

Willkommen
Welcome
Bienvenue
Bienvenidos



Analysis of Catastrophic Failures in Switzerland

Dr. Peter Richner
Head of Department
Civil and Mechanical Engineering

Content

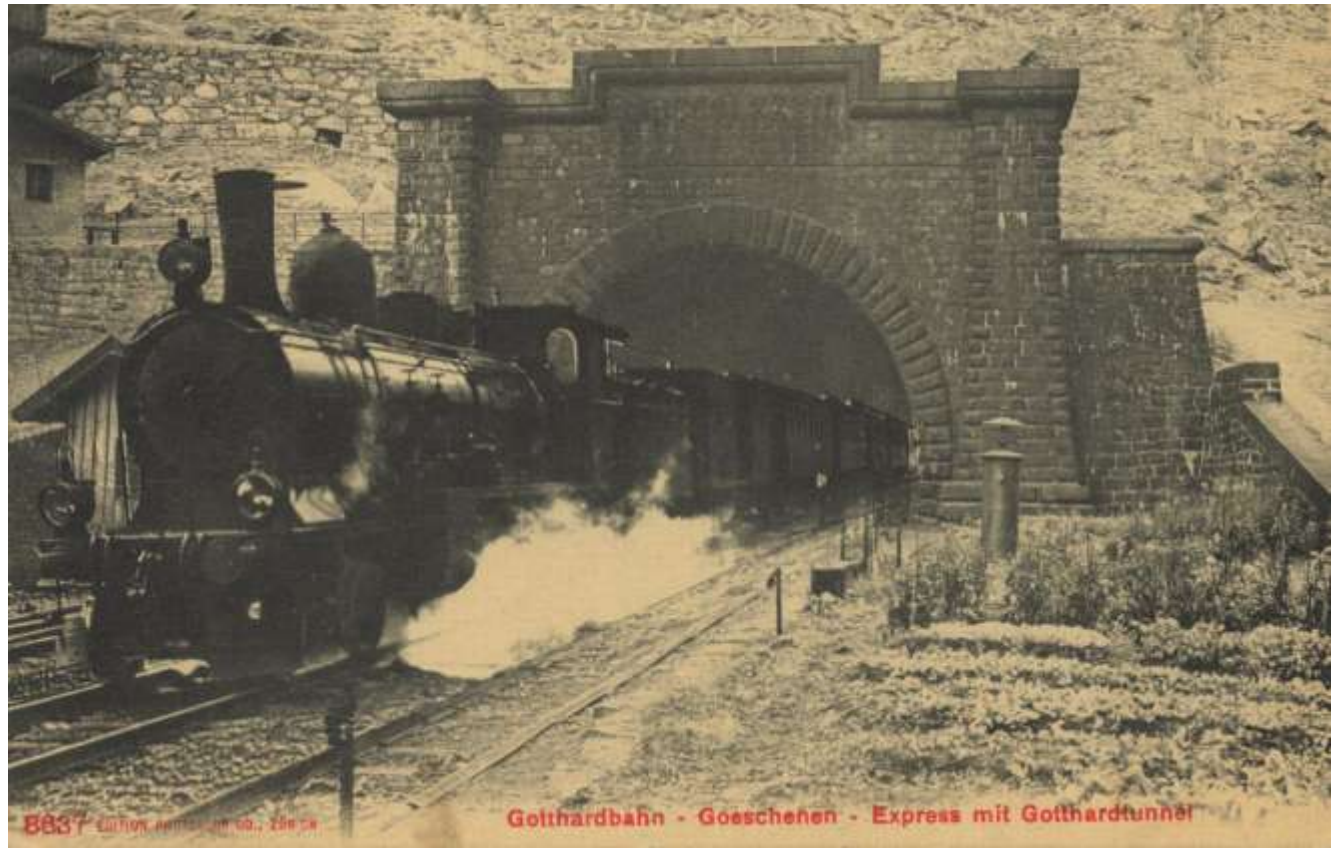
- A (nostalgic) retrospect
- A (sorrowful) look at the present
- A (uncertain) look to the future

Content

- A (nostalgic) retrospect
- A (sorrowful) look at the present
- A (uncertain) look to the future

Gotthard Railway Tunnel

Start of Construction:	September 1872
Start of Operation:	June 1882
Cost:	135 Mio BRL
Total of Passengers:	approximately 3 Mio per year





Robert Maillart (1872-1940)





Robert Maillart (1872-1940)

Othmar Ammann (1879-1965)





Robert Maillart (1872-1940)

Othmar Ammann (1879-1965)

Heinz Isler (1926-2009)





Robert Maillart (1872-1940)

Othmar Ammann (1879-1965)

Heinz Isler (1926-2009)

Giovanni Lombardi (1926)





Robert Maillart (1872-1940)

Othmar Ammann (1879-1965)

Heinz Isler (1926-2009)

Giovanni Lombardi (1926)

Christian Menn (1927)



