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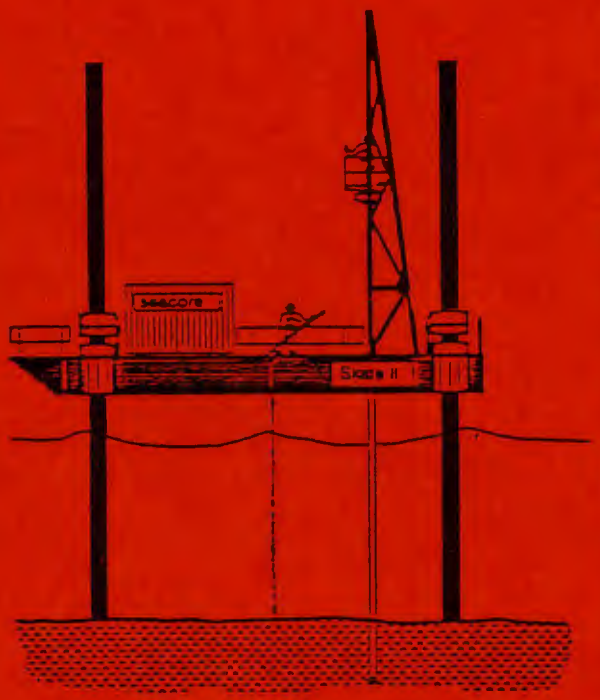

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Nieuwsbrief Ingeokring

december 1989

INHOUD pag

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Van de redaktie

Voor U ligt het laatste nummer van de Nieuwsbrief van 1989. Door een gebrek aan kopij leek het ons niet zinvol om nog twee nummers te laten verschijnen in de tweede helft van het jaar.
Vandaar een combinatie van het derde en vierde nummer.

In dit nummer is onder andere te vinden: het vervolg van het verslag van de in Shanghai gehouden conferentie over "Underground Spaces and Earth Sheltered Buildings", vijf boekbesprekingen van drs. R. Kronieger, ir. W. Kamp, P.M. Maurenbrecher M. Sc. en drs. P.N.W. Verhoef.
Verder een verslag van de Geotechniekdag, onlangs gehouden in Utrecht. Ook is er een begin gemaakt met een vervolg over de ervaringen met geofysische opsporingsmethoden in de milieuwetenschappen.

Het volgende nummer zal in april 1990 verschijnen. Kopij voor deze nieuwsbrief moet uiterlijk 15 maart bij de redaktie zijn ingeleverd.

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CONFERENCE REPORT

Instalment 3

Conference on Underground Spaces and Earth Sheltered Buildings
Shanghai, September 1988

Chronicle of a trip to China

by P.M. Maurenbrecher

This is the third instalment on the visit of P.M. Maurenbrecher and Prof. Ir. H.S. van Lohuizen to China. The third instalment finds us on the last morning of the conference our suitcases already packed so that we can leave by 11:30 a.m. to catch a train due to leave on the post conference tour from Shanghai main station at 12:30. Shanghai station is the starting point of our overland journey which will take us, eventually, as far west as X'ian, the start of the silk route. Before we could embark on the journey the conference had to officially end by summing up presentations by session reporters and closing speeches from our hosts and the more notable guests.

Shanghai, Tuesday, 6th September, 1988

Our banner spanning the entrance boulevard of the university looks forlorn after the rains of two days ago. At first I thought a new one had been suspended in its place but it is for the next conference: 1st International Conference on Marine Geology. I could have stayed.

Closing session 9:00 a.m.

Prof. van Lohuizen is looking smart for a change. His suitcase has arrived. He sits with the members of the closing session panel. Opening the proceedings Prof. Hou Xanyuan of Tongji University wishes the visitors on the post conference tour an interesting time and hopefully become better acquainted with the more typically Chinese environment of the hinterland. Mr. Xu said that from the contributions has resulted in lots of contact between China and abroad, congratulated the delegates and the organisers for its success and wished everyone the best for the future.

Session reporters were next:

Prof. van Lohuizen summed up as follows: In conclusion he read and listened to 16 Chinese papers. As a foreign guest he was impressed about sophistication in China on tunnelling, soil and rock mechanics, and their design and construction criteria and finally the number of Chinese working on the subject matter. International cooperation is important thanks to the efforts of Tongji University and Prof. Hou this could be realised. He felt there should have been more foreign contributions; 7 papers were from Japan, 5 from Germany, 1 from the Netherlands, 1 Canada, 1 Hungary, 1 USSR and 1 S. Korea. The Chinese papers are representative of the state of the art in China. The conference covers a wide multi- disciplinary field, resulting possibly into too wide a perspective, which could be covered by other conferences and suggesting that one should concentrate more on architectural and human influences. However as Prof. Hou pointed out, knowledgeable people in the whole field all have their own priorities so that when we cooperate we have to combine these, so we have to decide together which is only possible in conferences like these or by bilateral contacts. We should on such occasions decide on the direction of research effort and ensure we do not duplicate such effort. Themes for research could be chosen; examples are the interaction of soil/rock, ground-water and structure and its limitations with depth. A shield tunnel can make three types of tunnel,

hence it is very necessary these techniques are further developed. Prof. Goedehoes in Constance FRG on his paper was very relevant with regard to urban underground spaces at it considered the interaction between the environment consisting of soil, rock, water and existing structures. The Japanese have the right concept to move the most artificial type of structures underground so that green surfaces can remain to be blessed by the sun and rain.

Mr. Yoshio Higashikata (Japanese reporter on Session A and Director of the Japanese Underground Space Centre) said that the content of the conference supports the ideals of underground space technology. He apologised that Prof. Shirou Aoki was not here to give the final summing up for this session. Basements in housing is only small scale version of larger spaces to come such as public spaces and storage spaces (oil, wine, food etc). One question that has yet to be resolved is who owns the underground space, is it private or public? Should there be some sort of depth criteria? In Japan the following departments are trying to resolve this question:

Ministry of Public works
Tunnelling
Ministry of Post and Telegraphs
Ministry of Health and welfare
Ministry of Education

Despite extensive use, underground spaces are, as yet, not sufficiently popular in Japan. He promised to do his best for the next conference in Japan.

Session C reporter was Prof. Ray Sterling. The theme of the session was concerned with environmental protection and safety. Papers on fire safety codes were from PRC, FRG, and USA. Further papers from the PLC and Norway described underground civil defence shelters. Seismic subjects were presented in papers from PRC and FRG. The majority of papers concerned the thermal aspects . These were from UK, Italy, Japan and USA. Five papers covered physiological aspects of environment and health. Psychological aspects daylight were discussed in two papers from Japan and the USA. In the safety field the ITA (Int. Tun. Ass.) underground space use has a working group on safety and health during construction but they have not yet addressed safety during use of such spaces on completion. They should then concern themselves with indoor air quality, psychological aspects, fire/ explosion with respect to fast exit, ie London Underground. Economics should be more attuned to valid public purpose of the underground space then adaptations for civil defence shelters. Increasing familiarity could increase understanding of environmental aspects such as chemical and radiation leaks. Environment and health is physiological; several separate spaces should be considered for testing to determine best possible job for an attractively designed space as a poor space is not the best way to study such aspects. Despite different human cultures, both geographically and historically humans have shown strong adaptability to spaces. The last two centuries living cultures changed from low rise environments to high rise buildings of optimum design.

Prof. Sterling has seen these conference both grow and become more enthusiastic. The emphasis, though, has shifted. Urban uses has become more important. Changes in government attitudes are needed. Focus in the US is toward transport: buses, mass transit only perpetuate a system of continual spreading of cities from which the next fifty years would be difficult to recover from.

The next conference is in Japan; all are invited to come. Professor Hou

will mail a participants list. It is important that Engineers, Architects and Planners get together in conference like these to learn each others professional language. Prof. Sterling would like to add his thanks to the organisers and delegates to this conference.

To this Prof. B.. Maidl from the German Federal Republic also added his thanks.

Prof. Yange Linde read a telegram from the Rock Mechanics Society of China: Warm congratulations towards the conference.

The Post Conference Tour

Train 166 Express Shanghai - Kaifeng

A postcard sent to Holland reads: In Shanghai station I had to carry my suitcase, which has accumulated its weight to 30 kg, without wheels or trolleys or porter, for 1 km; endless galleries and platforms. That most people (in Europe) give anything to do this (tourist) is beyond me.

At 13.25 just passed a station called Zhenggji. Just beyond Zhenggji is an inland water port with canal boats, red roofed tiled houses, barges and general activity. Soon back to rice fields of deep green. The train left at 12:33 sharp from a large ultra modern railway terminal with large glass edifice, but without the trolleys. Had three large localities for boarding passengers; special class had an escalator up to the cross passageway. Little time to savour the linen covered sofas. Special class is at the front end of the train which meant a long long walk past many carriages. My suitcase is ballasted with papers and paperwork from the conference, 30 kg along at least 1 km of corridors (the station is on a grand scale), flight of steps down to platform, then endless train. I hauled this suitcase plus two carrier bags, an attache case and a shoulder strap bag on loan from Prof. van Lohuizen up to carriage no 2, then the conductor informed one of our student guides that our carriage was no 5 (note trains have up to 50 of these carriages). I pleaded exhaustion, was prepared to bribe a porter (non about) his months wages (US $10?) to carry the offending suitcase back. I'm now ready to invest in a new wheeled device.
We pass SuZhou, the eastern Venice and its leaning pagoda of a thousand years still leaning as it did yesterday visible on Tiger hill. (13.45). Prof. van Lohuizen and I share cabin with the Boyers from Texas. Soon the train moves back to the waterlands of the vast Yangtze plains. Island appears in a sea of green. Grey hazy steep isolated mountains, of which Tiger Hill must be a remnant. A large power station. The diesel pulling us is now feeling a gradient. Shoufang 14.14. Its hot. The train has an electric fan. Thermosflasks with hot water for making tea supplied in individual tea bags.

