CASE STUDY 1 - SEALING OF DIKES, LAKES, RIVERS AND CANALS – WATER: MAN'S BEST FRIEND AND MAN'S WORST ENEMY

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ABSTRACT

Reports about bursting dikes or embankments are always hitting the headlines. Examples include the natural disaster of the river Oder in Germany in 1997 and "the flood of the century" in Upper Bavaria in 1999.

The low cost protection of dikes and embankments is considered to be an increasingly important subject. The question of protecting against water on the one hand, and the availability and collection of water on the other, will increase with importance over the next few decades.

In this context, polymer bituminous membranes can make a valuable contribution, because of the following:

- uncomplicated laying
- excellent long-term performance
- ecologically sound
- highly resistant to mechanical stress

The lecture includes many long-term examples and their evaluation over a 20-year period.

ZUSAMMENFASSUNG

Berichte über brechende Deiche oder Dämme machen immer Schlagzeilen. Man erinnere sich da nur an die Naturkatastrophe der Oder im Jahr 1997 und die „Jahrhundertüberschwemmung" in Oberbayern im Jahr 1999.

Der Schutz von Deichen und Dämmen zu niedrigen Kosten wird immer mehr als wichtiges Thema angesehen, und die Thematik des Schutzes gegen Wasser auf der einen Seite und die Verfügbarkeit und das Sammeln von Wasser auf der anderen wird in den nächsten Jahrzehnten auch noch an Wichtigkeit gewinnen.

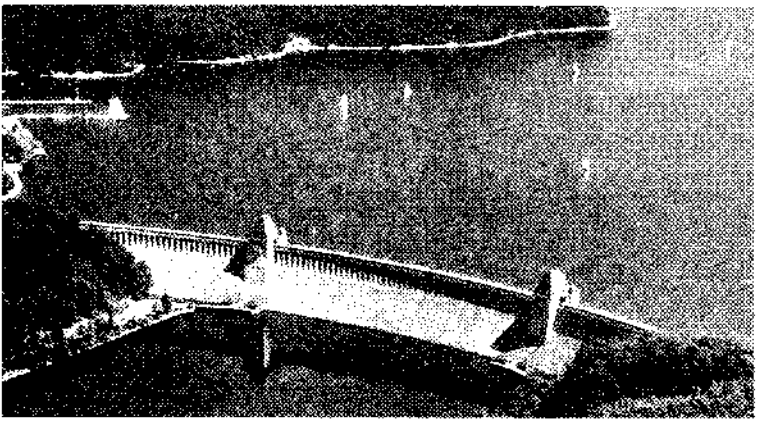
Hier können Polymer-Bitumenbahnen einen wertvollen Beitrag bei der Lösungsfindung leisten, da sie die folgenden Eigenschaften aufweisen:

- einfach zu verlegen,
- hervorragende Langzeitleistungen,
- umweltgerecht,
- äußerst widerstandsfähig gegen mechanische Belastungen.

Der Vortrag enthält viele Beispiele aus Langzeitanwendungen und deren Bewertung über einen Zeitraum von zwanzig Jahren.

INTRODUCTION

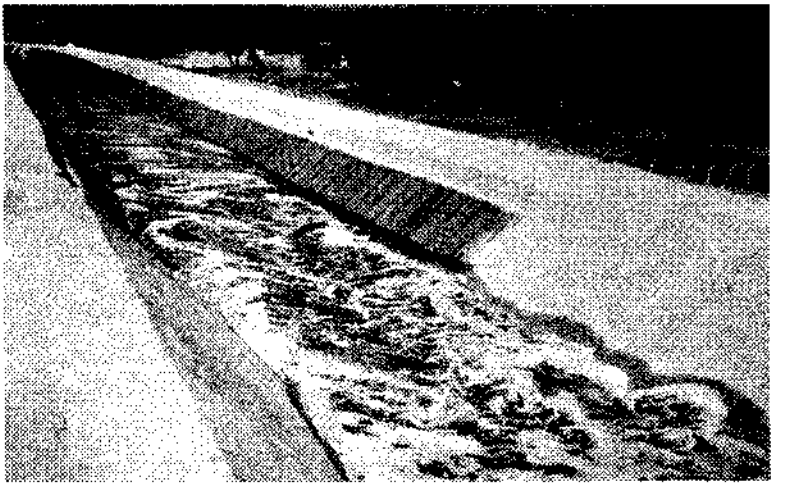
All politically aware persons agree on one point: Water will be the problem of the new millennium. Access to water can be a reason for war, ownership of water resources means prosperity. At the same time we know that water in excessive quantities can cause devastating damage.