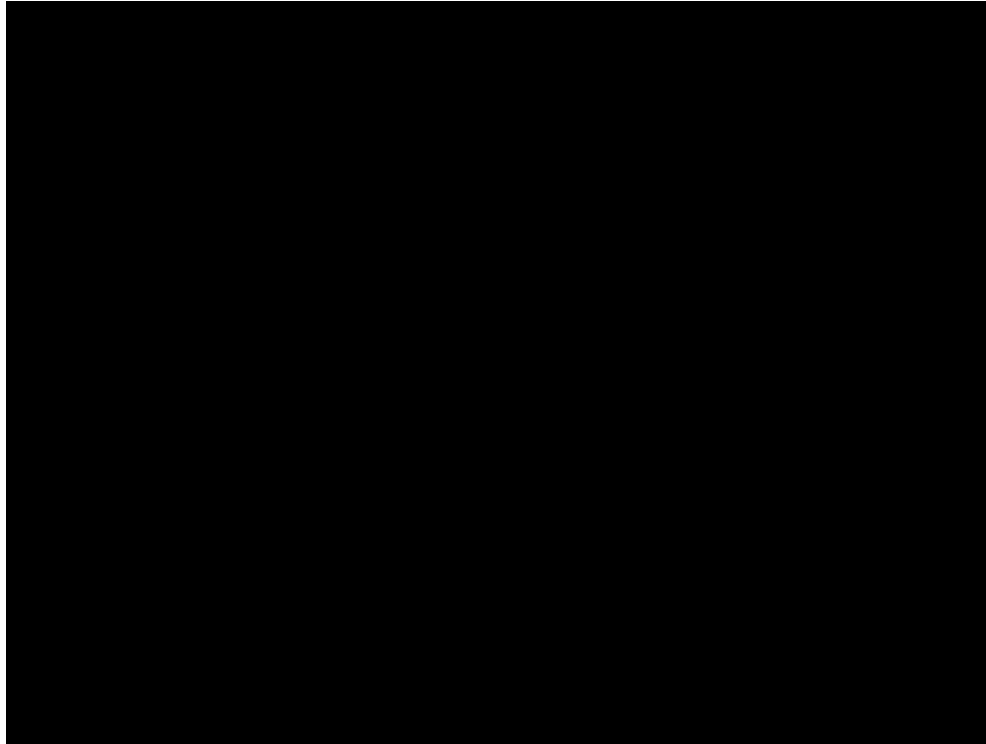
Conclusions I

- The art of structural engineering in Switzerland was founded in the past by a number of world known engineers which have designed exceptional structures
- The high quality of life in Switzerland is also due to their achievements

Content

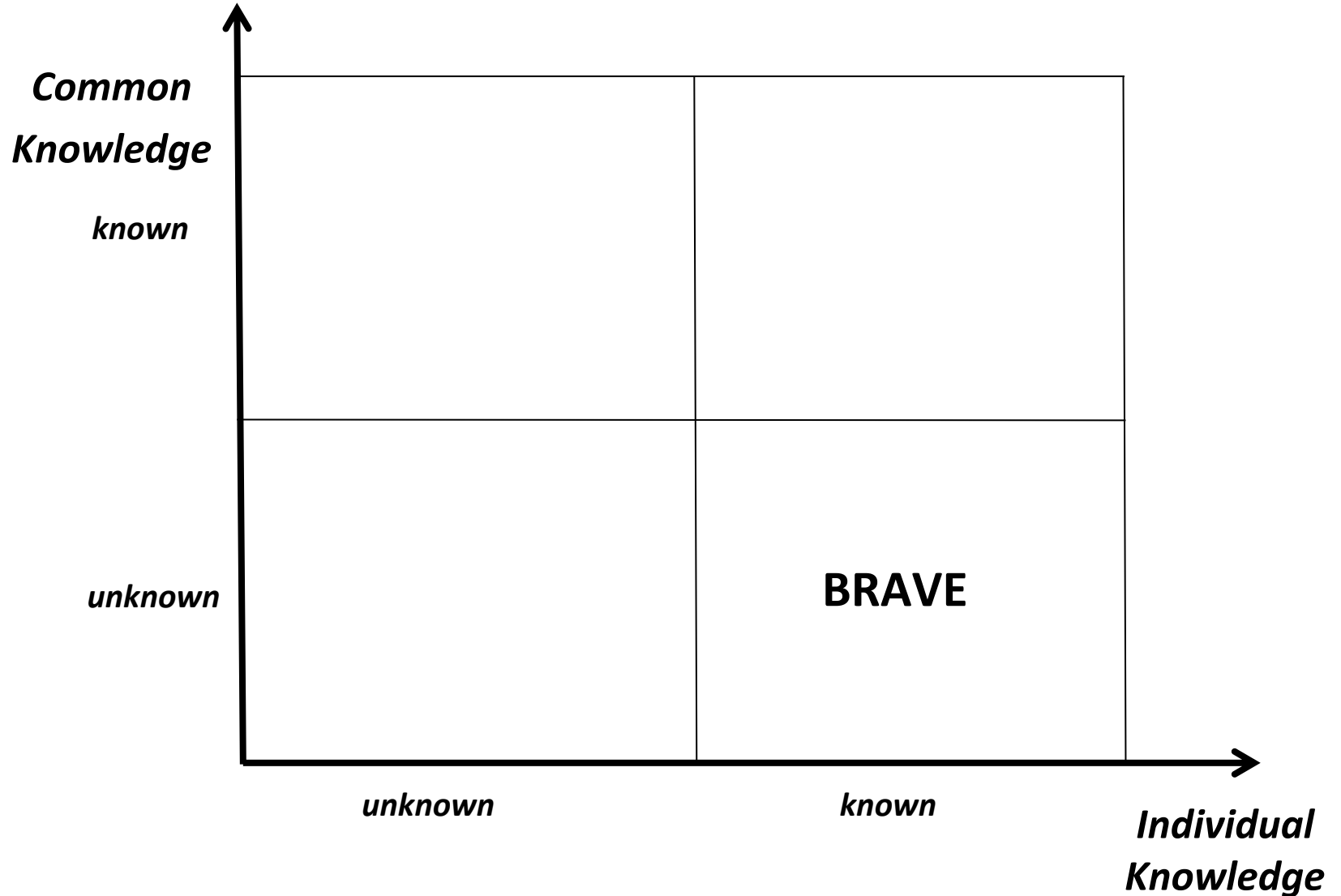
- A (nostalgic) retrospect
- A (sorrowful) look at the present
- A (uncertain) look to the future