Zhou our guide enters with the itinerary:

On 7/9 we are due to arrive at Kaifeng at 5.35 a.m. where we will be met by two busses 1 for passengers and one for luggage. At 8:30 for underground oil storage then also maybe food storage followed by steel tower, Longtin (Tourist) Art Factory, Monastary (Shangwot) Xiangguo Si and finally end the day by shopping at the Hotel.

On 8/9 Kaifeng to Louyang (early). On way we see Temple of KungFu fame then check into Friendship Hotel for one night at Luoyang.

The train passes through ZhanTai 14.28. Beautiful city, same as SuZhou.

9/9 Visit Longmen (Dragon's gate) caves morning, White Horse Temple (Pai Ma) leave late evening 22.55 by train for Xi'an.

10/9 Arrive 6:55 Xi'an: technical visit underground centre, big goose pagoda, underground hospital, cave dwelling.

We pass Loushe 14.46

Small goose pagoda, Great Mosque

11/9 East part Xi'an; Terra Cotta Warriors, Quinglong temple/ Huanquing Hot Springs

12/9 8:35 by plane to Beijing. Afternoon underground cinema, art centre and Tiamin Square, Forbidden city

13/9 Visit the great wall, summer palace and Dingling palace

I can see have to make some adjustments to my plans.

ChangZhou 15.13, Bennui 15.37. The plains are flat and the train has returned to an open ocean of green plains of rice, hamlets, ponds and rows of linear trees bordering the railway, roads and moats. Iucheng 15.42. Symbol for Chinese railways is an inverted cup covering the top flat of the railway track. Its seen at railway stations, a farm hamlet and on the embroidered head cloths in our railway seats. 16.10 train stops at nameless station. A passenger train overtakes us. The countryside starts to undulate. Rice in terraced fields, rivers cut into the ground and Lester Boyer spots his first earth house and a mountain to the north of which a good deal has been quarried (white face). Zha Ze 16.35 tiny station and train with 45 oil wagons. Zhen Jiang 16.50 Hilly with isolated mountains, steep rounded 300 m high topped with mast. Exposures are reddish brown (Loess?) Fish ponds. Gaozi 17.05 Mountain ranges, incised loess plateau, rice in lower flatlands. At Qiaotou Zhen, 17.25 we waited for second train to pass us. Flowering plants on railway platform and mountain as backdrop. In France they developed the 2CV as farmer's cheap transport. In China its a front-wheel drive donkey. The whole front is not unlike a lawn-mower so that steering is by outstretched handlebars. The front is hinged to the back two wheeled cart. The machine can be disconnected so it can also be used for ploughing.
Longtan 17.39 cuttings of layered indurated grey limestone; cement works and extensive quarrying in hill complex 3 km in extent both for cement and aggregate. Sections thickly wooded, others grassed, covering tailings in places. Further on new set of lower hills wooded with pine. Tunnel 17.50. Tinjiang Pagoda. Zhou explains: *Two girls from sky married with man. Girl is a fairy, not possible to marry a man. Man didn't believe this. To prove this a monk led girl up tower (in place called HouZhou). The Monk in the pagoda could just see that the girls could make the tower float. The Monk put the tower underwater to prevent the marriage from taking place.* (At least, that is what my notes tell me.)

Nearing Nanjing (Nanking) First tea plants, low hedges contouring the hill slopes. Brick arches re-inforce earth slopes.

Arrive Nanjing 18.13. Crew change. Purchase four beers at 2.4 yuan each. The trains travels on a long viaduct that seems to coalesce with an elevated roadway; the ramp approaches for the bridge over the Yangtze. The road deck is above the rail deck. River passes through a narrowing of the flood plane. Scarps of quarried faces gives downstream right bank steep appearance. North of the Yangtze water buffalos. Air somewhat cooler, sun

casting long shadows 18.47, sheep, brickworks, geese, weir, fisherman, buffalos, rice on an alluvial plane viewed from the window looking west as the train heads north towards the Yellow River. Hay stacks, river and more flat plains having just passed, soon after crossing Yangtze, through hills.... nodding off... maize, pond, geese, large fronds of water lily, circular granaries, people winnowing rice, water management; extensive sluice gates. Pump station and dikes with mountains in distance.

Steam locomotives, Lester Boyer tells me he had read in a newspaper, manufacture will stop as from the end of this year.

Its 19.11 and the sun is lowering behind a peak, then only to reappear briefly. We enter Chuxian 19.15. Large heavy electricity industrial complexes.

Dinner served at 20.00. I sat with Prof. van Lohuizen on one table for four We ate for four and paid for two. Food not very appetizing; a hot day and already 7 hours out of Shanghai, no cooling on train, a galley which didn't meet DB specification, so one was a little careful.

Somewhere on railway tracks to Kaifeng and Kaifeng, Wednesday Sept 7th

Upper berth for myself. The Boyers turned in early and so did we. A shaky noisy night. Promised snoring from van Lohuizen must have been drowned out. No one complained the next morning. At 5.00 a.m. action. Approach to Kaifeng. Still warm in sticky clothes, unwashed. Visit the Asian toilet; could not wait for hotel. Kaifeng still in darkness. Sleeping persons in the square in front of the station. Suitcase handling less then Shanghai. My back returning to normal. At hotel pickup carrying our luggage almost left with mine (I had hoped someone else would unload it; or was it because I was spreading rumours there is gold in it.). The hotel room is palatial. Some fellow travellers have suites; a separate sitting room. Their enhanced status means they would have to throw a party.

Sun rising at 7.30. Breakfast room without windows. Gaudy lights brighten room as some sort of parody on a Christmas tree. Table cloths are stained by fat marks.

The early morning drive through Kaifeng: It was still dark in Kaifeng. Most of people in train were up. Once train left, solitude. Groups of people in dark doing morning exercise. Here and there breakfast in the making. Tree lined road winds to hotel. Buildings along route are two storey terraced structures. Guest house palatial affair with pagoda shaped entrance and forms part of a complex of guest houses. Main building more like a *Hotel de Ville* pale yellow bathroom tiles cover the facade. Windows separated by red brown vertical bathroom tiled projecting columns and base of building red burgundy bathroom tiles.

By bus to underground grain storage:

Statistics are 500 000 kg per silo of 12 m diameter and 9 m deep. Cut and cover double bricked adits arched up to 3 m high with pitch sealant in brick cavity keeps the storage dry. A Ming dynasty tunnel which forms part of the complex showed leakage/ condensation. On the side of the Ming tunnels are inserts one can crouch into should the main tunnel collapse. Visited also the milling machines, shaking boxes containing sieves and the package machine hall.

The iron pagoda originally built on hill but a combination of rise of alluvial plane due to sedimentation and subsidence, the original terrace of

the pagoda now below ground level. Floods can pass through Kaifeng causing widespread damage. 240 000 people drowned (Ming Dynasty). Today protection is offered by an embankment. The river bed of the Yellow River is well above surrounding land. Delft blue dolls on sale at tourist kiosk. Pagoda not iron but brick masonry; very confined stair-well around a solid core.

Palace of Sung Dynasty emperor on what looks like a pyramid. Inside a theatrical tableau of the a vicious looking lst Sung emperor, his generals to his right, ministers to his left and next to him his heir, behind soldiers and musicians, then ministers and the empress. For a number of years in the Sung/Ming dynasty Kaifeng was the capital city. 71 steps to reach palace pavilion.

The table cloth with fatty stains has not yet been sent to the laundry by lunch time. The fat stains have made contact. Noodles with a lamb dish was served (amongst others) and beer of which the first two bottle were okay. but the third was flat; to date the beer has always been good.

Needlework factory in the afternoon, followed by a visit to a prime minister's residence from the northern Sing Dynasty (9 to 10th century). Again theatrical tableaus showing some high standing official either being pardoned, not found guilty or vice versa, being led away or being taken against his will to an execution. Whatever the case, the execution device consists of three large guillotines (similar to a paper cutter). Either the victim got chopped in three or three of these devices have been assembled in one place for display.

Next a Bhudhist temple/monastery complex. Most buildings have secular use for theatrical, sculpture, shops and residences. The temple features miniature tree gardens and a Bhuda with a thousands hands. The hands/arms look like the wings of an angel; the Bhuda is four sided symmetrical. The Bhuda is in an inner pavilion surrounded by an outer hexagon gallery which displays shop window fashion texts of presumably Bhudist mythology or, more likely, the Bhuda's previous incarnations.

Evening ate out in a very busy square with Granits (Architect and his wife from Sweden), the Tiedes (architect and his wife from W. Germany) and the Neumanns, (civil engineer and his wife from Frankfurt) in a delightful looking almost three level corner restaurant over looking a square which, as we sat, turned into a market, mostly catering. One such display consisted of a noodles made on the spot from dough. The restaurant has two levels of balconies running the full length of the building supported by pillars, the top balcony covered by extended roof. Structure mostly made of planks and thick wooden beams and struts.

KungFu pilgrimage whilst by bus from Kaifeng to Luoyang , Thursday, Sept 8th

08.57 a.m. we are on our way by bus; outskirts of Kaifeng passing a brickworks. 10.00 pass through Zhen Hou a provincial capital city. It is divided into three parts; old, new with government buildings and industrial. 10.27 pass a memorial tower. 11.00 limestone quarry topped by loess, 11.09 road construction in which lime stabilisation used, 11.25 drain under road collapsed into which truck loaded with stone dived into crumpling up its cabin. Lots of small scale lime kilns, also brickworks, deep ravines in loess, and underground dwellings. Pass ribbon development where outside people play snooker.

For lunch stop at Shao Dinji from 12.30 to 14.00. Heavy downpour. Its good to come into the countryside and see terraced farms and re-afforestation after a heavy downpour. Limestone mountains on our right (North) situated

between us and the Yellow river. Absence of quarries may suggest they are quartzitic instead, very jointed, weathered along joints, crisscrossed by veins. These are the Sung Sam mountains and soon the road skirts the Zhou Ling reservoir, with masonry/rock fill dam at its head. The time is 14.20. We have been standing for about five minutes. There is an accident and a queue of trucks, busses, tractors with trailers has formed. We are still at the Zhou Ling reservoir. Clouds are stroking the pale grey quartzites of the Sung Sam mountains.

