Ruhrverband
KNOW-HOW, VALUES, WATER

Water management on the Ruhr – the historical collection

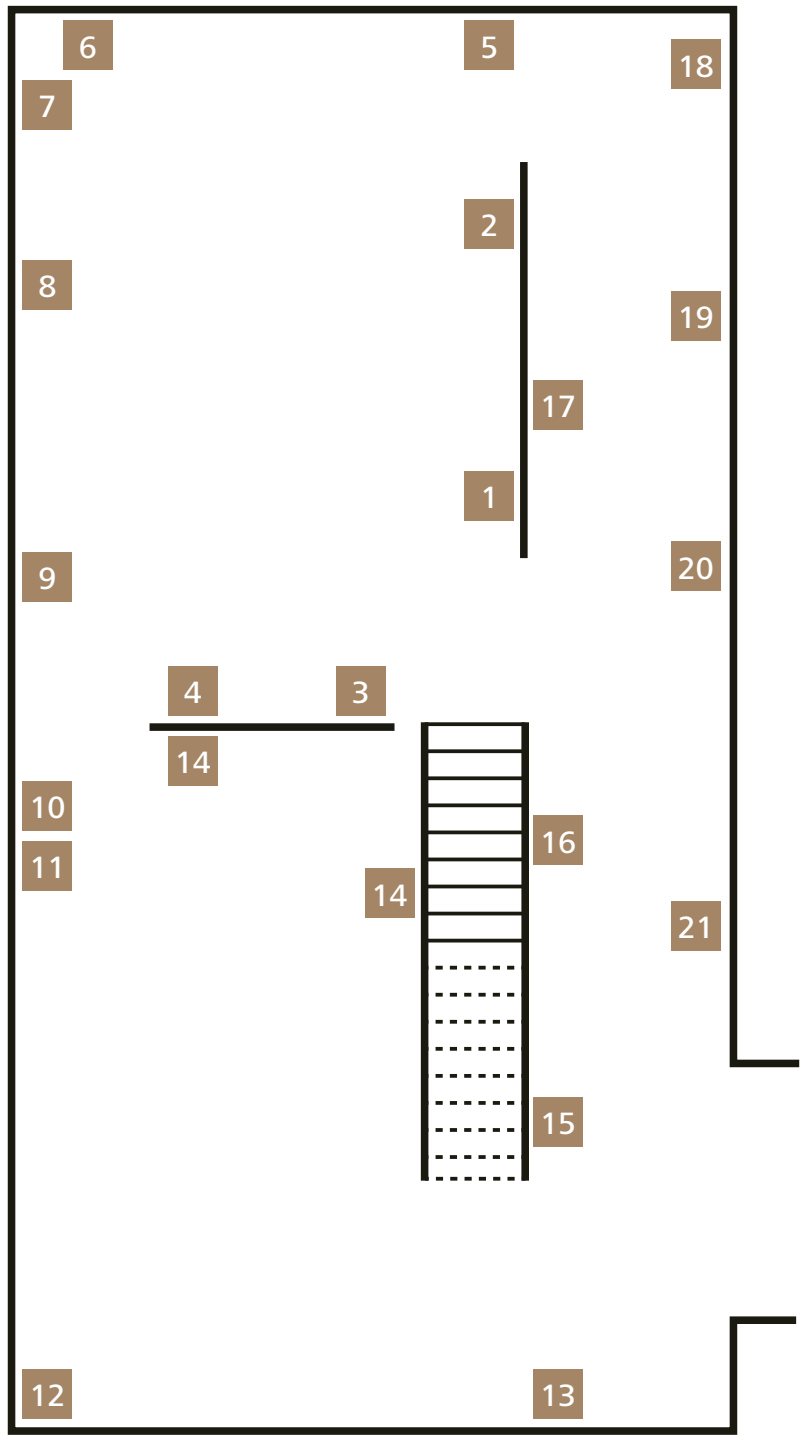
The house of the Historische Sammlung der Ruhrwasserwirtschaft

The house contains the historical collection of the Ruhrverband (Ruhr River Association) on the development of water management in the Ruhr river basin and simultaneously serves as centre for professional further training and exchange of experiences in the field of water management. It is located in close neighbourhood of the Rellinghausen wastewater treatment plant, which was commissioned in 1925 as the first of its kind on the Continent to use the activated sludge process already applied in the United Kingdom at the time.

On the first floor, there are a seminar room and the historical library that preserves a treasure of books and documents from the private collection of Professor Klaus R. Imhoff. In the basement, a range of contemporary documents and exhibits will give you an overview of the development of water management on the Ruhr.

The house itself was built at about the same time as the wastewater treatment plant and originally served as gas take-over station for the municipal services of Essen. In 1996, the building was taken over by Ruhrverband and restored with the financial support of the State of North Rhine-Westphalia whereby as much as possible of the historic building structure was preserved.