An attempt for a classification of failures

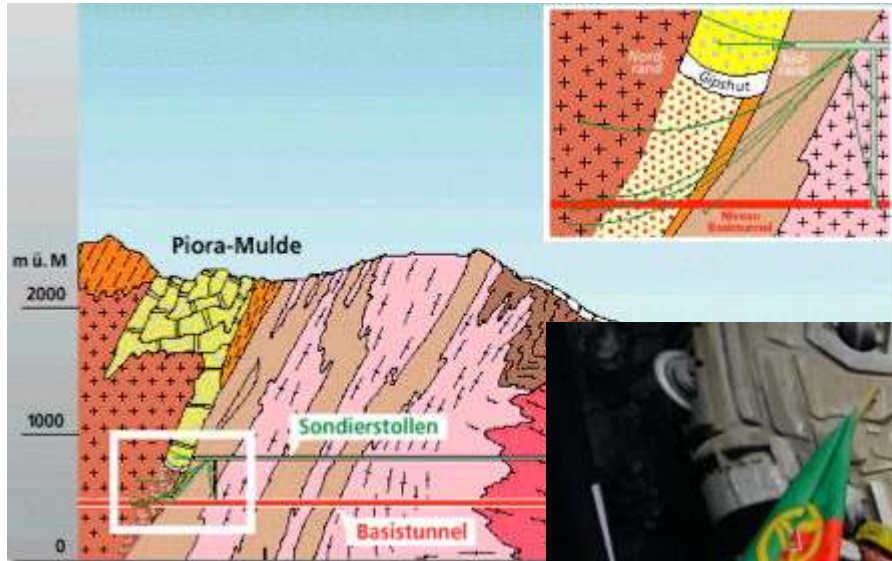


Donald H. Rumsfeld, US Secretary of Defense 1975-1977 and 2001-2006

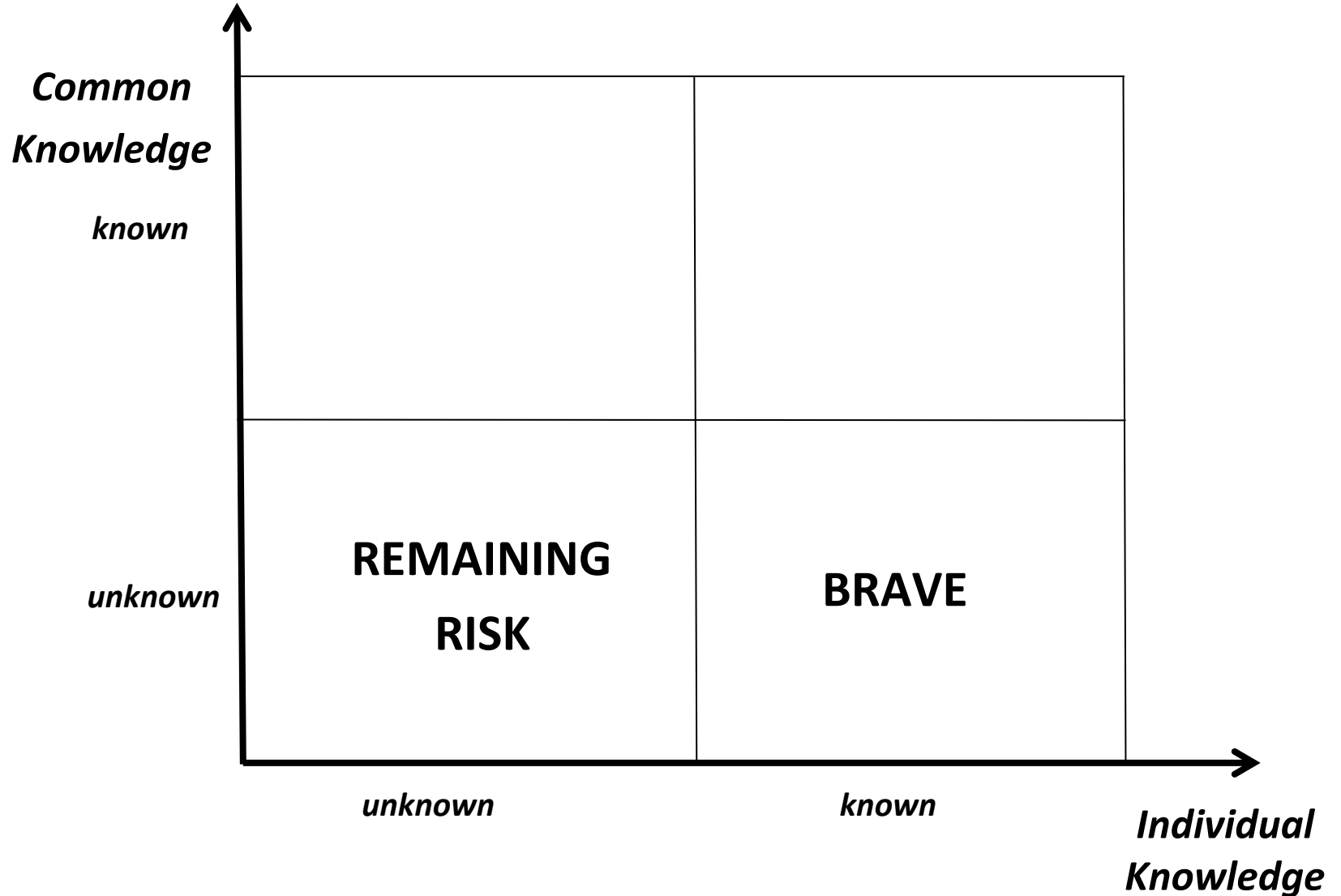
Known's and Unknown's



