resources through sustainable practices.
- Under Goal 2 in the Strategic Plan, EDUCATION AND TRAINING, the first subgoal is to provide educational forums to increase knowledge and understanding of emerging technologies and best practices in planning, architecture, engineering, construction, facility asset management, energy and sustainability.

I offer my humble congratulations to SAME for our abundance of sustainability initiatives! What a delightful context for what I'm going to share with you today.

Sustainability or sustainable development is a topic that continues to stir creative thinking, debate and action here in the United States and throughout the world – a topic that was embraced in the late 80's by many as a key to a secure future, but condemned by others as a no-growth, arrogant conspiracy to promote questionable agendas. The latter would often say to me "sustainability is a mere slogan and will soon fade into oblivion."

To the contrary, that notion has clearly matured from what some believed was a passing buzzword to an enduring and invaluable concept and now – to positive action among professional societies, on campuses, in business and industry and in the public sector at the local, state, federal and international levels.

You might wonder why a soldier became an evangelist for sustainable development. My first involvement with the notion of sustainability was in the late '80's when some of us were exploring appropriate post-Cold-War roles for the Army and its engineers. We believed that the Army's purpose was not solely "to fight the nation's wars", but to ensure what I call "enduring peace." That concept included multi-agency ("whole of government" as it would be called today) and international coalition actions to promote the conditions for peace, military deterrence and fighting if necessary, and, equally important, returning to enduring peace (locally, regionally, and globally).

If enduring peace was to be the underlying purpose, sustainable contributions to that peace had to be paramount. We quickly linked security, stability and sustainability as the keys to that enduring peace. Stability in this context is not the status quo, but an environment in which representative forms of government and market economies would grow and flourish.

Before continuing: What is sustainable development? The dictionary definition of sustainability is: *a state which is maintained at a certain level for a long time (indefinitely).* The World Commission on Environment and Development took the lead in outlining a sustainable future, culminating in the 1987 publication titled Our Common Future. This report (often referred to as the Brundtland Report) provided a focused definition for the concept that has endured:

[Sustainable Development]...is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.” In other words, it is “Meeting the needs of the present without compromising the ability of future generations to meet their own needs.

This is a vision, an ethic, not a strategy with supporting tactics, not a set of specific technologies, processes, laws, regulations or standards.

The application of this definition initially focused on environmentally sustainable development. Over the years I and others have been adding other adverbial modifiers to the phrase “sustainable development” to better express the broader context of sustainability. I began with the obvious one in a market economy – economically sustainable. In a socially conscience society, I add socially sustainable.

Today a broadly accepted definition of sustainability refers to the “triple bottom line” – environmentally, economically and socially. In a free democratic society (or even one that isn’t) I add politically. And more recently, I add ethically or culturally as we have become more aware of the religious and ethical underpinnings of so much of human behavior – particularly the extreme. These adverbs are not independent but are clearly interdependent and any successful endeavor must address and strike an appropriate balance among them all.

A major barrier we face in pursuing a sustainable future is the fact that the engineering and scientific professions are highly partitioned -- or fragmented. We are divided into a web of public, private, professional, academic and industry organizations at local, national, regional and international levels. Those divisions promote focus on particular disciplines, services or markets but render us somewhat impotent in influencing external decision makers -- public and private sector -- as well as addressing within our industries and profession, and with other professions, many common issues.

For engineers, there are many challenges that cut across the numerous segments or phases in project or product development, delivery, and operation and the professions or disciplines that provide the education, legal authority, brains, muscles, and money to support that project or product delivery.

These issues include:

1. Training and Education
2. Certification or Licensure
3. Risk Management
4. Liability
5. Partnering and ADR
6. Legislation and Regulation

And I add public awareness, understanding, and recognition of what engineers do and their immense contributions to our security, economy, and quality of life.

But there is a common issue that I believe is the multi-discipline engineering profession's greatest opportunity and challenge -- opportunity for greater public service (and, admittedly, financial reward) and challenge to our traditional education, our methods, our technologies and even our ethics. That issue is the achievement of development that is sustainable. Achievement of that goal will change how the public, our clients, our students, our employees and the youth we seek to attract to our professions and industries perceive us. Our relevancy and reputation will depend largely on our willingness and demonstrated contribution to achieving sustainability.

Achieving sustainable development is not simple. There is no simple blueprint. What works in developed countries may not work for the developing and undeveloped world. The set of feasible options for each country is shaped by its culture, its market mechanisms, environmental resources, population, industrial structure, labor force, infrastructure, geographic conditions and so on. Consider for a moment the complexities of development and reconstruction in the war-ravaged Middle East.

The process for change requires the expertise and responsibility of all disciplines in cooperation at all levels -- global, regional, national and local. While every society, and perhaps every individual, will ultimately become involved, engineers must be agents of change. First, engineers and scientists must join together in multi-disciplinary partnerships. We then must actively engage with all disciplines and publics to start the process of change for a more secure, stable and sustainable world. To achieve this, here are some steps for engineers toward a sustainable future:

1. **Pursue a Broad Continuous Education.**
Engineers and their colleagues should cultivate and continually update their understanding of the environmental, social and economic issues, problems, and risks and potential impacts associated with their work. Those factors are not static hence the need for continued education throughout one's productive life.