I have time to write as the bus is stationary:

We had lunch at Shao Dinji, a relatively small town for China, at least it did not take long to leave. All these places have tourist shops, yet if I want to buy something useful like a leather wallet (obtainable in the PCR's department store in Hong Kong) I cannot here in China. Its all tourist burden stuff; Chinese drawings, jade rings, porcelain horses, silk prints; basic bottled mineral water no, Coka Cola yes. Their market research has not quite got it right. All I want to purchase is a massive bicycle bell, a good guide book, a map, a leather wallet, and an English language newspaper from time to time.

As a result of this morning's travels I am now fighting off a dozing spell. Bus door opened 14.33, we can get out! 14.50 traffic starts moving. Mine workings, purpose not clear (aggregate?, room and pillar, rock also has schists. Tunnel accident suggests truck at fault, jamming a tractor-trailer up against right hand side. Probably none used lights. Mining appears to follow particular horizon as once out side scars again seen.

From 15.00 to 16.45 visit the Shaolin Temple famous for its Kung Fu fighting arts. Here the Bhudist religion seems to attract aspiring monks (in training suits). Kung Fu films made here and pilgrimages made by various Kung Fu societies from America and Japan. Restoration of buildings in progress, and the placing of new idols (the old ones must have suffered twenty years ago). The ornamental paintwork is done by women; probably because they have patience and persistence. High mountains as backdrop and for those who have a few yuan to spare can peer at a temple high on a ridge through binoculars. Despite its relative remoteness, about two hours drive from nearest large town, many visitors and lots of stands to purchase usual attendant riff raff souvenirs; popular at the moment in China is a gadget pulled by a string giving a jackdaw type sound. About the only bird sound one gets in China.

Down a steep winding road towards alluvial planes of rivers flowing from Sung Sam mountains. Lime kilns reappear and more fertile farms. Crops are cotton, alfalfa, maize and wheat. Second hold up; I was glad, the road surface very uneven and feeling pretty jaded by now. Not an accident but a crane truck was lifting one truck unto another. Road surface changes to concrete and a lot smoother. Jadeness ebbed somewhat as we entered Luoyang. Large city as it took a while reach the Friendship guest-house complex. Resembles very much western style hotels though a bit unconformist with regard to use of public spaces for shops, bars, dining halls and reception. Rooms very standard; the TV gets a very special velvet hood. Could use something similar for my computer monitor. (Good god! been without one now for getting on to two weeks; will I start showing withdrawal symptoms?).

Little has been said of my travelling companions:

The party consists of about a bus load. I don't know all the names but possibly with the aid of van Lohuizen I can get a few listed:

Americans: (they are easiest with regard to giving their names)

Prof. Lester Boyer and wife Patricia
Retired octogenarian Prof. Richard Hamburger and female travelling companion of similar age.
And naturalized Americans from China J. Scott Jin and wife with young son of seven.

Germany: Henrich and Barbara Tiede and Joachim and Christa Neumann

New Zealand: Helen and Fritz Eisenhofer from Wellington (he is originally from Austria)

Sweden: Michael and Elizabeth Granit

Italy: Gianni and Liuba Silvestrini (ancient monuments; Sicily) plus one other Italian colleague

Japan: Yoshiaki Yoshimi, Prof. Emeritus Tokyo Inst Tech and adviser Shimuzu corp (he spends much of his time measuring brick dimensions); was also at luncheon meeting. Ray Sterling receives sponsorship from Shimuzu. With him at least four Japanese all high officials if not directors of Shimuzu.
Yoshio Higashikata chairman of the Japan Underground Space Association
Mr. Mitio, from TEPSCO, the Tokio Electrical Power Sites Corporation
Mr. Yoshinobu Inoue of the Shimizu Corporation.

From Shanghai we have three guides of which Zhou is the only one who speaks English. He is an "AIO" of Professor Hou; up to now everything has run smoothly and on time.

Holland: the author and Prof. van Lohuizen

Luoyang, the Longmen Caves and other ancient sites Friday Sept 9th

On a bus 08:50 a.m.

"Trees planted 1950's along 15 km E-W street." we are informed by our guide Mr. Zhang from the foreign ministry. "Luoyang," he continues,"is one of the best three environmental cities of China. On left of road pass the old imperial gardens 1900 years old. The city makes do with four rivers; Luo River is the largest. The Yang (meaning facing the sun) lies on the north side of the Luo...." Other two rivers?

"There are two main railways: N-S and E-W. There are five urban districts covering 15 000 km2 containing 5m people. City proper has 700 000. It was the ancient capital of five dynasties, other capitals were Kaifeng, Hang Jo, Xian, Beijing. October first is approaching (the national day) which explains girls are wearing yellow ribbons. Five ancient cities in the Luoyang area; dating back to 5000 to 6000 B.P. First dynasty was the Sha 1500 B.C.. Confucius came to Luoyang. There are 30 000 university students."

"The silk road starts in Luoyang, from there heads west to Xian. *Imperial College* was the first university in China. All geniuses come from Luoyang."

09.04 we cross the Luo river. "About 600 years ago Luoyang declined as result of natural disasters and civil wars."

The Longmen caves (Gate of the Dragon, in fact the Dragon river flows through a gorge carved through a limestone escarpment to reach the Yellow

River confluence to the north. 400 a.d. Bhudist recluses started carving out temples from the limestone face so that over the years a tradition was set culminating into 2100 caves and 40 small scale pagodas. The caves range from 2m to 70 m in height. The first cave shows Bhuda with two disciples. His ear has slipped away along a bedding plane and is lying on the ground. Known as Chen Si temple meaning Bubbling Spring. Largest statue is 17.4 m. A long ear means prosperity and good luck. I now the significance of my ears.

White horse temple on the eastern out skirts of Luoyang is our next venue; it is the first in China and is called after the white horse which carried the Bhudist scriptures to China. (In Scotland they always did say you can take a White Horse anywhere.) After that bit of blasphemy: (White Horse is a whisky) to continue:

No notes on our luncheon venue: (probably back at the Hotel)

The next visit was the Luoyang Museum of Ancient tombs; no photos- a mixed blessing as it would have cost a complete film roll, unfortunately no picture postcards to infringe copyrights and books imported from Europe in German. Impressive brickwork patterns developing into domes or arched ceilings. The tombs were transferred from various points around the city to this one museum, except for one tomb, the Empress tomb which became central to the others. Some of the information on top of the tomb entrance went as follows 'A celestial phenomena myth picture frescoes'. Of note were the varied and intricate brickwork patterns used to construct the tombs.

Underground dwellings in loess: Zhong Pou Cun farming hamlet. About 2 to 3 m earth above cave roof, eves prevent scour of sunken courtyard walls. A ramp parallel to one of court yard walls is used for access, then one enters tunnel of about 10 m length to reach the courtyard. Well kept, though most people deserting these dwelling for above ground abodes. Pigs and chickens roam freely. School just disgorging its children so that we are entertained by babbling laughing children as they presumably find us very entertaining. One lobs a chicken, squawking into courtyard from above. Stall in one of the side caves/rooms with cow inside!

The five treasures from Luoyang are:

1. Pieung flower
2. Treasure liquor
3. Glazed pottery horses and camels
4. Monkey's head mushroom
5. Yellow river carp fish as it is in the middle reaches of the river: upper reaches to small and bony, lower reaches too large middle reaches just right at .5 to 1 kgm.

Riddle: How many banks are there in China
Answer: Two: along the Yellow river.

Riddle: Why doesn't a bicycle stand up by itself?
Answer: Because it is two tyred (too tired)

Dinner at a Cantonese restaurant consisting of...Yellow River Carp
Restaurant two blocks away, passing children on pavement practicing Kung Fu; presumably for the National Day festivities.

At 21.00 hrs left for railway station. Luxurious waiting lounge. The train had to wait as our wagon was shunted by a steam locomotive into position

despite the fact the locomotive had a string of wagons attached to its other end. We are the end wagon so it swings a lot. Finished day drinking potent Chinese Luoyang treasure liquor courtesy of the Tiedes.

Saturday on tracks to Xian and Xian, Sept. 10th

Lin Tung County 35 km east of Xian. Prof. van Lohuizen says its a happy coincidence (after our guide explained what was NE-SW) that it (?) was the same as in Holland. North of the yellow River the province is called Shamsi and south it is called Shanxi. We are south of the Yellow River (in fact a tributary) 5.6 m people in province, 2.8m in urban areas. 7 districts and 6 counties. Xian area is 2200 km2 and is 900 km distant from Beijing. Xian has a three hundred year history covering 11 dynasties who use the city as their capital. The main river is the Chan (meaning "spread") Hu (River). Total of eight rivers pass through Xian. This year there had been heavy rainfall and severe flooding. One river we passed usually does not contain water. One month ago severe flooding 25 km away in the county. Prominent dynasties were Chou, 1100 BC, Chin 221 BC, Western Ham, Western Tan.

The weather is at its hottest over 40 |C, winters below 0|C usually averages 13 |C. The best months are April, Sept Oct. Yearly rainfall is 600 mm. Main power is derived from hydroelectric stations on the Yellow River and from coal fired thermal stations. Main crops are wheat, corn, cotton, sweat potatoes and some rice. 400 000 tourists visit Xian each year, 5 m visitors including Chinese. There are a total of 36 universities. We cross the Bak Hu; back tracking along the railway line on which we approached Xian. Highway construction in progress to cope with the flood of tourists. Pom granit orchard passed at 09.48, the fruit of Xian at place called Ling Tu.