Known Unknowns: Piora Rift



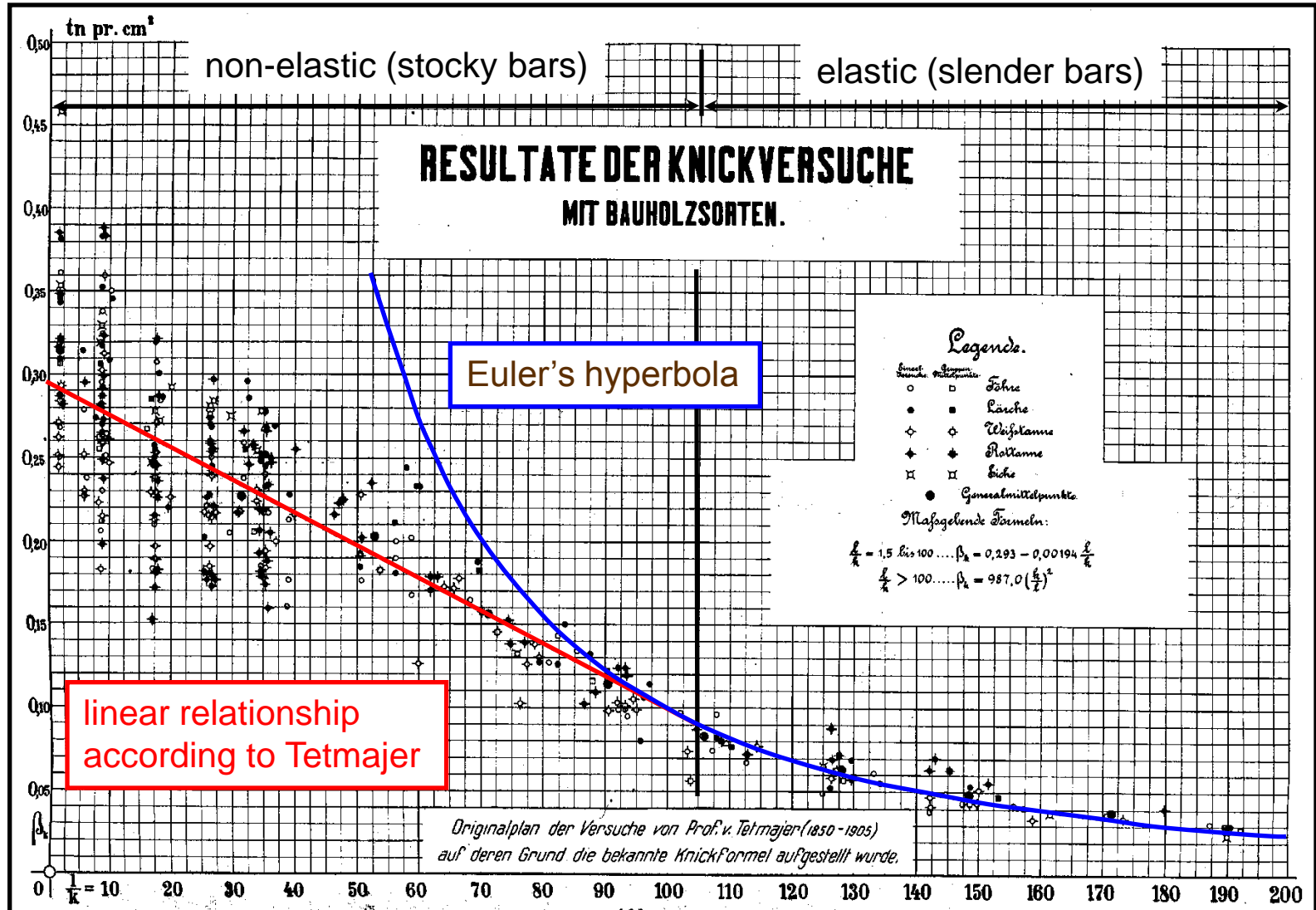
Known's and Unknown's



Unknown Unknowns: Münchenstein, 14. June 1891



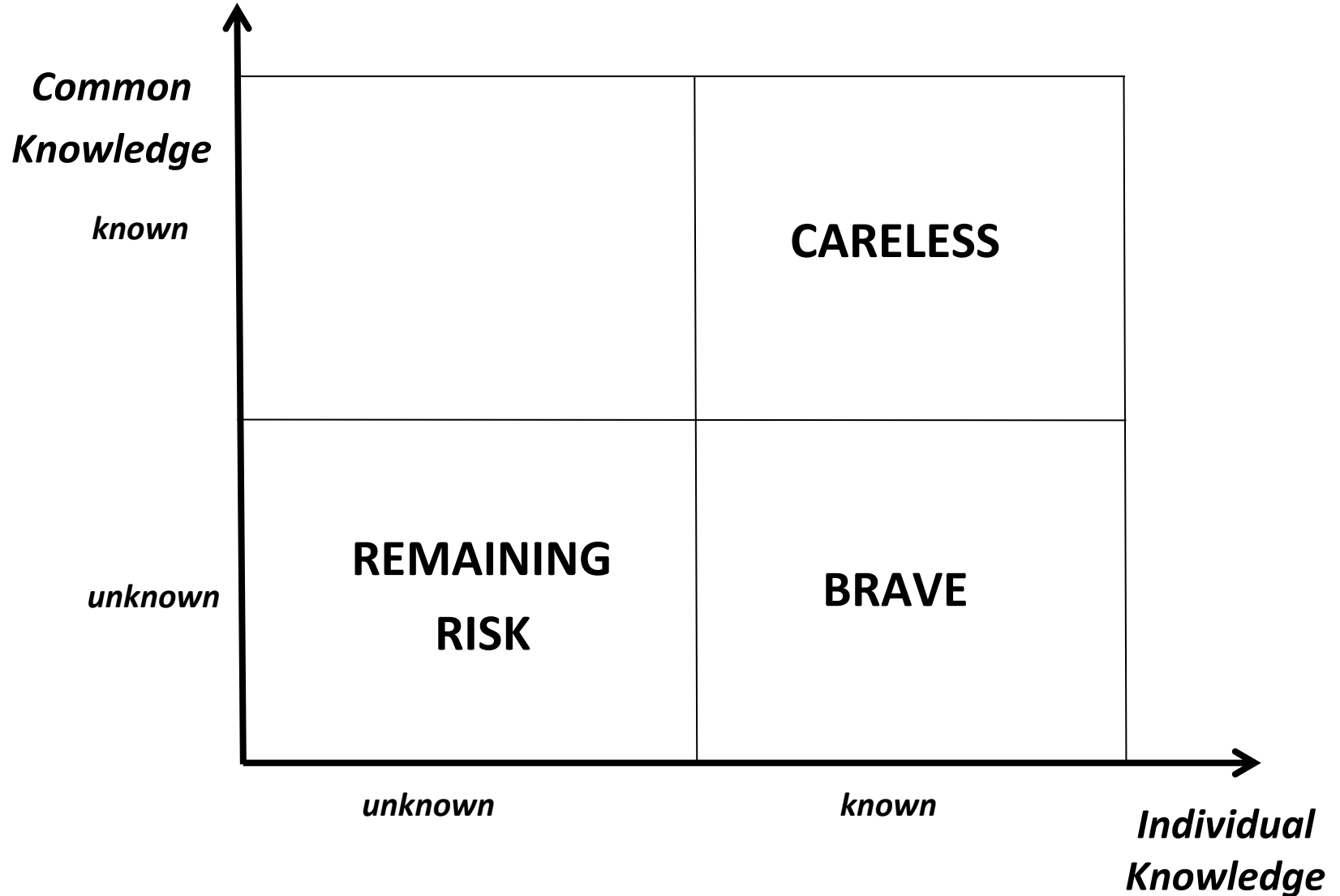
Unknown Unknowns: Münchenstein, 14. June 1891



