



# 6. Croatian Forum

on

## Sustainable Construction

01. 12. 2012

ZAGREB

## Recycling of C & D – waste

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# OEKOTECHNA

## Business Activities

- ♦ Waste Management
  - „Sorting isle“ for separate collection on Construction sites in order to increase the recycling rate
  - sorting plant for C & D – waste
- ♦ Recycling
  - 3 mobile recycling facilities
  - 2 stationary recycling plants
  - production of quality controlled recycling-granulate-material of about 350.000 to/p.a.

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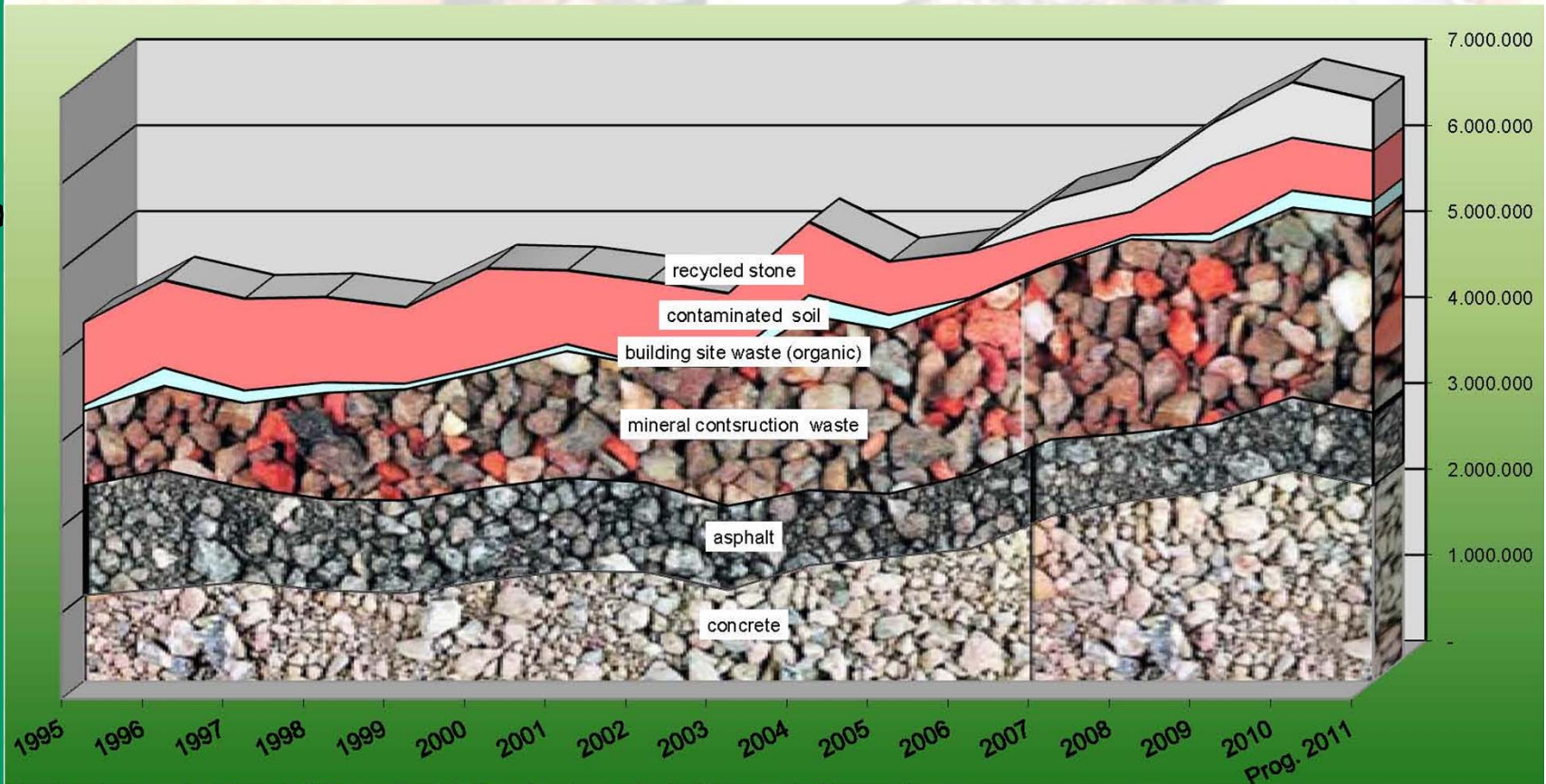
- ♦ landfill for excavation and demolition materials (300.000 t/a)
- ♦ Remediation of landfills and contaminated soils
- ♦ landfill constructions
- ♦ Redevelopment of contaminated constructions (e.g. asbestos)
- ♦ research and development

