

THE ROLE OF THE PLUMBING INDUSTRY IN GLOBAL HEALTH

Robert D BURGON

**Deputy Chairman,
World Plumbing Council,
2 Walker Street,
Edinburgh,
EH3 7LB
Scotland**

Email: robert.burgon@snipef.org

Abstract

In this paper, Robert Burgon, Deputy Chairman of the World Plumbing Council (WPC), outlines the mission and objectives of that organisation (established in 1990) and stresses the importance of plumbing as a contributor to global health, citing historic and recent examples of the way in which plumbing and public health are linked. It suggests that the connection between plumbing and health has been largely forgotten in many developed countries. The paper refers to the joint publication by WPC and the World Health Organisation (WHO) of "Health Aspects of Plumbing" which aims to assist developing countries tackle the issues relating to the improvement of health through water supply and sanitation. The paper refers to the importance of both industry and public education and refers to a number of initiatives being carried out to share good practice in the field of plumbing training. These include the WPC's annual Lecturers'/Trainers' Scholarship. Reference is also made to the need for appropriate registration and licensing arrangements. The paper concludes with some suggestions for future action.

Background to the World Plumbing Council

At a highly successful World Plumbing Conference in London in 1990, it was agreed that an organisation to be known as the World Plumbing Council (WPC) should be established to provide a mechanism for plumbing industry organisations and businesses to meet together to discuss issues of common interest and to provide a mechanism to hold further World Plumbing Conferences at least every three years.

There are two categories of membership of the World Plumbing Council:

Full membership is open to bona fide plumbing organisations such as professional bodies, trade associations, trade unions and research establishments with a recognised legal status and constitution. Full members have voting rights in Council meetings except on three issues- making changes to the Bylaws, deciding the venue for triennial conferences and election of the Executive Board. In these three areas, decisions are taken on the basis of one vote per country.

There are currently 36 Full Members of the WPC.

Affiliate membership is open to organisations including manufacturers, distributors and other bodies with an interest in the plumbing industry which wish to be associated with the WPC. Affiliate members have no vote at meetings of the Council but are listed on the World Plumbing Council website.

There are currently 80 Affiliate Members of the WPC.

WPC members are currently based in 22 countries and 6 continents and the WPC continues to work to increase the global coverage of the organisation.

The WPC **Executive Board** is elected for terms of 3 years and the current post-holders (2005-2008) are as follows:

Chairman	George Bliss III	USA
Deputy Chairman	Robert D Burgon	Scotland
Secretary	Andy Watts, MBE	England
Treasurer	Hans Tiedemann	Canada
Directors	Henry Hung	China
	Sudhakaran Nair	India
	Steve Movley	Australia

WPC is registered in Geneva, Switzerland.

Mission

The Mission of the World Plumbing Council is:

“to unite the world plumbing industry to safeguard and protect the environment and the health of nations, for the benefit of all”.

Objectives

The objectives of the WPC are:

- *To develop and promote the image and standards of the plumbing industry worldwide;*
- *To encourage and facilitate the exchange of information, ideas and technology between plumbing industry organisations and individuals worldwide;*
- *To promote and assist in plumbing industry education and training, recognising the need for appropriate standards and their international recognition;*
- *To create an awareness of the plumbing industry’s role in protecting the environment by providing safe fresh water and sanitation through proper management, care, reuse and conservation of natural resources;*
- *To provide and share information regarding research projects and technology that may be applicable to the plumbing industry and the people they serve;*
- *To meet at a World Plumbing Conference at least every three years, and to assure continued growth and member affiliations.*

World Plumbing Conferences

Since the Conference in London in 1990, the following triennial World Plumbing Conferences have taken place/will take place:

1993	Hong Kong
1996	Chicago, USA
1999	Sun City, South Africa
2002	Berlin, Germany
2005	Auckland, New Zealand
2008	Calgary, Canada
2011	Edinburgh, Scotland

WPC meetings

In addition to the triennial conferences, since 1996 WPC has organised two meetings each year and the intention has been to arrange these meetings in as wide as possible a range of venues to allow active participation from plumbing industry representatives from those countries. To date, meetings have taken place in:

USA and Canada (various destinations)
Europe (various destinations)
South Africa and Botswana
Singapore
China,
Australia and New Zealand
India.

