



## Potential and Barriers of Recycled Concrete – View of the Public Authorities

Final Conference **SeRaMCo**

**Secondary Raw**

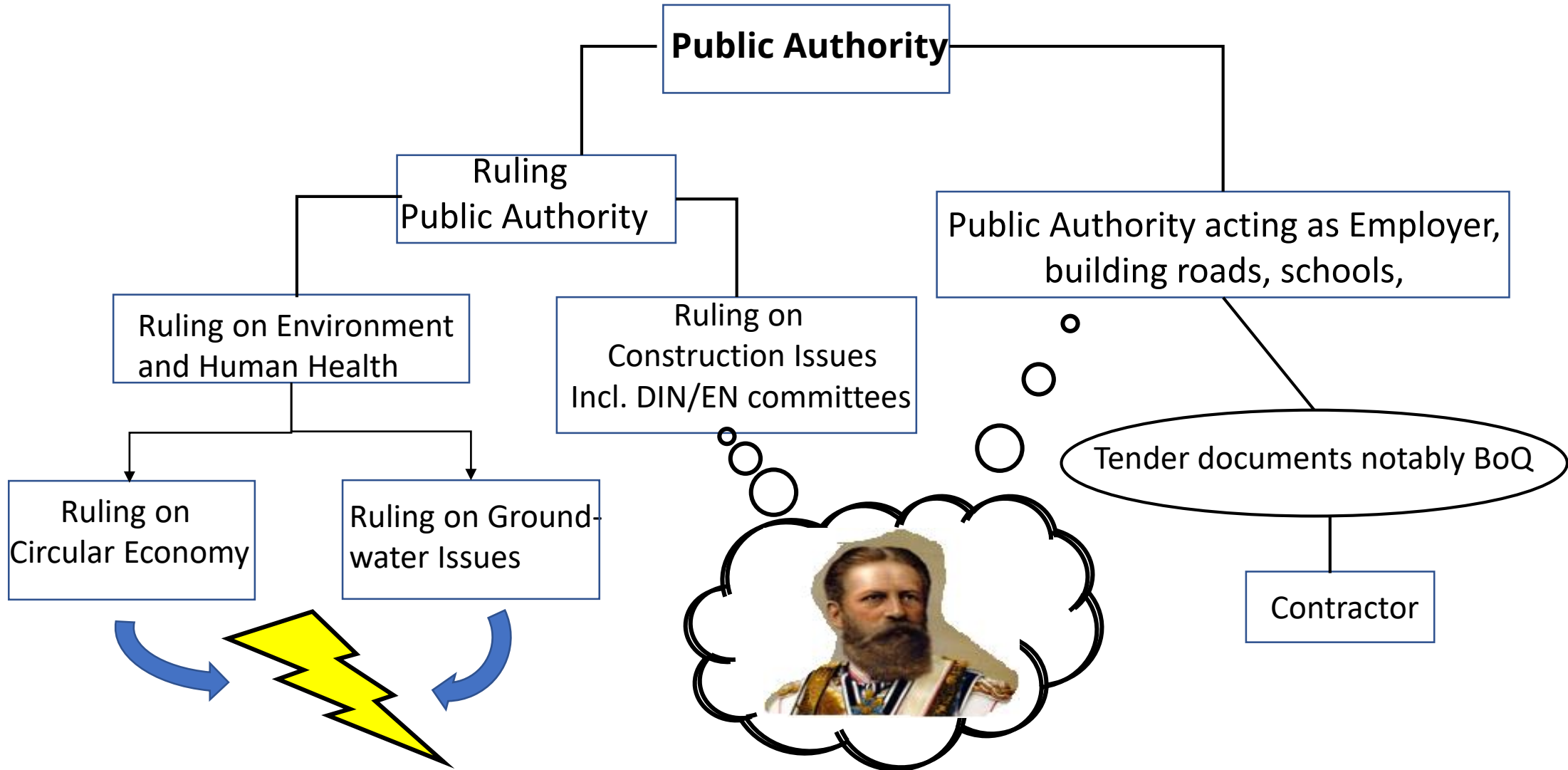
**Materials for Concrete**

**Precast Products**

Peter Dihlmann

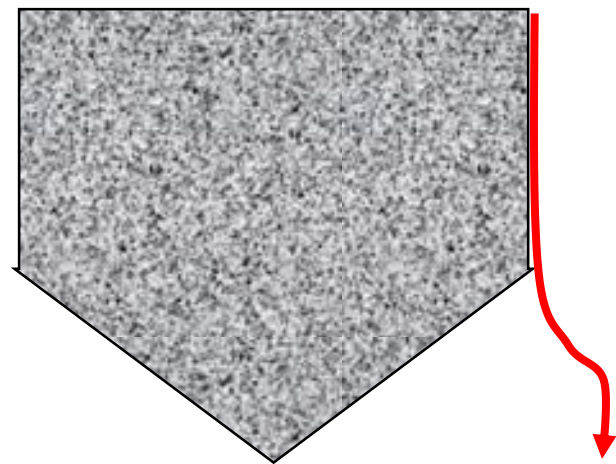
Retired senior official, Ministry for the Environment  
Baden-Wurttemberg, Stuttgart, Germany

# Who is Public Authority?



## Material flow – Status Quo versus potential

99% of aggregates made of demolition waste are being used as bulk material, meaning in layers for road construction or for re-fill purposes.



99% Bulk material

1 % concrete aggregates

Why that?

**Could be increased to up to 10 to 15%**

# Tendering: Automated Bill of Quantity (Standardleistungsbuch) – Stage 1

click-on....

<input type="radio"/> Foundation	<input type="radio"/> C 16/20
<input checked="" type="radio"/> Concrete floor	<input type="radio"/> C 20/25
<input type="radio"/> Wall	<input checked="" type="radio"/> C 25/30
<input type="radio"/> Ceiling joist	<input type="radio"/> C 30/37
<input type="radio"/> Column	<input type="radio"/> C 35/45

Fill in...

Thickness  
*20*  
 ..... cm

Quantity  
*15,000*  
 .....,..... m<sup>3</sup>

Finalised text of the Bill of Quantity

Concrete floor, Quality C25/30, 20 cm Thickness, 15,000 m<sup>3</sup>

Unit price    total price

.....            .....

# Tendering: Automated Bill of Quantity (Standardleistungsbuch) – Stage 2 and 3

click-on....

<input type="radio"/> Foundation	<input type="radio"/> C 16/20	<input type="radio"/> Recycled Aggregates
<input checked="" type="radio"/> Concrete floor	<input type="radio"/> C 20/25	
<input type="radio"/> Wall	<input checked="" type="radio"/> C 25/30	<input checked="" type="radio"/> Recycled Aggregates not allowed
<input type="radio"/> Ceiling joist	<input type="radio"/> C 30/37	
<input type="radio"/> Column	<input type="radio"/> C 35/45	

Fill in...