Unknown Unknowns: Indoor Swimming Pool, Uster



Known's and Unknown's



Known Known's

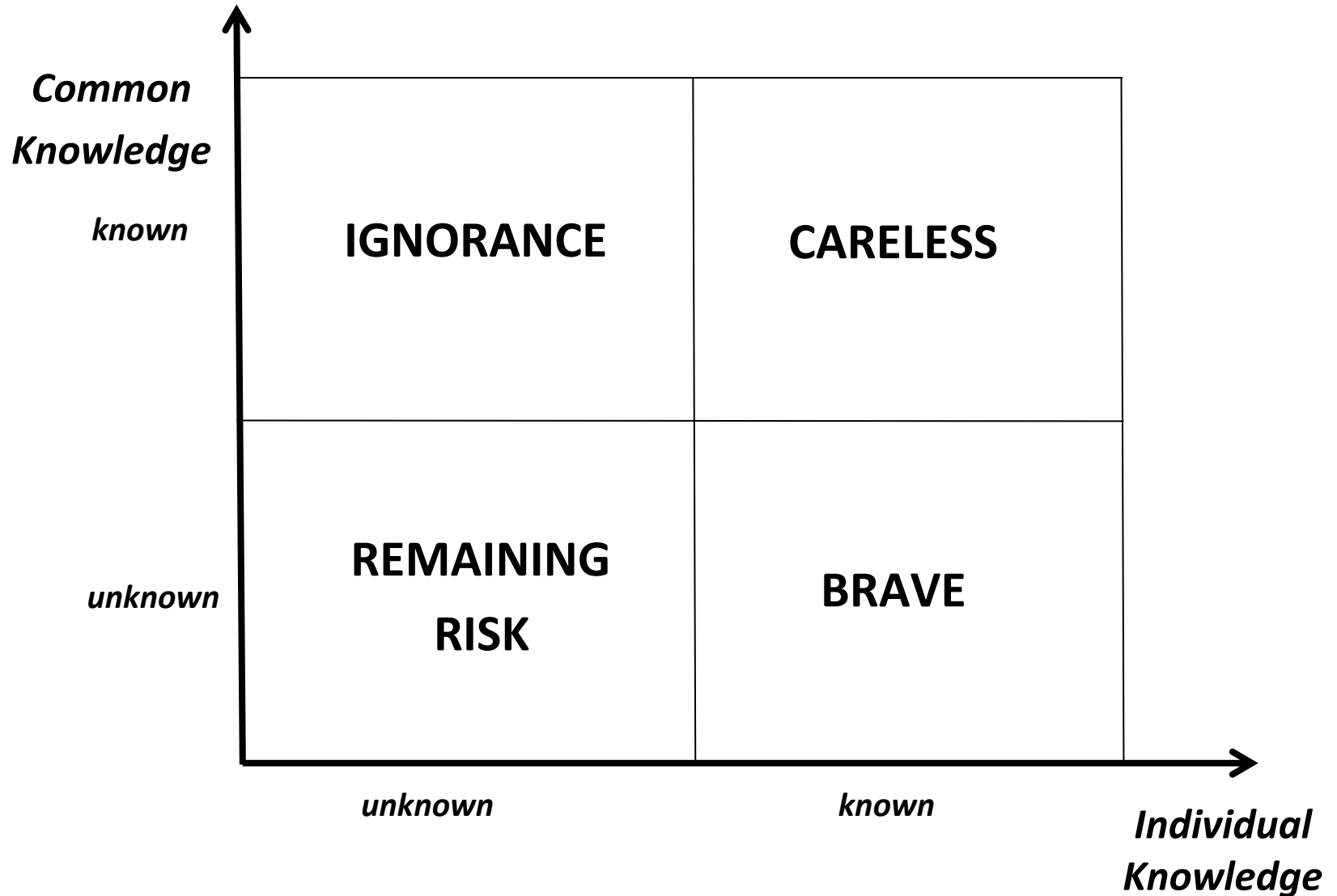
January 2010
Haiti
> 200'000
Casualties

Magnitude ≈ 7

September 2010
Neuseeland
No
