

New applications in dikes and banks

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INTRODUCTION

Sustainable development and environmental impact have become keywords in various fields of engineering. Civil engineering nowadays contains much more design aspects and shows more boundary conditions than a few decades ago. In a densely populated area like western Europe, every building activity is an infringement in the existing environment. Landscapes, developed in centuries, contain many elements that are deemed precious enough to conserve.

In the Netherlands environmental aspects have led to an interesting paradox when it comes to strengthening dikes. Many riverdikes in the country are still too low to offer enough protection for the area behind them. To raise them, however, the sacrifice of spots, valuable from a historical or cultural point of view, is necessary or the landscape in general has to be changed. Solutions are being sought that save space, while giving the same strength. Geotextiles can play an interesting role in designing such a dike. A key question will be the durability of the materials applied, in order to give confidence for the long term. Several examples will be presented.

Another variation on the theme of sustainable development is found in bank protection. There is an increasing awareness that healthy water systems with a large variety of species are essential for long term survival, also for mankind. For watersystems, integrated care for the condition, comprising the media water, beds and banks or shores, in relation to their relevant surroundings has become essential in the management of these systems. In this vision, banks form the transition between water and land and are closely related with the functions of both. In the past, the protection of banks with "hard" materials was the normal procedure. In this way, many kilometers of richly varied transition-zones between water and land, with lots of plants and animals, changed into hard, abrupt barriers with little or no ecological or scenic value. The banks became mono-functional, losing their functions for recreation,

fishery and nature. For the migration between land and water, as feeding- and spawning grounds, places for rest and growth, banks are indispensable for many species and consequently for varied and complete ecosystems, both in the water and on the land. Moreover, a richly overgrown bank or a gently sloping sandy beach are much more attractive than bare sheet-piles, debris or an asphalt slope.

All this has led to another approach in hydraulic design of waterways, expressed in the Dutch National Policy Document on Watermanagement (1989). Banks are no longer considered as a well defined, sharp transition of land and water, but as an integral part of a water system. Another aspect of sustainability is the use of materials. An economic use of raw materials and energy, recycling of materials, prevention of waste material during production, construction or demolition are now important issues in hydraulic engineering.

This new approach is not yet the "natural" way of thinking for all hydraulic engineers. This is not amazing, since most engineers have not been educated this way. On the other hand, there is hardly any profession where multi-purpose projects are so common as among civil engineers. Therefore, a multi-functional approach in the design of river banks and waterways would not be that strange. It certainly offers new challenges for creative designers. The question whether and how geotextiles fit into this approach will be the main topic in the second half of the Dutch chapter.