Thickness	Quantity
..... 20 cm	..... 15,000 m <sup>3</sup>

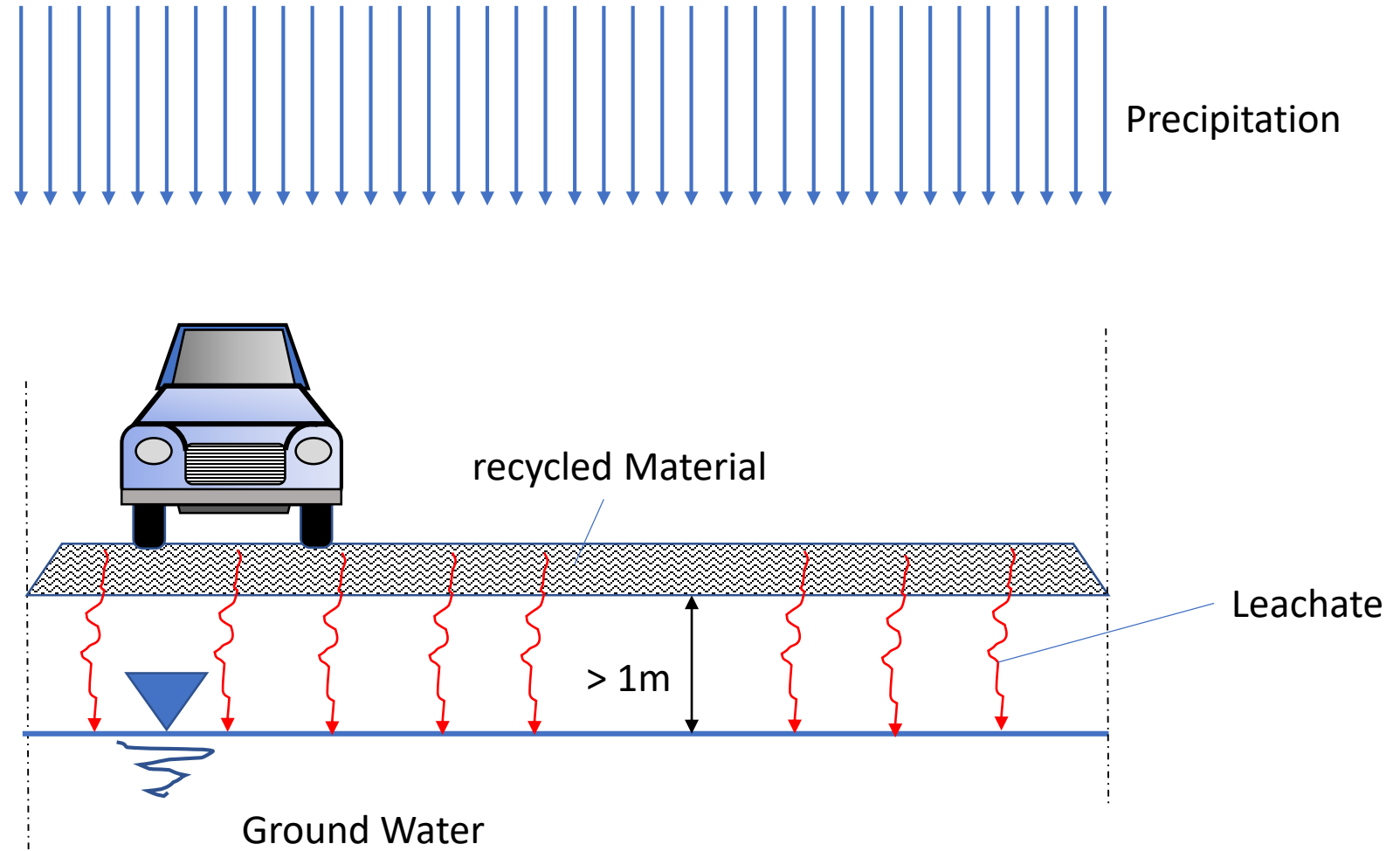
Finalised text of the Bill of Quantity

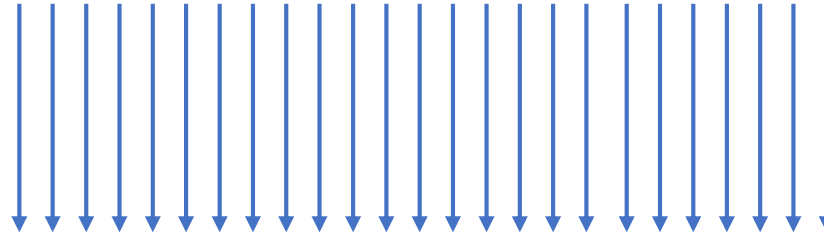
Concrete floor, Quality C25/30, Recycled Aggregates not allowed 20 cm Thickness, 15,000 m<sup>3</sup>

