



行政院農業委員會水土保持局

Soil and Water Conservation Bureau,
Council of Agriculture, Executive Yuan

優質·效率·團隊

土工纖維土應用於坡面工程

Application of Geofiber Technology in Slope



水土保持局 技術研究發展小組

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2016.11.22

Contents

1. Concept of Geofiber
2. Characteristic
3. Design and Execution
4. Applications

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Applicable Slope

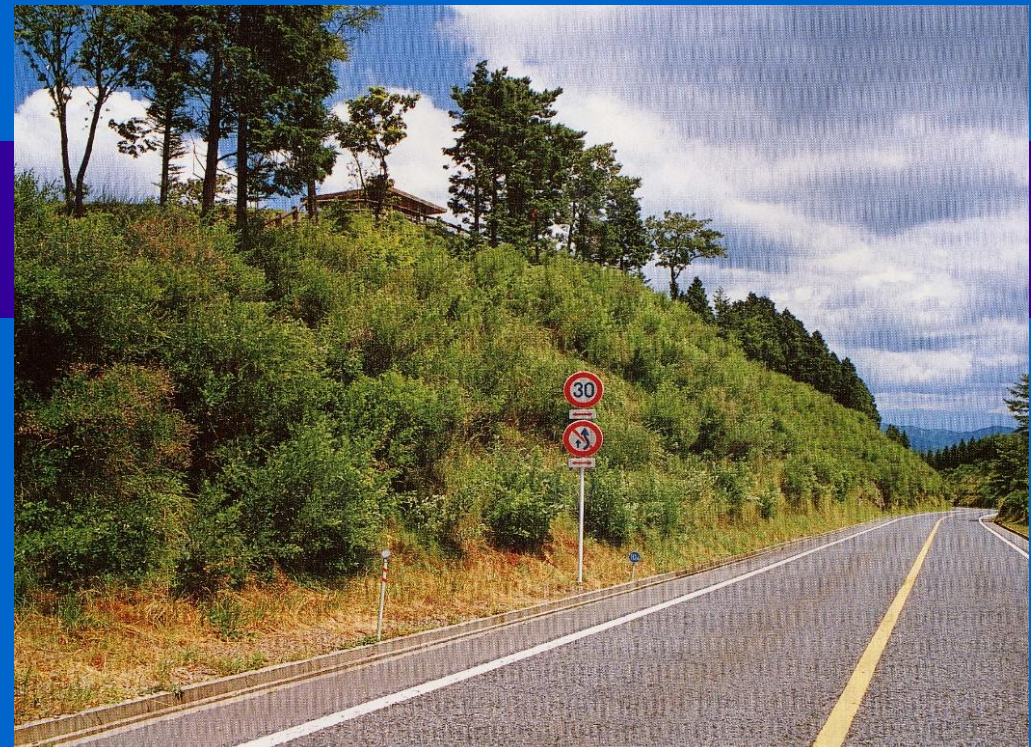


Rock face slope



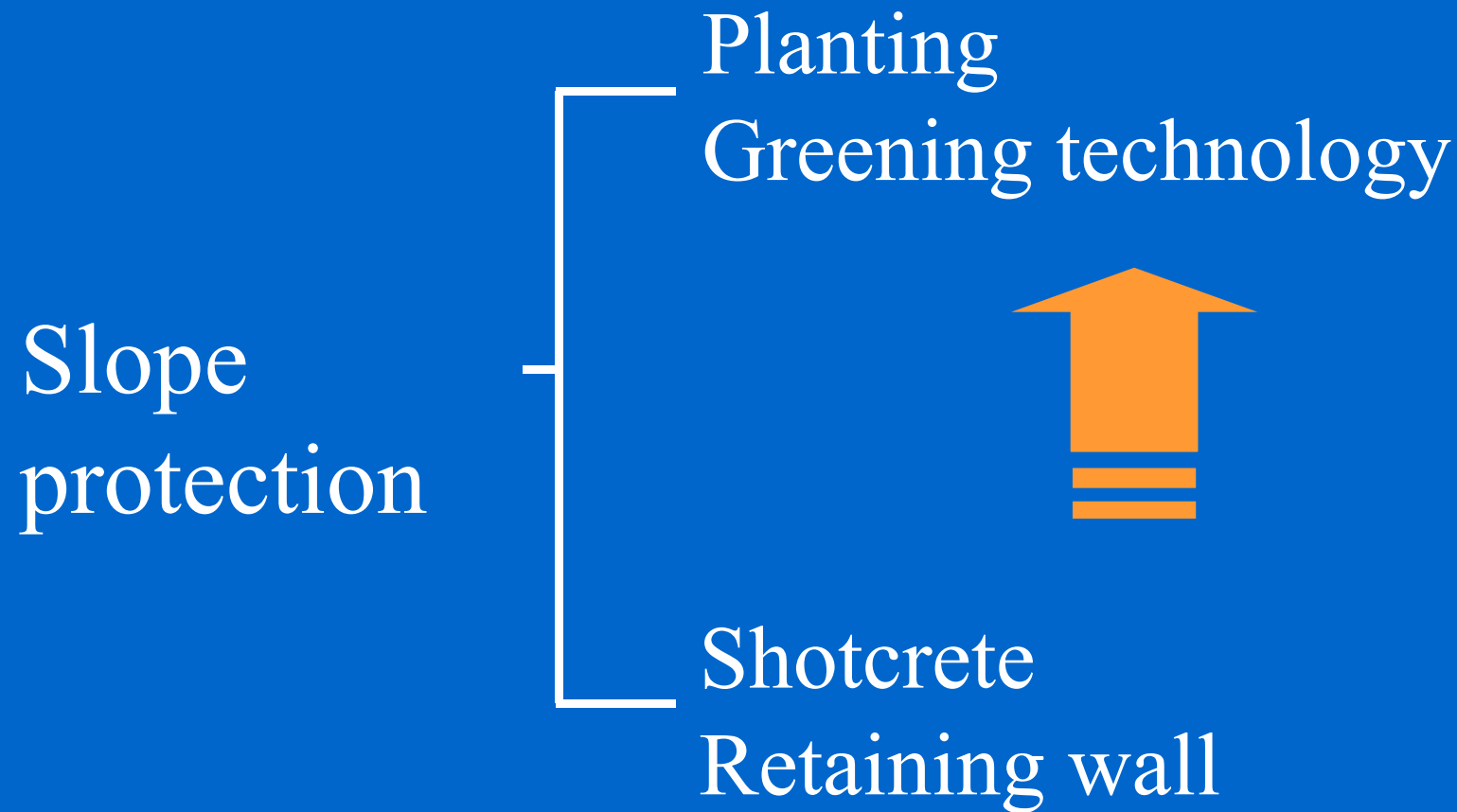
Disaster





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Required technology for Slope Protection