Casualties



Known's and Unknown's



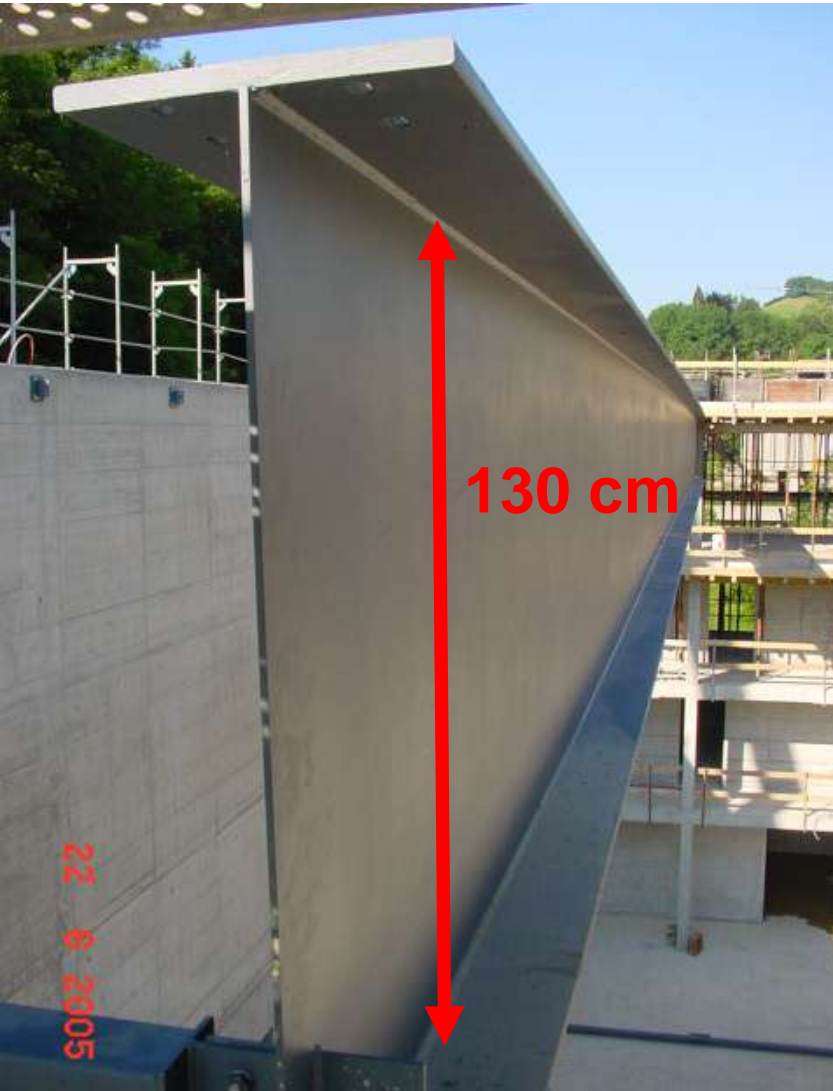
Unknown Known's: MZH Lupfig



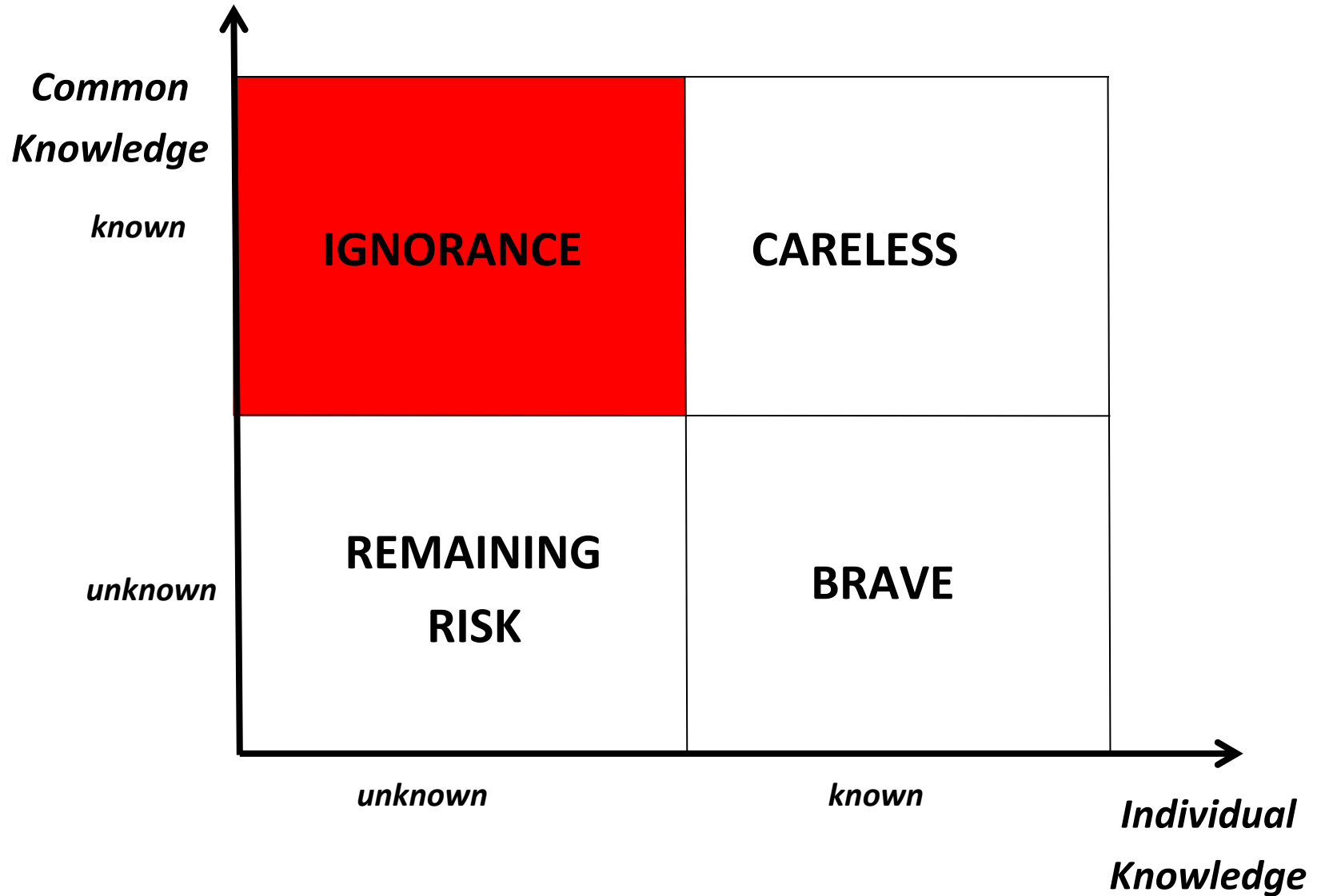
Unknown Known's: Indoor Swimming Pools 20 years after Uster