Unit price    total price

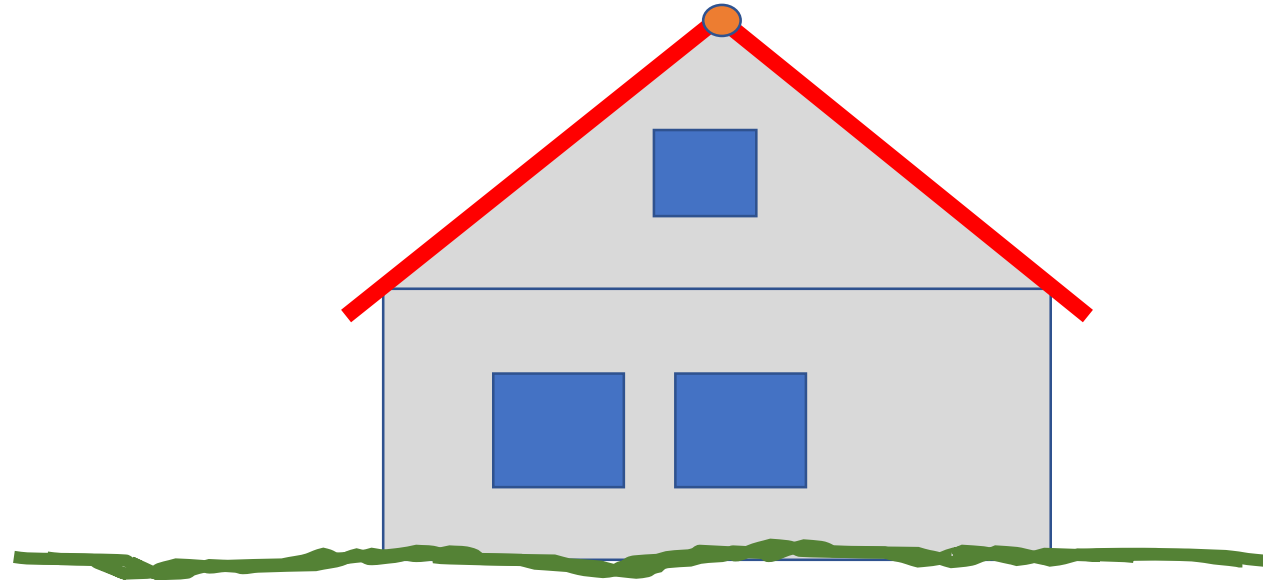
.....                    .....

Draw back  
of use as bulk material:  
**Impact on groundwater**





Precipitation



Limit values are not under discussion

Draw back  
of use as bulk material:  
**Impact on groundwater**

**Table 1: Limit values for ready-to-go aggregates to be used in road construction or similar purposes according to an ordinance**

Nr.	Parameter	Draft Limit Value (µg/l)
1	Chromium	150
2	Copper	110
3	Vanadium	120
4	PAH	4
5	Sulfates	600.000

