

# Hydroseeding of woody plants in immature soil on trafficway slopes

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(BRÜCKNER 2006)

## Introduction

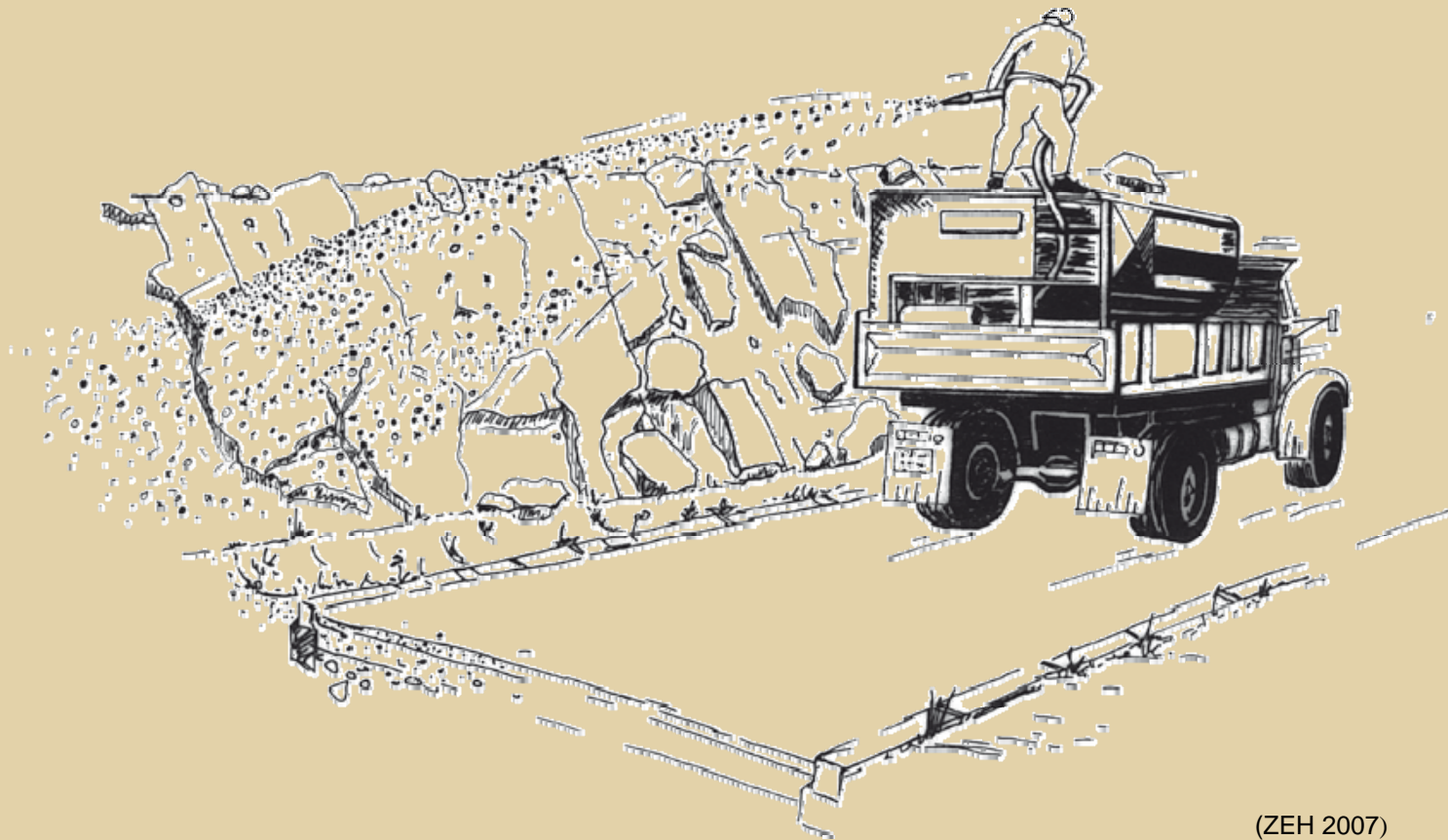
- Due to earthworks and road construction slopes of untreated soils have developed.
- It is essential to cover the slopes of immature soil with vegetation by planting or sowing to protect them from erosion / soil runoff.
- The only method to establish vegetation on this extreme sites without surface soil (steep terrain, stony ground, ruggedness, strong radiation and aridness) is by sowing. A support by soil improvers etc. depends on the conditions.
- Using woody plants or grasses and herbaceous plants depends on conditions regarding locations and on the planned aim vegetation.
- Aim vegetation = local adapted plant community of woody plants, which achieves the Soil Bioengineering tasks of erosion protection.

## Slope rearrangement / preliminary works

- Adjustment of the natural slope stability to get a rendered stable
- Creating a texture with shaping the ground to produce an open-pored, slightly uneven earth surface (where plants can settle easily)
- Terracing the slope or use a berm construction for easier access and handling
- Subsurface drainage for controlling the downstream of hillside ground water in pipes or channels

## Sowing of woody plants – techniques

- **Hydroseeding**
- Manual seeding



(ZEH 2007)

## Sowing of woody plants – techniques

- **Hydroseeding**

**Construction procedure and application:**

To promote the development of a woody plant community on extreme sites where planting is impossible, seeds from woody plants are sprayed onto the surface together with aggregates and water. For hydroseeding, only small seeds which are able to pass pipes and nozzles are suited.

