

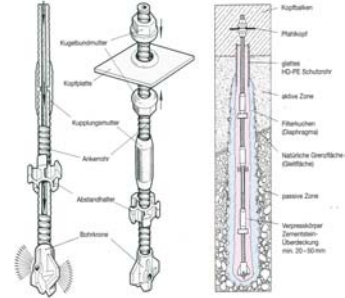
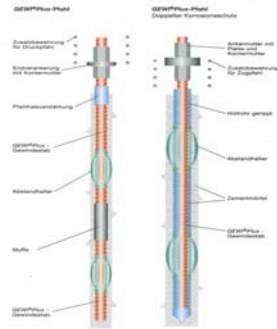
Micro-piles in high alpine  
regions  
a story of success

# Choice of subjects

- a short glimpse on History
- technical advantages of micro-piles in high alpine areas
- commercial merits
- design principles
- examples

# Drilled micro-piles

- GEWI, GEWIplus
- Hollow bars – TITAN, IBO, ROCKBOLT



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

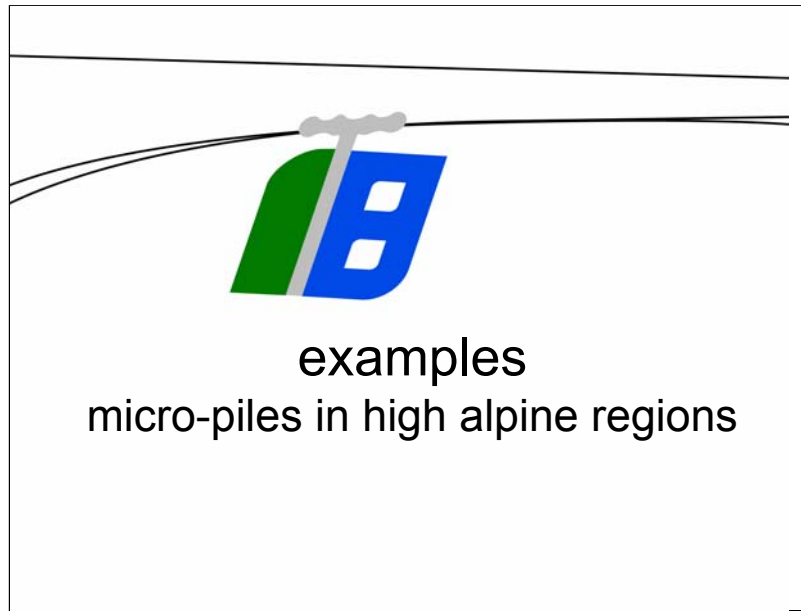
3

# Advantages of micro-piles

- Technical
  - simple site installations
  - flexible drilling equipment
  - easy to handle
  - high load capacity
  - Versatile – different pile types – shear, tie, bearing
- Commercial
  - cheap site installation
  - short construction period
  - competitive unit price

# design principles

- geotechnical structure – slope stabilisation
- foundation element – high or deep foundation grill
- construction in alpine permafrost
- standards
- Certificate of approvals of micro-piles



examples

micro-piles in high alpine regions



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

7

First project in Tyrol with micro-piles in 1991



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

8





ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

9



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

10

A 2-3 m thick layer of moraine gravel above a rock surface parallel to slope. The new erected ski run and road to the top of the mountain had to be reconstructed after one year in charge. This picture shows the situation at beginning of May.



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

11

Reconstruction with pile foundation – IBO R51N bearing and tie piles length up to 8 m.



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

12



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

13





ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

15



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

16

Reconstruction of a ski jump slope – the concrete slab had to be supported and doweling against slide – lightweight drilling equipment





ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

17

Drilling equipment on glacier



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

18

Pile test



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

19

Damage after slide of slope in spring 1999 – micro-piles fully without any damage



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

20

Reconstruction of a tower foundation in alpine permafrost



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

21

Pile foundation of ski lift station in alpine permafrost



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

22

Pile foundation of ski lift station in alpine permafrost



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

23

Bearing piles as sophisticated solution of pit lining



ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

24

Micropiles as bearing beam supporting a walking bridge in a canyon

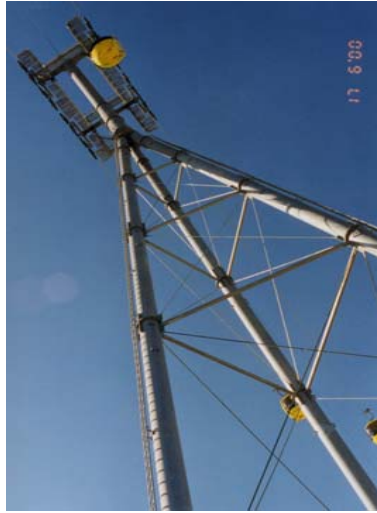




ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

25

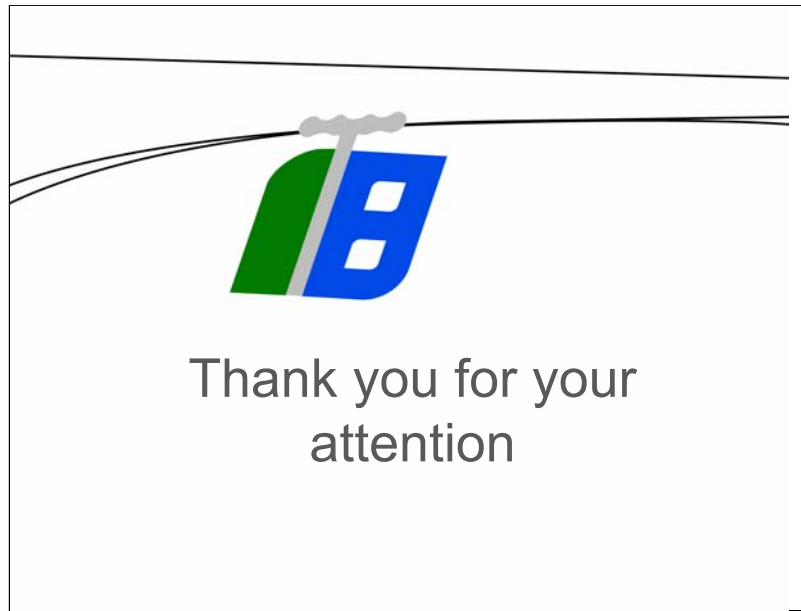


ISM-Toronto Sept. 2007

Ingenieurbuero Brandner

26

For micropiles nothing is too high – 60 m tower



Thank you for your  
attention