Exhibition plan
Basement



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Foundation of the Ruhrverband

In August 1908, the operators of the waterworks along the Ruhr demanded a better protection of the River Ruhr as a precious source of drinking water. And the presidents of the regional councils of Arnsberg and Düsseldorf were requested to take more drastic measures against all polluters – towns and industries – on the Ruhr. On a conference held on October 22, 1908, the idea of a water cooperative that would build and operate a network of wastewater treatment plants was formulated and discussed for the first time.

Dr. Karl Imhoff, then head of the wastewater department at the Emschergenossenschaft (Emscher river cooperative), was asked by van Bake, president of the regional council in Arnsberg, to draw up an expert opinion on "Pollution control on the Ruhr" (November 1910). His proposal to establish a cooperative that would jointly build and operate wastewater treatment plants was discussed in Witten on October 27, 1911. A Ruhr committee was set up. It prepared a bill which finally led to the Ruhrreinhaltungsgesetz (Ruhr pollution prevention act). And with its coming into force on June 5, 1913, the Ruhrverband was officially established. Since then it has been bound by law to care for the good water status in the Ruhr and its tributaries. Compulsory members of the association are all wastewater dischargers: communities and districts, enterprises of trade and industry, as well as all waterworks situated in the Ruhr river basin.

Also effective as of June 5, 1913, became the Ruhrtalsperrengesetz (Ruhr reservoirs act) which was the basis for the foundation of the Ruhrtalsperrenverein (Ruhr reservoirs association) as a public body responsible for water quantity management. In July 1938, both water associations were combined into a single administrative unit with a central management. Finally in 1990, both entities joined together to form the present Ruhrverband.

2

Karl Imhoff

April 7, 1876	Karl Imhoff is born in Mannheim.
1894 - 1902	He studies civil engineering and building construction at the universities of Karlsruhe and Munich.
1899 - 1902	Imhoff works as civil servant in the position of a "Regierungsbauführer" (Ger. title: government inspector of works) in Baden. He passes his examination as "Regierungsbaumeister" (Ger. title: government superintendent of works).
1902 - 1905	He moves to Berlin to work at the newly founded "Preußische Versuchs- und Prüfungsanstalt für Wasserversorgung und Abwasserbeseitigung" (Prussian research and testing institute for water supply and wastewater disposal).
1905	Imhoff gets his PhD at the university of Dresden (with his thesis titled "The biological wastewater treatment in Germany").
1906	Imhoff joins the Emschergenossenschaft (Emscher river cooperative) and is named head of the wastewater division and vice-president of the civil engineering division. He develops the Emscher or Imhoff tank which becomes the most successful wastewater treat ment system of the time.
1907	Imhoff publishes the first edition of the "Handbook for sewerage engineers". Under the title of "Handbook of urban drainage and wastewater disposal" it is still being published today.
1910	In his expert opinion "Pollution prevention in the Ruhr",he recommends the foundation of a Ruhr cooperative, responsible for wastewater treatment in the Ruhr river catchment.
1913	Dr. Imhoff, while staying with the Emschergenossenschaft, takes over additional management functions at the newly founded Ruhrverband.
1922 - 1934	In his capacity as full-time managing director at Ruhrverband he now deals in particular with biological treatment processes and the further development of the activated sludge process, using the Rellinghausen sewage treatment works as pilot plant. His plans also encompass the construction of impounding lakes along the Ruhr river to serve as river cleaning plants.
1934	Under the Nazi regime, Imhoff has to resign all his functions and opts for an early retirement at the age of 58 to become a free-lance consulting engineer.
1956	On occasion of his 80th birthday he is honoured by the community of German and foreign experts. And the ATV – the German Association for the Water Environment presents its new award named after Karl Imhoff
Sept. 28, 1965	Dr. Karl Imhoff, honorary doctor of the Technical Universities of Karlsruhe, Aachen and Stuttgart, dies in Essen.

Foundation of the Ruhrtalsperrenverein

The problems associated with the role the River Ruhr plays in water supply and wastewater disposal for a whole region could neither be solved by the towns and government authorities nor by the industries involved alone.

So in 1893, when the Ruhr was hit by severe water scarcity, Otto Intze, professor at the Technical University of Aachen, was asked to work out an expert opinion on the water situation of the river. He recommended the construction of reservoirs and initiated the pooling of interests in the form of jointly operated pumping stations. But it took another four years before his innovative ideas were taken up again.

Freiherr von Rheinbaben, then regional commissioner in Düsseldorf, invited representatives from towns, water and power stations, industries and local authorities to a first meeting on July 26, 1897. On occasion of the following big conference held in Essen on January 10, 1898, it was concluded to set up a "Commission for the construction of reservoirs in the Ruhr".

The commission's work finally led to the foundation of an association based on voluntary membership.

The constituent general assembly of the Ruhrtalsperrenverein took place in the town hall of Essen on April 15,1899. One of the association's main purposes was the support of cooperatives, enabling them to construct dams and reservoirs.

Otto Intze

May 17, 1843 — Otto Intze is born in Laage (Mecklenburg).

1860 - 1862 — Works as draughtsman for a British company during construction of the Riga-Dünaberg railway line.

1862 - 1866 — Studies at the Hanover polytechnic institute.