The Terra Cotta Warriors:

They were discovered in 1974 in as a well was dug for a local farmer. There were no records of the existence of such an antiquity. From 1974 to 1979 3 vaults containing 8000 figures were excavated. Vault 1 is the main part of the military formation containing 6000 figures, vault 2 to the right of vault 1 contain the calvary and no 3 the "hercules" formation. Museum contains vault 1 site; the figures were all broken. The emperor Qin Shi Huang who ascended to the throne at age of 14 ordered in his fifteenth year the statues to be made for his future mausoleum. The work took 11 years involving 700 000 labourers. Quick silver channels were made in floor to represent rivers. After installing the army in the vault all the designers, and courtiers etc. who new about the project were feasted in one of the vaults which was then sealed into the tomb (221 BC) to suffocate so that they would not pass on the whereabouts of the warriors. The actual tomb of the emperor is situated in a pyramid tumulus called Tin Shou Bin, 47 m high, 1400m perimeter 1.5 km to the west of the warrior army, the army protecting the emperor from where the greatest threats came: the more populous east. The main vault consists of several galleries constructed by cut and cover techniques in the loess. The wooden beams holding the overburden turned to charcoal over the years and hence lost their strength. All figures were damaged to various degrees but in general very well preserved. Excavation and restoration about 1/3 complete, the site is now covered by a large arched-hangar like structure.

Lunched locally at the Lishan Hotel catering for large number of visitors. We were lucky to be early. Many visitors well over 60. Finally got into the purchasing act and got some local handiworks. The fever took hold the rest of the day and I even started negotiating the purchase of a 2000 guilders worth of carpet, then I remembered material wealth is a burden especially as a tourist and opted out.

Hatshi Hot Springs used to house palace and formed the imperial palace in the Tang dynasty,. The palace contained 72 concubines and 3 wives. Hatshi means "running beautiful Horse". In 1936 Chang Kai Shek and Chu En Lai formed an alliance to try and stop the Japanese advance into China for which the original furniture and rooms are preserved.

Rooms consisted of about four chambers, rather spartan with table, western table lamp, bed and screen.

Returning to Xian pass a convoy of mules hauling concrete roof slabs. The traffic consists of a large variety of road users, trucks (most common), busses, mules, tractor-trailers, jeeps, some cars, bicycle/ tricycles with rear loading platform, some motorcycles, also motor tricycles, some bicycle rickshaws, (tractors are two varieties: the lawn mower type described earlier, the other a small miniature version western type tractors having size of a golf-cart.

Visit pottery. Expensive, my cheap tourist momentos 5 yuan set of terra cotta soldiers more rustic then the carefully scaled models of the factory.

Last visit of the day was the Panpo Site Museum exhibiting a neolithic settlement found at the site. No notes, but have a book on museum in Chinese. Examples of Earth Sheltered Building, some looking very much like tepees of the American Indian. The pottery designs could also resemble the pottery designed of the American Indians.

In evening went to restaurant in park. After dinner walked in search of route to main feature of park: a Pagoda (Its on an island in a lake). Came across a student in a park, half-crazed practicing English for high school exam. He sounded very fluent. Van Lohuizen took the opportunity to test his English against that of the student. End of walk thought I heard birds; they turned out to be song birds in cages in which the owners have taken them to the park for an airing.

The final instalment is about Sunday outings in Xian, how one survives a flight in a CAAC Tupolev 125 and still visit the same day the Great Wall during sunset. The last day in Beijing visiting Mao Tse Tung, the Forbidden City and the Winter Palace followed by not so happy dinner-voucher saga (don't miss it!) made happier during Happy Hour at the Crystal Lounge. The story ends after a short visit to the Hong Kong Geotechnical Control Office and an extended weekend in Singapore, its university and a geotechnical company or two.

Book review

"LOESS - It's Distribution, Geology and Soils"
Edited by D.N.Eden & R.J.Furkert

Proceedings of an International Symposium on Loess.
New Zealand / 14-21 February 1987. 245 pp.

A.A.Balkema / Rotterdam / Brookfield / 1988
ISBN 90 6191 851 0 Price: HFL 95,--

The papers and abstracts in the hard cover book are contributions to the third meeting held by the Western Pacific Working Group of the International Union for Quaternary Research (INQUA) Loess commission. According to the introduction the symposium consisted of a two-day conference at Palmerston (N.Z.) and a six-day field trip on the South and North Island. The field trip concentrated on stratigraphy and composition of the loess on the two main islands and highlighted the importance of tephras in dating and correlating the local loess. About 30 to 40 participants joined the conference which is referred to by the editors as to "deal with all aspects of loess".

The aim of the symposium and a more restricted problem definition in the introduction would have helped the reader better than a listing of 3 symposia already held by the working group. Also a framework in which the papers are related is missing, causing the reader to jump geographically and geologically back and forth. The presence of keynotes below the abstracts would be to the benefit of the reader.

The 29 titles, geographically ranging from New Zealand 19(7), USA 5(3), China 2, Antarctica 1, Iran 1 and Europe (1), are composed of 18 full papers and 11 abstracts "()". The majority of the full papers have as main topic the correlation and stratigraphy of loess with magnetic susceptibility, oxygen isotope and pedological studies. In New Zealand this is especially enhanced by the presence of datable layers of volcanic material in the sequence.

Noteworthy are papers by Lateef (p.93) of the loess in central North Iran, one of the few publications on the loess in that area and Claridge & Campbell (p.33) on loess sources and aeolian deposits in Antarctica. The book benefits from a consistent lettertype, layout style, drawing style of diagrams, graphs and maps. But the photographs are generally printed too dark.

Conclusion

It is felt that in the preview a more to the point discussion about the main topics and researches should have been presented. Especially since the New Zealand loess is strongly influenced by and originating from volcanic activity in the area, by which it may have other properties than the loess found elsewhere. E.g. it is not stated if a definition like silt-sized aeolian deposits associated with Pleistocene glaciations with a certain particle-size range, mineral composition and texture is used or that any fine-textured deposit of aeolian origin (volcanic ash ?) meets the requirement to be called a loess. Therefore the reader is advised to read carefully the loess definition

given by the author of each paper . However a grain size analysis as well as other important physical properties of the investigated materials is often found to be missing.

About 30% of the titles are abstracts of papers NOT published in the book. The book therefor may only meet the "value for money" principle for those interested in the loess of New Zealand since 11 of the 19 papers deal with studies localised on the North Island. Earlier studies on New Zealand loess concentrated predominantly on the South Island according to a review by Smalley & Derbyshire ('89). Therefor as a contribution to the New Zealand Loess stratigraphy the booklet is certainly a worth-while contribution.

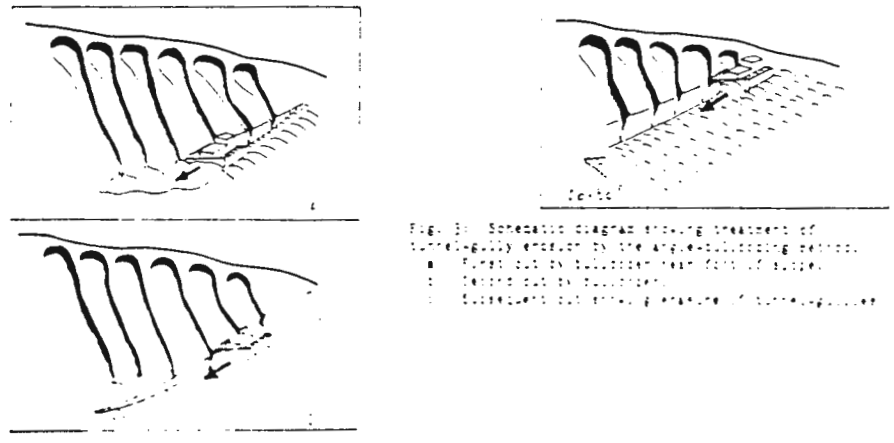
The amount of papers covering the research outside New Zealand is however so limited that the book's title should better be "Loess in New Zealand". It's present title gives the impression that the book is covering all types of loess research in the world, which is certainly not the case.

Engineering-Geological interests:

Only the paper of Laffan,M.D. & Sutherland,R.D. (Treatment of tunnel-gully erosion in loess colluvium on the Wither Hills, New Zealand. p.81-91.) presents an engineering case. The technique to treat the sometimes 7 m deep gullies was contour reshaping by low-angle bulldozering followed by revegetation. However, looking at the figure (see below), one wonders why slope-stability calculations are not discussed (done ?) for the construction phase and the resulting slope with reworked material.

Drs R.Kronieger,
Section Engineering Geology
Technical University Delft

Lit: Smalley & Derbyshire - "The Latest on Loess ", Geology Today,
june 1989, p.97-99



Een verslag van de geotechniekdag te Utrecht.

W.O. Molendijk, F. Bisschop, A.R.G. van de Wall

Ter ere van het 40 jarig bestaan van de afdeling Geotechniek binnen het KIVI, werd op 1 november in Utrecht een symposium georganiseerd. Hier werden verschillende aspecten van de geotechniek belicht.
Sprekers waren onder andere prof. dr. ir. de Josselin de Jong, Ir. A.F. van Weele, Ir. L. de Quelerij, prof. dr.ir.A.A. Verruijt, en Prof. dr.ing. U. Smoltczyk. Hieronder volgt een samenvatting van de gehouden lezingen.

De toekomst van de geotechniek

Prof.Ir. A.F. van Weele

De voordracht van Prof. van Weele was voornamelijk een pleidooi voor het gezond verstand. Er moet worden opgepast dat men zich niet te veel laat meeslepen door de enorme rekencapaciteiten van de hedendaagse computers. Dit werd verduidelijkt aan de hand van enkele voorbeelden.

In de grondmechanica is een ontwikkeling naar steeds uitgebreidere en nauwkeuriger rekenmethoden. Deze methoden - ontwikkeld veelal op theoretische bases - worden getoetst aan theoretische modellen en laboratorium onderzoek. Er bestaat echter het gevaar dat het contact met de realiteit verloren gaat. Men moet er ten alle tijden op bedacht blijven dat de resultaten nooit nauwkeuriger kunnen zijn dan de invoergegevens toestaan. Men denke hierbij aan de veranderingen in het monster als gevolg van het verkrijgen hiervan. Moderne programma's maken het veelal mogelijk om met betrekkelijk weinig gegevens tot verstrekkende conclusies te komen. Dit kan desastreuze gevolgen hebben als er onverwachte afwijkingen in de grond voorkomen. Intensiever meten lost dit probleem voor een deel op. Rekenmethoden moeten vooral dienen om meer inzicht te verschaffen in mechanische processen. Voor het juist interpreteren van de door de computer berekende uitkomsten zou de rekenaar een hoeveelheid praktijk ervaring moeten bezitten, en indien mogelijk zou dezelfde persoon ook tijdens de uitvoering van het project aanwezig moeten zijn om de berekeningen te evalueren en zo nodig aan te passen.