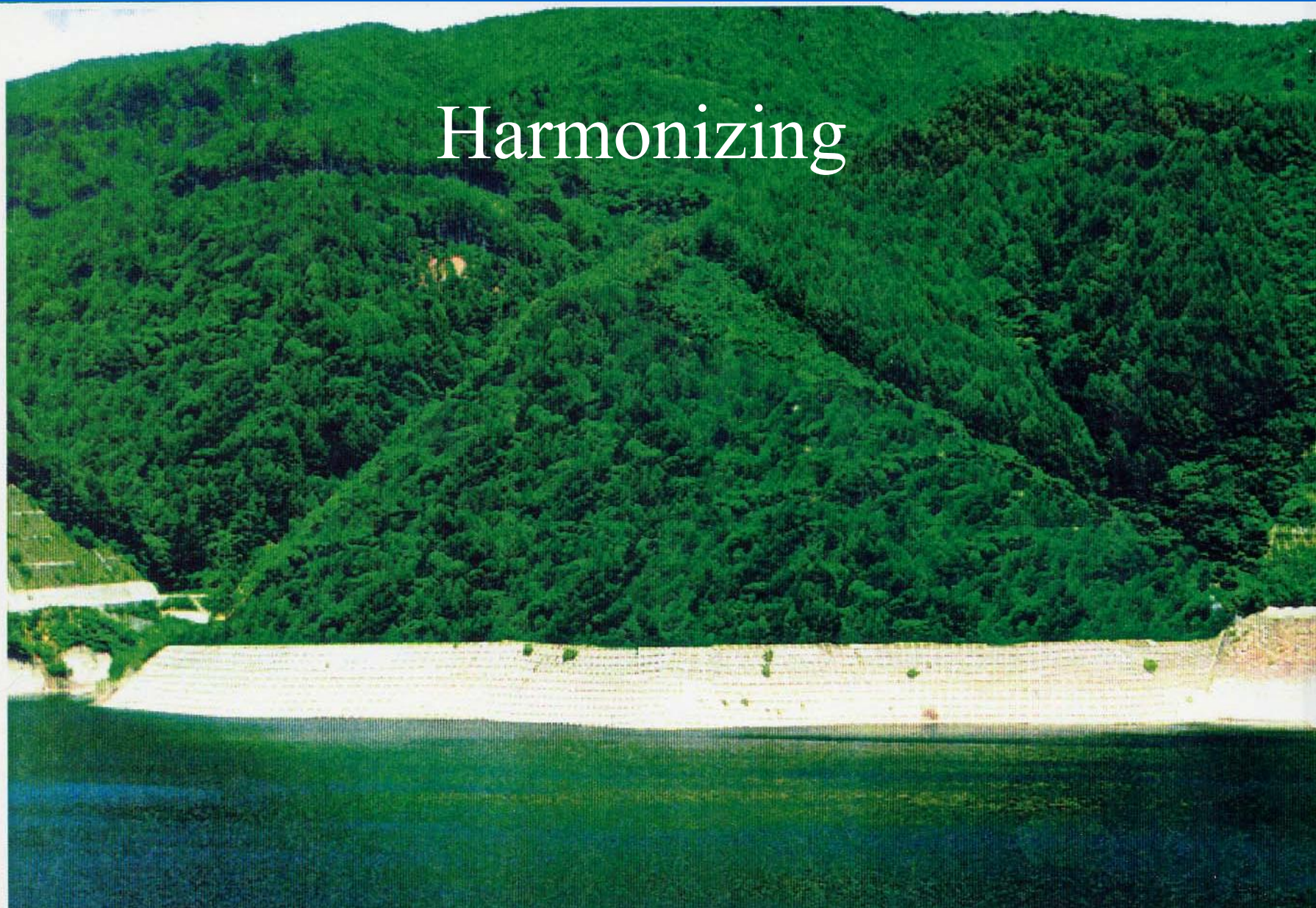
- Concrete Grid+ Vegetation Base

Artificial Landscape

▪ Non Harmonization

'99 6 10

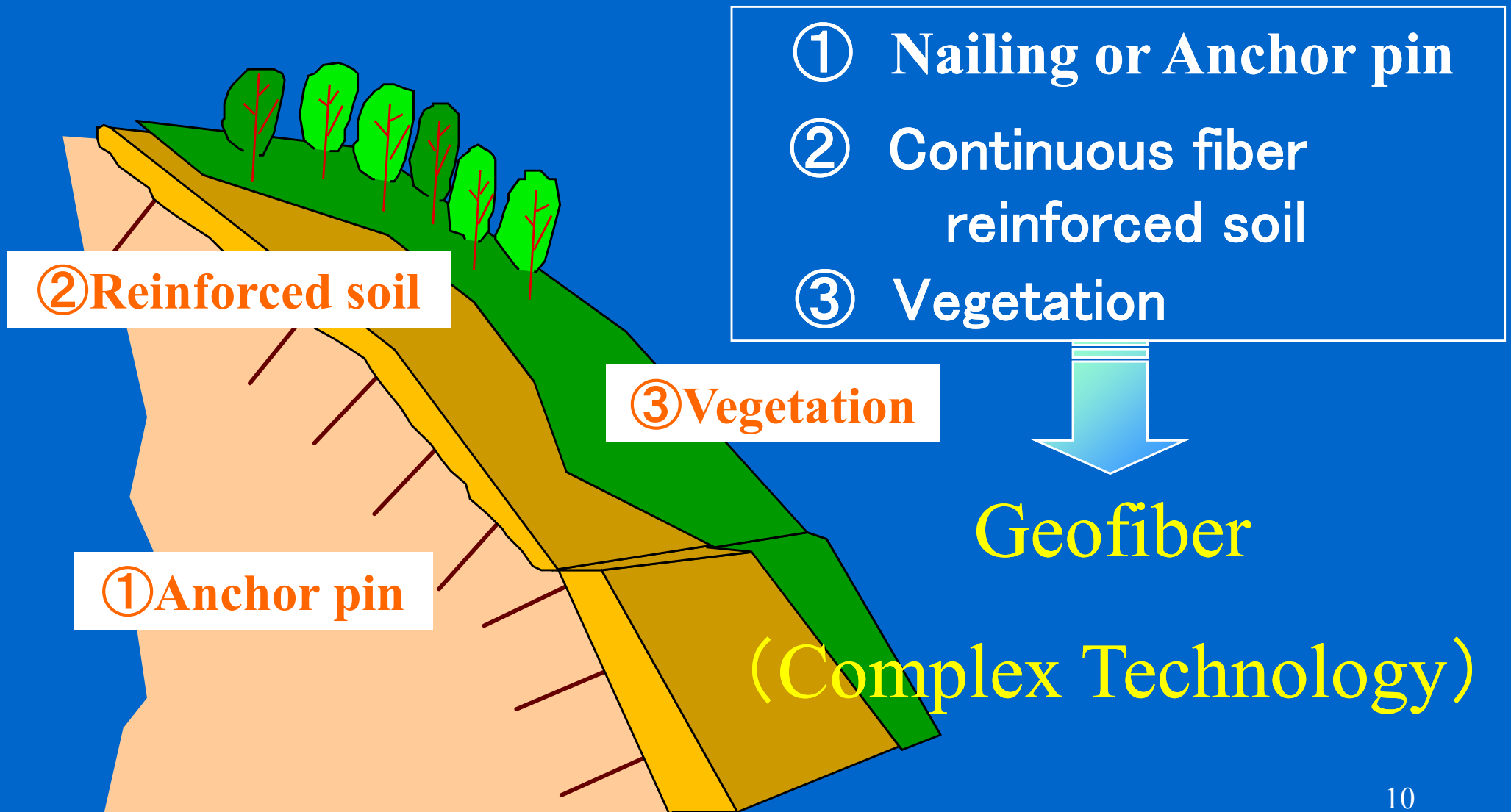
Harmonizing



