GERMAN
ATV-DVWK RULES AND STANDARDS

ADVISORY LEAFLET ATV-DVWK-M 362-2E

Handling of Dredged Material

Part 2: Case Studies

October 2004

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ATV-DVWK

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The German Association for Water, Wastewater and Waste, DWA (former ATV-DVWK), is the spokesman in Germany for all universal questions on water and is involved intensely with the development of reliable and sustainable water management. As politically and economically independent organisation it operates specifically in the areas of water management, wastewater, waste and soil protection.

In Europe the DWA is the association in this field with the greatest number of members and, due to its specialist competence it holds a special position with regard to standardisation, professional training and information of the public. The ca. 14,000 members represent the experts and executive personnel from municipalities, universities, engineer offices, authorities and businesses.

The emphasis of its activities is on the elaboration and updating of a common set of technical rules and standards and with collaboration with the creation of technical standard specifications at the national and international levels. To this belong not only the technical-scientific subjects but also economical and legal demands of environmental protection and protection of bodies of waters.

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Foreword

Subject of this Advisory Leaflet is dredged material obtained from the maintenance and development of inland water bodies up to the freshwater border. This procedure generally can also be applied to the entire coast region. The volume of dredged material occurring in the Federal States and municipalities has been estimated by company LAHMEYER INTERNATIONAL (1997) – who carried out a survey on behalf of the Umweltbundesamt (UBA – Federal Environment Office of Germany) – between 8 mio. m³ and 10 mio. m³ annually. Additionally, there are between 2 mio. m³ and 3 mio. m³ from the river and navigation authority (WSV – Wasser- und Schifffahrtsverwaltung). Not accounted for have been the volumes which occur in single expansion activities like the development of the project 17 "Incorporation of Berlin in the West German canal system" of the Transport Projects German unity.

The pollution load of dredged material in the case studies described herein, in many cases is assessed according to the Technical Standards No. 20 of the Laenderarbeitsgemeinschaft Abfall [LAGA – Working Group on Waste of the Federal States of the Federal Republic of Germany] "Anforderungen an die stoffliche Verwertung von mineralischen Reststoffen/Abfällen – Requirements to the material recycling of mineral residues/waste – (Residue Directive)" of 1997 and graded under classification code (Z).

The Advisory Leaflet ATV-M 362 "Handling of dredged material", parts 1, 2 and 3 was first prepared in 1997/99 by the ATV-Technical Committee 3.7 „Baggergut aus der Gewässerbehandlung" [dredged material from water treatment]. A new and changed legal basis and additional standards as well as improved technical implementations have necessitated an updating of this paper.

The revised part 2 of the Advisory Leaflet focuses on case studies. As far as possible, the legal classification and relevant standards and approval procedures applicable at the time each case study was realized have been mentioned for the cases presented. However, current procedures which copy appropriate case studies must adhere to actual legal regulations.

Part 1 of the Advisory Leaflet ATV-M 362 "Handling of dredged material" is presently being revised and outlines the estimation of the different utilization possibilities, the basic storage feasibilities and the currently valid legal standards.

Part 3 of this Advisory Leaflet, "Umgang mit Baggergut – Mindestuntersuchungsprogramm" [Handling of dredged material – minimum investigation programme] deals with the programme of the minimum scope of studies and was published in 1999.

Authors

This Advisory Leaflet has been prepared by the ATV-DVWK-Fachausschuss AK-7 "Baggergut aus der Gewaesserbehandlung" [ATV-DVWK Technical Committee AK-7 "Dredged material from water treatment"].

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Authors of technical contributions, who are not members of the Technical Committee, will be named as originator of their contributions.

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This Advisory Leaflet is the result of honorary, technical-scientific/economic collaboration which has been achieved in accordance with the principles applicable therefore (statutes, rules of procedure of the ATV-DVWK and the Standard ATV-DVWK-A 400). For this, according to precedents, there exists an actual presumption that it is textually and technically correct.

The application of this Advisory Leaflet is open to everyone. However, an obligation for application can arise from legal or administrative regulations, a contract or other legal reason.

This Advisory Leaflet is an important, however, not the sole source of information for correct solutions. With its application no one avoids responsibility for his own action or for the correct application in specific cases; this applies in particular for the correct handling of the margins described in the Advisory leaflet.

