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It is a particular privilege for me to be with you today, and I look forward to another opportunity to share with the Society some issues that I believe are of our common professional concern. I intend to share with you some of my thoughts about our changing world and the opportunities and responsibilities facing civil engineers as we strive to be creative, in building a better world and building a better America. I will talk about all engineers; not just the Corps, but, of course, that is my primary experience and my primary reference point. So I will include a little bit about what our organization is doing as we look to the future.

I am going to talk about what I respectfully submit to you is the engineering issue for the '90s and beyond - the issue that will challenge our creativity and must be addressed if we are to achieve a better world in the next century.

Engineers should take great pride in the role that we have played in developing our civilization and our nation. It is impossible to even conceive of what the world would be like without what civil engineers have produced and the resulting economic growth and social and economic well-being. I am particularly proud of your Army Corps of Engineers. The Corps is the oldest engineering organization in the nation, one whose history is inextricably tied to the development of our country. We built early forts for defense and roads for commerce. We identified the value of and managed Yosemite National Park and preserved its beauty long before we had a National Park Service. We developed the waterways for navigation. We built levees and dams to protect lives and property from floods and built military bases to defend our country. We built the support facilities for the space program. And in the support of our foreign policy, we have built infrastructure for other nations and, more importantly I believe, we have developed their capabilities in engineering and construction to promote their stability and growth.

When I say we, I include, of course, the private sector as well as the Corps. When I talk about Army engineers - forgive me - but I include you. I talk about the three components of Army engineers, and we have always had the three. Right now, we have about 100,000 engineer soldiers in uniform, two thirds of which are in the reserve components; about 100,000 Army civil servants; and, at any time, about half a million civilians, here and abroad, working for the Army as part of that Army engineer team through the vehicle of the contract. So you are very definitely a part of that team.

All of this development was in response to real and perceived needs and contributed markedly to the health, prosperity and security of our people. For our nation's first 200 years, engineering - civil engineering - and development were essentially synonymous. In the late '60s and '70s, however, our nation recognized that continued development must be tempered by a concern for the environment. We had overloaded ecosystems. Hence, mitigation and environmental compliance became a part of our vocabulary and our professional practice.

Now, today, after a few years of quiescence, I believe, the environment is receiving renewed attention as an area of serious concern, nationally and internationally, and has received renewed emphasis from President Bush. The reason is that research and monitoring around the world have signalled that the exponential increase in human activity on our planet is straining the ability of the life-sustaining processes of the natural world to continue to regenerate. Not only are we learning what is happening, we are learning the consequences of it. We are learning that human activities - for example, the use of chlorofluorocarbons and the destruction of the rain forests - are actually affecting the climate on planet Earth, with implications ranging from energy consumption to agriculture. The President has committed us to the phaseout of those chemicals by the year 2000.

Another example particularly appropriate for us to consider as we meet here in Louisiana is the loss of coastal wetlands or tidal marshes. The United States, as a whole, has lost over half of the wetlands that existed when the Pilgrims landed at Plymouth Rock, and we continue to lose nearly half a million acres a year. Here in this area, in response to needs for flood protection and to develop our vital navigation linkages to world markets, we built levees and deepened the Mississippi. Now, just here in Louisiana, over *35* square miles of marsh are lost every year, the victim of natural processes and changes caused by flood control levees on the rivers that previously replenished the nutrient-rich sediment of the marshes, and other activities. But only in the last few decades have we come to recognize the value of those coastal marshes - the value of those productive ecosystems, such as the role they play not only in the life cycle of shellfish but in flood protection and hurricane protection as well. Waste disposal is another issue. And I could go on.

The bottom line is that our planet has serious environmental problems. At the time of his first budget submission to the Congress and the American people on the ninth of February of this year, President Bush issued a report called "Building a Better America" (we engineers should like that title!). The President didn't say "Preserving" one, he said "Building" a better America. In his speech to the United Nations last month, he again drew attention to the global aspects of these problems. He pointed out that the environment belongs to all of us and noted that the United States has begun to explore ways to work with other nations to make our environment a common cause.

So I believe that the environment is the most significant engineering issue of the next decade and into the next century, not to the exclusion of other issues, but one that presents the greatest challenge and opportunity to civil engineers. It is we engineers who hold most of the keys to the solutions of the world's environmental problems. Without us, they will not be solved.

Note, however, that development will and must continue. The population of the world will double sometime in the next century. To support that population, our economies must grow five to ten times in that same period. Today, there is no responsible consideration given to a no-growth policy. Economic growth is not only inevitable, it is necessary, and - paradoxically, as I will point out in a moment - economic growth is necessary to conserve the Earth's environment as well. So the challenge to all of us is to achieve growth that is environmentally sustainable, that does not exceed the ability of the Earth's natural processes to regenerate themselves: for the rain forest to regenerate, for agricultural land to retain its topsoil, for the air we breathe and the water we drink to be life sustaining - not life threatening.