Ontwikkelingen van de berekeningsmethoden in de geotechniek

Naar de lezing van prof. dr. ir. A.A. Verruijt

Prof. dr. ir. A. Verruijt (TU Delft) besprak de ontwikkelingen van de berekeningsmethoden in de geotechniek.
Hij gaf aan dat men in de geotechniek zeer gecompliceerde berekeningsmethoden ontwikkelt en toepast maar dat men ook een zeer kritische houding aanneemt t.o.v. uitkomsten van computerberekeningen. Dit kwam men vroeger ook al tegen. Zo

haalt Verruijt Keverling Buisman aan, die al stelde dat men zich in veel gevallen tevreden zou moeten stellen met een verbeterd inzicht als resultaat van berekeningen.
Verruijt gaf verder een aantal voorbeelden van ontwikkelingen van berekeningsmethoden zelf.
Bij berekeningen van de stabiliteit van taluds werd altijd uitgegaan van een cirkelvormig glijvlak. Nu zijn er methoden, gebaseerd op de eindige elementen methode en elasto-plastische rekenmethoden, ontwikkeld. Deze zijn niet beperkt tot cirkelvormige glijvlakken maar deze laten het bezwijkmechanisme zonder beperkingen ontwikkelen, zoals het programma PLAXIS. Bij dit programma blijkt het afschuifvlak nog wel te lijken op een cirkelvormig glijvlak.
Ook om drie dimensionale gronddrukken te berekenen zijn er uitgebreide programma's, zoals het programma DIANA, ontwikkeld. Dit programma heeft als voordeel dat het voor veel verschillende toepassingen kan worden gebruikt. Voor specifieke toepassingen kan men met dit programma specifieke numerieke modellen maken.
Op het gebied van grondwaterstromingen zijn ook de laatste jaren met behulp van de methode der eindige elementen grote ontwikkelingen bereikt. De moderne rekenmethode heeft meer mogelijkheden dan de oude methode van vierkantjes tekenen. Zo kan men eenvoudig de doorlatendheid van de elementjes varieren. Nadelen zijn dat het niet makkelijk is met zo'n programma stroomlijnen te genereren, wat bijvoorbeeld zeer belangrijk is bij de verspreiding van verontreinigingen, en dat een grote hoeveelheid hard- en software nodig is.

De betekenis van 1992 voor Europa

Naar de lezing van prof. dr. ing. U. Smoltczyk

De ochtendsessie werd afgesloten door Prof. dr. ing. U. Smoltczyk, voorzitter van de Europese landen in de overkoepelende internationale geotechnische vakvereniging, die de betekenis van 1992 voor de Geotechniek belichtte.
Hij gaf aan dat het aantal grootschalige projecten in Europa zal toenemen in de komende jaren. Hiervoor zullen in toenemende mate ervaren geotechnische adviseurs beschikbaar moeten zijn. Hier ligt een probleem: deze capaciteit is niet voldoende. Dit ligt volgens hem aan de verkeerde opbouw (te theoretisch) van de opleiding tot civiel ingenieur, waardoor de studenten te gauw de constructieve kant opgaan waar het aanbod al te groot is. Expertsystemen zouden in dit geval een oplossing kunnen betekenen.
Ook gaat hij in op het feit dat een geotechnisch adviseur, om over een probleem creatief na te kunnen denken, regels nodig heeft zonder zijn eigen creativiteit te blokkeren.
Hier zijn dat:

- rekenmodellen;
- kwaliteitscontrole van de constructieelementen;
- veiligheidsvoorschriften voor de bouwarbeiders;
- standaard proeven voor Geotechnisch onderzoek.

Verder bracht hij een aantal ideen naar voren op het gebied van de verspreiding van kennis in Europa. Zo zou er bijvoorbeeld een tijdschrift op het gebied van de geotechniek uitgegeven kunnen worden waarin dan over lopende en toekomstige onderzoeken kan worden geplubiceerd. Ook het organiseren van congressen, symposia en dergelijke wordt door hem zeer aanbevolen. Om de kennisuitwisseling dan

zo groot en gemakkelijk mogelijk te maken zouden de deelnemers aan zo'n symposium in de proceedings vermeld moeten staan met hun actuele functie.

Lessen uit het Oosterschelde-project.

Naar de lezing van ir. L. de Quelerij

Belangrijke technologische ontwikkelingen op het gebied van de civiele techniek worden niet zozeer bepaald door toevallige wetenschappelijke vondsten, maar veel eer door de noodzaak praktische oplossingen aan te dragen voor concrete problemen die zich op een gegeven moment in de maatschappij manifesteren. Een grote stimulans voor geotechnische/ingenieursgeologische vondsten zijn voornamelijk (helaas) grote rampen als bijvoorbeeld de Watersnoodramp van 1953.
Deze ramp was de aanzet tot het realiseren van de Oosterschelde Werken. Extreem hoge veiligheidseisen en veranderende inzichten in de omgang met het milieu deden een beroep op de inventiviteit van de civiel ingenieur en dus ook op de nieuwe vondsten.

Ter illustratie zijn hier enkele van de randvoorwaarden en eisen die aan de Oosterschelde stormvloedkeering zijn gesteld:

- opname van zeer hoge statische vervalbelasting en cyclische golfbelastingen (met een optredingsfrequentie van 1/4000 jaar);
- funderingsgrondslag bestaande voor de bovenste 5-15 meter uit losgepakte zandlagen;
- zeer strenge eisen ten aanzien van de vervormingen van de afzonderlijke funderingselementen om vastlopen van de beweegbare schuiven te voorkomen;
- de toelaatbare faalkans van de constructie voor alle geotechnische grenstoestanden (faalmechanismen is extreem laag (orde 10^{-7} per jaar);
- levensduur van 200 jaar;
- uitvoering als geprefabriceerde constructie die in den natte met bijzonder kleine toleranties moest worden geplaatst in waterdiepte tot 30 meter.

Om aan deze eisen te kunnen voldoen is destijds gekozen voor de volgende uitvoeringsmethoden:

- in-situ verdichting van de losgepakte zandlagen tot 10 meter onder het funderingsniveau;
- de toepassing van onafhankelijke caissonfunderingen die hun draagkracht ontlenen aan het eigengewicht (bodemwrijving) en de drempelinbedding (passive steun aan kopzijde);
- 3D-modellering van de grond/water/constructie interactie.
- integrale ontwerpaanpak gestoeld op probabilistische benadering waarbij alle elementen van de k ng (beton, staal, fundering en bodembescherming) op analoge wijze moest worden beoordeeld;
- waarborgen van de stabiliteit van de peilers bij het mogelijk ontstaan van ontgrondingskuilen (tot 40 meter diepte ten opzichte van het wateroppervlak) aan de rand van de bodembescherming;
- implementatie van een systeem voor kwaliteitswaarborging, bestaande uit contrôle van de verschillende funderingscomponenten tot en met een monitoringsysteem in de operationele fase.

De praktische implementatie van deze condities heeft geleid tot het op probabilistische wijze ontwerpen van de werkmethoden. Het Oosterschelde project is een van de weinige projecten ter wereld die in totaliteit is ontworpen en uitgevoerd met probabilistische methodieken.

Of een nieuwe ontwikkeling daadwerkelijk vruchten afwerpt in de vorm van verdere implementaties op het gebied van de (civiele-)techniek, het zogenaamde spin off effect, hangt af van een aantal factoren:

1 Het is noodzakelijk dat de ontwikkelaar van de nieuwe technieken deze technieken in practische zin kan toepassen.
2 De ontwikkelaar moet de ontwikkeling voldoende kenbaar maken aan potentiële afnemers. (De gebruikers moeten op de hoogte zijn van de nieuwtjes)
3 Aan de zijde van de afname moeten problemen bestaan waarbij er behoefte is aan nieuwe oplossingen.

De volgende technieken zijn intussen verder ontwikkeld en toegepast:

. De modellering van het gedrag van zand onder een cyclische belasting.
. Het ontwerpen van filterkonstrukties voor een breed scala aan filtermaterialen.
. Het gebruik van modelproeven, met name het gebruik van centifugeproeven.
. Offshore in-situ meettechnieken.
. De toepassing van probabilistische berekeningsmethoden.

Spin off kan verder verbeterd worden door het volgende in ogenschouw te nemen. Het is onverstandig de kennis van nieuwe ontwikkelingen in een kleine selecte groep op te bouwen, de kansen voor nederlandse ondernemingen op de buitenlandse markt wordt hiermee verkleind. Het is verstandig om toekomstige aanbieders en gebruikers reeds in een begin stadium op de hoogte te brengen van bij een project ontwikkelde kennis. In dit verband verdient het de aanbeveling, voor bijvoorbeeld overheden, om meer gebruik te maken van aannemerskombinaties in plaats van één gespecialiseerde aannemer. Van essentieel belang is dat alle ervaringen op papier worden gezet in de vorm van handboeken, richtlijnen, normen en rekenmodellen.

Keverling Buisman Lezing

Naar de lezing van prof.dr.ir. G. de Josselin de Jong

In deze laatste lezing nam prof. de Josselin de Jong de symposiumgangers even mee terug naar het begin van deze eeuw, toen de basis van de huidige grondmechanische kennis nog gelegd moest worden. Een herdenkingswoord voor een van nederlands grote namen op het gebied van de civiele techniek: prof. Keverling Buisman.
Zestig jaar geleden begon prof. Keverling Buisman met het doceren van het door hem opgezette vak Grondmechanica aan de Technische Hogeschool te Delft. Een eerste leerstoel voor de grondlegger zelf. Keverling Buisman begon met de in het buitenland ontwikkelde technieken uit te breiden voor de nederlandse bodemomstandigheden.
Waneer men een lijst gaat samenstellen van de onderzoeken die Keverling Buisman heeft gedaan, ontstaat een indrukwekkende opsomming van onderwerpen die wij nu als grondmechanische grondbeginselen aanmerken. Keverling Buisman is de ontwikkelaar van de nu niet meer weg te denken CPT en van een met de triaxiaalproef vergelijkbare test, de celproef.

