



China's Relationship with IMWA

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China is one of the world's largest mining economies and the number, scale, and difficulty of China's mine water problems are unique. China has more than 60,000 mining engineers, geologists, mine designers, researchers, and university faculty engaged in mine water prevention and resource utilization in China, making it an important part of the international mine water field.

From the early 1980s, China has participated in some of the academic activities and international exchanges of the International Mine Water Association (IMWA). Since 2008, we have continuously sent people to participate in IMWA meetings, and an application for hosting IMWA meeting in China was submitted in 2009. Quite a few of China's mine water experts have participated in the last few IMWA Congresses and Symposia, in Chile, Germany, Finland, South Africa, and Russia, although delays in visa processing unfortunately limited our participation in the 2019 Russian meeting. IMWA attaches great importance to the work of mine water in China and its leaders have visited China many times.

In 2014, the China University of Mining and Technology successfully hosted the 12th IMWA Congress with the theme of an "Interdisciplinary Response to Mine Water Challenges." More than 380 experts from more than 30 countries participated in six days of academic discussion. Representatives from China presented a large number of research achievements in the field of mine water during the congress. Academician Qiang Wu organized this congress and was elected to serve as a member of IMWA's Executive Council. During the congress, China submitted an application to establish the China National Committee of IMWA. IMWA officially approved the establishment of the China

National Committee in March 2015, with Academician Qiang Wu serving as its chairperson.

Since then, the China National Committee of IMWA has been actively attracting researchers, faculty, and engineering technicians in the field of mine water in China. It has focused on the hydrogeological conditions of China's mines, the types and characteristics of its mine water disasters, the risk assessment, prediction, detection, and prevention of water disasters, along with issues such as emergency disposal and management information, the resource utilization of mine water, discharge water quality standards, and the ecological and environmental aspects of China's mines. Also, through IMWA's international meetings and its journal, the China National Committee of IMWA has kept in close touch with its international counterparts and has actively participated in international academic exchanges and cooperation.

There are currently 315 members of the China National Committee of IMWA, mainly from universities, research institutes, and very large coal companies. The next goal is to develop more members in large and medium coal companies, and metal and non-metal mining enterprises, which also have very serious mine water problems and a large number of engineering technicians engaged in the field of mine water. It is estimated that the number of members can reach about 500. At the request of the government, the China National Committee of IMWA does not charge individual membership dues.

The central goal of the China National Committee of IMWA is tackling China's mine water problems. The first step involves engineering measures to minimize the supply of various water filling sources to the mine, thereby reducing mine drainage (dewatering). These measures address the problem of water inrush prevention and control for safe mining, while also helping to effectively protect water resources, decrease drainage costs, and reduce the environmental pollution of surface water by mine drainage. These engineering measures specifically include: grout reinforcement of the coal seam floor and aquifer reconstruction technology for a single mining working face; grout reinforcement and reconstruction of aquicludes; blocking partial water flowing

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channels by grouting; using room-and-pillar mining or back-fill mining instead of longwall mining; limiting blasting to restrain the development height of the fracture zone when mining below an aquifer; locally limiting full-height mechanized mining or top-coal caving mining to minimize damage to the roof and floor of a coal mine; establishing areas at the surface to intercept the supply of groundwater in advance of mining; pre-drainage of areas with abundant groundwater; establishing a waterproof gate (wall) and waterproofing coal-rock pillars in the mine according to national technical standards; and diverting surface water away from areas where it would otherwise infiltrate towards the mine.

Although implementing engineering controls can minimize recharge sources to supply the mine, some groundwater will still enter the mine. The second step is to render this water harmless via underground and/or surface water treatment, so that it has an appropriate water quality for those who will use the water. This means that different mines can have different discharge requirements, based on the intended water use.

The third step is resource utilization, which mainly includes using the water for: dust control in the mine, pre-grouting reinforcement of the floor of working face, and surface reclamation and revegetation, but also includes treating it so that it can be used to irrigate nearby fields or for animal or human consumption, depending on the local needs. This not only turns wastewater into a valued resource, but also converts harm into benefits, greatly improving the effective utilization of mine water, and decreasing the discharge of mine water, thereby reducing pollution of surface water and the ecological environment.

In addition, the China National Committee of IMWA is responsible for compiling China's National Technical Standards, such as the "Detailed Rules for the Prevention and Control of Mine Water," "Coal Mine Safety Regulations (the part on Water Prevention and Control)," "Exploration Specification of Hydrogeology and Engineering in Mining Areas," "Code for Design of Water Prevention and Control of Coal Mine," and "Exploration Specification of Hydrogeology and Engineering in Nonferrous Metal Mines."

The China National Committee of IMWA encourages Chinese scholars and experts to apply for international patents, Chinese invention patents, and software copyrights in the field of mine water prevention and resource utilization, and to publish monographs and academic papers in peer reviewed journals, especially *Mine Water and the Environment*. So far, it has obtained 35 international patents, more than 600 Chinese invention patents, and 200 software copyrights, and published more than 160 monographs and 800 academic papers in international journals.

In addition, the China National Committee of IMWA also actively encourages its experts and scholars to join IMWA and to thereby receive its journal, *Mine Water and the Environment*. Due to the large number of papers submitted by Chinese experts and scholars, there are currently five Chinese scholars serving as associate editors of *Mine Water and the Environment*, and another Chinese scholar who serves on this journal's international editorial board and translates the abstracts of all of the papers into Chinese—these translations accompany the on-line versions of all of our published papers. And finally, since the China National Committee of IMWA formed, there have been two special issues of the journal focused exclusively on China's mine water problems.

Although the membership application form on the official website of IMWA has been translated into Chinese, most of the China National Committee members have not yet joined IMWA. This is because the English proficiency of engineers in China's mining enterprises is relatively weak. The China National Committee of IMWA plans to address this issue by strengthening domestic awareness of IMWA's work.

The China National Committee of IMWA has organized and held four National Congresses. In 2017, it established a Professional Committee on Mine Water Prevention and Utilization of Geological Society of China and held a high-level forum of the China National Committee of IMWA in Wuhan, with international participants. Due to COVID-19, the 5th National Congress, originally scheduled to be held in May 2020, was postponed. It will be held in Jinan, Shandong Province in August 2021.