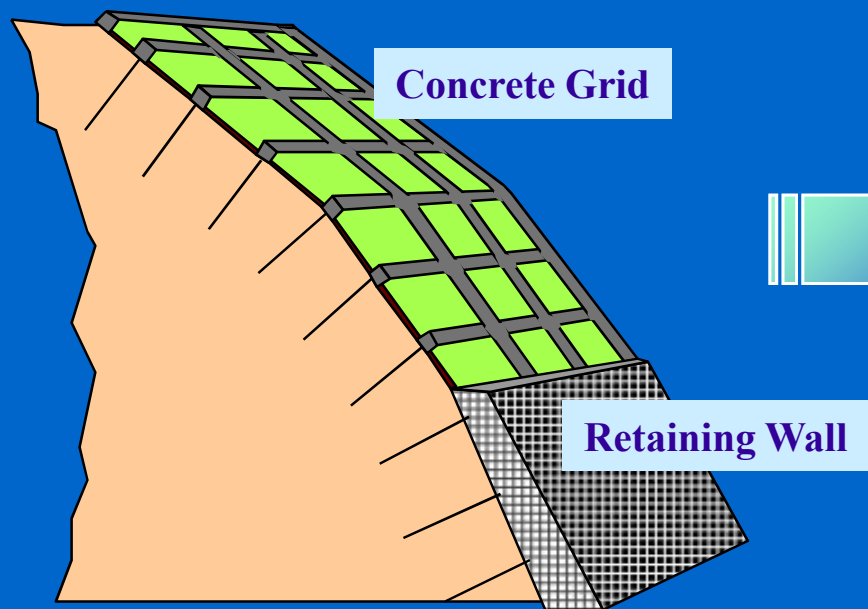
Geofiber : Approved Technology



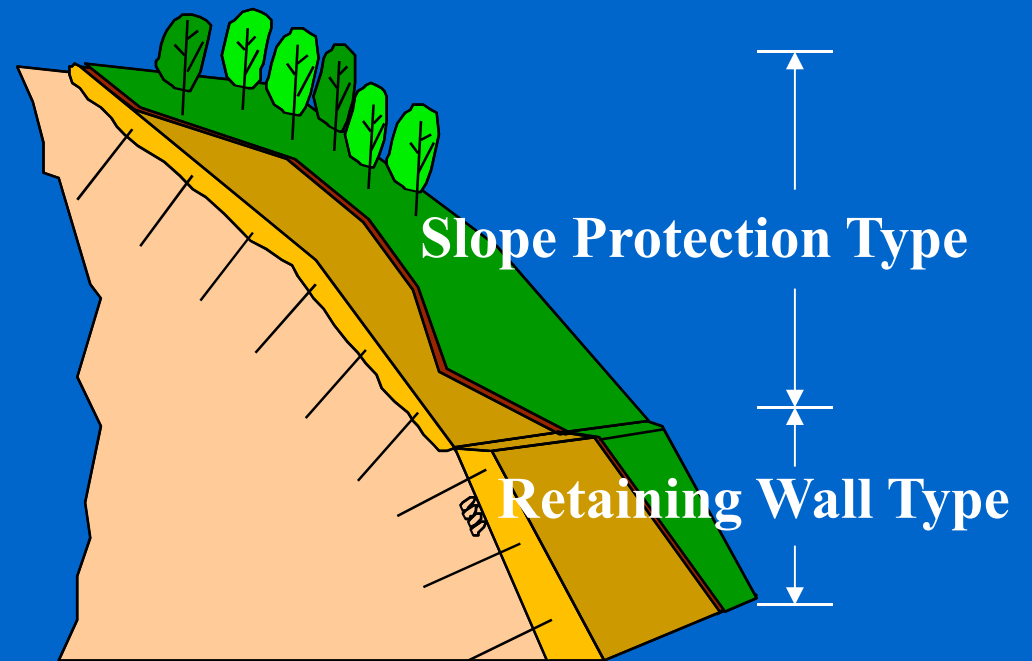
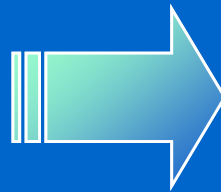
Geofiber Method