1870 - 1904 — At the age of 26, Intze is offered a chair at the newly founded Technical University of Aachen. He lectures building construction in timber and stone, waterway construction and industrial hydraulic engineering. During this period he develops a special tank, known as the Intze Tank, which becomes a commonly used type of storage vessel for water and gas in Germany and abroad.

1875 — Intze delivers his widely acknowledged lecture titled "Zweck und Bau sogenannter Thalsperren" (purposes and construction of so-called reservoirs) to promote his idea of reservoirs building. With his work he provides the fundamentals of modern water management in Germany.

1887 - 1891 — Intze designs and builds a reservoir in the Eschbach valley on behalf of the town of Remscheid.

In the years to follow, a string of reservoirs is built according to his plans, among others in the Bergisches Land: Beyer reservoir (completed in 1898), Lingese reservoir (1899), Salbach reservoir (1899), Hebringhauser reservoir (1900); in the Sauerland: Fuelbecke and Heilenbecke reservoir (1896), Hasper reservoir (1904), Fürwigge reservoir (1904), Ennepe reservoir (1904), Glör reservoir (1904), Henne reservoir (1905), Jubach reservoir (1906), Oesterreservoir (1906). Intze's largest project is implemented between 1900 and 1904 in the Eifel: the Urft reservoir.

1893 — Intze establishes a first expert opinion on the status of water management in the Ruhr. He recommends the construction of reservoirs and formulates for the first time the idea of an alliance of all waterworks on the river to form a single community of interests.

1895 - 1898 — Chancellor at the Technical University of Aachen.

1898 — He is elected life member of the Prussian Upper House and awarded the title of a Geheimer Regierungsrat (Ger. title: privy councillor to the government).

1899 — Expert opinion on the "Nutzen der Triebwerke an der unteren Ruhr durch Anlage von Sammelbecken" (The benefits of power stations on the lower Ruhr by construction of storage basins). Intze's proposals essentially promote the foundation of the Ruhrtalsperrenverein (Ruhr reservoirs association). In the following years, Intze is engaged time and again by the association as a competent consultant.

Nov. 28, 1904 — Intze dies in Aachen. At the time of his death, 12 of the reservoirs he has planned are already in Operation, 10 are under construction and plans for some further 24 reservoirs are under review.

The Ruhr District

The Ruhr District, which derived its name from the river Ruhr, was a sleepy, mainly rural region up to the 19th century when coal mines and blast furnaces gave a new look to the countryside and transformed it into the "land of a thousand fires".

The discovery of coal on the banks of the Ruhr is lost in the mists of the Middle Ages. First it was extracted in rather small pits; but coal mining saw a dramatic upsurge during the industrial revolution and a move northwards following the geological path of the coal seams. In 1850, there were 198 coal mines in the region, and just seven years later their number had increased to 295.

Also the heavy industry expanded rapidly. While in the 1830s, Krupp in Essen employed no more than 50 to 80 workers in the foundries, its workforce increased to 10,000 in the space of just 40 years. And as the industry continued to grow, so did the need for human resources. Migrant workers first came from nearby regions, like the Sauerland, Westphalia, the Netherlands and Belgium, then mainly from the eastern provinces of the German Reich, like Masuria.

Formerly rather quiet rural places developed into big cities which, growing together more and more, now practically form one mega-city: the Ruhr District.

The River Ruhr – lifeline of a region

The Ruhr, rising in the scenic landscape of the Sauerland, serves as drinking water source for no less than five million people.

With its length of 219 km, it is a rather small low-mountain stream. Its catchment area covers 4,485 km², extending from Brilon in the east to Duisburg in the west and to Olpe in the south.

Already before the industrialization process got momentum in the 19th century, the Ruhr played a vital economic part in the Rhenish-Westphalian industrial region. In the 18th century, the small iron ware industry settled in the valleys of the upper Ruhr and its tributaries and exploited the waterpower: hammer and rolling mills, forging and wire drawing shops. Also operators of paper mills and wood processing operations felt drawn towards the River.

The Ruhr, navigable from 1772 onwards, was also an important waterway. At times it was one of the most frequented waterways, with the highest tonnage carried, in Europe.

However, navigation was strongly affected by a special characteristic of the Ruhr: extreme water-level fluctuations. Just as dry spells often made navigation impossible in summer, so did floods and ice formation in winter.

Water scarcity in the Ruhr District

The enormous increase in water demands was the result of the stormy industrial development in the Ruhr District. The coal, iron and steel industries consumed huge quantities of water: to extract one ton of coal, some 1.75 cubic metres and to produce one ton of coke, 2.25 cubic metres of water were needed. While to manufacture one ton of steel, it took no less than 5 cubic metres of water.

Around 1900, a loud "cry for water" went through the Ruhr District, in which not only industry and trade, but also the communities joined in. A population that kept growing by leaps and bounds had to be supplied. The old supply systems, relying on groundwater wells and springs, collapsed as many wells dried up as a consequence of underground mining.

So the Ruhr became the lifeline of the region. Essen was the first town to build central waterworks which used raw water from the Ruhr to produce potable water. Further towns followed this example.