In 1940 publiceerde Keverling Buisman zijn standaardwerk GRONDMECHANICA, met daarin de theoretische inzichten ten aanzien van de door hem ontwikkelde testen.
Hij had nog vele goede ideëen voor onderzoek op het gebied van de grondmechanica, toen hij vroegtijdig uit ons midden verdween. Hij stierf in Japanse gevangenschap in Nederlands Indië tijdens de Tweede Wereldoorlog.
Prof. de Josselin de Jong besloot zijn lezing met een aanmoediging voor de geotechnici van deze tijd. *Er ligt nog steeds een grote uitdaging in de vraag hoe we veilig, maar toch zuinig, met grond kunnen konstruëren ...*

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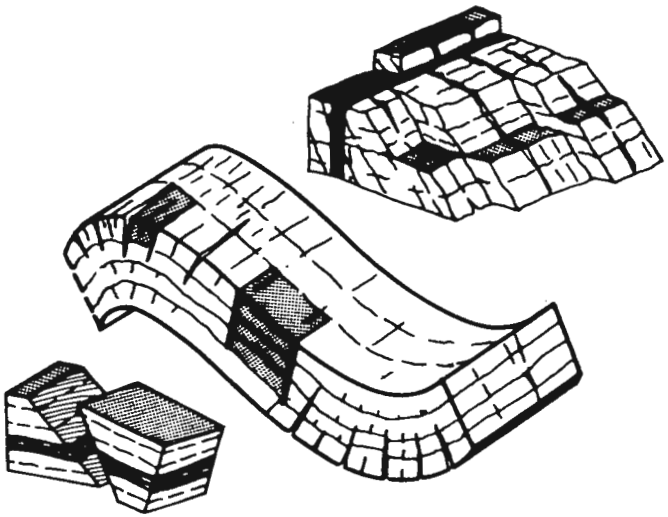
International Conference on

MECHANICS OF JOINTED AND FAULTED ROCK

MECHANIK VON STÖRZONEN UND GEKLÜFTETEM FELS



April 18-20, 1990
Vienna, Austria
Technical University Vienna

organized by

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CALL FOR PAPERS

CONFERENCE SCOPE AND OBJECTIVES

New developments in the field of theoretical, experimental and numerical modelling and improvement of testing and testing equipment for rock joints and jointed and faulted media call for an international conference in the centre of Europe. This conference covers all aspects of jointed and faulted rock and rock masses from geophysics/geotectonics to engineering rock mechanics applications and fragmentation by blasting in quarries. Special emphasis will be focussed on the implementation and application of new concepts and methods to modelling, analysis, building, performance control and repair of structures of and in jointed rock and rock masses.

The goals of the conference are

- to provide a forum for presentation of new research results and discussion for researchers, scientists, engineers and practicians from the communities of geologists and structural geologists, geophysisists, tectonophysisists, rock mechanics, rock engineering and rock fracture mechanics,
- promotion of the interaction among theoreticians, engineers, practicians and consultants,
- the search for a common language in terms of testing and standardization
- to promote the feedback from performance analysis and analysis of failure of jointed rock and engineering structures in jointed rock to failure prevention already in the design stage

TOPICS

The main themes of the conference will be:

- Structural geology and formation of joints and faults
- Physical and mechanical properties of jointed rock
- Fracture and damage processes in jointed rock media
- Failure criteria in jointed media
- Initiation and propagation of shear fractures fault zones in rock
- Mechanics of tectonic faulting and shear rupture
- Time-dependent deformation and failure of jointed rock
- Geotectonic fracture processes
- Geothermal fracturing
- Hydromechanics of jointed rock masses
- Hydrofracturing and fluiddynamics of fracture systems
- Modelling of joints and jointed rock masses
- Numerical simulation and modelling; Continuum versus discontinuum approaches
- Dynamic behaviour of jointed rock and dynamic rock fragmentation
- Toughness testing of rock and filled joints
- Mining and underground constructions in jointed media
- Excavation design in stratified and jointed rock
- Performance and stability of rock slopes
- Stability and performance of engineering structures in jointed and faulted zones
- Dam foundations and abutments in jointed and faulted bedrock
- Geophysical applications of fracture mechanics

A larger number of state-of-the-art and review-type plenary lectures will be en presented in order to emphasize the themes of the conference and prepare the ground for extensive discussions.

Plenary lectures will be presented by

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W. L. FOURNEY (USA)
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U. ZISCHINSKY (West Germany)

GENERAL INFORMATION

Papers are invited on the topics outlined above and other topics within the general scope of the conference. Abstracts of no more than 300 words should be submitted to the Conference Secretariat as soon as possible, but no later than the deadline shown below. Abstracts should clearly state the purpose, results and conclusions of the final paper. Authors will be notified of preliminary acceptance within one month and final acceptance will depend upon review of the full length paper.

A volume of reviewed and selected papers in English will be published by an international publisher.

The conference language is English. Presentations in German will also be accepted.

TIME SCHEDULE

Submit reply forms	**as soon as possible**
Abstracts are due to	**July 30, 1989**
Full paper deadline	**January 31, 1990**
Conference	**April 18-20, 1990**

CONFERENCE ORGANIZATION AND PROGRAM

The Austrian Organization Committee will make all the detail arrangements for the conference including the extensive social program. Information about travelling, accomodation, registration, local attractions etc. will be mailed to all persons completing the attached questionnaire.

An international committee will be in charge of reviewing the papers and publishing the conference proceedings.

Piling and deep foundations; Volume 1, 472 pages, 9 themes having 55 papers.

A.A. Balkema/ Rotterdam/Brookfield/ 1989 Cost fl80.20 incl 6% BTW

Edited by J.J. Burland and J.M. Mitchell

from the Proceedings of the International Conference on Piling and Deep Foundations, London / 15-18 May 1989

Volume 1 of the conference contains the pre-conference papers whereas Volume 2 which still has to appear will contain further papers, general reports on the papers, discussion, and author and keyword indices. Hence to use Volume 1 as an effective reference work one will have to wait until Volume 2 is published.

As the title suggests, the conference tackles a wide range of foundation types. Had the theme been restricted to piles or to deep foundations one can still expect a large number of publications. The themes covered by the proceedings are:

1. Special foundations *on slurries, grouting, soil reinforcement, diaphragms walls, auger piles, hand dug under-reaming, pile for earth-retention, nodular piles, barrettes over underground openings, stone columns and from Japan "large diameter drilling operations of multi-head down the hole hammer drill through boulders and granite".* (Total of 17 papers)

2. Maritime structures *on just two papers consisting of a mono-pile for a dolphin structure and lateral loading of elastic piles using an elastic-plastic numerical model.*

3. Basement construction *is covered by five papers ranging from top-down building methods to diaphragm walls.*

4. Piling problems *(nine papers). The titles at a glance suggest both construction and design problems. The case histories on the effect of a neighbouring structure, heavily contaminated sites, and environmental regulations figure prominently.*

5. Rock sockets *(four papers) consist of four case histories in Australia, Philadelphia, New York and Birmingham.*

6. Driven piles *(five papers). Two papers give case histories in Iraq and Port of London and three on design aspects.*

7. Instrumentation and interpretation *(four papers) consist of the effects of vertical loading on lateral behaviour of piles, loading tests, caisson (in fact large diameter piles) support for a navigation guide wall, and, the first paper from Holland, on the CPT and pile bearing capacity (the author accidently left a Dutch word in it page 401 "Interpretation of the CPT bij extrapolation").*

8. Pile testing methods *Four papers are attributed to this theme. The first three are on field test methods: on a "Statnamic explosive pile test" from Canada, a similar test from the USA and a drop hammer from the UK. The fourth paper contain formulae from Germany to assess dynamic pile tests (presumably to assess the Canadian, USA and UK tests?)*

9. Base grouted piles *contains four papers of which the second from Holland appears on vibration free tubular piles and two papers on piles in the Thanet sands of London and one on effects of effective stress changes on a base grouted pile.*

One is tempted to zero in on the more exotic titles such as *..high capacity barrettes in a region of old underground quarries* pp 119 to 130 by F. Schlosser, B. Simon and J. Morey. This paper deals with the extension of Montparnasse station in Paris over old limestone quarries. Interesting are the French methods of logging their boreholes (drill rates, flush returns etc.) and the low pressure mortar grouting methods they adopted to plug the old workings.

J. Nakayama's paper, the other exotic title *..multi head down the hole hammer drill through boulders and granite.* The instrument used looks like a tunnelling machine and is called the *MACH drill.* It is used in typical weathered granite soil profiles to make sure your pile hasn't been socketed into a granite residual core stone, in fluvial cobble-boulders and "boulder clays"; (Hong Kong, Nagasaki and Papua New Guinea respectively).

The conference was organised by the Deep Foundations Institute with the assistance of the Federation of Piling Specialists. The Deep Foundations Institute draws it members from contractors, consulting engineers, educator and suppliers and hence papers reflect this membership; the most recent experiences in piling practice. Some of this corroborates existing experience, some show innovative methods whereas others, which would attract the attention and interest of the engineering geologist, deal with new geological situations. The reviewer is tempted after selecting two papers at random due to their rather quaint titles to further peruse the remaining 53 papers which would produce a rather long review. As for the piling contractor who recently asked the reviewer if there was a good publication on piling into rock will now receive a suggestion that he should purchase for f180 from A.A. Balkema Volume 1 containing several million to billion guilders worth of experience.

P.M. Maurenbrecher, TU Delft Engineering Geology.

