Contribution: Congratulations on the 90th Anniversary Special Issue of Valqua's Establishment

Let me express my sincere congratulations on the 90th anniversary special issue. I have enjoyed reading this journal since 1993 when the journal's name was different from the current Valqua Technology News (VTN). At that time, I met an engineer of Valqua for the first time, when he came to my workplace at University of Yamanashi to learn about the trends of gasket and sealing technologies in Europe and the U.S. I am also honored that VTN has published my articles several times.

At that time, non-asbestos gaskets were being developed in the U.S., Canada, the U.K., and France, but fugitive emissions occurred when the working fluid was a gas. Therefore, researchers were requested to urgently do the following: introduce new gasket factors, collect data, and, using the gasket factors and collected data, establish methods for designing bolted flange connections which met the standard leakage rate.

From 1989, I made presentations on my paper at the Pressure Vessels & Piping (PVP) Conference of the American Society of Mechanical Engineers (ASME) every year. I also participated in the Bolted Flange Connection Committee (BFC) of the Pressure Vessel Research Council. So, by chance, I grasped the global trends and direction of research. The chairperson of BFC at that time was Dr. K. H. Hsu, and I had kept a summary of his resume (on a slide), so I gave a copy to the engineer. After exchanging information with the engineer several times, I asked Mr. Jim Payne, a central figure in BFC's research of bolted flange connection design, about the employee's questions while at the PVP Conference in 1994. He gave me his answers which I simply conveyed to the engineer.

Before asbestos regulations were introduced in 2008, asbestos gaskets had been the most widely-used gaskets in Japan. Although I don't precisely remember the R&D situation for non-asbestos gaskets at that time, Japan was probably isolated and in a very different environment from that in Europe and the U.S. However, amid such environment, the staff at Valqua studied new technologies in the U.S. based on the information summary which I had handed to the engineer and they prepared for the development of non-asbestos gaskets in Japan.

Around 1997, I was appointed chairman of the Flange-Gasket Committee of the High Pressure Institute of Japan, so I had more opportunities to learn about research on the sealing performance of gaskets and bolted flange connections. In 1996, 1998, and 2000, engineers of Valqua participated in the PVP Conference and gave presentations on their work. Mr. Payne of the U.S. had high expectations for their presentations on gasket technologies. I also conducted several joint researches with Valqua during my tenure at University of Yamanashi and Hiroshima University.

Valqua also received the attention of researchers from a major US petroleum company when Valqua more recently presented papers at the PVP Conference related to our joint research on the analysis of the mechanical behavior and sealing performance evaluation of bolted flange connections with PTFE gaskets, as well as the stress analysis and sealing performance evaluation of bolted flange connections with larger nominal diameter.

The major research trends in Europe and the U.S. at present appear to be as follows: to develop techniques for detecting fugitive emission amounts at levels ranging from 10^{-7} to 10^{-9} Pa m^3/s and, due to environmental problems, to establish methods for the design and construction of bolted flange connections. In addition, research and technological development of not only gaskets but also overall bolted flange connections for establishing the following methods are required: a method to design bolted flange connections and to develop gaskets for high-temperature environments when a combined external load is applied; an efficient and reliable multiple-bolt-tightening method; and a method for preventive design and assembly for bolted flange connections with larger nominal diameter. That is, the design and assembly of bolted flange connections including a more reliable bolt tightening method than the standard leakage rate is required.

I believe that Valqua will continue to lead the world in the development and expansion of sealing technologies.

Professor Emeritus at the University of Hiroshima Toshiyuki Sawa