

RUHRVERBAND – SOLUTION FOR REGIONAL WATER MANAGEMENT

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Water Management on the River Ruhr

The Ruhr district is one of the most important densely populated areas of Europe. More than 5 million people live and work here – that is about 6,5 % of the population of the entire Federal Republic of Germany.

This region derived its name from the river, which runs along on its south side – the "Ruhr". Considering its length, runoff and the size of its catchment area, the River Ruhr is a comparatively small river. It is 219 km in length and yields a mean yearly runoff of 76 m³/s at its mouth. So the runoff of the River Ruhr remains clearly under that of the River Rhine at Duisburg whose mean runoff is 2510 m³/s. The Ruhr catchment area covers 4485 km². It is about five times the area of Berlin or about twice the area of the Saarland.

Plants of Ruhrverband



The River Ruhr provides population and industries in the Rhenish-Westphalian industrial district and the Sauerland with drinking and process water. It is due to this highly densely populated industrialised area that water consumption per unit of area is approximately seven times higher than the average consumption in the Federal Republic of Germany. Special measures are therefore necessary in order to guarantee optimum conditions for the supply of drinking water and the disposal of wastewater, on of the most important elements in the everyday life of a large number of people. Also the world of commerce and industry could not function without an efficient and reliable water management.

The supra-regional water management for the River Ruhr is the task of the Ruhrverband. By the construction and operation of reservoirs the Ruhrverband takes care that the River Ruhr has enough water for the supply of millions of people the whole year round. In addition, the construction and operation of wastewater treatment plants improves the quality of the water from the River Ruhr. And this has been the case for more than 80 years.

Reservoirs and Water Quantity Management

In the Ruhr catchment area, which extends from Brilon in the east to Duisburg in the west, the mean annual precipitation varies between 640 mm and 1389 mm (with an average of 1056 mm). After abstraction of the losses due to seepage and evaporation 2.4 billion m³ of water flow from the River Ruhr into the River Rhine in an average year.

On part of the natural input by precipitation is reduced by water abstraction for water supply. Yearly, households and industries get about 600 million m³ of water from the River Ruhr. From this amount, around 300 million m³ of water are lost from the River Ruhr, mainly through the export of drinking water into neighbouring catchment areas.

The water resources of the River Ruhr are not distributed equally over the whole year. Before there were reservoirs, the natural runoff at the mouth of the River Ruhr sank to 4-5 m³/s in extreme dry conditions. The river Ruhr was at this time no more than a brook. In contrast, the maximum flood in winter was quite able to exceed 2000 m³/s.

This enormous range between dry and rainy spells shows how necessary it is to find a balance. And this is the exact task of the Ruhrverband, which operates a system of reservoirs in the Ruhr catchment area. The reservoirs are required on the one hand to keep the runoff in the River Ruhr high enough so that the supply of drinking water is maintained at all times, and on the other hand to keep it low enough so that serious flood damages are avoided.

In dry periods the Ruhrverband discharges the stored water from the reservoirs into the River Ruhr. Thus it prevents water shortage and at the same time improves the water quality of the rivers. With the help of these reservoirs, the Ruhrverband can reduce the height of the floods in the rivers downstream. During rainy periods considerable amounts of water are withheld in the reservoirs and so the most serious flood peaks are prevented.

While the Ruhrverband among other tasks guarantees that the River Ruhr always holds enough water, the numerous waterworks deal with the task of withdrawing, processing and distributing drinking water. The large waterworks in the Ruhr valley take their raw water from the River Ruhr. A few smaller waterworks, situated close to the reservoirs, obtain their water partially straight from the reservoirs.

Currently around 474 million m³ of Water can be stored in the reservoirs in the Ruhr catchment area. Since private consumers and industries are handling the precious water more and more economically, there is enough storage capacity for

the time being to cover the demand and in addition to that, to guarantee the minimum runoff required by law in the River Ruhr, provided that all reservoirs, including the old ones, remain permanently at the Ruhrverband's disposal. Therefore the dam structures are permanently controlled by precision survey and repaired if necessary, so that a future development in the Ruhr district would not be inhibited due to water shortages.

Wastewater, Treatment Plants and Water Quality Management

As its other major task, the Ruhrverband cares for the purity and therefore the quality of the water in the River Ruhr. It is in this area of "Water Quality Management" that the Ruhrverband makes an important contribution to the protection of the environment – and it is successful, since the River Ruhr today is one of the cleanest rivers in comparison with those in industrial regions worldwide. Many pretentious species of fish such as trout and grayling make this their home once more and kingfishers and other protected bird types nest on the river banks.

Water quality management is a constant challenge. Every day the well-treated wastewater of 2.1 million people and industrial firms flows into the River Ruhr. This wastewater, which is collected by the communities and dispatched to the wastewater treatment plants belonging to the Ruhrverband, contains many different impurities, ranging from food remains and faeces to the residuals of the pre-treated industrial wastewater.

