BY WINSTON HUFF, CPD, LEED AP

The Future of Plumbing Engineers

"Let's get this project started."

An architect begins a typical kickoff meeting, and the design of a new building has begun. In the meeting are the architect and owner and structural, civil, electrical, and mechanical engineers. The owner's dream of a new building includes retail space, doctors' offices, a clinical laboratory, and a MRI. The architect explains the complex coordination among life safety, user needs, codes, fire protection, and utility requirements.

Questions arise that could potentially kill the project. Does the existing water service have sufficient quality, pressure, and quantity to meet the demand of this seven-floor building? Is a pump or water treatment required? The civil engineer can help answer some of these questions, but he only works with the system outside the building. The mechanical engineer knows how the plumbing system should work in theory, but he cannot answer all the questions.

The sprinkler system has special needs. Will the building require a water curtain, preaction, or Halon system? Do they even make Halon anymore? Does the laboratory require a special waste system? There also are storm water issues: Will a roof storm water retainage system reduce the need for a storm water retainage system on the site? Can the laboratory share an air compressor with the medical air system required by the MRI?

The meeting soon ends because the plumbing engineer is not at the table. But what is the plumbing engineer's role? When will professional certification be required to design plumbing systems on an equal level as a professional engineer (PE)? What is the future of the plumbing engineer?

PLUMBING ENGINEER TRADITIONS RUN DEEP

As people started living together in large numbers, complex plumbing systems developed. This can be seen in early structures such as the Roman aqueducts. Every plumbing engineer who has witnessed these great structures realizes that ancient engineering disciplines and calculations have been lost. The modern plumbing engineer wonders if these systems could be designed and built with today's technology.

In recent history, with the beginning of the scientific method, plumbing engineering grew again. Calculations developed for ways to transport, clean, and maintain water over long distances and into complex structures. Many of these systems were developed before air-conditioning and electrical power. Over time, electrical systems were developed, creating a new engineering discipline. Mechanical engineering included plumbing in addition to many other systems. However, how long can plumbing systems and mechanical systems remain under the same engineering discipline?

WHAT IS A PLUMBING ENGINEER?

The plumbing engineer is responsible for the design of a wide range of plumbing, process, and power-piped systems that overlap with the mechanical, civil, fire protection, and chemical engineering disciplines. Typically the plumbing engineer prepares the calculations, specifications, and drawings under the license of a mechanical engineer.

The common systems under plumbing engineering include the domestic water, domestic hot water, waste, vent, storm water, and natural gas systems of a facility. Other more technical systems include grease waste, acid waste, and compressed air systems. Plumbing engineers often work on special laboratory and medical gas systems including vacuum, nitrogen, nitrous, and carbon dioxide. A growing field in piping hazardous waste systems could contain a cocktail of hazardous chemicals. Fire protection systems that can include water, chemical, and foam systems are designed by plumbing engineers. Landscaping systems that feed water and nutrients to plants in a wide variety of methods are designed by plumbing engineers.

New sustainable systems are now our responsibility, including low-flow plumbing fixtures and water reclamation, water treatment, and waste treatment systems. While responsible for all these systems, the plumbing engineer finds himself in the shadows of other professional engineers who know little about the details and special requirements of plumbing systems.

WHAT IS THE FUTURE OF THE PLUMBING ENGINEER?

The future is very bright. As time goes by these systems will grow in complexity, forcing the engineering industry to accept the plumbing engineering professional on the same level as other professional engineers.

In the last few years a change has occurred in one of the fundamental areas of engineering. The Construction Specifications Institute (CSInet.org) has changed the basic structure of the specifications under which many plumbing engineers work. Plumbing formerly was under Division 15–Mechanical of *MasterFormat*. Many engineering firms intermingled the mechanical and plumbing systems into one mechanical specification division.

The revised version published in 2004 introduced the following plumbing divisions, independent of the mechanical division:

- Division 21–Fire Suppression,
- Division 22–Plumbing,
- Division 33–Utilities, and
- Division 43–Process Gas and Liquid Handling, Purification and Storage Equipment.

While this is a subtle change, it separates plumbing engineering from the other professions as the previous *MasterFormat* did not.

PLUMBING ENGINEERING CERTIFICATION

It has been a rough few years for many in the engineering profession. After Sept. 11, 2001, many in the plumbing engineering community paused and reflected on our industry. Projects were postponed or canceled, and the number of professionals entering the engineering disciplines slowed.

The dust now has settled, and as we look around we see that we have survived. Now is the time to look at the Certified in Plumbing Design (CPD) program. State and local professional engineer license departments are renewing interest in a plumbing engineer certification program. It is unrealistic to think that a single professional can oversee and be responsible for both the plumbing and mechanical systems.

It is time for plumbing engineering and design professionals to promote the CPD program.

FUTURE TRENDS IN PLUMBING ENGINEERING

A trend to look at buildings as whole buildings and communities as whole communities applies to plumbing systems as well. Storm water systems are a good example. There was a time when rainwater fell on a building, and the plumbing engineer designed a system to move the water out of the building to where it became the responsibility of the civil engineer.

The civil engineer then designed systems to move the water as quickly as possible off the property into the municipal storm water system. The municipal storm water system was designed to move the storm water as quickly as possible away from the community and into a stream or river.

Communities and municipalities are starting to see the problems with this approach. Large tracts of land have become hard surfaces that no longer can absorb rainwater. The result is large-scale flooding after the smallest of storms.

With the whole building/whole community approach, the amount of storm water cannot be reduced in the building's design. However, reusing storm water in the building or on site can reduce flood problems and help reduce the amount of potable water and irrigation water used by a facility. In the end less water is pumped out of natural places for potable water uses, and more storm water is absorbed back into the ground in a process resembling the natural methods of the biosphere.

The trend in plumbing engineering is to return back to the model of the Earth's biosphere, our best example of efficient plumbing systems. Learning from the natural way the biosphere treats waste and cleans water and developing plumbing systems that respect the biosphere are the successful system trends of the future.

The growth of the world's population and demand for increased standard of living will guarantee successful and rewarding vocations to engineers designing sustainable, biosphere-friendly plumbing systems. **PSD**

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