Conventional Method Vs Geofiber



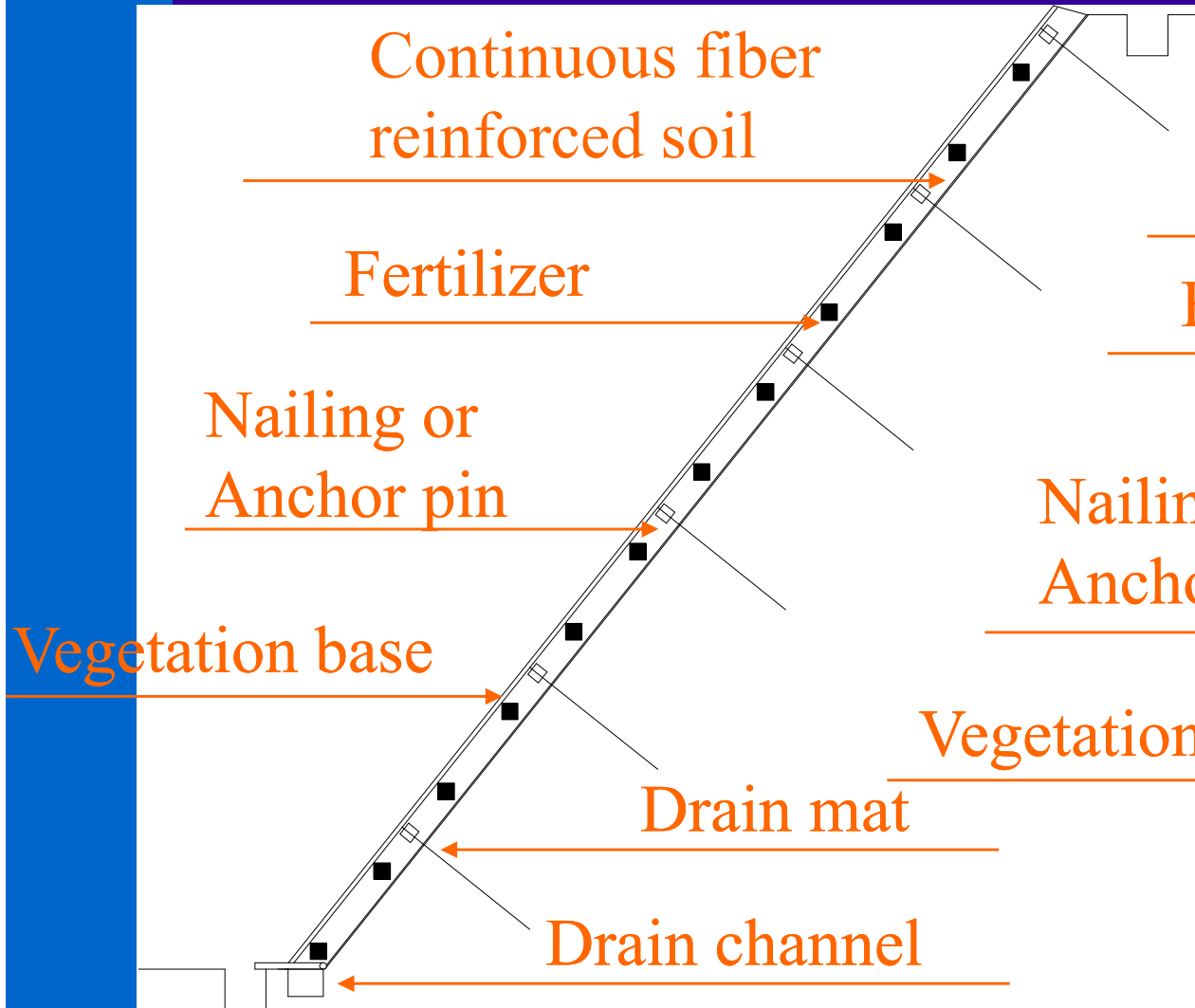
Conventional Technology



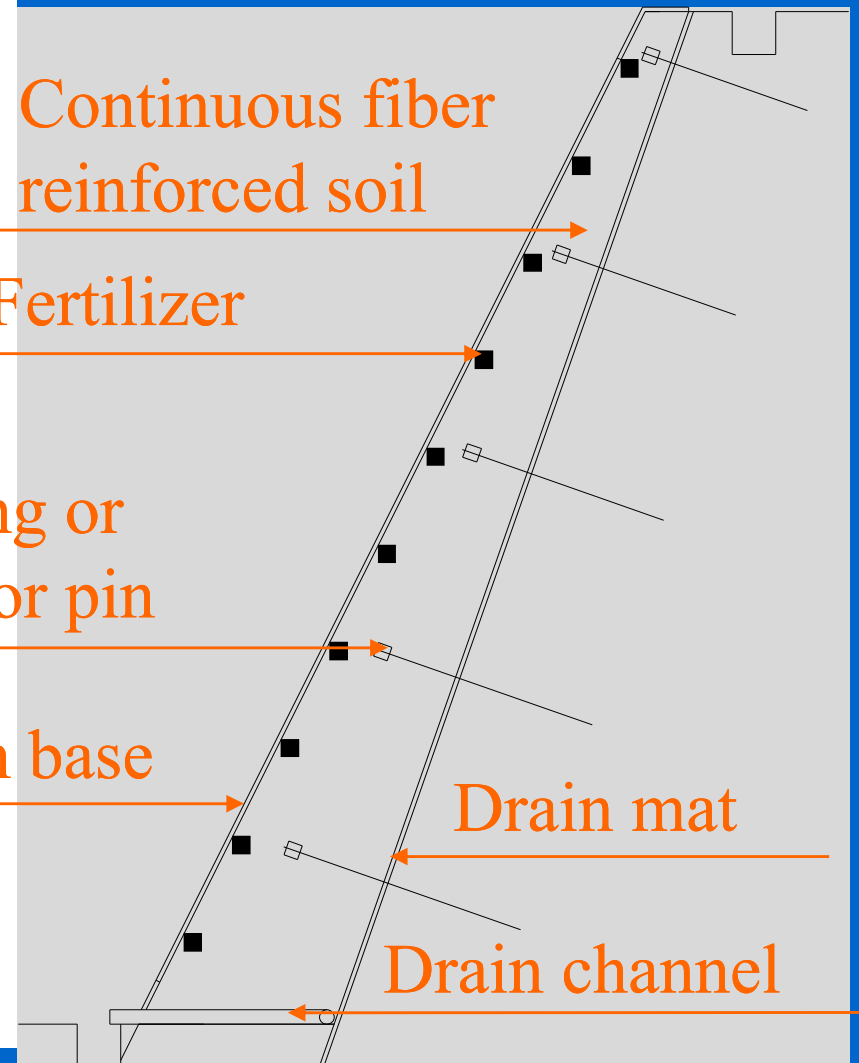
Geofiber Method

Geofiber Method :