Scope

Part 2 of the Advisory Leaflet ATV-DVWK-M 362 “Handling of dredged material“ is a demonstration of practised means to avoid, relocate, use, recycle and dispose of dredged material in case studies.

The Advisory Leaflet is directed to the public, approving authorities and to all those in the Federal Republic, the Federal States and municipalities, who have to deal with the disposal of dredged material from the maintenance and development of water bodies. They are herewith provided with instructions for the handling of dredged material.

Because of the complexity of the pollution load and different conditions on site, it will not be possible to apply a single and comprehensive procedure that covers all eventualities. The development therefore will always result in **solutions for an individual case**.

The individual case studies or parts of them have to be understood as modules, which, depending on the problem (or purpose) and starting situation can be joined to new module-combinations, where ecological and economical aspects play an important role in the choice of approach to solve a problem.

The compilation is not complete, and cannot be because of the manifold combination possibilities of the available modules, especially since new developments and new focal points have to be observed.

Here, we would like to refer the reader to a publication of the Working Group I/17, the PIANC (1996). The second volume published at the end of 1997 (as CD-ROM), contains about 100 brief descriptions of suitable and available sampling, dredging, transportation, recycling and storage procedures for contaminated dredged material. Furthermore, approximately 20 international case studies on the storage of dredged material are documented in this publication.

Die ATV-DVWK Working Group WW-2.5 “Sedimentation removal from reservoirs“ has compiled an extensive work report entitled “Sedimentation removal from reservoirs” (ATV-DVWK 2004).

Some case studies are also contained in the comprehensive compilation issued by CALMANO (2001).

Case Studies

1 Avoiding, Relocation, Immediate Use

1.1 Avoidance/Reduction of Dredged Material

The legal dispute, whether dredged material is to be considered as waste, is to be taken from the Advisory Leaflet ATV-M 362-1.

Wastes are to be avoided according to § 4 para. 1 No. 1 KrW-/AbfG – Waste Disposal Act –.

Hence, it is first to be examined whether dredged material can be avoided or minimized. At federal waterways in Germany, a general avoidance of dredged material within the frame of maintenance and development and in view of the transportation safety obligations is not possible under normal circumstances without effecting the national economy. In specific cases, however, the volume of dredged material can at least be reduced on a long-term basis, partly even avoided entirely by means of hydraulic measures.

The most promising method of reducing the quantity could be a purposively planned dredging measure, which requires the dredging volume to first be defined and an exact adherence to the set standards when dredging, to avoid excess dredged volumes.

A reduction of occurring dredged material can be achieved, if for example the entries to harbour basins or the setting of longitudinal walls would be arranged parallel to rivers.

The design of groynes in hydraulic measures can contribute to the reduction of dredged material.

To which extent the maintenance of water bodies of the Federal States or municipalities (drainage channels etc.) can be reduced, is generally difficult to answer. Dredging becomes immediately necessary when the runoff of water can no longer be guaranteed because flood retention basins or impoundments are filled with sediments.

Dredged material is often aggregated alongside the water body (e. g. to the right and left hand side of a trench) to form an earth bank. However, in heavy rain there is the special danger that wet material may partly slide back into the water body.

Environment-friendly dredging techniques

There are a number of special dredging techniques available, which are differentiated by their hoisting capacity in respect of surface and depth, material density (portion of make-up water), turbidity and material loss during the dredging process. The dredging techniques therefore have to be examined (CEDA/IADA 1998) individually whether they are suitable in respect of their environment-friendliness and efficiency depending on the condition of the dredged material

A suitable precise technique will avoid an excess delivery of dredged material. This topic is treated by the IJsseloog project (see case study 2.6), VAN RAALTE (1997) and MINK (1997).

1.2 Avoidance of Dredged Material/Sedimentary Deposit in Water Bodies – Current Deflection Wall

method:	avoidance in the water body
design:	current deflection wall in the “Hamburg Hafen”
assessment data:	
origin	eddies with increased sedimentary deposit
quantity	reduction by 140,000 m³/a
soil characteristics	sand and silt, lightly argillaceous
chemical condition	size related contamination of the fine grain similar to that of the actual suspended solids content
special criteria	nautical frame conditions are to be observed where applicable
legal classification/standards:	permission according to water legislation