INTERNATIONAL ASSOCIATION OF ENGINEERING GEOLOGY

SIXTH INTERNATIONAL CONGRESS

6 - 10 AUGUST 1990

By now every member of the Ingeokring will have received a copy of the Second Announcement for the Congress to be held in Amsterdam next August. Because it is the 25th. Anniversary of the IAEG the scientific scope of the Congress has been made very broad to include all aspects of engineering geology. So far we have received about 400 abstracts from all over the world covering all the session themes and including descriptions of some problems which, while clearly engineering geological, are hard to place within any session.

Because of the late production of the Second Announcement abstracts will be accepted up to end December, so those who have yet to submit a paper have still got an opportunity to do so.

On the third day of the Congress participants will have the choice of following a technical/touristic excursion to the Delta Works or of attending symposia on particular topics considered to be of great importance. These topics, given in your Second Announcement, include use of computers, environmental pollution, sea level changes and engineering geology in the oil industry. Some papers will be given by invited speakers and others given by speakers who have submitted papers to the general Congress. It is possible to register just for the day of the symposia at a reduced registration fee.

There will be an exhibition of equipment throughout the period of the Congress and it is worthwhile noting that for our Congress the majority of the participants will be coming from countries outside the host country and many from East Block countries and China. It may be that the exhibition will prove a good opportunity to sell.

So far the indications are that the Congress should be a success but much will depend upon the participation of the members of the Ingeokring, for one objective of winning the Congress for The Netherlands was to strengthen the position of Engineering Geology within our own country.

David Price
Chairman Science Committee

BOOK REVIEW

Modelling of Mine Structures.
A. Kidibinski and M. Kwasniewski, editors.
A.A. Balkema, Rotterdam.
Price: HFL 125,--

Proceedings of the 10th plenary scientific session of the international bureau of strata mechanics/world mining congress/Stockholm.
4 June 1987.

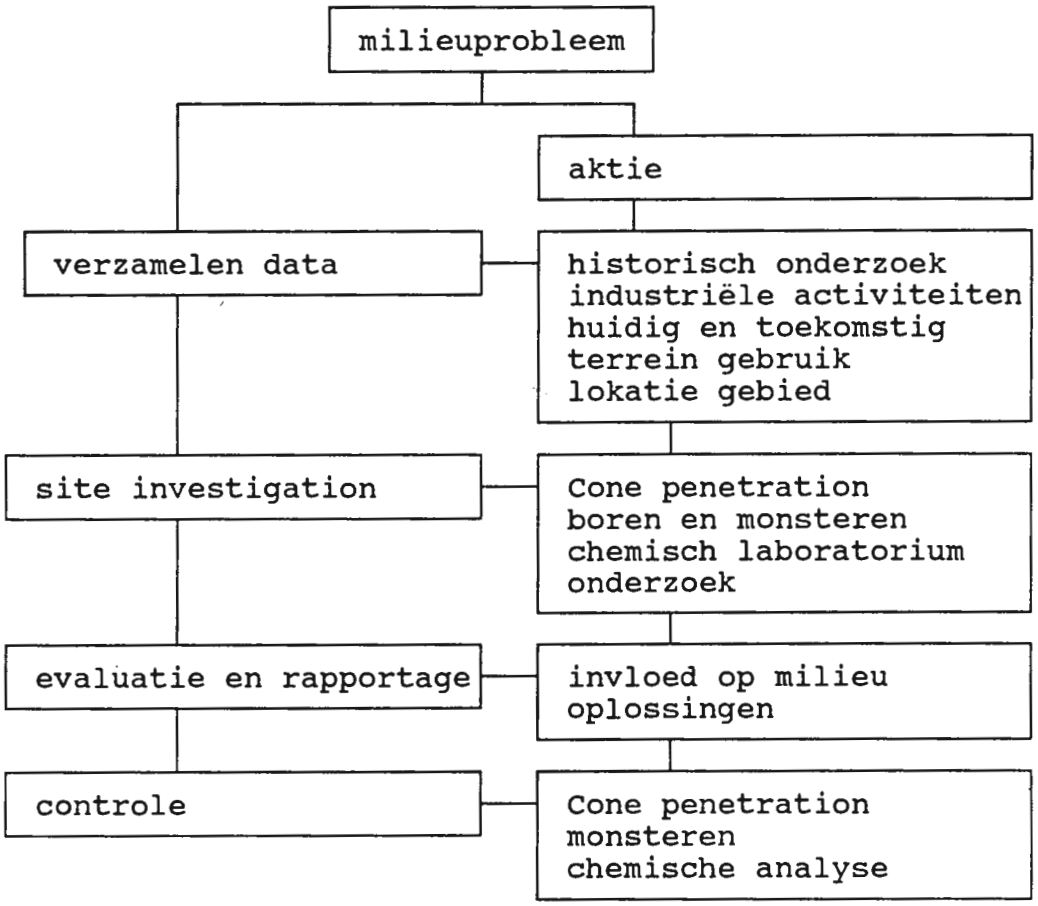
This book is a collection of 22 papers, written by a total of 46 authors from 11 different countries from all over the world. It is remarkable to observe the international character of rock mechanics research. From reading the book (the papers are pleasantly to read), it becomes clear how wide the field of rock mechanics is.
The book cannot be regarded as a complete overview of the topic, it is dealing with. This is of course impossible if one realises the broadness of the field. There is a wide range of shapes of excavations (open pits, tunnels, pillars, longwalls, caverns), a wide range of material properties to be considered (elastic, plastic, failure, softening, time dependence, temperature dependence) and a wide range of phenomena that can play a role (tunnel or longwall progress, instability, rockburst, support-rock-interaction, effects of fluids or gasses). The number of combinations will soon be infinite.
Nevertheless the book gives a fine collection of studies of such combinations. The separation into three parts (fundamentals, modelling and applications) seems somewhat odd. In most cases, the papers deal with, the papers are a combination of these aspects.
There are some topics in rock mechanics that become more important nowadays. Strain softening is a complicated material property causing stress-redistributions. Its understanding and application is gradually improving. It appears in 8 of the 22 papers.
The possibilities of numerical modelling (mainly the finite element method) are steadily improving. Nevertheless physical modelling is often used to study certain problems and for comparisons. Physical modelling appears in 4 of the papers.
Acoustic (or seismic) phenomena and measurements are playing a growing role in rock mechanics studies. Two papers deal with this topic and it is shortly mentioned in several others.

ir. W. Kamp.
TU Delft.

Milieu en onderzoeksmethoden

A.R.G. van de Wall, F. Bisschop

De laatste tien jaren wordt men overal ter wereld geconfronteerd met bodemverontreiniging. In figuur 1 is een diagram gegeven hoe dergelijke problemen kunnen worden geïdentificeerd en aangepakt.



De nieuwe ontwikkelingen in de techniek doen de vraag rijzen of voor het onderzoek mogelijk ook geofysische methoden kunnen worden toegepast. Men denke hierbij aan georadar, weerstandsmetingen, logapparatuur, etc.
Om hier wat meer van te weten te komen werd een bezoek gebracht aan Gemeentewerken Rotterdam, afdeling Geotechniek en Milieu. Er werd gesproken met Ir. J.G. de Gijt.
Deze afdeling houdt zich onder andere bezig met het identificeren en kwantificeren van bodem verontreinigingen rond Rotterdam. Eveneens geven zij advies en ondersteuning bij het -indien noodzakelijk- saneringsproces. Het gebruik van geofysische methoden is niet zonder meer als goed of niet goed te definieren. Het grote probleem is dat de resultaten gecorreleerd moeten worden en dat zij geen antwoord geven over de vraag wat voor soort vervuiling aanwezig is.
Het gebruik van de georadar zal in Rotterdam weinig of geen zin hebben. Dit doordat de stad aan zee ligt en er derhalve niet alleen zoet water aanwezig is maar ook zout. In zout water is de georadar van generlei waarde daar de ionen concenrtratie zeer hoog is en derhalve ook de geleiding. Op deze geleiding berust juist de

herkenning van de verschillende lagen en hun eigenschappen. Bovendien bestaat de bovenste laag meestal uit veen wat een sterke absorberende werking heeft. Georadar wordt door dit bedrijf dan ook niet gebruikt. De voornaamste toepassing ligt in het opsporen van ondiepe vaten gif en dergelijke.
Het gebruik van weerstandsmetingen kunnen weliswaar anomalieën in de grond identificeren, maar het grote probleem zit in de verwerking van de meetresultaten. De meetresultaten geven geen direkte antwoorden, zij moeten worden toegepast op theoretisch opgestelde modellen die zij dan wel of niet ondersteunen. Deze methode gebaseerd op de concentratie van ionen in het grondwater heeft dus te leiden van vele invloeden die niet direkt met vervuiling verband houden. Voor toepassing zou onderzoek moeten worden verricht naar de geleidbaarheid van de verontreiniging en de variaties daarin, de geleidbaarheid van het grondwater en de verdeling ervan in de grond. Vervolgens zou het theoretisch mogelijk zijn de omvang van de verontreiniging vast te stellen door de geleidbaarheid van vervuilde en niet-vervuilde grond te vergelijken. Daar deze methode een grote massa behandeld is het van belang de juiste stratigrafie te kennen. Zelfs al zou dit alles gedaan worden dan zou de interpretatie uitermate discutabel blijven.
Het gebruik van de 'electric cone penetrometer' zou dit probleem deels worden opgelost daar deze over een veel kleiner gebiedje meet. Het probleem van de stratigrafie-invloed wordt op deze manier omzeild. Echter, ook deze resultaten zijn niet bepaald eenduidig. Bovendien is het gebruik van deze apparatuur kostbaar. Dezelfde vaagheid treedt op bij het gebruik van een penetrometer met thermometer. De penetrometer heeft zijn voornaamste nut in het orienterend onderzoek naar de omvang van de vervuiling en in de controle achteraf.
Voor het gebruik van log apparatuur moet een gat worden geboord en op dat moment is het meer zinvol monsters te nemen dan via metingen er achter te komen wat er in de grond zit.

Uit het voorgaande mag blijken dat aan het gebruik van geofysische methoden voor het opsporen en identificeren van verontreinigingen nogal wat haken en ogen zitten. Het boren van gaten voor onderzoek zal derhalve voorlopig nog niet van het toneel verdwijnen.