Unknown Known's: Gymnastic hall, St. Gallen



Known's and Unknown's



An attempt for an explanation

- The appreciation for engineering work has decreased over the last 30 years
 - Status in society
 - Importance of technical arguments for decision makers
 - Salaries of engineers
 - (temporary) decrease in number of students at universities
- «Pocket-Calculator» syndrom

Content





- A (nostalgic) retrospect
- A (sorrowful) look at the present
- A (uncertain) look to the future

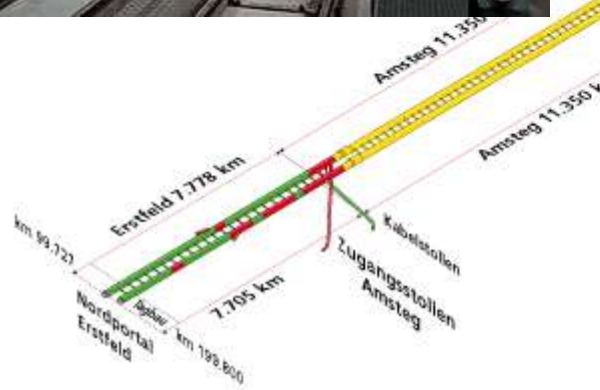
Thesis 1: We are still able to achieve unique goals