The introduction of central water supply systems soon brought up the question of central sewerage systems. Used water had to be collected and disposed of properly. In 1866, the town of Essen started construction works for a sewerage system, to be followed by Dortmund in 1880, and by Mulheim on the Ruhr in 1894.

Conflicts of interest around water and wastewater

However, with the arrival of modern municipal services not all problems related to water supply and wastewater disposal could be solved straight away. The amount of river water abstracted by the waterworks still was significantly higher than that returned. A large proportion of drinking water went northwards and finally reached the Emscher river. In 1893, for example, the waterworks on the Ruhr supplied some 90 million cubic metres of drinking water, 75 % of which was exported into neighbouring river catchments.

In particular during dry periods, this water export badly affected the runoff in the middle and lower Ruhr, resulting in severe quarrels over water: power station owners sued the waterworks for compensatory damages on account of lost energy output.

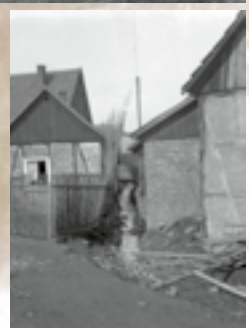
Wastewater was another problem. In most cases, it was released untreated into the Ruhr. As a result, a severe epidemic of typhoid fever occurred in the area of Gelsenkirchen in 1901, which took a death toll of around 500 people.

Up to the mid-1950s, there were still simple privy cesspools in many towns on the Ruhr. When these were full, the deposit was removed and simply dumped into the watercourse. So the river had to play a difficult double role as a supplier of potable water and a collector of wastewater.








Town drainage – local sewerage systems

The construction and upgrading of sewers did not progress satisfactorily in all towns and communities alike. As up to the 1920s many municipalities still didn't have efficient sewerage systems, the Ruhrverband began to support the local authorities, providing funds for construction. Its engineers worked out the necessary plans. In summer of 1924, the Ruhrverband opened a branch office in Arnsberg, in response to the lack of sewerage systems in almost all communities of the upper Sauerland region at the time.

Performance in river basin management – wastewater treatment plants

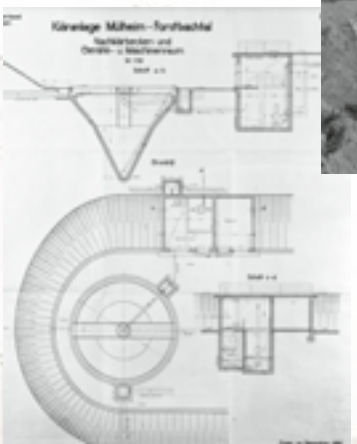
Ruhrverband began its work on the design and construction of wastewater treatment plants after the first cooperative assembly of March 2,1914. But unfortunately World War I soon interrupted all activities. And not until 1922, when Dr. Karl Imhoff was named full-time managing director, could the work be continued on a larger scale.

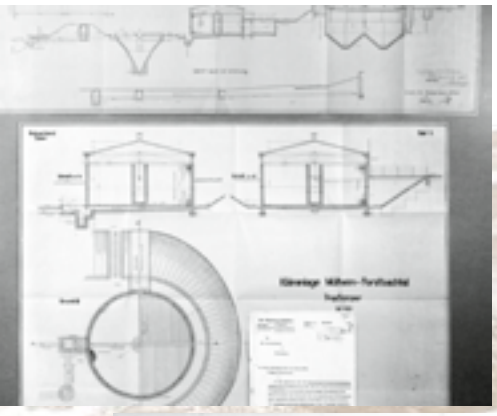
Between 1922 and 1924, a public sewer system was built that served the collection of the wastewater from the towns of Mülheim on the Ruhr, Oberhausen, and Duisburg and that discharged all effluents directly into the Rhine.

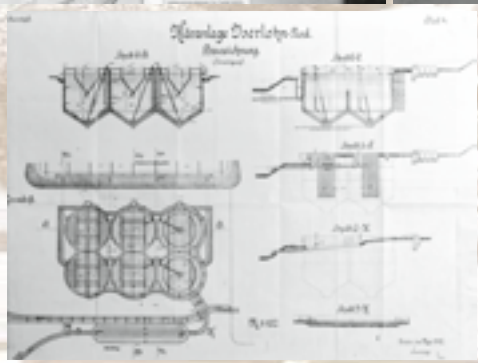
Also the numerous wastewater treatment plants built under the direction of Dr. Imhoff brought some relief to the Ruhr river. And in particular his invention of the so-called Imhoff tank contributed to the success. It consists of an upper continuous-flow sedimentation chamber and a lower sludge digestion chamber.

Besides his work on mechanical wastewater treatment, Imhoff also tackled the problem of biological treatment. Together with his colleagues Dr. Friedrich Sierp and Franz Fries he investigated and tested the activated sludge process, already used at the time in the UK and the USA. Billions of bacteria are grown in the wastewater and kept alive by artificial aeration. These bacteria are capable of degrading dissolved organic pollutants.

