How Accreditation Could Have Prevented an Outbreak of SARS

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It was something as seemingly innocuous as a P-trap — a couple of pieces of pipe purchased at any hardware store for around $50 — but in early 2003 its failure played a deadly role in a near pandemic that infected more than 8,000 people in 37 countries, causing 774 deaths before it was controlled.

The breach of a plumbing system and subsequent spreading of the Severe Acute Respiratory Syndrome (SARS) Coronavirus six years ago provides a detailed allegory on the importance of accreditation as it concerns the plumbing industry and, ultimately, the health of every human living on Earth.

According to the World Heath Organization's April 2004 concluding report, the SARS epidemic began in China's Guangdong Province in November 2002, but remained local until February and March 2003, when infected individuals traveling from Mainland China sparked separate outbreaks in Singapore and Hong Kong. One of the two major incidents in Hong Kong came as a result of the failed P-trap.

A Chinese doctor, visiting his cousin at the Amoy Gardens apartments and unaware he was carrying the SARS Coronavirus, became ill with diarrhea. Unbeknownst to anybody, the P-trap (a common plumbing fitting consisting of a U-bend and a 90-degree elbow) attached to the toilet and leading into the high-rise building's sewerage system had become compromised. Two bolts connecting and sealing the P-trap had rusted and loosened, causing a separation in the pipes that allowed infected sewage water to seep out of the plumbing system.

As a result of this structural failure, an open pathway was created. This was compounded by the presence of a large exhaust fan placed in the same bathroom, which created a direct pathway from the sewerage system into the living space. As a consequence, the SARS Coronavirus was sucked out of the plumbing system and into the living space of not only the original apartment, but also to a number of adjacent apartments. There were 321 reported cases of SARS at the Amoy Gardens, 42 resulting in death.

Although it is not certain that this SARS outbreak could have been prevented, it is reasonable to conclude it might have been if a series of applicable accreditations were met during a long progression of steps leading up to the catastrophic failure.

The following are eight different safeguards that might have been ensured through proper accreditation:

1. DESIGN: It all begins with the design of the product itself. An engineer, trained and certified by an accredited educational institution/organization, will know which materials are viable options for the production of a P-trap and call for these specifications in his design.

2. PRODUCTION: Next is the manufacturer. If there is an ISO 9001 Quality Management System in place, audited regularly by a third-party body accredited to certify such systems, the manufacturer is likely to recognize a deficient material being used in a product and make the correction before the faulty product can go to market — in this case, the bolts that rusted and compromised the integrity of the sewerage system.

3. STANDARDS TESTING: Similarly, this defect could have been caught during testing at a properly accredited product-testing laboratory. Standards dictate the allowable materials, design, function, etc. for a given product. If the product standard calls for galvanized bolts, for instance, any product not using the specified bolts would not pass testing to show compliance with the applicable standard(s).

4. PRODUCT CERTIFICATION: Without meeting the required standards, the product cannot be certified and listed by a third-party certification body suitably accredited to grant Marks of Conformity to products. Authorities Having Jurisdiction (a city's building inspector for instance) look for these Marks of Conformity when determining which plumbing products they will allow for installation within their municipality.

5. CODES: The adoption of building codes, such as the American National Standard designated Uniform Plumbing Code and Uniform Mechanical Code, within a municipality goes a long way toward ensuring the safety of a city's residents from system failures such as the one at the Amoy Gardens. The Uniform Codes, developed through an ANSI-accredited consensus process, draw upon industry expertise and all applicable standards to determine the safest means toward the installation and maintenance of plumbing and mechanical systems.

6. INSTALLATION: A workforce certified as highly trained and educated to the existing code language by an organization accredited to perform this training is essential to the proper installation of a plumbing system. If the plumber who installed the P-trap at the Amoy Gardens was properly certified to perform this work by an accredited education body, it is quite possible he would have recognized the potential for failure in this particular product.

7. INSPECTION: In the same vain, a similarly certified plumbing and mechanical inspector might have red tagged this installation during his code-

dictated on-site inspection of the installer's work. This red tag could have required the installer to remove the faulty P-trap and replace it with the proper part before the plumbing system could be approved as being compliant.

8. MAINTENANCE: Over the life of a plumbing system, periodic maintenance is required. The chances of the system continuing to function in the safest manner possible grow exponentially when the person performing that maintenance is certified to the highest standards by an accredited training organization. During routine maintenance of the building's plumbing system, the failed P-trap might have been discovered and repaired before the SARS Coronavirus was introduced to it.

When all of these steps work in concert with each other, each the direct product of accreditation, it drastically reduces the likelihood of the type of failure that facilitated the spread of the SARS Coronavirus in Hong Kong. In developing nations, many of these steps are often bypassed, with increased health risks illustrated by statistics; for example as many as 7.5 percent of deaths in India are attributed to water and sanitation related causes, according to statistics from the World Health Organization — a staggering figure in a nation of 1.1 billion people.

Developed nations are not immune from these problems, of course, particularly with more and more products being imported from developing regions. IAPMO R&T, for instance, the largest certifier of plumbing products in the world, sees a significant amount of product coming into North America from China and surrounding Asia Pacific nations that does not always meet the highest standards for use within the United States or Canada. As a third party certification agency accredited by ANSI and the Standards Council of Canada (SCC), IAPMO R&T not only weeds out the inferior products by certifying only those that meet the required standards, but also helps educate the manufacturers on the right way of doing things.

IAPMO R&T Lab operates two product-testing facilities, one at world headquarters in Ontario, Calif., and a newly opened laboratory in Guangzhou, China. IAPMO R&T Lab provides independent testing, research and technical services to the plumbing and mechanical industries. The ISO/IEC 17025 accredited lab in Ontario is capable of testing to more than 400 standards, as well as providing special services including consultation, training, quality assurance, failure analysis and witness/field testing.

"Accreditation is validation to ourselves and our clients that we do things according to specific policies and procedures," says Ken Wijaya, senior director of IAPMO R&T Lab.

Accreditation impacts nearly every facet of The IAPMO Group's business and is often a defining characteristic, distinguishing a given business unit from its industry peers. From its *Uniform Codes* being designated as American National Standards to the expertise and commitment to proven procedures exemplified by

the numerous accreditations granted to its certification and testing bodies, The IAPMO Group places a great value not only upon the distinction provided by accreditation, but on the ultimate beneficiaries of that distinction.

“More than 80 years ago when The IAPMO Group was formed, the safety of the end user of a plumbing system was the driving force of the business,” said Russ Chaney, IAPMO Group executive director. “Today, the organization has grown to ensure safety through product certification, product testing, code development, ISO registration and continuing education. The IAPMO Group understands that all of these elements play a major role in protecting the end user of a plumbing system.

“What happened at the Amoy Gardens is just one clear example of how the understanding and implementation of accredited programs can have a profound affect on our world. In this case, it may well have been able to prevent the spread of a deadly coronavirus and save lives.”