Het saneren van de grond is in Nederland op het ogenblik nog niet zover. Meestal wordt de grond geïsoleerd of afgegraven en ergens anders opgeslagen. Voorbeeld is de Slurfter in de Botlek. Dit is echter geen oplossing doch slechts een verplaatsing van het probleem.
In Delft doet dr. Ir. van de Hoeven onderzoek naar het neutraliseren van schadelijke stoffen door middel van elektrolyse.(cadmium, kwik, fosfaten, etc.). Hierbij worden door elektochemische reakties onoplosbare verbindingen gevormd.

In het volgende nummer van de Ingeokring zal verder op dit onderzoek worden ingegaan.

OPROEP

De redaktie wil alle lezers er op attent maken dat artikelen ten alle tijden welkom zijn op het onderstaand adres. Vooral artikelen over actuele zaken of ervaringen worden op prijs gesteld.

REDAKTIE INGEOKRING

** NB Kopy bij voorkeur inleveren op floppy, in WordPerfect of ASCII.

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Telefoon: 015-782543

Book Review

"Geomechanics in Tropical Soils"

Proceedings of the second international conference on geomechanics in tropical soils, Singapore, 12 - 14 December 1988. Volume 1. Balkema, Rotterdam. Price: Hfl 195,- (2 vol.)

The interest for the geotechnical properties and problems of tropical soils has increased in recent years. Since 1985 the International Society for Soil Mechanics and Foundation Engineering has a Technical Committee on Tropical and Residual Soils. Its second conference was organized in 1988. Volume 1 of the proceedings contains 58 submitted papers, which are evenly distributed among the following session headings:

1. Characterisation, identification and classification of soils
2. Engineering properties of tropical soils
3. Stability of slopes and excavations in tropical soils
4. Foundations of buildings in tropical soils
5. Construction of dams, roads, airfields, harbours, land reclamation in or on tropical soils.

Many contributions dealt with identification and classification. The well known author on laterite soils Gidigasu (Building Research Institute, Ghana) favors an "engineering pedological" approach of site investigation, whereby the soil is studied from a knowledge of all factors involved in soil formation (parent rocks, geological and geomorphological setting and history, soil forming process, climate etc. etc.). A site investigation method involving terrain analysis and classification is described to assess subsoil conditions. On the site "tropical soils engineering" should consider the soil profile as the important unit. Gidigasu states that Europian and North American engineers are not the first to go to for expertise on these matters, since their experience is mainly in the geotechnics of temperate soils and: "temperate soils standards are framed to suit temperate materials and soils and that a new form of tailoring may be necessary for the tropical and subtropical materials and soils". Irfan (Geotechnical Control Office, Hong Kong) gives an interesting paper on fabric variability and index testing of granitic saprolite. He further applied methods developed by him and Prof. Dearman to assess weathering grade using microscopic information, showing the important influence of mineralogy and microcopic texture on engineering properties. Vargas (Themag Engenharia Ltd, Sao Paolo, Brazil) and Wesley (University of Auckland, New Zealand) independently show the usefulness of Atterberg limits and the Casagrande AC diagram in classifying residual soils. Vargas, however, states that it is necessary that the fine grained soil groups are sub-divided to include clay mineral type and mineralogical nature of the clay fraction.

Most contributions are a clear illustration of the very special geotechnical problems that occur in tropical areas. The book contains many case studies or test programs carried out on mainly residual soils. Several papers report data of numerous engineering tests on specific tropical soil types and are valuable just for that reason. Of course most are concerned with residual soils, but also papers are included on engineering properties of soil materials, especially lateritic types, used in constructions. In the book also a paper by Sweere, Galjaard and Tjong Tjin Joe

(Road Engineering, Delft University of Technology) is included on the engineering behaviour of laterite soils in Surinam roads. A conclusion of their paper, namely the positive influence of soil suction on the performance of poorly graded laterite road foundations, is reitterated by the editors in their preface. Many presented papers illustrate the influence of negative pore pressure and cementation on the strength of residual soils and of weathered rocks. Also case histories are presented showing the importance of soil structure, including inhereted joint patterns in saprolites, on permeability and soil mass strength. This book is a valuable source of information on the geotechnical behaviour of soils in tropical areas.

Landslides: Extent and Economic Significance

Proceedings of the 28th International Geological Congress: Symposium on landslides. Washington D.C., 17 July 1989. Edited by Earl E. Brabb and Betty L. Harrod. Balkema, Rotterdam, 385 pp. Hfl 143,10.

This book contains a number of papers describing the extent and economic significance of landslides for a number of regions and large countries in the world. The organisers of the Symposium had invited 64 authors and provided them with an outline of the type of information wanted. 36 of the invitees managed to deliver their work in time for publication. Many of the papers are remarkably comprehensive and give information on location, (historical) occurrences, hazards and estimations of casualities and costs. Some papers cover really huge areas, like Canada, United States, China, Central Europe, Central and Southern Andes. The purpose of the work was to provide society (and governments) with information on the importance and economic significance of the landslide hazard. The book is a welcome preparation of the organisation of the natural disaster decade of the United Nations.

In France (paper by Flageolet) in 1982 a legislation on natural disasters, including landslide hazard, was accepted certainly thanks to the role of the well known volcanologist Haroun Tazieff in the French socialist government. In this legislation hazard prevention is considered a duty of the state; protection against natural hazards is a right for all French citizens. In France insurance companies must cover natural disasters for a premium which amounts to 9% of the prime rate for fire and theft. A disaster is declared by a ministerial commission in which insurance representatives play an important role. Building is forbidden or controlled in dangerous zones. These zones are defined on large scale maps (so-called Plans d'Exposition aux Risques (PER). The 1982 law requires State Agencies to make these maps. I think this approach is favoured by a large majority of earth scientists! May be less so by insurance companies, which lost large sums of money due to natural disasters (wind, hail, and snow) occurring excessively in 1982, 1983 and 1984 in France.

P.N.W. Verhoef

Conferences, Seminars and Symposia:

1990:

2- 6 April **3rd International Symposium on Pressuremeter.**
Oxford, UK.
Topics: pressuremeter technology; analysis and interpretation; applications in geotechnical design.
Dr. G.T. Houlsby, Secretary Organising committee, Dept. of Engeneering sience, Parks Rd., Oxford OX1 3PJ. UK.
tel: 0865 273162

Medio April **Ondergrondse werken en Aardwetenschappen.**
Delft, the Netherlands
Dispuut Ingenieursgeologie, T.U. Delft
Mijnbouwstraat 128, 2628 RX Delft, the Netherlands.
tel: 015-784751

14-18 May **14th World Mining Congress and Exhibition.**
Beijing, China.
Topics: Mining for the Future; Trends and Expectations.
Chinese Organizing Committee of the 14th World Mining Congress, 54 Sanlihe Road, Beijing, China.

28- 1 June **4th International Conference on Geotextiles and Geomembranes.**
The Hague, Netherlands.
Topics: Bank and bed protection; Soil reinforcement; Properties and testing; Unsolved problems; Roads and runways; Drainage; Special applications; Environmental control; Reservoirs; Irrigation.
Secretariat of 4th Geotextiles Conf. c/o Holland Organising Centre, Lange Voorhout 16, 2514 EE the hague, the Netherlands,
tel: 031-70657850

4- 6 June **ISRM Regional Conference on Rockjoints.**
Loen, Western Norway.
Topics: Characterization of joints, Mechanical hydraulic, dynamic and coupled behaviour; Constitutive models.
Dr Nick Barton, N.G.I., P.O.box 40 Taasen, N-0801 Oslo 8, Norway.

10-13 June **2nd Symposium on Strait Crossings.**
Trondheim, Norway.
Topics: Technology; Safety and Traffic Operation; Social and Economic Effects.
Strait Crossings, Att: Mr. Vidar E. Storvik, Norwegian Society of Chartered Engineers, Kronprinsensgr. 17, N-0251 Oslo 2, Norway.

18-20 June **ASCE Special Conference on Design and Performance of Earth retaining Structures.**
Ithaca, NY, USA.
Topics: Wall selection and performance; Mechanically stabilised systems; In-Situ walls, Waterfront retaining structures; Contracting practice; Gravity walls.
Dr. Phillip Lambe, Dept. of Civil Engeneering, N-Carolina State University, Campus box 7908, Raleigh, NC 27695, USA.

6-10 August **6th International Congress of the IAEG.**
Amsterdam, the Netherlands.
Topics: Engineering Geological Mapping and Site Investigation; Remote Sensing and Geophysical Techniques; Hydro-Engineering Geology; Surface Engineering Geology; Underground Engineering Geology; Engineering Geology of Land and Marine Hydraulic Structures; Construction Materials.
Dr. L. Primel, Secretary General IAEG, Laboratoire Central des Ponts et Chausees, 58 Boulevard Lefebre, 75732 Paris Cedex 15, France.

3- 7 Sept. **Tunnels and Underground Works.**
Chengdu, China.
Topics: Design and Construction of Railway Tunnels; Design and Construction of Metro and Urban Underground Works; Design and Construction of Hydro Tunnels; Rock Caverns for Storage; Use of Numerical Methods in the Tunnel Design.
Secretariate CCES, P.O. Box 2500, Bai Wan Zhuang, Feljing, China.

1991:

27- 1 June **10th European Regional Conference.**
Florence, Italy.
Topics: Deformation of Soils and Displacement of Structures.
Ing. G. Baldi, Secretary, Associazione Geotechnica Italiana, Viale Regina Margherita 183, 00198 Roma, Italy.

27- 1 June **9th Asian Regional Conference.**
Bangkok, thailand.
Prof. A.S. Balasubramaniam, Secretary, South East Asia Geotechnical Society, Asian Institute of Technology, P.O. Box 2754, Bangkok 10501, thailand.

26-30 August **9th Pan Am Regional Conference.**
Santiago, Chile.
Mr. Luis Valenzuela, Secretary, SOCHIMSYF, San Martin 352, Santiago, Chile.

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