Slope Protection Type



Retaining Wall Type



Continuous Fiber Reinforced Soil

■ Complex Material with Sandy Soil and Fiber



Continuous Fiber
(Recycled Material)



Reinforced Soil

Recycled Material

◆ Continuous Fiber



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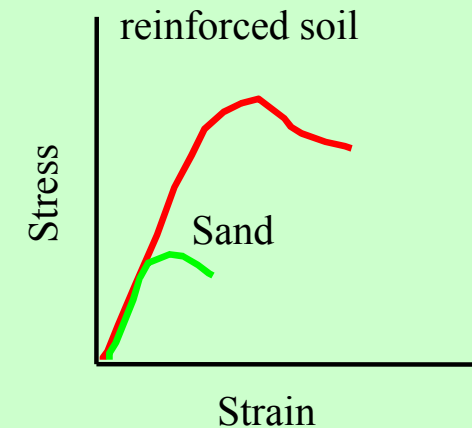
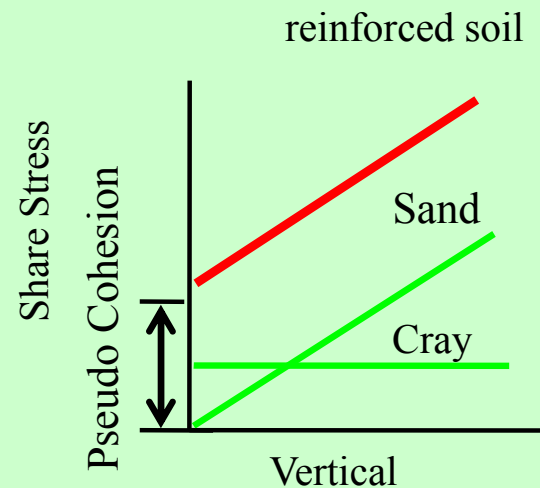
Standard Combination of Continuous Fiber Reinforced Soil

Standard Combination Table

Material	Standard	Quantity	Remark
Sandy Soil		1m ³	
Continuous Fiber	Polyester	3.3kg	
Fertilizer	Organics	1 or 2 peices/m ²	
Admixture		If needed	

Characteristics

- Give Pseudo Cohesion
- Increase the Residual Strain
- Erosion Resistance
- Permeability
- Plant Base



Mechanical Concept

Construction Equipment

- Application to Various Conditions
- Approved Mechanical Technology



Handy Type

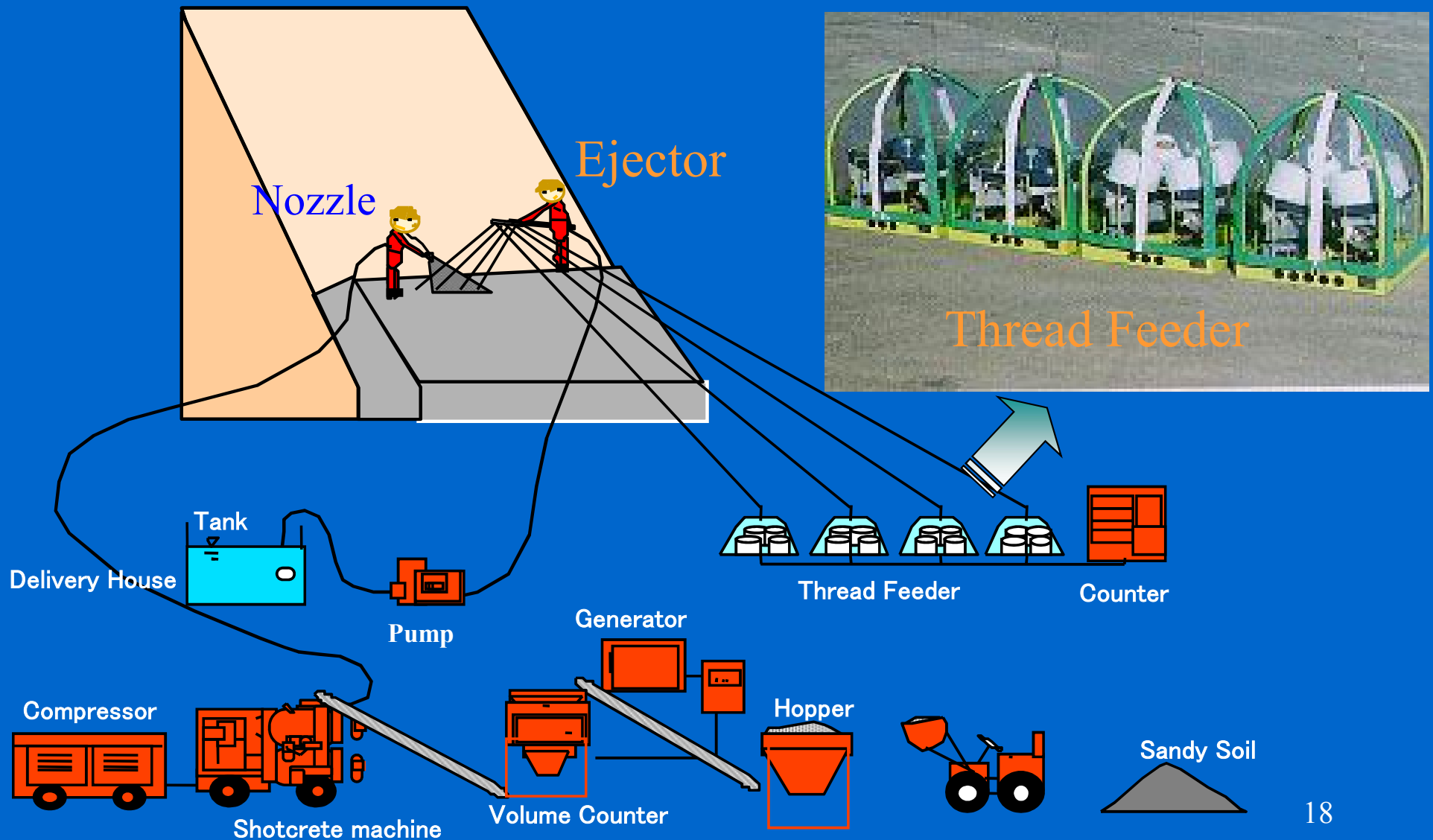


Robot M type



Robot L type

Construction System (Handy Type)