The 2007 annual meeting is to take place in Tokyo, Japan in November 2007.

Plumbing and Global Health

Plumbing improved health in the 19th century

Although the plumbing industry has a history spanning more than 2000 years, it was only about 150 years ago that significant breakthroughs occurred which proved, beyond all doubt, that it was an industry which made a major contribution to public health.

Many people are unaware of the significant difference which good plumbing made to public health in the 19th century in what are now seen as developed nations. In the middle of the 19th century, Britain's increasing population was forced to live "a life of misery in unsanitary, over-crowded dwellings. Cholera and typhoid wreaked havoc among communities throughout the land with the result that improvements in public health became the nation's number one priority. Desperate situations bring forth heroes and they duly emerged. Edwin Chadwick and Dr John Snow were two notable advocates of proper sanitation and water supply systems. Chadwick argued the case for public health legislation that would remove open sewers and prevent pollution of ground water. Snow identified contaminated water supplies as the carrier for typhoid and cholera." (Ref.1) In his paper "Plumbing- The Public Health Service" (2006) Geoffrey J W Marsh MBE, the first Chairman of the World Plumbing Council, suggested that these events prompted the development of plumbing as a professional occupation to protect public health.

What a difference a century makes

Over the course of the 20th century, it is generally believed that plumbing's link with public health became forgotten, at least in the developed nations of the

world. People took the provision of clean water and effective sanitation for granted and paid little attention to the mechanics of how these functions were achieved. It was only when things went wrong that the plumber was called in and then, the services provided by the industry were largely seen as nuisance purchases. It could be argued that the industry itself has to take the blame for this loss of recognition as it effectively did too good a job in installing and maintaining effective and, above all, safe, water and sanitation systems. If asked today, I imagine that the majority of people living in developed countries would have little awareness that good plumbing and good health are closely related.

One way to raise awareness of the public health role of plumbing would be for governments to ensure that the department effectively responsible for or the sponsor of the industry is that which deals with health. In reality, this happens very rarely although this has been the situation in New Zealand for many years. In my view, it is logical that an industry which can contribute so much to or indeed detract from good health should be seen as part of the responsibility of Departments of Health. While it may be unrealistic to expect this to happen in countries with long histories of plumbing coming under the scope of a department which also looks after the wider construction industry or the environment, this goal might not be so difficult to achieve in developing nations with little similar history.

The SARS epidemic in 2003

One event in recent years which serves as an important reminder of the link between plumbing and health was the spread of severe acute respiratory syndrome (SARS) in 2003 as the following case study illustrates:

“Amoy Gardens is a private residential estate providing living space to approximately 20,000 Hong Kong residents. Around March 20, 2003, an unusual cluster of SARS cases was discovered in Block E of the estate with apartment units 7 and 8 most unusually affected. The initial epidemiological investigation and the unusual high number of cases affecting these two units prompted the hypothesis that environmental factors may have been involved in the transmission of the infectious agent.

The areas of investigation centred on the plumbing and ventilation systems. There was a potential of plumbing and ventilation system interaction that could have promoted the transmission of an infectious agent. To prevent a free flow from the plumbing system to the indoor environment, water traps are installed to ensure waste containment. Amoy Gardens has all the necessary plumbing features for such containment. The containment would be maintained, provided that the plumbing system is operated as per design intent, with all traps sealed either by a water seal or by a solid, gas tight plug. However, if the traps were left without water and without a plug, this would establish an open path for waste, in the form of sewer gas and aerosol/droplets, to enter the occupancies. A strong vertical distribution of infectious material was obvious in unit 7 and particularly in unit 8 apartments

leading to the hypothesis that the unprotected occupants could have been infected by contaminated droplets drawn from a waste pipe previously used by an ill resident in a living unit above or below, who was shedding infectious material. A transfer of particles from the water pipe system to the occupancies was tested and proven possible. The floor drain traps in many apartments seemed to have not been primed on a regular basis and thus had lost their sealing function. Thus aerosol and droplets generated within the plumbing system had access to the bathroom through the unsealed floor drains. The inside apartment testing revealed that the bathroom fan created a vacuum inside the bathroom when the door and window were closed. This is most likely the case if the occupant uses the toilet or takes a shower. Thus infection material could have been sucked into the bathroom from the waste stack system and exposed the occupant.” (Ref.2)

Commenting on the issue in 2003, the World Health Organisation (WHO) concluded that inadequate plumbing may have contributed to the spread of SARS. These events are surely a warning that we take plumbing for granted at our peril.