## Recycling Materials in Austria

- Waste accumulation (C&D-waste): 6,5Mio. t
- Rate of recycling: 80 %
- Proportion of recycled material on prime building material: 10 %
- Number of BRV recycling plants: 120
- Recycling plants with quality certificate 15
- Members of BRV: 75



## Recycling Construction Waste in Austria



## Waste directives, laws and guidelines in Austria

- 1989 ALSAG : Introduction of taxes for deposit of C & D – waste in landfills
- 1990 AWG : Obligation for reuse, reutilization, recycling
- 1991 BRM-Trenn-VO – Decree for the separation of construction waste
- 1992 Guideline for Recycled Construction Material
- 1996 DVO – directives for landfills
- 2002 Quality label for Recycling Construction Materials
- 2009 Guideline 8<sup>th</sup> edition, including the targets of EN 13242 and EN 12620
- 1990/91 Austria Construction Materials Recycling Association (BRV)  
Austrian Construction Materials Quality Assurance Association (GSV)



## Act on the Remediation of Contaminated Sites (landfill tax)

The landfilling of waste is subject to the so called „**ALSAG fee**“ which has to be paid in following situations:

- landfilling with non-hazardous waste
- storage longer than allowed
- adaptations of site (dams, railway tracks, foundations)
- backfilling of excavation material
- burning of waste
- export

## Applicable Law

### Act on the Remediation of Contaminated Sites AISAG fee (landfill tax)

<b>Classes / subclasses of landfills Waste classification</b>	<b>Since 1st January 2012 per ton</b>
<b>Landfills for non-hazardous wastes</b>	
Demolition debris	€ 9,20
Residual material	€ 20,60
Mass waste	€ 29,80