Construction

Continuous Fiber

Sandy Soil





2003 11 26
20



2003 11 26
21



2003 11 26



2003 11 26

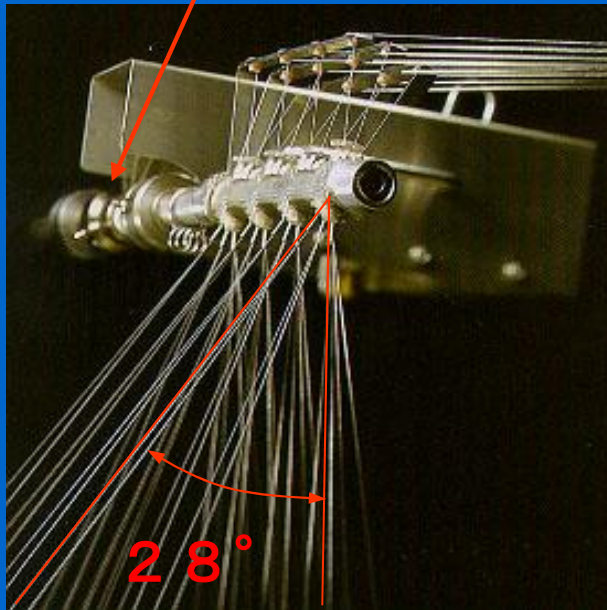


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Automatic Swing Nozzle (Ejector)

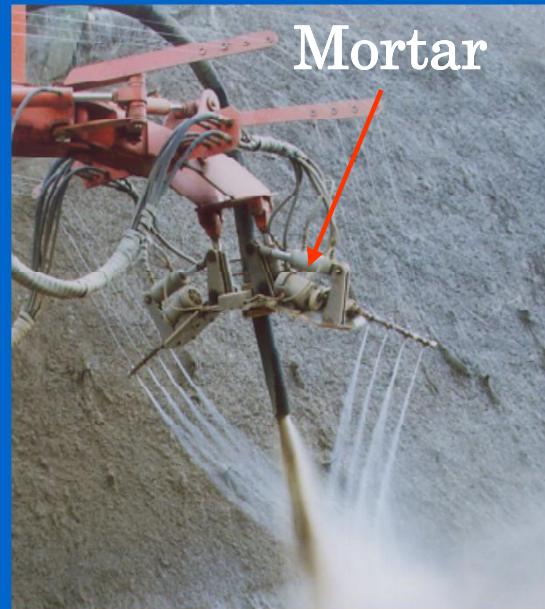
■ Ejector (Swing angle 28°)

Air cylinder



Handy Type

Mortar



Robot Type

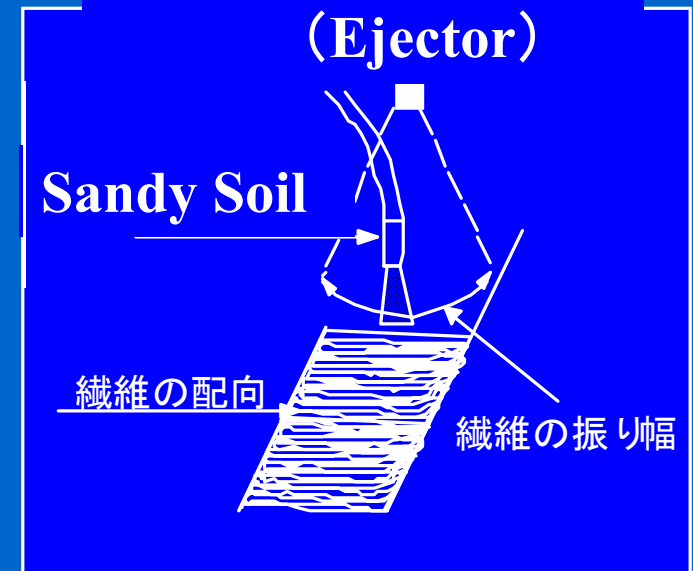
Continuous Fiber

(Ejector)