In 1931, the Ruhrverband already operated around 60 wastewater treatment plants which included four activated sludge tanks and twenty Imhoff tanks. By 1977, the number of facilities increased to its highest level of 120 plants as a consequence of the decentralised treatment operations. Since then, the figure was been decreasing steadily after the treatment of wastewater from many communities and town districts in the topographically strongly structured river basin has been combined into central units.







The wastewater treatment plant in Essen-Rellinghausen as a prototype

1912	The town of Essen builds the Rellinghausen wastewater treatment plant, originally designed for 22,000 inhabitants. Treatment is carried out in Imhoff tanks.
1914	Ruhrverband takes over responsibility for the wastewater treatment plant.
1923	The Imhoff tanks are the first to collect digester gas on an industrial scale. The gas is delivered to the municipal gas grid.
July 1924	The pilot plant uses the model of an activated sludge process already applied in the 1924 UK and the USA. Karl Imhoff, Friedrich Sierp and Franz Fries carry out comprehensive tests and improve the process. They succeed in lowering the operating expenses by separating aeration and circulation.
May 1925	Start up of construction works for a large-scale activated sludge plant.
Dec. 1925	The activated sludge plant becomes operational as the first of its kind on the Continent. It is designed to treat the wastewater from 45,000 inhabitants.
1927	A drum screen is connected after the overloaded Imhoff tanks to improve primary sedimentation.
1930	The primary sedimentation tank is put into operation. Further two separately heated digesters are built, after Sierp has determined, in a series of digestion tests, the relationship between gas production and temperature. An oil trap enhances primary sedimentation.
1960er	With the reorganisation of the treatment of pit water from the mining industry, it becomes possible to separate this amount of extraneous water from the municipal treatment operations.
1976	The old Imhoff tanks are dismantled, then redesigned and rebuilt as Dortmund tanks to become component parts of the secondary sedimentation stage.
1990er	In the early 90s, simultaneous precipitation by addition of ferric salts is introduced for phosphorous removal.
2005	Upon completion of the wastewater treatment plant in Essen-Süd, also the sewage from Essen-Rellinghausen will be treated there.

Sludges are residues resulting from mechanical, biological, and chemical treatment processes. And their safe disposal is another task associated with sustainable wastewater management. In the course of the past decades, different disposal methods have been applied which had to be constantly upgraded to comply with the latest ecological findings and economic requirements.

Inventive genius and practical experience

At the turn of the 20th century, experts with a scientific and technical education held senior positions in the industrial society. Engineers put the new scientific findings into practice. They developed new production and construction techniques, measuring and monitoring methods.

Apart from their role in the business world, engineers played an increasingly important part in the society at large, widening the spectrum of the bourgeoisie at the time: besides the academic as a man of culture and the civil servant, the industrialist and entrepreneur, it was now the technically and scientifically educated citizen to become a man of high standing in the German society.

And not only the mining and the iron and steel industry drew this new technical elite to the Ruhr District, but also the water management business got concerned about its needs of highly qualified people. The large water associations like Emschergenossenschaft, Ruhrtalsperrenverein, and Ruhrverband needed specialised personnel for the completely new field of municipal services. On account of the lack of experience in most subject areas, often new ground had to be broken. But inventive genius and growing practical experience helped surmount all hindrances.

Engineers from the Ruhrverband and Ruhrtalsperrenverein developed new process variants, system improvements and operational optimisations with the aim to enhance efficiency and to cut costs.

About the appetising appeal of water

Municipal services have of course continued to develop since the introduction of sewerage systems and wastewater treatment plants and brought into being a special branch: municipal hygiene. Entire occupational fields focused on this new issue, involving wastewater engineers, chemists, and biologists. Hygienists and health engineers became so to say the sentinels of public health.

A society's actual attitude towards water is generally reflected in the discussions among experts. This so also in the early 1930s, when Dr. Karl Imhoff presented his ideas about the water cycle. He emphasized that every drop of wastewater would finally reach a watercourse the water of which would in the end be re-used by man, also as potable water. “The cycle as such cannot be avoided. But never let it become too short“, so Karl Imhoff.

His opinion prompted strong protests on the part of the hygienists who talked about the “appetising appeal“ of water. This savour would get lost, they argued, “if people had to drink their own urine plus that of their dear neighbours, spiced up with wastewater from households“.

Water quality in the Ruhr is permanently monitored. As early as in 1907, first investigations were undertaken by the Hygiene-Institut in Gelsenkirchen. The waterworks set up so-called “bacteria counting laboratories“ where skilled employees carried out bacteriological examinations.

The laboratory of the Ruhrverband was founded in 1923. Its tasks include the monitoring of all wastewater treatment plants and of all waterbodies in the catchment area and the instrumental analytics. To this effect, water samples are regularly examined to control pollution in the surface bodies of water. Besides the central laboratory, which is located in Essen, there are three division laboratories in Arnsberg, Plettenberg, and Hagen.