**Material:**

Small seeds of woody plants, water, soil improvers, growth enhancers, bacteria and mycorrhiza cultures, mulch material, biological glue, if necessary

**Time of construction:**

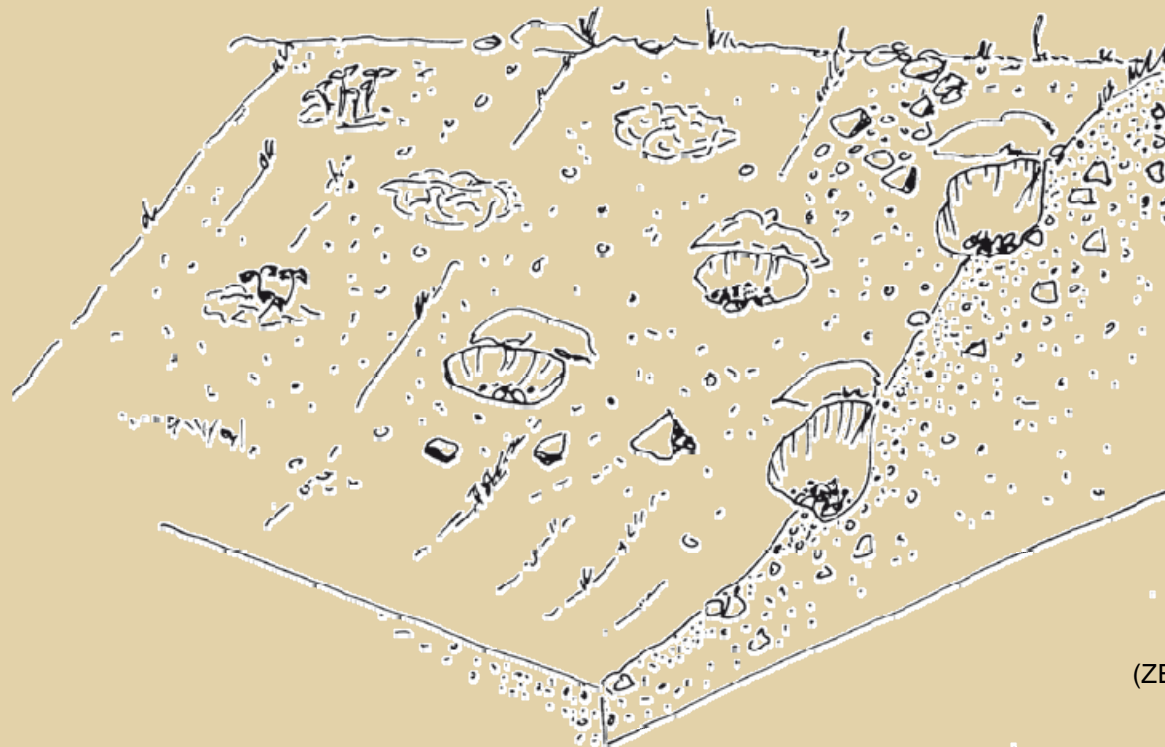
during the vegetation period  
at the beginning of a wet period

**Time required:**

3 min./m<sup>2</sup>

## Sowing of woody plants – techniques

- Hydro seeding
- **Manual seeding**
  - for large seeds from woody plants which cannot be distributed mechanically and small seeds from woody plants to be planted at specific locations



(ZEH 2007)

## Main thesis

Seedings of woody plants are the best method for erosion protection of slopes in extreme sites.

## Main questions

Which are the stability limits for seeding woody plants on slopes at extreme sites?

What happens to the Bioengineering erosion protection regarding to the successive development of the woody plant communities? Does it work permanent?

Is the Bioengineering erosion protection still given according to the development of the root connections inside the woody plant communities?

Is seeding of woody plants a good method for combine aspects of technological slope protection, ecology, (aesthetical) landscaping and economy?

## Actual state of work

- Formulation of technical and ecological bases regarding to seeding of woody plants
- Survey and evaluation of several slopes (on various sites and of different ages), which were vegetated by seeding of woody plants

## Still to be done

- Relation between vegetation development of slopes on different sites and of different ages
- Analysis of the successive plant community development and root connection regarding to aim vegetation and erosion protection



## First Results

There are no fundamental erosion marks at the proved slopes with woody plant stocks by seeding – **permanent erosion protection** (The development of seeding woody plants is local adapted since the germination):

- Development to a closed vegetal coverage
- Stable root connection

The aim vegetation will be achieved.

Using seeds of woody plants from the surrounding areas or regional seed-banks saves the genetic biodiversity and affords the best regional adaptation at the macro climate.

Woody plant stocks, sowed by the same seed mixture, develop differently depending on the exposition of the slope (it depends on the micro climate).

## Example for different expositions:

### Aichelbergaufstieg in Baden-Württemberg (close to Stuttgart)

**Expositions:** north / northeast (1),  
south / southwest (2)

### Woody plant communities:

1 - *Rhamno-Cornetum* or *Pruno-Ligustretum*

2 - *Corylo-Rosetum* (OBERDORFER 1992)



# Thank you for attention!

## References

GESELLSCHAFT FÜR INGENIEURBIOLOGIE E.V. 2000:  
Ingenieurbiologie. Sicherungen an Verkehrswegeböschungen

OBERDORFER 1992: Süddeutsche Pflanzengesellschaften

ZEH 2007: Soil Bioengineering. Construction type manual



## Discussion

Using seeds of woody plants from the surrounding areas or regional seed-banks saves the genetic biodiversity and affords the best regional adaptation at the macro climate.

Woody plant stocks, sowed by the same seed mixture, develop differently depending on the exposition of the slope (it depends on the micro climate).

- Does it seem logical to use several seed mixtures of various species on different slope expositions (to achieve the best local adaptation)?
- Or is the using of one site seed mixture enough for an rich successive development itself on different expositions?