Sandy Soil

繊維の配向

繊維の振り幅



Vegetation Base

- Standard Thickness: 3cm



- Natural Condition Environment, Whether, Slope Angle
- Implant



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Tree Plant



Systematic

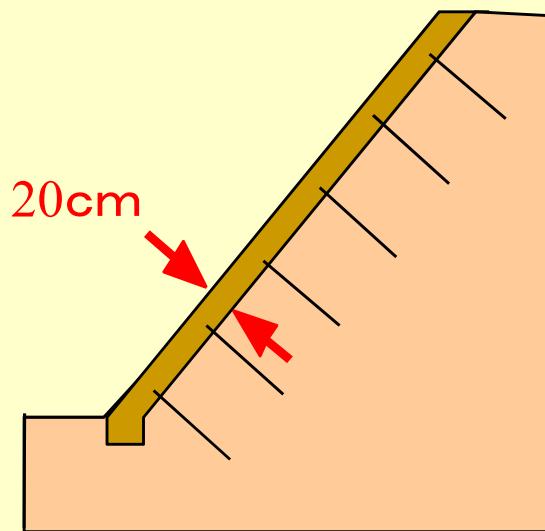


Random

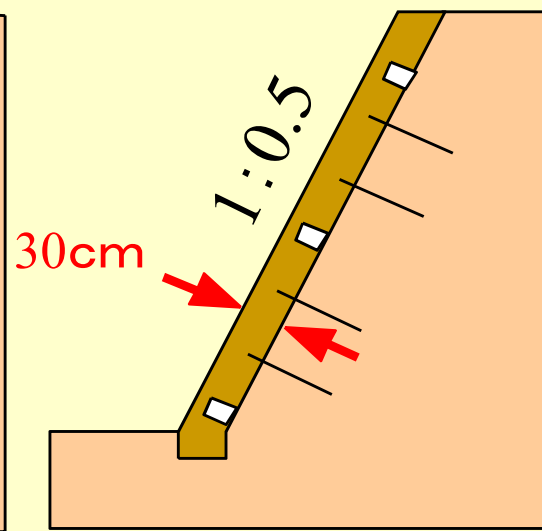
Applicable

Slope Protection type

① Below 1:0.8

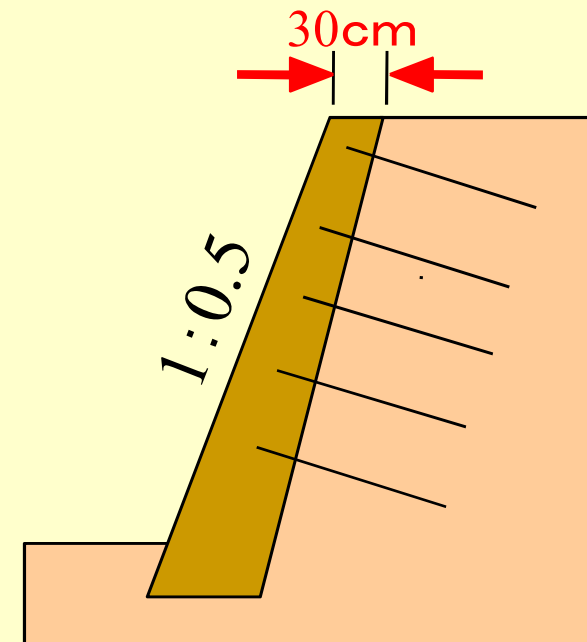


② $1:0.8 < 1:0.5$



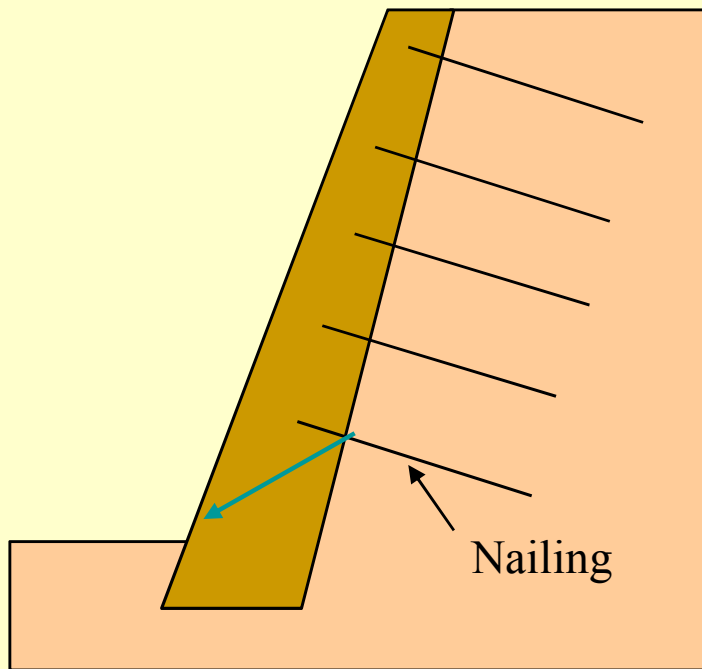
Retaining Wall Type

② 1:0.5

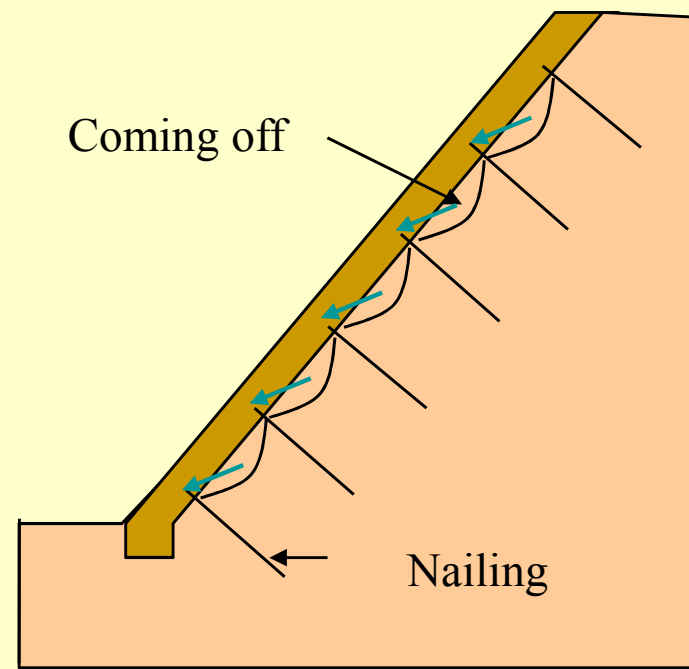


Stability Calculation

Retaining Wall Type



Slope Protection Type

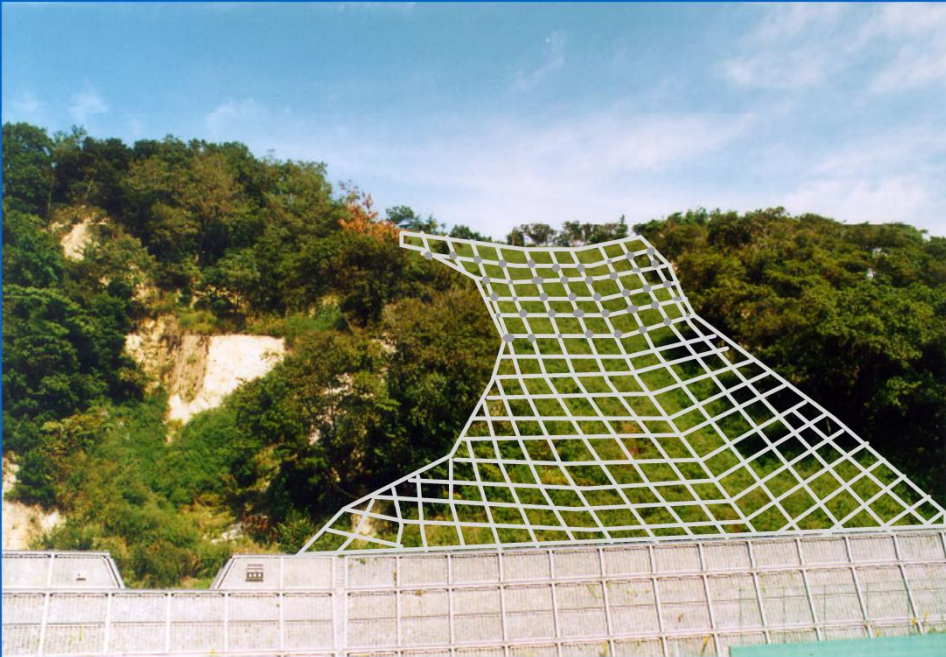


Applications

- Replacing Conventional method
- Use with grid system
- Rock Face applications
- Reservoir and Riverside applications

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Replacing Conventional Method



Concrete grid (Image)



Geofiber (no grid required)

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Replacing Conventional Method



