From dredge spoil to concrete

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Water management is essential. A great deal of water and sludge from other European countries ends up in the Netherlands. Therefore, management and maintenance of rivers and flood plains is an important point of attention. In addition to the Water Authorities, there are other official bodies that are responsible for this.

In the Province of *Gelderland* RGV is one of the bodies managing a number of recreational areas, which means that they are also responsible for the removal and processing of dredge spoil from these areas, both with a view to water management and to the recreational functions of the areas.

At the marinas, camping and daytrip sites in the recreational area north of Arnhem called the *Rhederlaag* the waterway must be dredged regularly. The resultant dredge spoil is moderately to highly contaminated. Usually, this dredge spoil is dumped into submerged depots in the same river system.

Fig. 1: Site location of the Rhederlaag-area

In addition, it is also necessary to render the beaches accessible for daytrips. Among other things, this requires the construction of car parks for which building materials have to be supplied.

These two tasks, i.e. the dredging and the cementing, can go together very well by using the dredge spoil as paving material for the parking facilities. There are several advantages to this. The dredge spoil remains in the water system, but with a useful purpose. It would also remain in the system by dumping it, but it would not have a function then. Even worse, it would require space. In addition, combining the two tasks means that no additional material will have to be supplied to the river system in order to create the parking facilities. In other words, the total use of space is much smaller and the dredge spoil has been given a useful purpose.

The usefulness has been effected by means of immobilisation. This is a process binding the harmful components from the dredge spoil into a concrete structure, preventing a spread via the water system.

Fig 2: Production of the dredge spoil - concrete

This technique must meet high requirements because during high water periods, the parking facilities are flooded. There should be no erosion due to the flowing water or due to the parking of cars. Nevertheless, all environmental and civil engineering requirements and criteria have been met, with the result that a pilot car park (3,700 m^2) was constructed in the Rhederlaag recreational area in October 2007, in which more than 1,200 m^3 severely contaminated dredge spoil has been processed.

Finally, there is another environmental advantage to be gained. One that enjoys worldwide urgent attention: CO_2 reduction. Because the final product must be more or less similar to concrete, cement was used as the binding agent. However, in addition to cement, a number of additives were used to ensure the right fixation and strength. These additives resulted in much less cement being required than for normal concrete, which yielded another 15% CO_2 reduction for said pilot car park. An amount equalling the emissions of a medium-sized car driving three times around the world.