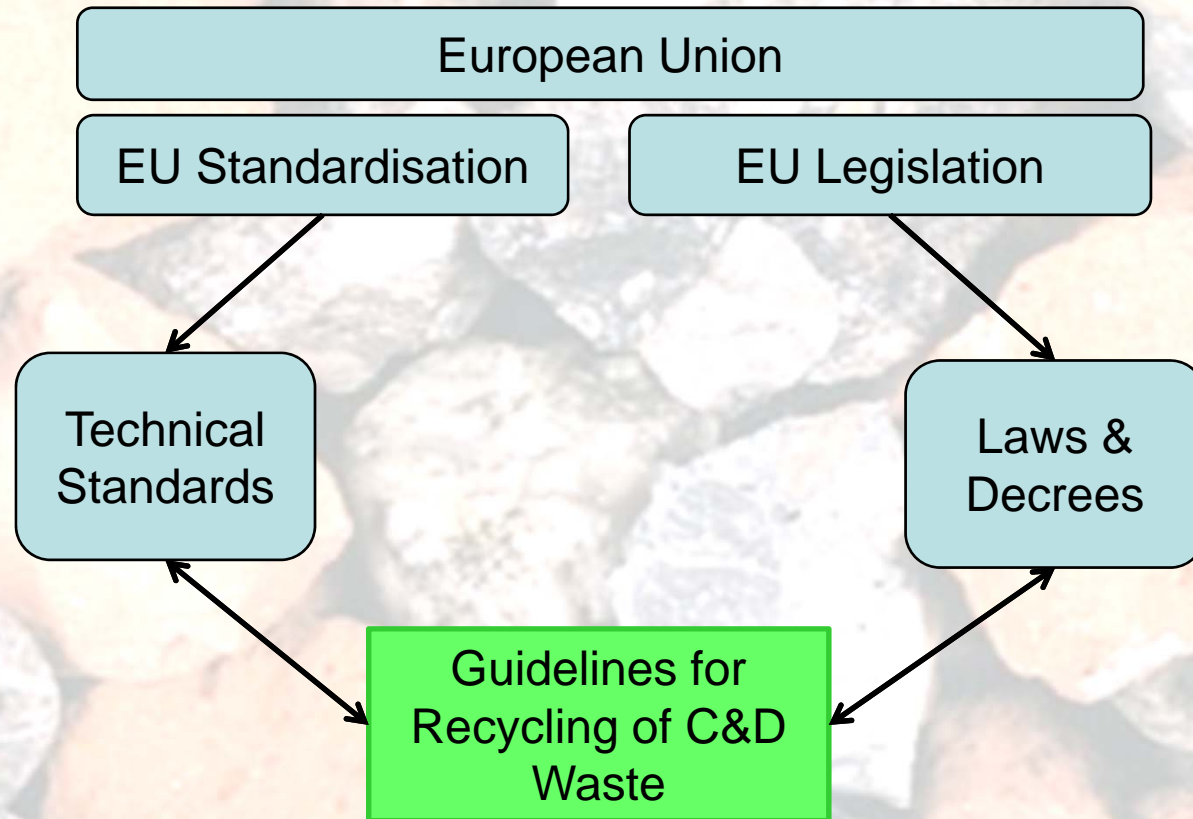
Information: No landfills for hazardous waste in Austria (incineration facilities)