The situation in developing nations

It is widely recognised that water and sanitation issues account for a large percentage of health issues in developing nations today.

The United Nations declared 2005-2015 as the International Decade for Action “Water for Life” drawing the attention of the world to water-related issues. It is believed that “preventable diseases related to water and sanitation claim the lives of almost 3.1 million people a year, most of them children less than five years old. Of these about 1.6 million people die from diarrhoeal disease associated with lack of safe drinking-water and adequate sanitation. In further support of the enormity of the problem, we understand that “in 2002, 1.1 billion people (two thirds of them in Asia, and 42% of the population in sub-Saharan Africa) lacked access to improved water sources. At least 2.6 billion people lacked access to improved sanitation; over half of them live in China and India. Only 31% of rural inhabitants in developing countries have access to improved sanitation, versus 73% of urban dwellers”.

(Ref. 3)

Although it is not claimed that the plumbing industry will alone resolve these serious issues, it has to be recognised that the industry will play a significant role in installing and maintaining the systems which are so badly needed to improve these situations.

Health Aspects of Plumbing

In the late 1990s, the World Plumbing Council commenced a dialogue with the World Health Organisation and the WPC offered to undertake a rewrite of

the WHO's publication, "Guidance on the Health Aspects of Plumbing" which was out of print.

Over a period of some 9 years, the document was revised with input from plumbing industry professionals in many countries. Editing was undertaken by Professor Charles Watson (Executive Dean of Health Sciences at Curtin University of Technology, Perth, Western Australia) and additional input was provided by Professor H. Feroz Ahmed of Bangladesh University of Engineering and Technology and Sergio Mendonca and R. Rojas Vargas of the Pan American Center for Sanitary Engineering and Environmental Sciences (CEPIS/PAHO/WHO). Under the strategic direction of WHO officials, Jamie Bartram and Jose Hueb, the revised "Health Aspects of Plumbing" was formally launched on World Water Day, 22 March 2006.

"Health Aspects of Plumbing" (HAP) aims to assist developing nations to realise health improvements which effective plumbing can provide and it contains chapters on the following headings:

- Basic principles of safe drinking-water supply
- Hazards in drinking water-supply and waste management
- Water safety plans in the operation and management of water systems
- The role of plumbers in risk assessment and risk management
- Principles of effective plumbing systems
- Codes of practice for plumbing
- Implementation of the plumbing code of practice
- Training and registration of plumbers
- Standards for materials used in plumbing systems
- Design of plumbing systems
- Design of plumbing systems for single dwellings
- Design of plumbing systems for multiple dwellings
- Design of plumbing systems for multi-storey dwellings
- Design of plumbing systems for industrial and temporary applications
- Storm water drainage
- Intermediate and communal models for drinking-water supply and sanitation
- Conservation of water in public and domestic supply systems
- Wastewater use.

In launching the document, WHO and WPC note that "sustainable health, especially for children, is not possible without access to safe drinking-water and basic sanitation facilities. This publication is dedicated to assisting in achieving the best possible plumbing levels to ensure the highest health benefits from the use of sound plumbing practices... The World Health Organisation and the World Plumbing Council will feel rewarded if this document achieves its ultimate aim: to play a strategic role in facilitating the adoption of good plumbing practices in developing countries to ensure the health gains and well-being expected from such systems". (Ref. 4)

Although the clear emphasis of HAP is on developing countries, it has also proven to be a useful tool in reminding politicians and other decision-makers in developed countries that the plumbing industry has an important role to play in the maintenance of public health.

The Role of Education and Training

Most developed nations have long established formal systems for the education and training of plumbers. These often include formal apprenticeships of around 4 years' duration involving comprehensive programmes of off- the-job and on-the-job learning leading to the achievement of nationally recognised plumbing qualifications. Post-qualification there are often regular updating training requirements and systems of Continuing Professional Development.

In some countries (such as the USA, Australia and New Zealand but notably not the UK), practising in the plumbing industry is regulated by law at either state or national level with various systems of licensing and registration.