This wastewater is polluted to such a degree that it must not flow untreated into the rivers. Therefore the Ruhrverband plans, constructs and operates wastewater treatment plants. The plants are planned in a central office while the construction work and operation is overseen by regional departments. The main advantage in

leaving the responsibility for planning and operation to one enterprise is that gained experience can consequently be used for further development.

One of the goals of the Ruhrverband lies in the development of effective and environmentally friendly solutions in the planning and operation of wastewater treatment plants. For example, by using gases which are produced in the digestion process of sewage sludge, modern wastewater treatment plants can to a large extent cover their own energy demand themselves – this is only one of many examples where environmental protection is evident in the plants of the Ruhrverband.

In addition to this, from 1981 onwards the Ruhrverband has been carrying out stormwater treatment as an associative task. Up to this day there are around 500 plants in operation in the Ruhr catchment area. They collect the stormwater, store it during rainy periods and later feed it into the wastewater treatment plants for purification. The residual pollution from nonpoint sources is further reduced in the course of the river itself and in the impounding lakes in the River Ruhr.

The efficiency of the Ruhrverband's wastewater treatment plants and the quality of the water in the rivers, impounding lakes and reservoirs in the Ruhr river basin are constantly controlled by the chemical-biological laboratory of the Ruhrverband.

Usage of Water Power

A further example of the usage of natural resources in a consistent and environmentally aware way: As far as it is possible, discharged water quantities are used for the generation of electricity in hydro power stations on the reservoirs and impounding lakes. Both the hydro power stations on the reservoirs and the hydro power stations Niederense, Hachen, Bamenohl, Lenhausen and Ahausen are

operated by the Lister- und Lennekraftwerke GmbH (LLK), a 100 % subsidiary company of the Ruhrverband situated in Olpe. About 80000 people in the Olpe-Attendorn area receive the electricity produced – free of carbon dioxide – by LLK.

Legal Form, Structure and Finances of the Ruhrverband

The Ruhrverband is a self-governing, but state-controlled public body. It looks back on more than 80 years of water management practice. Both the former Ruhrverband and Ruhrtalsperrenverein were founded in 1913 by special acts of Prussian legislation. From 1899 to 1913 the Ruhrtalsperrenverein existed as an association under private-law. From 1st of July 1990 the Ruhrverband Act came into effect, unifying both water associations into the Ruhrverband as it stands today.

The Ruhrverband is self-governing, but subject to legal supervision for the state of North Rhine- Westphalia, which is cared for by the Minister of Environmental Protection, State Planning and Agriculture.

Associates of the Ruhrverband are communities and districts, which are situated either wholly or partly in the Ruhr river basin, as well as enterprises of trade and industry which discharge wastewater. Further associates are enterprises, other supporters of public water supply as well as other withdrawers of water and the owners of hydro power stations.

Associates must pay subscription fees to the association, which are needed for the accomplishment of its tasks, duties and commitments and for an orderly economy management in case other income is not sufficient to meet the expenses of the Ruhrverband. The Ruhrverband Act outlines the principles for subscription

charges. The statutes and assessment guidelines of the Ruhrverband detail the exact distribution of subscriptions.

The principle of associations offers several fundamental advantages:

- Self-administration guarantees associate participation in the accomplishment of tasks and in the fixation of guidelines for the distribution of fees. Here in the truest sense of the word, it is in the interest of the associates to apply the principle of causality, the guiding principle in modern environmental law.
- Since the Ruhrverband is responsible for the entire Ruhr catchment area, it can carry out its tasks according to natural conditions, regardless of community boundaries.
- The supra-regional organisation produces cost-saving effects for the Ruhrverband in design, construction and operation of its plants.
- Being a self-administered state-controlled body with sovereignty over subscription fees, the Ruhrverband has a good reputation in taking out credits. It is able to use convenient communal loans and other credits from the state NRW with low-rate interest.

Consulting and Cooperation

Intensified environmental laws place for the time being special demands on communities and industries responsible for the disposal of wastewater. In order to assist them in the solving of their tasks, the Ruhrverband offers its associates both theoretical and practical help in the organisation and operation of local drainage systems. The RWG Ruhr-Wasserwirtschafts-Gesellschaft mbH (Ruhr water

management company) was founded as a 100 % subsidiary of the Ruhrverband so that it could also contribute to private cooperation enterprises.

The Ruhrverband as an Employer and Partner

The Ruhrverband is a supra-regional enterprise of water management. Its main services consist of guaranteeing suitable water quality for drinking water supply and a sufficient amount of water at all times. To cope with the manifold tasks the Ruhrverband presently employs around 1200 employees. They work at the Ruhrverband, for example, as engineers, chemists, biologists, specialists in wastewater disposal, lawyers, foresters, businessmen, electricians, EDP specialists, administration experts, plant operators, laboratory assistants, mechanics and technicians for people and the environment.

In addition, employees of the Ruhrverband are represented nationally and internationally in professional associations of water resources management and are very active there in many working committees.