Performance in river basin management – reservoirs

Initially the Ruhrtalsperrenverein supported the work of small reservoir cooperatives. With its financial assistance, a number of reservoirs was constructed: the Haspe reservoir (built between 1901 and 1904), the Fürwigge reservoir (1902-1904), the Glör reservoir (1903-1904), and the Ennepe reservoir (1902-1904). However, it soon turned out that the overall storage capacity of some 16.1 million cubic metres would not be sufficient to satisfy the constantly rising demand.

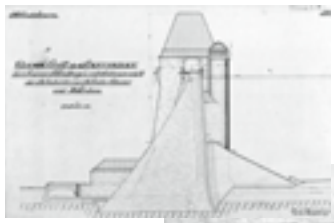
So plans emerged to build the Möhne dam and reservoir, which was constructed in the uplands of the Sauerland in just five years between 1908 and 1913. It was one of the largest reservoirs in Germany, with an effective storage of around 130 million cubic metres.

Meanwhile, several further reservoirs have been built which take care that the river always holds enough water for the supply of millions of people living in the metropolitan Ruhr area:

- The Sorpe Reservoir (1926-1935) with a design capacity of 68 million cubic metres which was increased to 70 million cubic metres in 1963. The barrage is a 69-m-high earthfill dam which, at the time, was the highest in Germany.
- The Verse Reservoir was constructed, with some interruptions, between 1932 and 1951. Its storage capacity is 32.8 million cubic metres.
- The Henne Reservoir was put into operation in 1955 to replace an old dam (completed in 1905). Its storage capacity is 38.4 million cubic metres.
- The Bigge Reservoir was built between 1957 and 1965 as the largest reservoir in the Sauerland region. With its storage capacity of 173.8 million cubic metres, it even surpasses the Möhne Reservoir.

Currently some 464 million cubic metres of water can be stored in the Ruhrverband's reservoirs. During dry spells, the Ruhrverband discharges water from the reservoirs into the Ruhr river system and with that prevents water shortage.

Also the impact of floods, typical of the Ruhr river, can be made less severe. During rainy periods, considerable amounts of water are withheld in the reservoirs which helps prevent serious flood peaks.



Electricity from hydropower

The usage of water power has a long tradition in the valleys of the upper Ruhr basin. Wire mills, hammer mills, and rolling mills as well as paper mills and other wood processing operations used the power of the flowing water.

The Ruhrtalsperrenverein continued along this traditional line by integrating power generation plants in their reservoir systems.

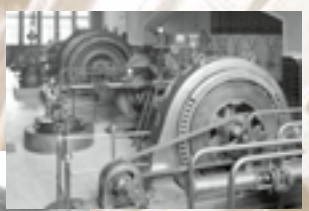
With the reservoirs it is possible, to an extent, to compensate for the typical fluctuations in the river's natural flow regime over the year. Low flow augmentation in summer benefits the operators of waterworks and power stations situated along the river.

Right from the beginning, hydropower generation was a major point in the plans for the construction of impounding lakes. So the RWE group built several hydroelectric plants on the weirs of the impounding lakes along the Ruhr and also the Koepchenwerk or pumped storage hydrostation on Lake Hengstey (1926-1928), (named after Prof. Koepchen).

Land requirements

Water resources management in densely populated regions involves large-scale infrastructure works like the construction of dams and reservoirs, impounding lakes, and wastewater treatment plants. For the purpose, huge areas at appropriate locations have to be made available. Sewerage systems have to be built to collect the sewage from households and industrial enterprises and to dispatch it to the lowest point in the river valleys where treatment takes place. The purified wastewater is then recycled into the rivers. There is no alternative to this process. An average area of about one square metre per inhabitant is generally assumed as rule of thumb to determine the land requirements for modern wastewater treatment facilities, which incorporate highly concentrated purification stages.

Also large water-storing reservoirs confront their builders with considerable land requirements. Before the first sod can be turned, often lengthy negotiations with the land owners have to be completed and extensive relocation projects have to be implemented. So clashes of interests are almost unavoidable. And often it takes a lot of time to arrive at a mutually acceptable agreement for the benefit of the public welfare.



Performance in river basin management – impounding lakes on the Ruhr

The lakeland district between Hagen and Essen attracts many people as a nature park and recreational area. However, these lakes are artificial waterbodies: strictly speaking they are river barrages which, from an ecological point of view, are neither flowing waterbodies, nor lakes. Unlike reservoirs, they are constantly filled, with only slight water level fluctuations and a relatively high flow regime.

In August 1927, the Ruhrverband presented its rehabilitation project for the Ruhr. In accordance with the ideas of Dr. Karl Imhoff, the impounding lakes were planned to serve as so-called river cleaning plants. Out of the projected eight lakes on the Ruhr, five have been realised:

- Lake Hengstey near Hagen, built between 1926 and 1928. While the Lenne river which here flows into the Ruhr was heavily polluted by acid and iron, the Ruhr carried along above all alkaline wastewater discharged by the paper and pulp industries. The basic idea was to mix these wastewaters in one impounding lake, so that all sludges produced might be collected in this storage basin.
- Lake Harkort between Wetter and Herdecke, completed in 1931. It serves the further purification of the water from the Volme river and of the effluents from the Hagen wastewater treatment plant.
- Lake Baldeney in Essen, completed in 1933, is the largest lake. Its storage capacity at the time of its construction was 8.3 million cubic metres.
- Lake Kettwig, though already planned in 1939, was completed after World War II, in 1950.
- Lake Kemnade near Bochum, completed in 1979. Planned from the beginning as a recreational site, the lake was taken over by the Ruhrverband in 1995.