In spite of this, there have been attempts in recent years to introduce short courses which purport to provide the new recruit with all the skills he or she requires to become a plumber. In the UK, for example, prompted in part by a recent shortage of appropriately qualified plumbing labour, there is currently a plethora of short courses (usually costing significant amounts of money). The shortest of these is 4 weeks!

Although it has to be accepted that technology, such as the use of plastic pipes and fittings, has to some extent reduced the skill requirements of the plumber, many plumbing industry organisations believe that the comprehensive set of skills required by today's plumbing professional (and more importantly the knowledge and understanding which underpins those practical skills) cannot be achieved in a few weeks or months. To some extent, politicians have contributed to these misconceptions about the plumbing industry.

If it is accepted that the plumber is a health professional, then a comparison can be drawn with the education and training requirements of other health professionals. Few would claim that a doctor or nurse can acquire all of their necessary skills and knowledge in a few weeks. Nor is that the case for the plumbing health professional.

While it is accepted that the long traditions of formal apprenticeship training used in developed countries have served the needs of these countries well, it is unrealistic to expect that developing nations with little or no formal approach to plumbing training will be able to move immediately to adopt the type of schemes used elsewhere. "Health Aspects of Plumbing" provides some guidelines on the development of training programmes. It suggests that where formal education systems in such countries might offer limited opportunities for individuals to train to the level known as "Master Plumber" in some countries, "it is fundamental that the water authorities themselves make an

effort to support the establishment of schools for plumbers conducive to the formation of this type of professional”. It also recommends that the first challenge “ in setting up a new formal training programme in a city or country where no such programme has existed is the recruitment of qualified and experienced individuals to help design and establish the training and certification programmes...The first training programmes can be set up on a small scale, and these pilot programmes can later be expanded to meet the needs of the region”. (Ref.5)

In the fastest growing economies of the world such as India and China, there is a concerning lack of formal plumbing industry training with a greater reliance on plumbing work being carried out by relatively unskilled workers under closer scrutiny by qualified engineers than is usually the case in developed countries. There are, however, encouraging signs that the plumbing industry in such countries wishes to develop an appropriate training infrastructure. For example, the Indian Plumbing Association (IPA) recently launched an initiative known as the Indian Institute of Plumbing (IIP). In December 2006, IPA/IIP announced a partnership arrangement with the College of Engineering, Pune (CoEP) for the establishment of the first Plumbing Laboratory in that country. CoEP offered around 2000sqft of constructed area for the establishment of the Plumbing Laboratory, a classroom and a roster gallery. In the same Indian state, the Pune Construction Engineering Research Foundation (PCERF) is delivering plumbing education to young, generally illiterate, people from rural backgrounds. Full time residential courses lasting one month are enabling these young people to learn basic plumbing skills leading to the issue of a certificate of “Apprentice Plumber cum Plumbing Helper”. While such courses are limited in the extent of the skills which they can impart, they must be seen as an important step in the process of developing formal plumbing training programmes in India.

Licensing and registration

Training programmes often prepare qualified individuals to meet local licensing, registration or certification requirements. Although licensing and registration is not applied in all developed countries, it is recommended as a means of ensuring that plumbing work is carried out professionally and in accordance with local legislative requirements. The appropriate licensing body can suspend or withdraw an individual’s licence to practice which acts as an important incentive for plumbers to do work in a competent and professional manner. It is suggested in “Health Aspects of Plumbing” that lack of regulation “may contribute substantively to poor plumbing, especially in developing countries”. (Ref.6) The resulting inference is that lack of regulation may mean that the real health benefits which plumbing can provide may not be experienced.

Educating society

If we are to see the real benefits of the link between good plumbing and good health across the world, then there is a need to ensure that consumers of

plumbing (who are virtually every householder and everyone responsible for any type of building) are fully aware of the link.

As previously suggested, following high awareness in the late 19th century, it seems that people in developed nations have subsequently either forgotten about or never really been aware of the public health role of the plumbing industry.

The UK is one such nation and this led the British Plumbing Employers' Council (Training) Ltd (a plumbing industry training charity) to publish a series of "Big Books" for use with primary school children (age 5-10). The first of these (aimed at 5-8 year old children) told the story of the Peter the Plumber who came to the rescue when a family experienced a flood caused by a failed do-it-yourself attempt to fix a dripping tap. This book, which was 1 meter in width (and therefore a truly "Big" Book), was used by teachers during what is known as the weekly literacy hour. Feedback was positive and investigations are being undertaken into ways of modernising the approach using interactive technology. While some people in the UK interpreted this project as a way of encouraging very young people to think about a later career in plumbing, the real aim was to encourage young people to grow up with a clear understanding that plumbing is important and should be carried out by those professionally qualified.