## Waste Hierarchy



## Development of Guidelines





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# cen

Comité Européen de Normalisation

Europäisches Komitee für Normung

# Aggregates

Aggregates for mortar

→ EN 13139

Aggregates for concrete

→ EN 12620

Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas

→ EN 13043

Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction

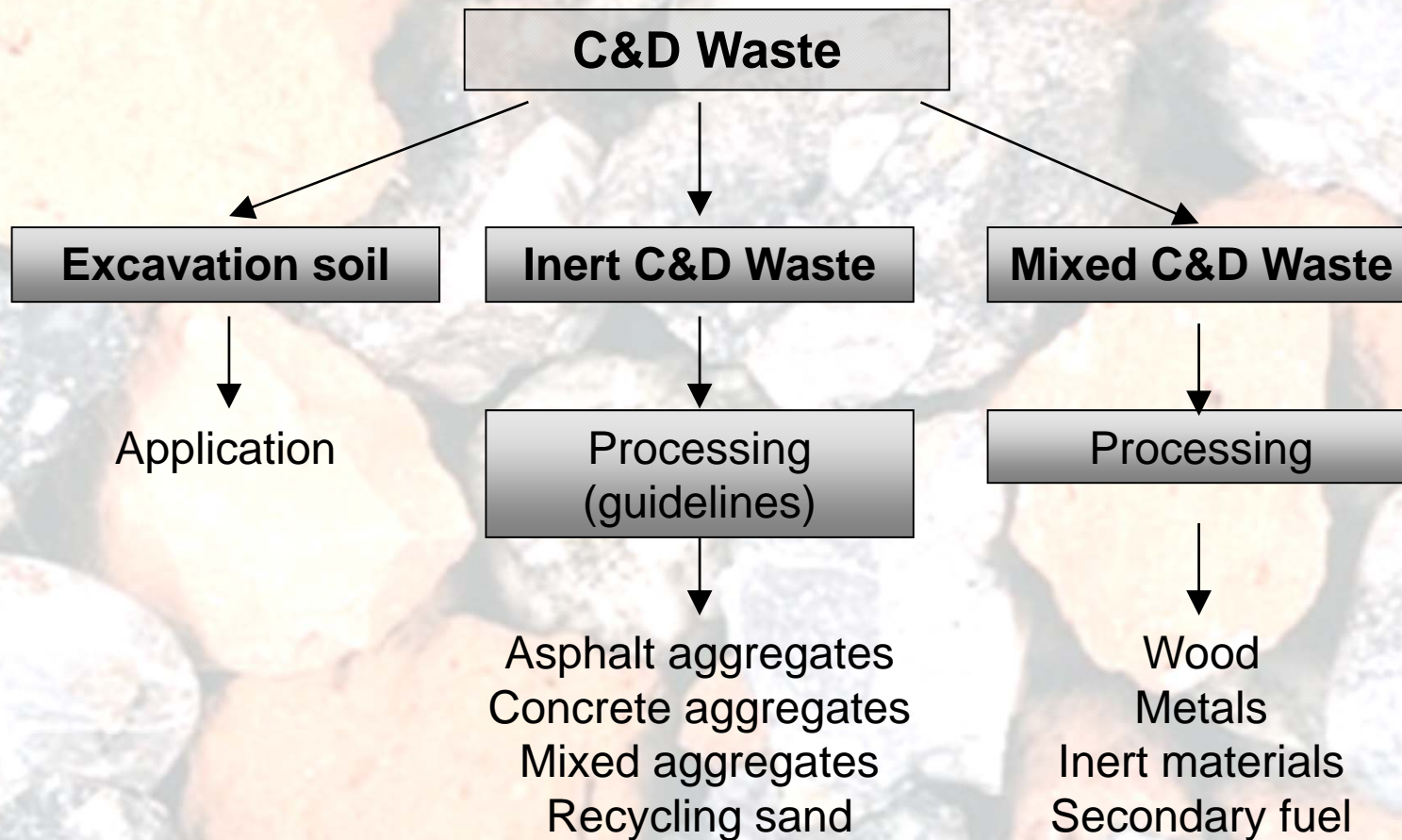
→ EN 13242



## Purpose

The aim of these additional orders is, to complement existing harmonized product standards in order to fulfil the environmental performance requirements; however, just to the extent that an CE marking is possible in Member States without installing further national requirements.