In view of all this a technology will develop over the next decades to ensure, wherever possible, equally distributed water supplies that can be relied on also in the long term. Sealing products and the sealing industry will play a leading role in this technology - if we see our chances NOW!

On the one hand we will have sophisticated retention basins to store the precious gift from nature, on the other hand there will be simple and cheap protection measures to prevent dikes from being gradually washed away or bursting in floods. These will be the issues of the future.

Some contributions at earlier IAV congresses focused on positive aspects. For example Mr Gorgatti informed us about the sealing of canals in Italy; Mr Gilbert Berebi talked about the sealing of retention basins with plastomer bituminous sheets in Tunisia, and at the last congress in Copenhagen Mr Marcos Storte described the sealing of a 101.6 kilometre long canal in Northern Brazil which brings drinking water to an arid area. But we have also heard an increasing number of reports about burst dikes causing immense material damage and claiming human lives.



Most of us will remember the flood disaster in the Yangtse region in China where dozens of dikes burst and hundreds of people died; the Chinese army tried to prevent the worst.

Another recent example is the "flood of the century" in the Oder region in 1997 where the German army and emergency services were only able to ward off the ultimate disaster with the help of excellent technologies and outstanding equipment. A situation has arisen where almost every year a flood disaster strikes in Europe. In 1999 it was the turn of Switzerland and Upper Bavaria where bursting dikes near Ingolstadt caused damage running into millions of Deutschmarks. A more straightforward and less expensive protection of dams is getting ever more important. This is not about high-technology in dam construction or driving in sheet piling - it is all about systems that provide reliable long-term sealing at low cost and with unqualified labour.

This is true also for the construction of cisterns in Southern Europe, for example in countries where the rainy season lasts only a few weeks in February and March but mostly brings so heavy rainfalls that the watering of gardens and collecting secondary water for non-drinking water supplies can be essential. Here polymer modified bituminous sheets and other water-proofing systems come in: polymer modified bituminous sheets are the products of choice, because their laying is

uncomplicated, their long-term behaviour is excellent, they are ecologically sound and - most importantly - they are highly resistant to mechanical stress.

When they hear the word "sealing" many people think exclusively of the roofing sector which is, of course, the largest field of use for sealing materials. This is proven by the fact that several lectures here in Florence deal with roofing. But my job today is to make quite clear that sealing is almost as important in other sectors so that we must adopt well-targeted strategies in those sectors, too!

This is illustrated best on the example of a building where "sealing" comprises not just "classical roofing" but also balconies, roofs used for ecological or economic purposes, bathrooms, green roofs and - in particular - cellars in underground engineering. It is widely believed that solely the water-proofness of a cellar is decisive so that only standard basement waterproofing with concrete in a structural and sealing function is undertaken. (In German we call that "weiße Wanne" or "white tub"). Other frequently used and simple alternatives are black paint or fillers. But it is equally important to prevent diffusion through the cellar walls, because in many cellars the actual water-proofing is okay but due to diffusion enough humidity penetrates to cause the destruction of stored goods by mould and fungi.

Better protection against humidity - for example by polymer modified bituminous sheets! - is increasingly needed also for structures in the transport sector where especially bridges and high-speed train lines are worth mentioning. Add to this dikes, canals, golf ponds, water retention basins and a multitude of construction activities that involve sealing. Besides, much more attention should be given to prefabrication, using for example self-adhesive polymer modified bituminous sheets.

Polymer modified bituminous sheets for welding in single or double layer systems are most practical for the following reasons:

- They are perfectly sound in ecological terms, do not require special adhesives and are not water-polluting as sheets - which means that they can be used also for retention basins in the drinking water sector.