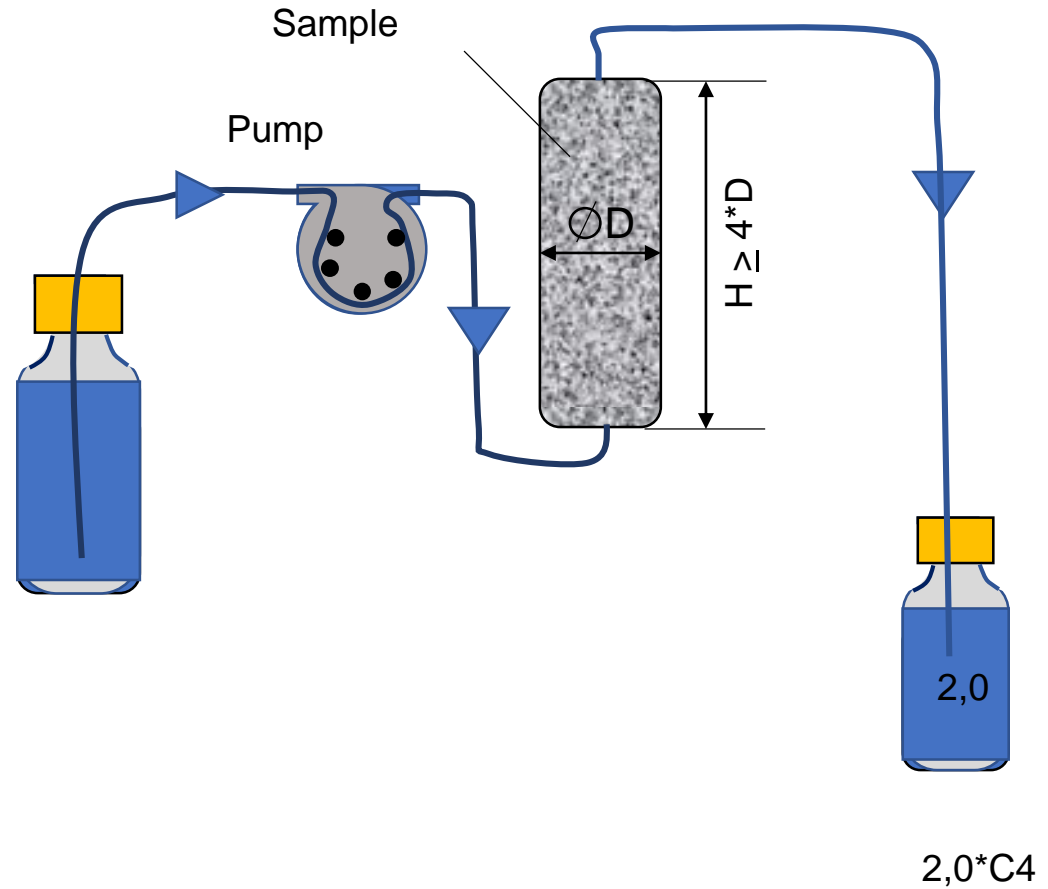
About 50 % of all prepared demolition waste meet these limit values,