## Development of Guidelines

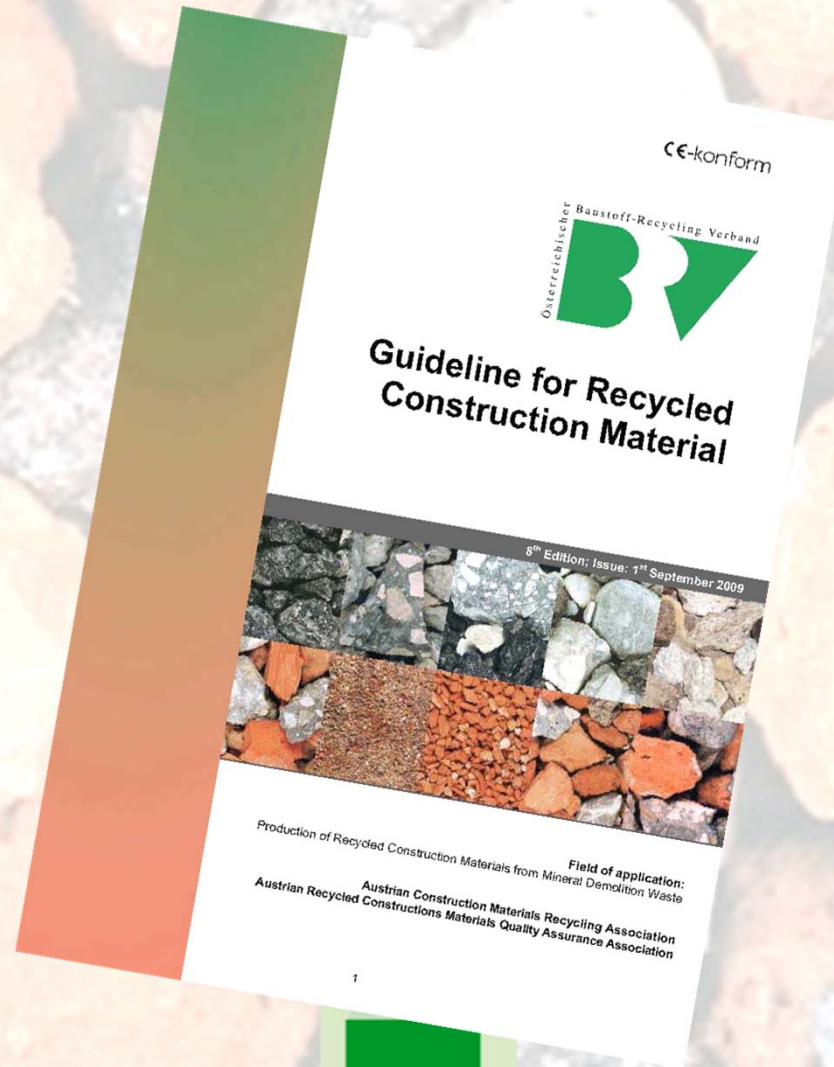




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# Guideline for Recycled Construction Material

8<sup>th</sup> Edition; Issue: 1<sup>st</sup> September 2009



## Technical Guidelines and Bulletins

### Guideline for Recycled Building Materials:

Field of application

Norms and technical regulations

General requirements

Engineering properties – grading regulations

Environmental compatibility – quality regulations

Applications

Grade and quality surveillance

Acquiring of quality marks for recycled building materials



## **Field of application**

This guideline regulates the production of quality proven recycled construction materials made from demolition waste for standardized applications. Setting grade and quality standards it also determines the kind and the extent of assessments which have to be carried out on recycled construction materials.

## Designation of recycled construction materials Quality of Use

### RA – Recycled crushed asphalt granulate

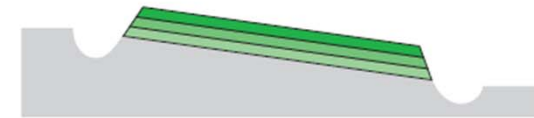


### RA

#### Recycled crushed asphalt granulate



Quality building materials for  
upper unbound base layers,  
lower unbound base layers,  
bound base  
agricultural roads,  
Aggregate for asphalt production



### RB – Recycled crushed concrete granulate

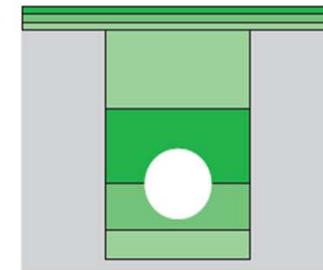


### RB

#### Recycled crushed concrete granulate



Quality building materials for  
unbound top and bottom base layers,  
cement-bound base,  
agricultural roads,  
Aggregate for concrete production, quality  
backfilling for trenches, drainage layers





## Quality of Use

**RAB** – Recycled crushed mixed asphalt and concrete granulate

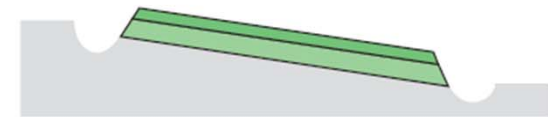


**RAB**

Recycled crushed mixed asphalt and concrete granulate



Quality building materials for upper unbound base layers, lower unbound base layers, bound base, agricultural Infrastructures



**RM** – Recycled crushed granulate mix of concrete and asphalt.

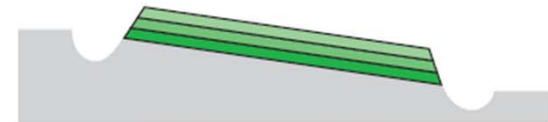


**RM**

Recycled crushed granulate mix of concrete and/or asphalt with a maximum content of stone (natural and/or recycled) of 50%