This notion of sustainable development received public attention in 1987 when the World Commission on Environment and Development called for a new era of economic growth - growth that enhances the resource base, rather than degrading it. The Commission described environmentally sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

So my purpose is to point out that the success of environmentally sustained development depends on creative, environmentally sensitive engineering. It depends on engineering that looks beyond the immediate problem, the immediate gain, and considers the long-term and wide- ranging effects.

Now, some in our profession will question that. They see the role of the engineer as that of essentially a technician who is only concerned with the narrow scope of the immediate and not the second and third order of effects over a long period of time. We engineers must look at our work in a broad social and environmental context as well as in technical and short-term economic terms. The professional engineer must look at the problem in its broadest context and ensure that decision makers are aware of the consequences of a wide variety of possible solutions. The key to that is wise planning at the outset and integration of environmental thinking with engineering thinking. We must widen our vision to see the broader consequences of our actions and to see broader possibilities for innovative solutions.

Now, little I have said to this point is really more than to emphasize the strengthening and broadening of our resolve to be environmentally compliant - something we learned to do in the late '60s. Environmentally sustainable development leaps beyond that to directly anticipating and solving environmental problems.

Environmental engineering, in its broadest definition, must not only mitigate environmental costs of development, but must also directly attack environmental issues as a purpose for the engineering effort itself. The two together can yield development that can be reasonably considered environmentally sustainable.

For our first 200 years, the Corps of Engineers pursued a basic development mission, responding to our nation's needs, domestically and for defense, and in direct response to our Presidents and our Congress. In the late '60s, in response to a changing national will and Congressional mandate, the Corps of Engineers overlaid onto its developmental bent an environmental sensitivity. We hired biologists and ecologists and sought environmentally acceptable solutions and mitigated damages caused by development. We began to change the very character of our organization, yet we remained basically a developmental organization that designed and built environmental value into its projects.

I am now challenging our Corps by saying that simply overlaying an environmental sensitivity and consciousness on our developmental activities is insufficient to meet our nation's and the world's needs. Environmental ethics and values must be more than an overlay. They must be a bone-deep part of our foundation ethic and part of our way of doing business.

To achieve environmentally sustainable development, we must forge partnerships with environmentalists as well as with those who pursue development. We have a common concern with environmentalists: the health of our planet and the health and prosperity of our people. We both must be guided by a common ethic that emphasizes sustainable development, based on sound economic and sound environmental principles.

I believe the concept of environmentally sustainable development can be the unifying ethic that will reconcile these disciplines where they have not been already. Engineers and environmentalists must stop thinking of each other as adversaries and see each other as partners with complementary expertise. Many of contemporary society's environmental problems cannot be adequately addressed without this cooperation. On the other side, I believe, environmentalists have failed miserably in exploiting the nation's engineering talent - while engineers have missed both economic and service opportunities as well.

If engineers accept the ethic of environmentally sustainable development, then, for example, our efforts to restore our aging national infrastructure should not be perceived as an onslaught on the

environment. Indeed, the rehabilitation of infrastructure provides an opportunity to restore the national environment as well as to provide the necessary foundation for our economic health.

In meeting the challenges I have outlined, the Corps has a special role to play. The Corps still thinks of itself- and I believe with some justifiable pride - as a "nation-building" organization. But nation building means something quite different today than it did 150 or even 50 years ago. Nation building no longer automatically means large construction and maintenance operations. Today, environmental issues are some of the world's most critical public works challenges. The Corps is ready to use its engineering capacity - and is being called on today - to help create a future that is economically sound and environmentally sustainable. In short, I see the Corps' future as an environmental engineering organization. . as well as a development organization. . . as well as an agent to protect our nation's security.

The Corps' traditional strengths in project management, planning, design and construction will be essential to meet many environmental challenges. It is our hope that in the future environmentally focused organizations will work with us and you for engineering and management assistance, just as development organizations traditionally have.

The Corps is re-examining its mission and mustering its energy to enhance environmental quality while contributing to social and economic well-being. We are not seeking to become the nation's environmentalists. Our business is building for peace and public service. We believe that development is absolutely necessary for both, but I am committed that the development in which we are engaged be environmentally sustainable.

Environmentally sustainable development is the key, and your civil engineering skill is essential.

There are many opportunities. I think "opportunity" is the operative word. Many of you are now experiencing the economic opportunities in at least some narrower aspects of what we now call environmental engineering. But I believe we have a broader opportunity to reestablish or regain some relevancy in our society that, at times, we seem to have lost. It is an opportunity to excite our society in our profession, to increase the interest among our young in engineering because they sense we are directly relevant to the problems they believe our nation and the world faces. Accordingly, it is an opportunity to increase the numbers of graduate engineers who will strengthen our nation in international peacetime competition.

In summary, now is the time to use our engineering capacity to advance environmental goals.

Now is the time to consciously choose and create our future.

For today, we recognize that sustaining the environment is a necessary part of building this nation … and every nation on this planet.