Retaining Wall (Image)



Geofiber

Application on Shotcrete Surfaces

(Vegetation Natural Regeneration)



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- Application on the Concrete Grid
—8 years Change of Plant Growth—

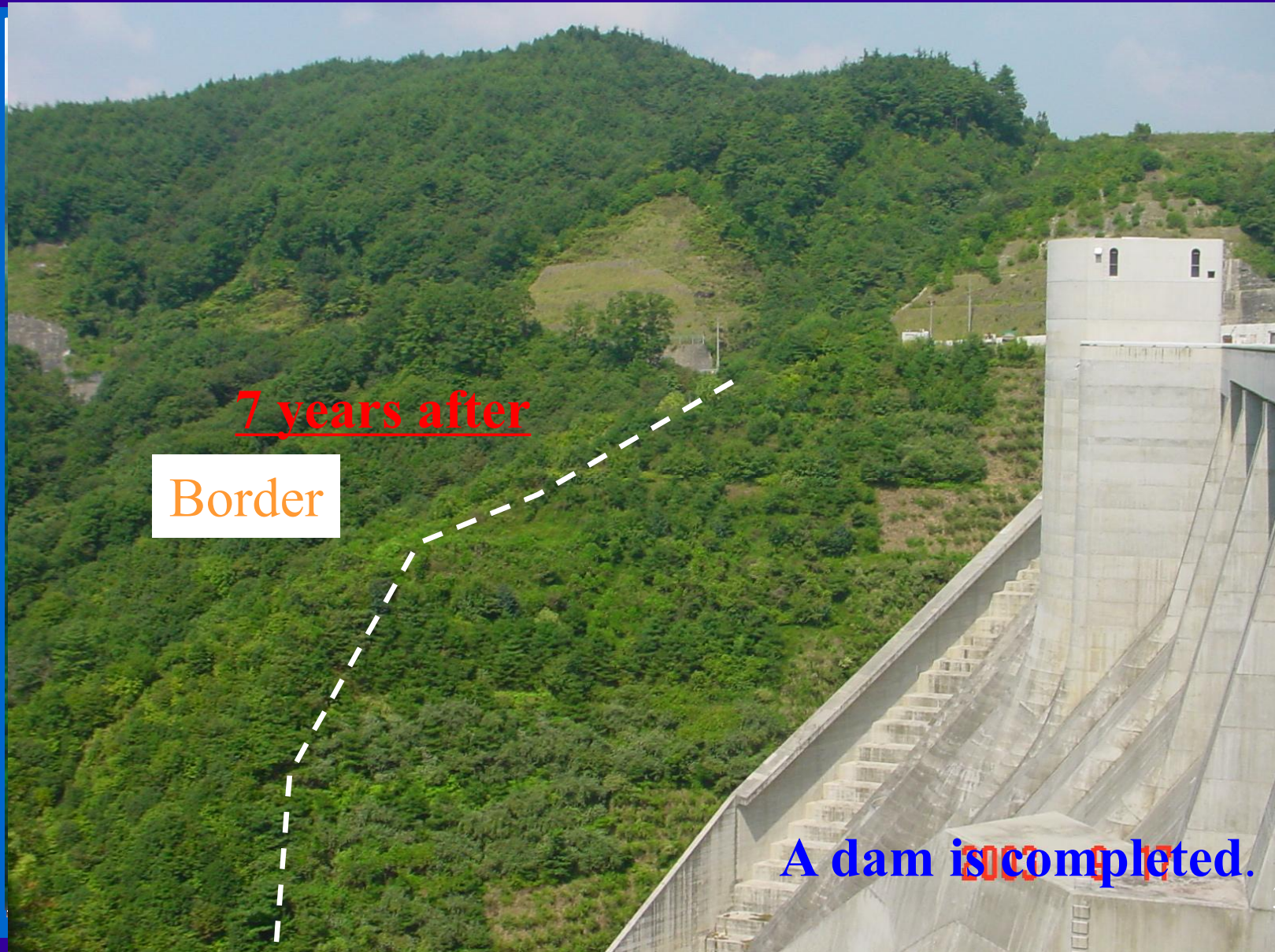


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Application on the Dam side Slope



Application on Huge Excavation Slope at the Dam



Geofiber vs. Convention Method



Concrete grid



Geofiber

Concrete grid

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Application on the Rock Face Slope



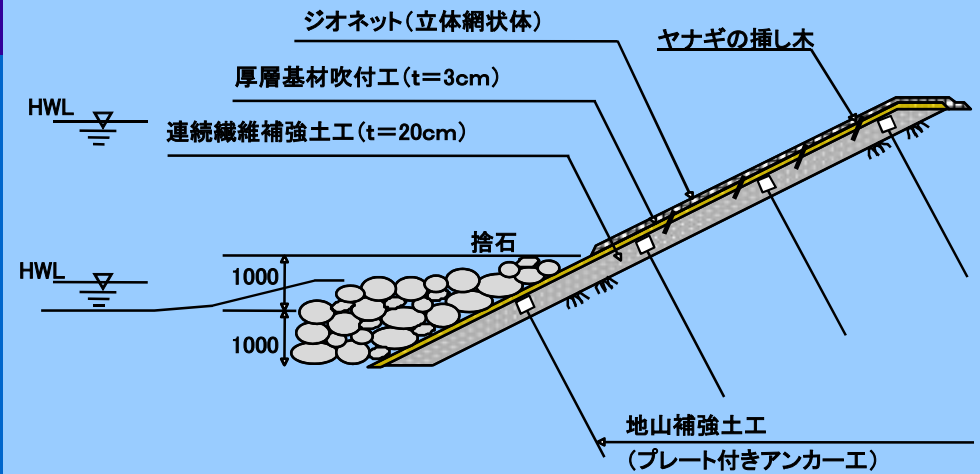
- Miyagase Dam



Application at the River Side

- Kaeda River

Design velocity 5.81m/S



施工概略



Application at the River Side

- Kaeda River



Geofiber Application

HONG KONG



Typical Slope

Shotcrete Surface



Geofiber Application at Hong Kong



Geofiber Application at Hong Kong



Geofiber Application at Residential Quarter



Geofiber Application along Highway



Vide

- Handy type
- Robot type
- 清水寺のGeofiber工事、法面強化工事 -
Geofiber construction at Kiyomizu Temple
of Kyoto

(<https://www.youtube.com/watch?v=q3qabZ3lmyE>)

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Thanks for listening



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