Quality building materials for upper unbound base layers, lower unbound base layers, bound base



## Quality of Use

**RZ** - Recycled brick sand;  
recycled brick

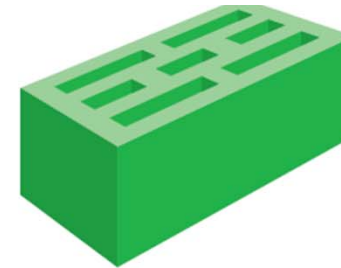


**RZ**

Recycled sand from  
bricks; recycled  
gravel from bricks



**Quality building materials for**  
Additive for the production of  
Masonry stone, concrete and  
lightweight concrete,  
Stabilization, drainage layers,  
Fillings, embankments



**RHZ** – Recycled brick sand as  
well as brick gravel gained from  
above-ground construction

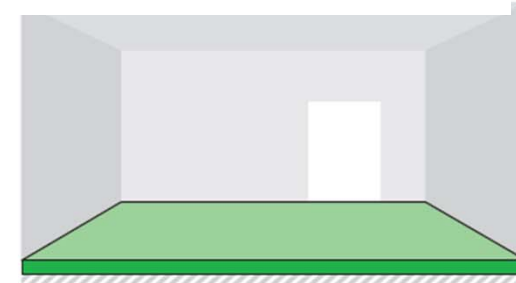


**RHZ**

Recycled sand from bricks  
used for above ground  
structures; recycled gravel  
from bricks used for above  
ground structures



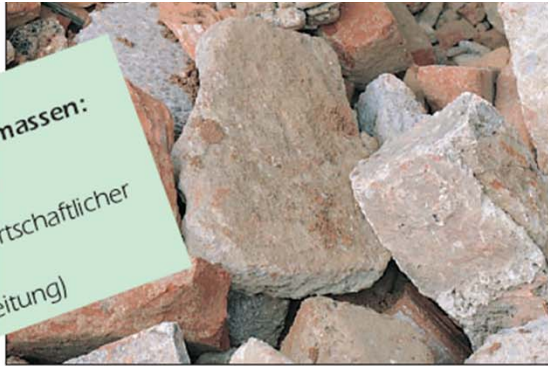
**Quality building materials for**  
Additive for the production of  
Masonry stone, concrete and  
lightweight concrete,  
Stabilizations, fills, embankments,  
screeds





## Quality of Use

**RH** – Recycled sand or gravel from above-ground construction



**RH**

Recycled sand from above ground structures; recycled gravel from above ground structures



### Qualitätsbaustoff für

stabilisierte Schüttungen, stabilisierte Künettenverfüllungen, Bauwerkshinterfüllungen, Sportplatzbau



Quality building materials for stabilized embankments, backfilling for trenches stabilized, backfilling for constructions, construction of sport fields

**RMH** – Recycled mineral demolition wastes from above ground construction

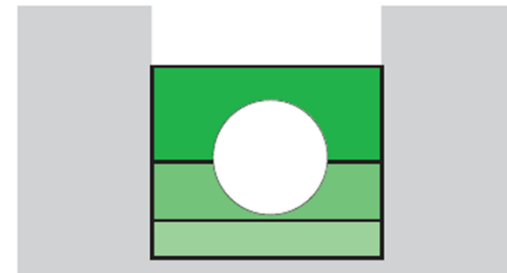


**RMH**

Recycled mineral demolition waste from above-ground structures



Quality building materials for backfilling for trenches, embankments, drainage construction of sport fields