2. **Adopt “Ecosystems” Thinking.**
Traditionally, engineers are taught to break down each problem into its simplest form, study each component, and move on to the next in a linear manner. Engineers should, instead, approach sustainable development in a way that imitates the natural process around us, as a multi-dimensional, circular process. We are proud to be problem solvers, but at what level: the building foundation, the entire building system, or meeting a client’s needs, or the community’s and society’s needs – perhaps without the initially assumed built solution?
3. **Seek and Apply Environmental Economic Tools.**
In our market economy, we must demonstrate the economic or business case for sustainable alternatives. That business case may be based on straight forward reduced life cycle costs, and improved marketability to an ever more aware public. Engineers can develop these alternatives and communicate them. The market would be a major contributor if the entire true life cycle costs were accounted for up front -- or at least recognized.
4. **Search for Sustainable Alternatives.**
Engineers should reach behind the stated problem and expected solution to explore and present sustainable alternatives. Those we serve will not automatically specify the best solution, but may be open to a better one if we offer it. How often do we suggest a “nonstructural solution” when arguing for improved infrastructure?
5. **Develop and Apply Technology to Sustainability.**
The engineering and scientific communities should work toward the evolutionary and revolutionary advancements in technology that will yield the fundamental capabilities to achieve sustainable development. The pursuit of a sustainable world depends largely on technology, new materials and their use and reuse.
6. **Develop Multi-Disciplinary Teamwork.**
The knowledge, skills and insights of physical and social scientists must be cooperatively focused on achieving sustainable outcomes.
7. **Listen to Those We Serve.**
Becoming more relevant to society includes listening and responding to our employers, clients and all stakeholders in our enterprise. It means promoting a climate in which cooperation and coalitions replace confrontation.
8. **Continuously Educate Those We Serve.**
Engineers and scientists should become assertive teachers who teach our clients, publics and governments, to make sustainable choices.

Sustainable development should become the basis of the way we do business. Each of us can make a difference – if not on the job which may have a very narrow scope, then at least in our communities that are continually dealing with issues such as smart growth or urban sprawl and meeting infrastructure needs without the public input from engineers as private citizens, professional societies and industry associations.

There have been so many initiatives among professional societies, industry associations, government agencies, and on campuses promoting the concepts of sustainable development that it would be impossible for me to mention even a small fraction of them.

Essentially every engineering professional organization, nationally and internationally, has embraced the concept. Among U.S. professional engineering societies, The American Society of Civil Engineers (ASCE) took the lead over a dozen years ago when it included in the first of its seven fundamental canons “Engineers shall hold paramount the safety, health and welfare of the public and shall strive to comply with the principles of sustainable development in the performance of their professional duties.”

Beyond the professional societies, many public and private organizations are actively engaged. For example, as most of you are aware, The U. S. Green Building Council has a rating tool for the design of sustainable facilities called Leadership in Energy and Environmental Design called LEED. Although far from perfect, improved versions of LEED are increasingly cited by government agencies, municipalities and many others as a standard. Today nearly every issue of Engineering News Record includes something on green or sustainable design and construction.

I’d now like to expand on some of the things ASCE has been doing in the area of sustainability.

First, the current ASCE definition of sustainability and sustainable development:

Sustainability is a set of environmental, economic and social conditions in which all of society has the capacity and opportunity to maintain and improve its quality of life indefinitely without degrading the quantity, quality or the availability of natural, economic and social resources.

Sustainable development is the application of natural, human and economic resources to enhance the safety, welfare and quality of life for all of society without degrading the quality, quantity or availability of natural, economic and social resources.

We address environmental, economic and social as equal considerations in making balanced decisions.

ASCE's other sustainability activities include:

1. Adopting of a Policy recognizing the leadership role of Civil Engineers in sustainable development and their responsibility to provide effective and innovative solutions in addressing the challenges of sustainability. (Policy Statement 418)
2. Adopting a policy on Capacity Building, which promotes the building of indigenous capability in the developing world (Policy Statement 506)?
3. Describing the critical role of engineers in a sustainable world in its report on "The Vision of Civil Engineering in 2025". In that report the global civil engineering profession recognizes:
 - The reality of shrinking resources;
 - The desire for sustainable practices and design;
 - The deficit in infrastructure performance and adequacy to support a desired quality of life and to effectively guide investments to where the greatest need exists and without unacceptable social and environmental impacts;
 - The need for social equity in the consumption of resources.

And,

4. Including as a goal in its Strategic Plan that the Society will, "Facilitate the advancement of technology to enhance quality, knowledge, competitiveness, sustainability, and environmental stewardship."

The U.S. has had a sustainable certification for buildings (the LEED Program), but we did not have a sustainable infrastructure rating system. As part of our Sustainability initiative, we helped establish the Institute for Sustainable Infrastructure (ISI). We co-founded ISI with industry partners, the American Public Works Association and the American Council of Engineering Companies. We are very proud to have been an integral part of the creation of a new sustainable infrastructure rating system known as Envision™.

ISI also provides training on the Envision system and graduates become official verifiers who provide independent, third party project assessment. Project owners will now be able to know the true sustainability of their infrastructure projects through verification using this infrastructure rating system. Download Envision and use it as a reference for designing your own sustainable infrastructure.

In conclusion, engineers are essential to a sustainable future. Without us it simply will not happen. We translate needs, technology, resources and dreams into reality -- enduring reality (for better or worse). But we certainly don't create the "built" environment" alone. We must lead by engaging actively in the political, economic,

technical and social dialogues and decision processes. We must help to set the new direction, not just follow. We must actively influence public and private sector development decisions.

Our children and their children deserve a future of security, stability, sustainability and enduring peace. We cannot risk the consequences of a future that is built on an unsustainable foundation. It's up to we engineers – with other doers in this life -- to insure future generations receive their heritage in a secure, stable and sustainable -- hence peaceful -- world.

Thank you.

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