The role of the WPC in education and training

The World Plumbing Council has a role to play in the propagation of good practice in the field of education and training. It is in discussion with the World Health Organisation about a number of future projects, one of which would involve the creation of a guide to good practice in plumbing training which could be accessed by countries where the base line is currently very low.

Through exchanging information at meetings, and the involvement of overseas experts in education and training at conferences and other events, there are already encouraging signs of these exchanges of information having a positive effect.

The WPC Lecturers'/Trainers' Scholarship

In 2003 the WPC launched an annual scholarship which allows the successful applicant (who has to be involved in plumbing industry education and training) to visit another country to learn something about that country's approach to the subject with a view to instigating some improvements in the system in the candidate's home country.

The Scholarship, which in 2007 has been increased to US\$10,000 in value, has already been awarded 4 times with an interesting range of candidates and visits.

In 2003, the first winner, John Smartt, from Dublin, Ireland elected to visit the USA where he toured a number of the excellent training centres operated by the trade union, the United Association. The 2004 winner, Arnold Iru from the Solomon Islands visited Australia where plumbing industry training is considerably further advanced than in his own country. The third winner, in 2005, Phil Campbell, an instructor from Las Vegas, Nevada, USA, visited the United Kingdom where he saw at first hand the Modern Apprenticeship system used there. The Scholarship winner in 2006, Geoff Moore of New South Wales, Australia, has chosen to visit Denmark later this year. The 2007 winner will be selected after the closing date for applications (30 June 2007).

Although it still a relatively new initiative, the WPC feels that this project is already proving to be of real benefit in sharing plumbing industry training practice and it is hoped that as the years go on, there will be opportunities for more plumbing teachers, especially from developing countries to gain the insight which this prize permits.

Conclusion and future actions

It is believed that education and training is likely to remain as a key objective of the WPC. The organisation was granted Non-Governmental Organisation by the World Health Organisation in early 2007 and this will almost inevitably lead to further initiatives in the field of education and training, both within the industry and with the people who are the beneficiaries of the plumber's skills.

WPC continues to work to expand its membership with new organisations and new countries being added on a regular basis. It recognises that it has some way to go before the term "World" Plumbing Council will really mean what it says.

In an early part of this paper it was suggested that people living in the world's developed nations in the late 19th century possibly understood rather better the truth that good plumbing is a significant contributor to public health. Our aspirations in the early years of the 21st century must be to remedy the failures of subsequent generations and to recreate a situation, across the world, where plumbing is seen to play a major public health role.

In pursuit of this goal, I suggest the following actions:

- Water supply, health and plumbing officials in every country should establish a formal dialogue to find ways of cooperating to promote the public health role of plumbing.
- Discussions should take place with governments to treat plumbing as part of the wider health remit of the country in question.
- "Health Aspects of Plumbing" should be promoted on a wider basis.
- The World Plumbing Council should explore further ways of working with organisations such as the World Health Organisation to enable good practice in areas of education, training, licensing and registration to be shared with particular emphasis on the creation of appropriate training programmes in countries where none currently exist.

- Plumbing and water industry organisations not already involved in WPC activities should be encouraged to join and to play an active role.
- Educational authorities should be encouraged to include references to the link between plumbing and public health in all school curricula.

References

1. "Plumbing- The Public Health Service" by Geoffrey J W Marsh, MBE, IEng, FCGI, FRSH, FIPHE, RP presented as the Worshipful Company of Plumbers' 22nd Annual Lecture 2006 at the Royal College of Physicians, London on 7 February 2006.
2. "Health Aspects of Plumbing" published jointly by the World Plumbing Council and the World Health Organisation (2006) pages 3-4. This publication can be purchased from WPC or WHO and can also be downloaded from the following website: http://www.who.int/water_sanitation_health/publications/plumbinghealthsp/en/index.html.
3. "Health Aspects of Plumbing" page vii
4. "Health Aspects of Plumbing" page viii
5. "Health Aspects of Plumbing" page 45
6. "Health Aspects of Plumbing" page 45