## Quality of Use

### RS – Recycled sand

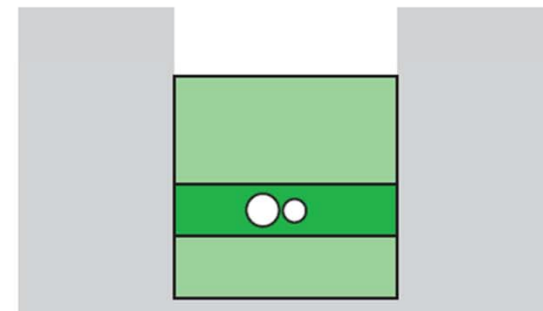


### RS

#### Recycled sand



**Quality building materials for**  
the ballast of energy and telecommunications  
cables (cable sand), duct, e.g. by channel,  
gas and water pipes, and for other  
infrastructure





## Recycling construction examples



## Recycling construction examples





## Recycling construction examples



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## Recycling construction examples





## Recycling construction examples





## Recycling construction examples





## Recycling construction examples



# Classifications – Quality guarantee (see guidelines)

1. Grade Classes – Civil Engineering  
Grades S, I, II, III, IV  
- different specifications for road constructions
2. Quality Classes – Environmental Compatibility  
Quality A<sup>+</sup>, A, B  
- according to their composition (limits of different parameters)  
- and form of application

Form of application	Hydro-geolocial delicate area	Hydro-geological less delicate area
Unbound without cover layer	Quality class A <sup>+</sup>	Quality classes A <sup>+</sup> , A
Unbound with cover layer or in bound form with or without cover layer	Quality classes A <sup>+</sup> , A	Quality classes A <sup>+</sup> , A, B
Aggregate	Quality classes A <sup>+</sup> , A, B	Quality classes A <sup>+</sup> , A, B



Definition of hydro-geological less delicate area:

An area is to be considered less delicate in respect of hydro-geological conditions if it shows the following criteria:

- ❖ existence and sufficient efficiency of layers with low permeability
- ❖ sufficient distance from ground water supplies

The application of recycled construction materials is not permitted in

- ❖ water-source protection areas
- ❖ areas with changing groundwater levels

# Classifications – Quality guarantee (see guidelines)

## 3. Quality Management

### External Control

Charge of an independent laboratory

Examination report

Result report

Operating and result report of the internal control

### Internal Control

Regular operating reports

Regular result reports

must be presented to the ÖGSV



# Quality Management

## Quality Seal on Recycled Construction Materials:

Its award is subject to periodic external and internal quality assurance reviews as specified.

### CE:

Declaration by the manufacturer that the product meets all the appropriate provisions of the relevant legislation implementing certain European Directives



## Propositions for new User

- 1.) Political intention  
Change of the topical bad habits by new regulations, deliveries and controls
- 2.) Execution of EU-law (waste framework directive, landfill .....)  
Application of the technical standards  
Ban and control of wild depositions / dumps
- 3.) Taxation of depositing waste or on new minerals  
Promotion of Recycling Products by improved competition ability
- 4.) Adaption the technical standards of EN 13242  
Aggregate of raw materials or recycling granulates used for civil engineering work and road constructions
- 5.) Croatian Guidelines for Recycled Construction Materials  
→ see the Austrian Guidelines



## Propositions for new User

- 6.) Regulations for recycling plant-installations  
Regulations for noise- and dust-emissions
- 7.) Establishing of a market under ecological conditions
- 8.) Educational measurements  
applicative of efficient ressources
- 9.) Promotion, Control  
Promotion for - installation of sorting and recycling plants  
- applications  
Control of legal utilisation
- 10.) The image of recycling products should be better than of primary materials

## European Quality Association for Recycling e.V. (EQAR)

**Founded in 2005**

**Members: Austria, Bosnia-Herzegovina, Germany,  
Netherlands, South Tyrol/Italy, Switzerland,  
Czech Republic, Netherlands, Ireland, Slovakia,**

**activities concentrate on:**

- Promoting international cooperation and experience sharing between national quality protection organisations and their members,
- Transfer of know-how
- Supporting the dissemination of thinking on quality protection and quality assurance for recycled building materials at European level.

***President: Wierichs, Germany;***

***Vicepresident: Günter GRETZMACHER, Austria***



**THANK YOU  
for your attention**

**Ing. Günter Gretzmacher**

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