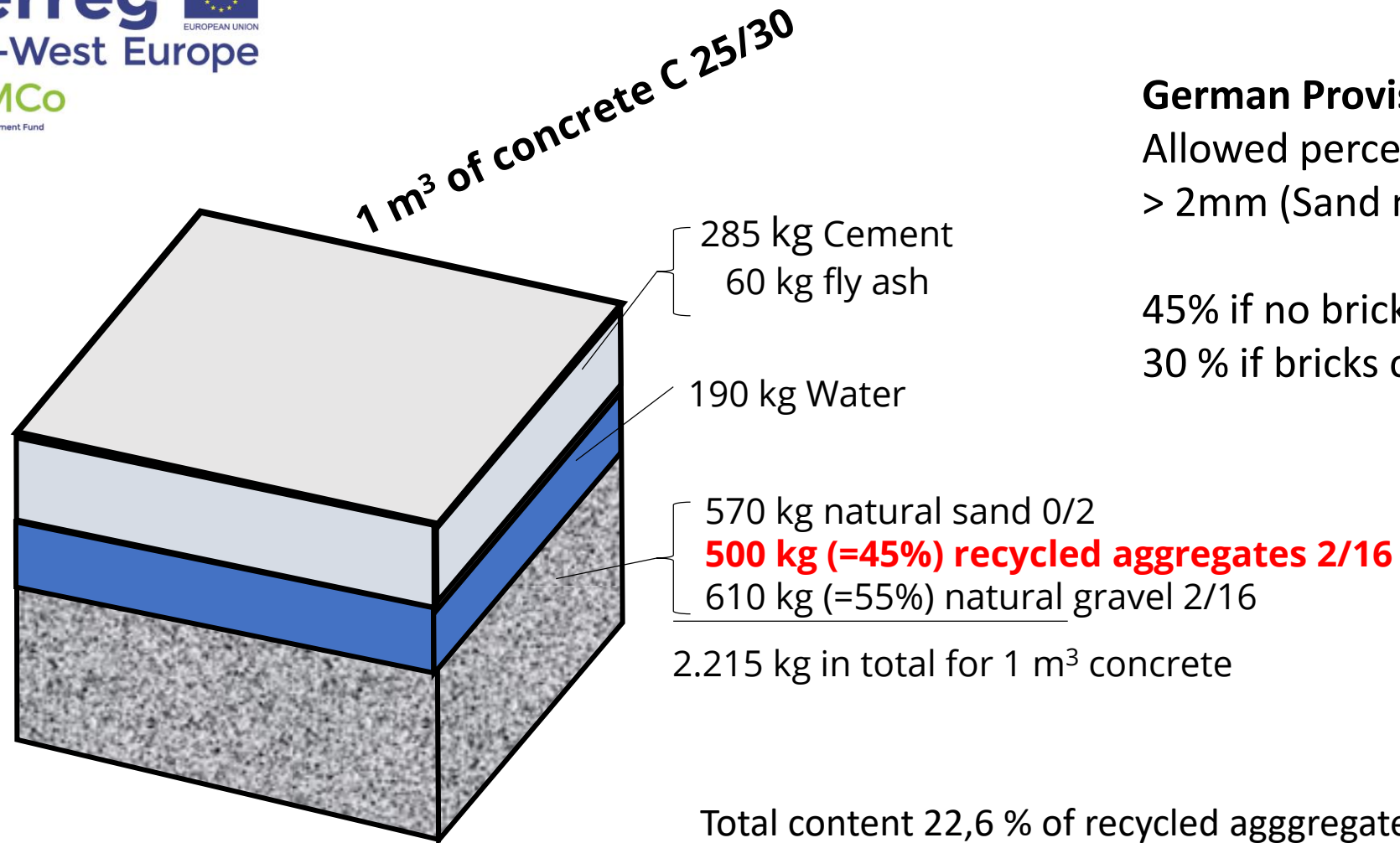


## Cross-flow-test according to DIN 19528

**Excursion:**  
How do we check these limit values?

Distilled water





### German Provisions

Allowed percentage of RC-Aggregates  
> 2mm (Sand not to be replaced)

45% if no bricks contained  
30 % if bricks contained

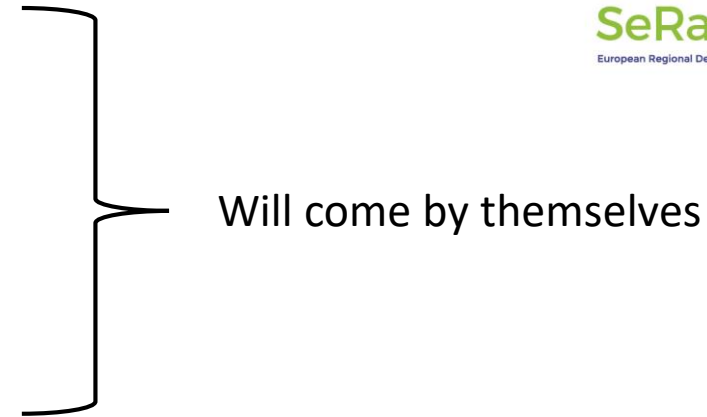
**Table 2: Limit values for ready-to-go aggregates to be used in concrete according to DIN 4226-101 (excerpt only)**

Nr.	Parameter	Limit Value
1	Chromium	100 µg/l
2	Copper	200 µg/l
3	Vanadium	n.a.
4	PAH	25 mg/kg
5	Sulfates	600.000 µg/l

About 90- 95 % of all prepared demolition waste meet these limit values,  
**NO** debate on becoming more stringent

## Effects that will push R-Concrete:

- Tighter **and more complicated** requirements for Groundwater Protection for use as bulk material
- Less road projects
- Shortage on landfills
- Shortage on natural resources
- Better sorting of demolition waste by e.g. Robots → Need scientific support and investment
- An Aggregates Levy as in UK → Need political will



## Effects hampering R-Concrete

- Conservatism of authorities tendering projects and authorities setting rules
- Conservatism of architects and designers
- Investment in concrete mixing plants
- So far no robust situation in terms of available quantities

## Summary

- 1** The author estimates that the quantity used at present as concrete added aggregate could be **increased by a factor of 15 (!)**.
- 2** Some side-effects might **push** R-concrete **automatically**
- 3** **Controversial:** The author recommends to consider a financial incentive (**levy on aggregates**)
- 4** Need for **open minded** authorities especially when they act as employers contracting building projects. .... **That is why we should create convincing facts!**