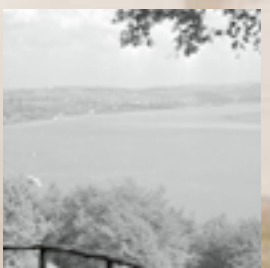
Fund raising in difficult times

Construction and maintenance of the water management facilities of the Ruhrverband and the Ruhrtalsperrenverein were financed through the subscription fees of their members. However, in times of economic crises, alternative forms of fund raising had to be found:

During the inflationary period that followed World War I, the subscription fees were good for nothing as they used to be fixed one year in advance and were paid on a quarterly basis. So when coming in, the paper Marks were already worthless. In response, it was decided to link the fees to the coal price and to plan the budget in accordance with this commodity price.

The Ruhrverband was the first public body to issue coal bonds to finance construction measures.

Between 1923 and 1931, large-scale building projects were essentially financed through foreign loans.



The world of work at the Ruhrverband

Also Ruhrverband's working environment has been and will continue to be influenced by the progress of the art and by the requirements fixed by laws and directives.

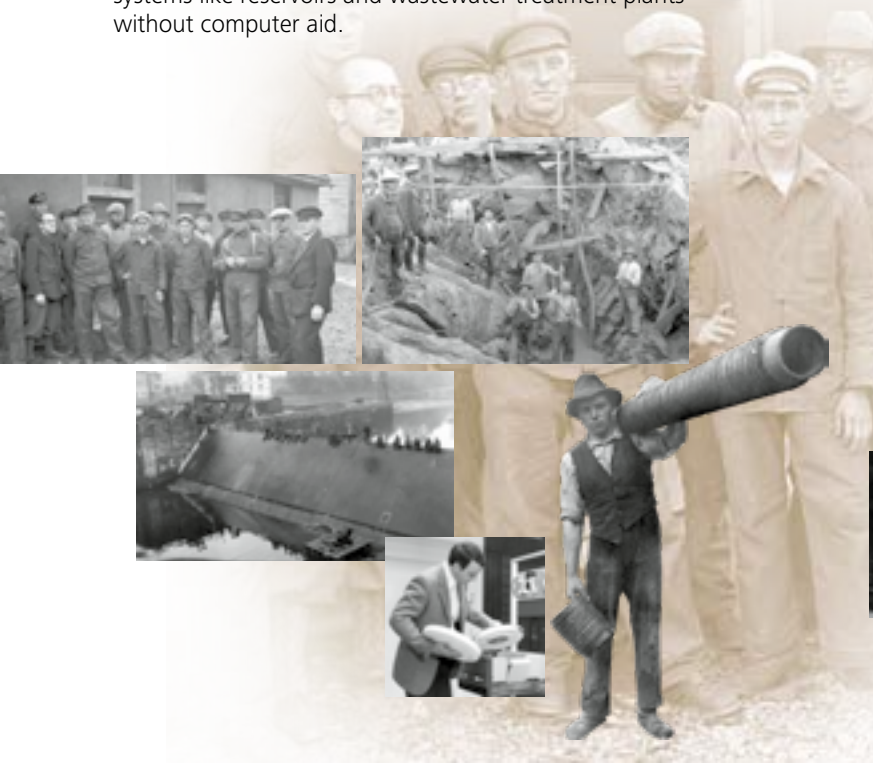
Both the use of modern plant and machinery and the application of more stringent labour-safety rules have markedly improved the working conditions on the construction sites.

And, of course, also the engineer's work place has undergone many changes in the course of the past hundred years, not least most recently with the advent of the information technology. But not only has the geometry set been replaced by the computer, also the number of laws and rules to be complied with has risen many times over.

EDP has changed the flow of work in many office functions. Already in 1967, the huge amount of data gathered from the reservoirs segment was processed electronically by computers, taking up whole rooms at the time. With that, Ruhrverband was one of the first enterprises in Essen to pioneer the new technology.

In 1977, the collection of fees from the members of the Ruhrverband and the Ruhrtalsperrenverein was taken over by another EDP-unit. And upon entry and processing of all relevant data related to water management, budgeting and liquidity management was carried out computer-aided as well.

Meanwhile it has become unthinkable to monitor complex systems like reservoirs and wastewater treatment plants without computer aid.



Environment and nature

The Ruhrverband cares for water purity in the Ruhr and its tributaries and with that it makes a considerable contribution to environmental protection. Whereby, in the course of the past decades, the association had to cope with constantly changing realities and the growing public awareness of environmental issues.

The load or pollution of the waterbodies is also a function of the current state-of-the-art in wastewater treatment technology and the ups and downs of business cycles in the economy and industry.