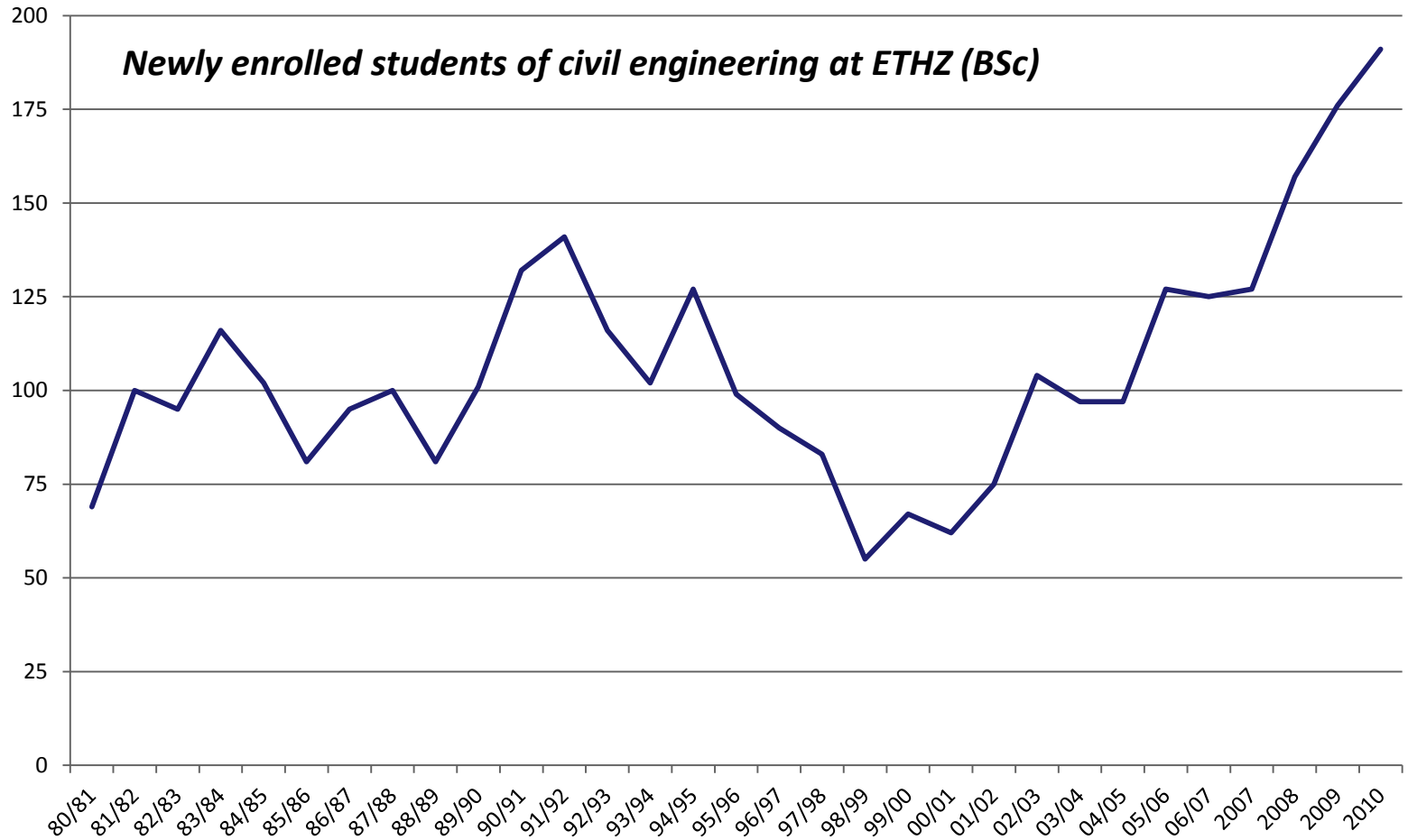
Gotthard-Basistunnel

Stand der Arbeiten, 1. Dezember 2010

-  noch auszubrechende Tunnelröhren
-  Ausbruch abgeschlossen
-  Ausbruch und Ausbau abgeschlossen
-  bereit für Fahren / Betriebsteil



Thesis 2: Young people are on our side



Thesis 3: We are not on the safe side yet

- We are facing plenty of problems which we do not even know of at the moment
- Life cycle cost calculations must become the basis of the evaluation of projects, not the short term investment costs
- The overall responsibility of a project must be with a person which has the needed technical know-how

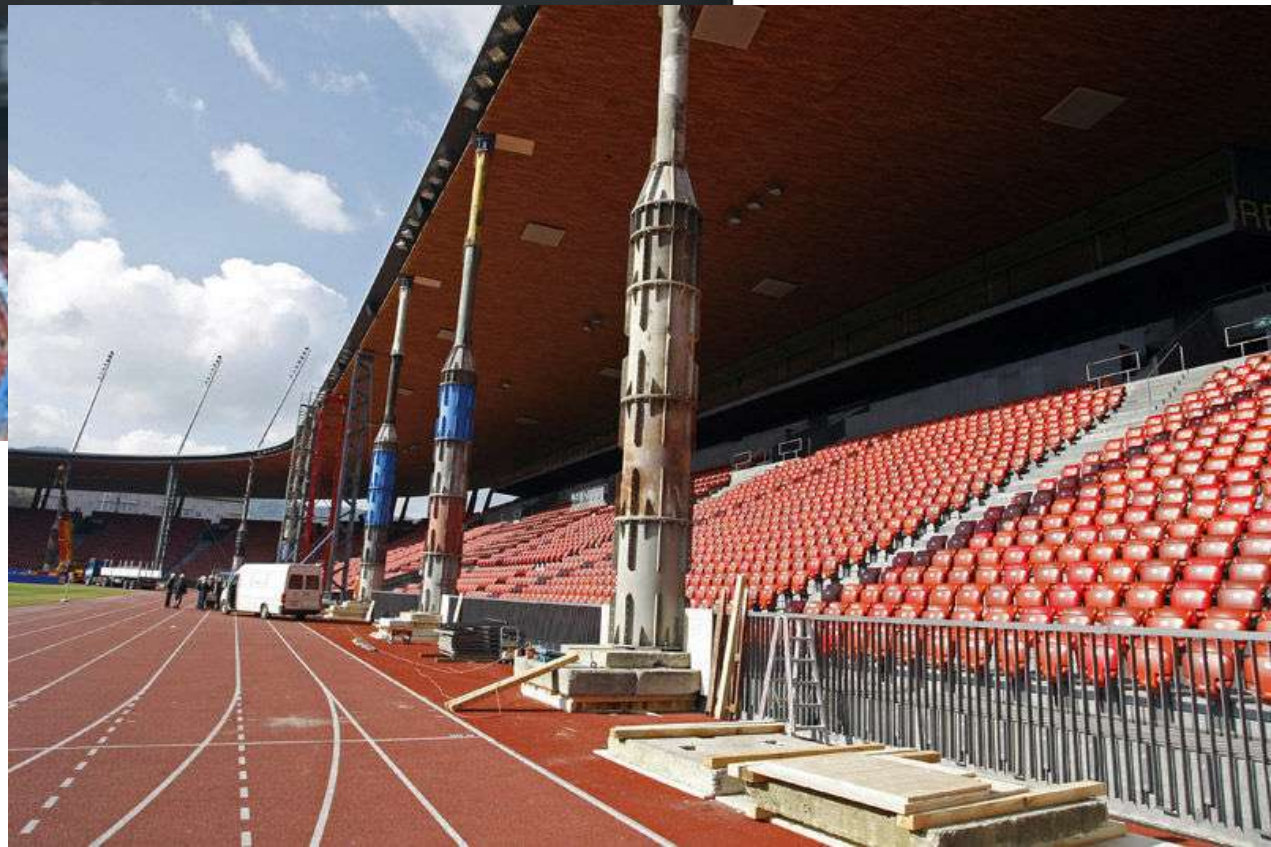
Letzigrundstadium – a horrifying example



Letzigrund gesperrt - Spiele verschoben

Das Letzigrund-Stadion muss bis am 1. März geschlossen bleiben. Die Ursache für die Risse in der Dachkonstruktion wurde noch nicht gefunden. Drei Fussballspiele müssen verschoben werden.

Question:
**What is the meaning
of the cracks for the
safety of the roof?**



Thesis 4: Engineers must step up

- Take responsibility
 - They have the know-how (not lawyers or politicians)
- Show self confidence
 - In public
 - In the political arena
- Create sustainable values
 - economically
 - ecologically
 - socially

Conclusions

- Quality of life and the competitiveness of a society is based on a high performing and safe infrastructure
- Civil engineers must performe at the highest level to enable this performance
- These achievements have to be honored by society