To give an example: The saline load in the Ruhr, caused by mine water, which has been a severe problem for a long time,now plays only a minor role. This is the result of the decline in production in the mining industry over the last decades.

Though during the 1970s, the purification performance of the biological wastewater treatment plants was upgraded to around 90 %, the Ruhrverband still was concerned about the condition f the waterbodies. In 1973, a memorandum about the growing endangerment of drinking water supply from the Ruhr was published. And in the following year the first “Ruhr Water Quality Report“ was edited, now coming out annually. “Waterbody quality“ is not synonymous with “water quality“, but goes far beyond, encompassing the entire ecosystem around a surface body of water. Since 1970, it has been possible to markedly enhance the waterbody status of the Ruhr river basin thanks to improved purification performance.

Today, the Ruhr river is classified into high waterbody quality classes. More than 30 fish species live in the river, among which you'll find the trout, pike-perch, eel and the pike. And in 1995, even the first salmon was caught since 1890. Moreover, the Ruhr impoundments serve as important habitats for many birds. On Lake Baldeney, for example, there is a bird sanctuary which is the nesting area of the grey heron and the great crested grebe. The steadily increasing diversity of species is another side benefit of the improved efficiency in wastewater treatment.

Recreation

Soon after their creation, the reservoirs and impounding lakes situated on the Ruhr were welcomed by the population as excellent leisure time resorts. And their history reflects the development of recreational activities over the last decades: from swimming and skating, through sailing and fishing to jogging and inline skating.

The large forest areas surrounding the reservoirs are a special nature and recreational reserve. Ruhrverband owns more than 3,100 hectares (approx. 7,600 acres) of forest land and is strictly committed to sustainable forestry. Further the Association is responsible for the fishery management on the reservoirs which is carried out under ecological and biological aspects. At Möhnesee-Körbecke, it runs a fish hatchery where trout and pike, as well as char and whitefish are bred. The relation between hatchlings released and fish stock in the reservoirs is carefully controlled so as to ensure a sustainable ecological balance which is an important prerequisite for good water quality in the reservoirs.

Integrated Water Resources Management
– River Basin Management –

Water for Millions of People

More than 4.6 million people are reliably supplied with drinking water from the Ruhr at all times. Maintaining and distributing such a valuable resource is Ruhrverband's major task.

Water quantity management

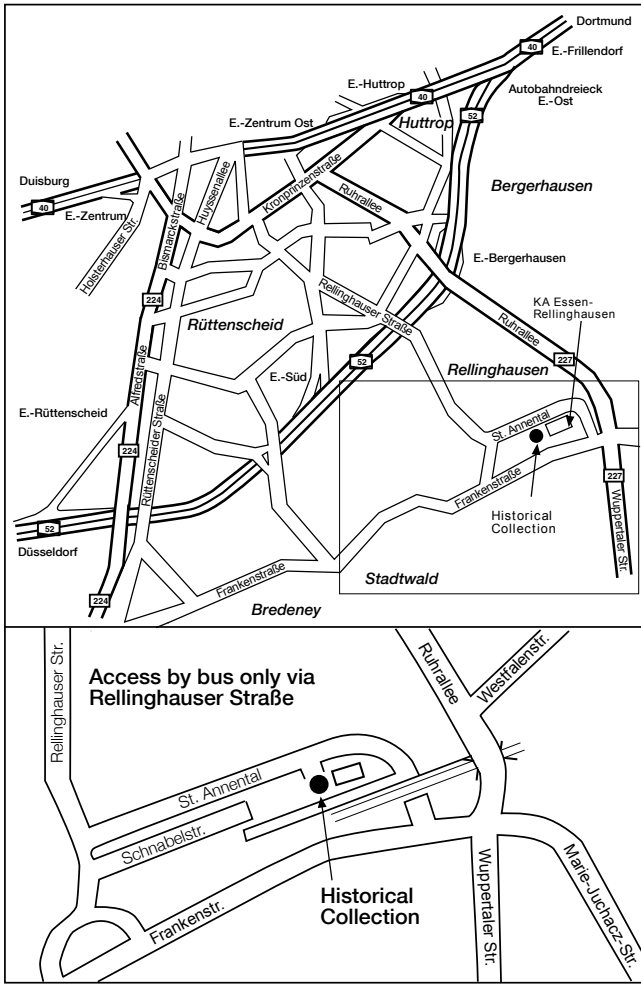
A system of reservoirs helps balance the enormous range between low and high runoffs in the Ruhr: helping to avoid flood damages during rainy periods, preventing water shortage during dry spells, and producing power.

Protection of waterbodies

The wastewater treatment plants along the Ruhr purify the wastewater from municipalities and industries. These efforts to protect the surface bodies of water are necessary for a reliable drinking water supply and for the manifold recreational activities along the Ruhr, on its impounding lakes and on the reservoirs in the Sauerland region.

Environment protection has always been our competence

Directions:
How to find the "Historische Sammlung der Ruhrwasserwirtschaft"



Visits on appointment by telephone.
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Ruhrverband
KNOW-HOW, VALUES, WATER

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